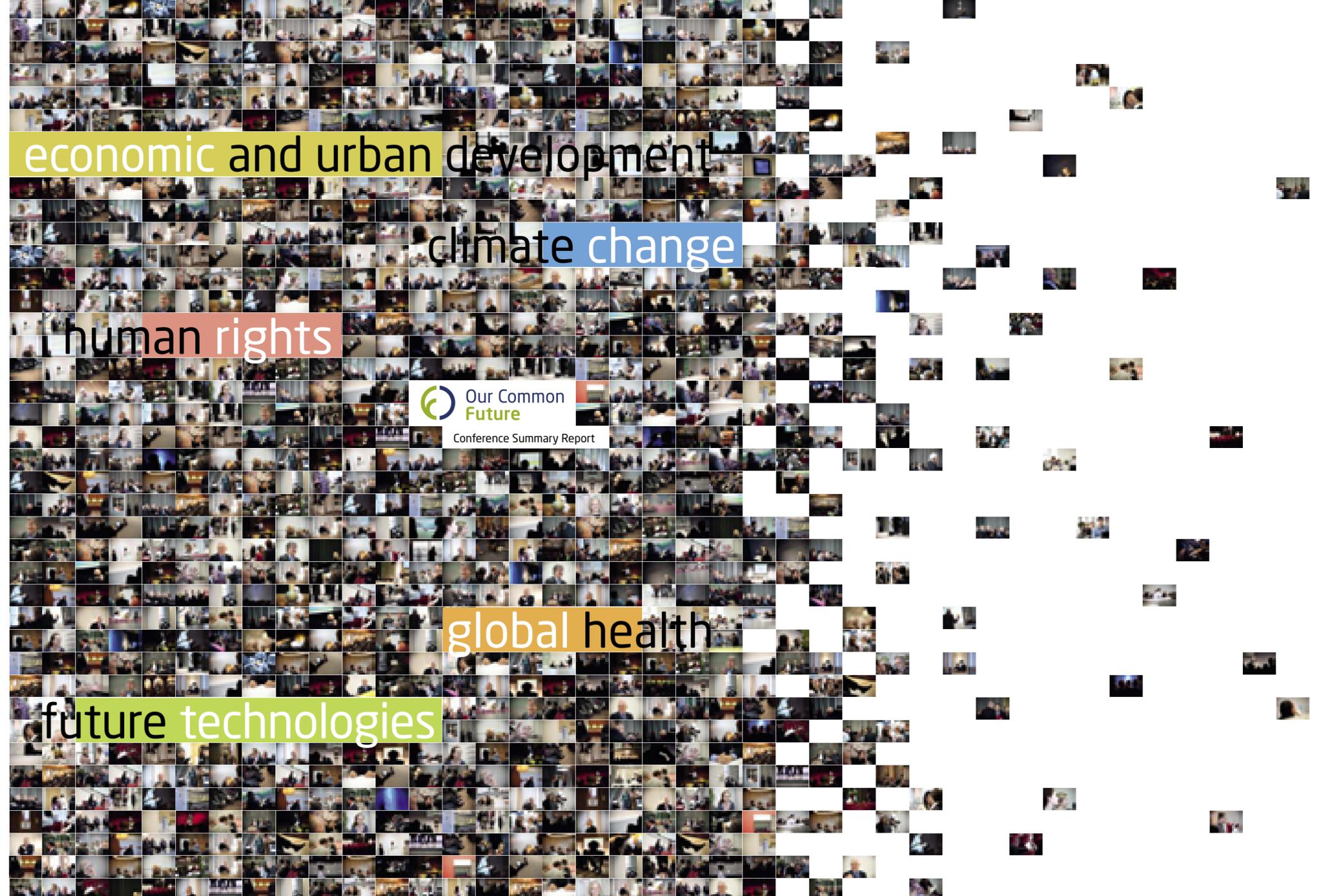


Our Common Future Conference | Hannover · Essen | 2-6 November 2010

Our Common Future Conference Summary Report



economic and urban development

climate change

human rights



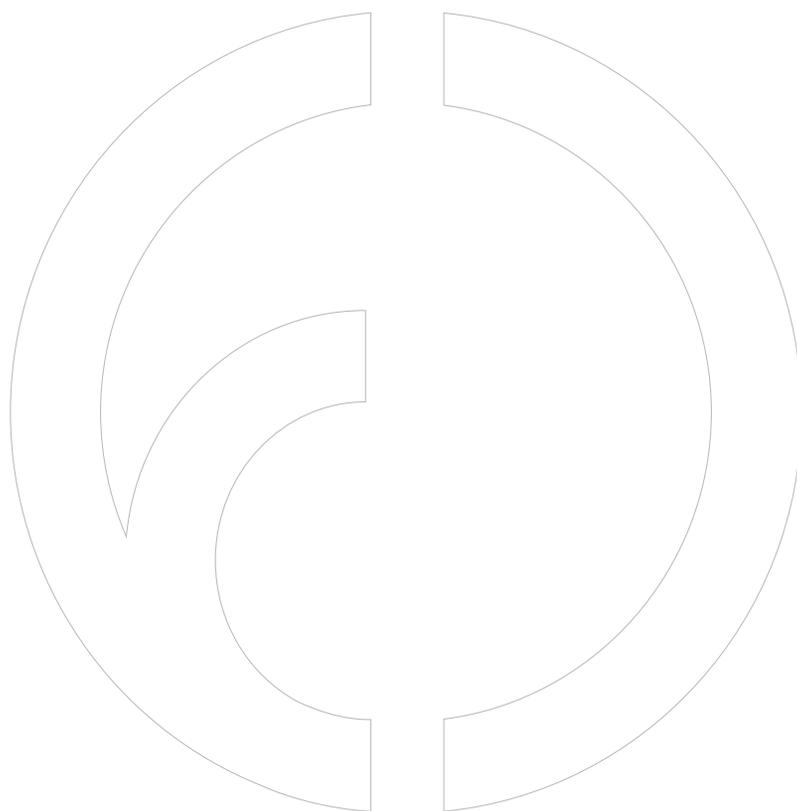
Conference Summary Report

global health

future technologies

Our Common Future

Conference Summary Report



Editorial

DEAR READER,

our globalized world is faced with a multitude of diverse challenges. Natural and man-made catastrophes, climate change, economic crises, global health issues, increasing migration, political systems in transition: The effects that go with them cannot be met by unilateral measures alone. Lasting solutions have to rely on close cooperation with others - beyond the borders of nation-states and academic disciplines.

Hence, in order to advance dialogue on these topics, the VolkswagenStiftung, Deutsche Messe and Stiftung Mercator invited eminent intellectuals from all over the world to a four-day conference held in Hannover and Essen. The event was attended by scientists and scholars, representatives of business and industry, high-court judges and church leaders, and last but not least, a large number of young researchers.

In the course of twelve conference sessions, the participants identified and discussed what they found to be the most pressing issues facing our societies, economies, and the scientific community. In addition, fundamental questions were covered like: What political and economic prerequisites must be fulfilled before the scientific community will be able to make substantial contributions towards resolving future issues on a global scale? What role will international institutions, religious movements, and NGOs play in a future world which is becoming increasingly interconnected? Where in the midst of the grave dangers threatening humankind can we perceive opportunities for action on the part of civil society actors: For individuals and organizations?

It goes without saying that the conference “Our Common Future” did not come up with a comprehensive set of recipes for shaping a just and better future. Nevertheless, it did make an important contribution towards stimulating the international debate and providing tentative suggestions: This is portrayed in this publication. It contains keynote speeches of internationally renowned experts, portraits of passionately committed young academics and their projects, as well as conversations between experts from various spheres of life.

Despite the partially bleak outlook, the conference “Our Common Future” did give cause for some hope. It showed that the scholarly and scientific community, at least, is capable of taking common action across borders and at a global level.



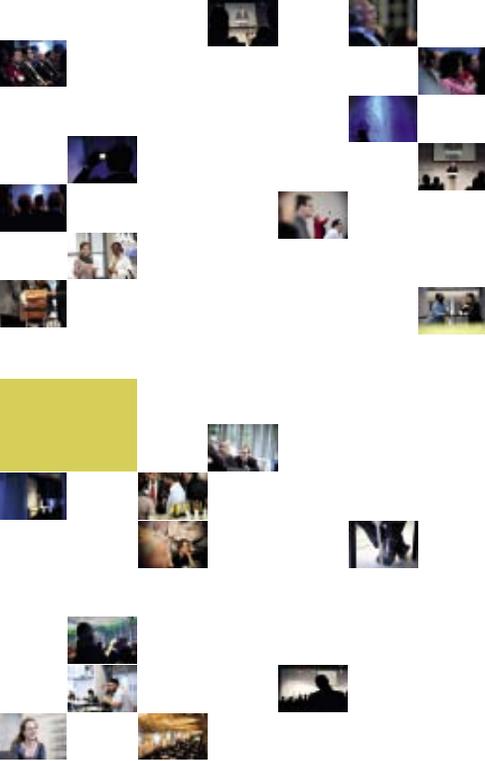
Wilhelm Krull
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About the Conference

- 005
Editorial
- 008
Essay
Closing the Gap
- 012
The Conference
Facing Our Common Future
- 018
Worldwide Science
- 020
Homi K. Bhabha and
Norbert Lammert

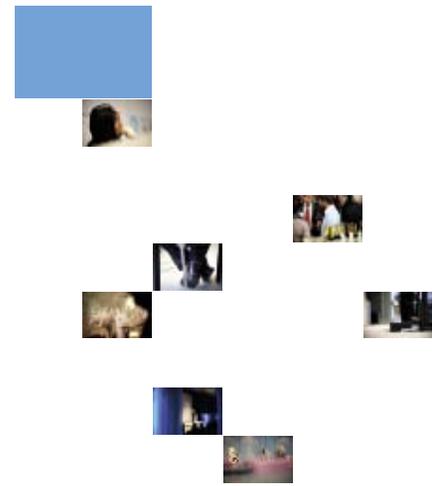
- 174
Impressions
- 188
Hosts and Partners
- 190
Publication Details

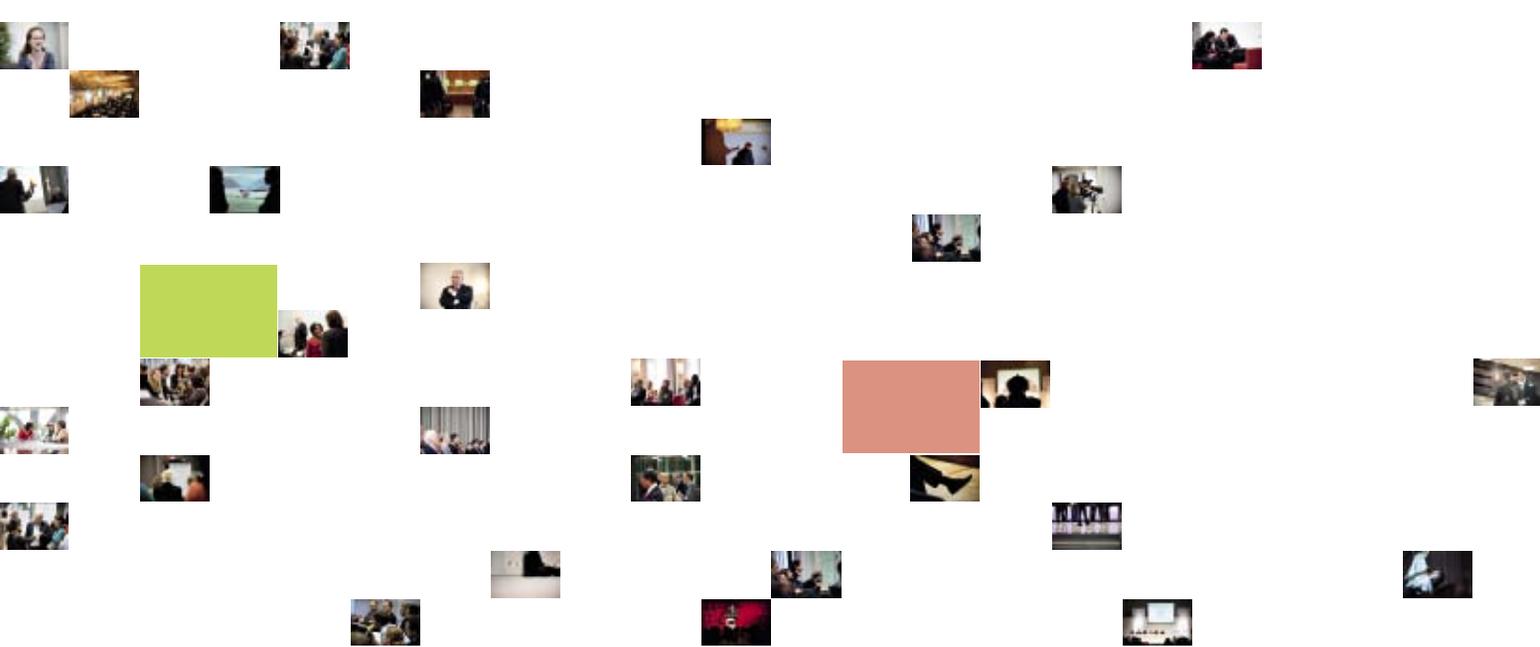
024 Economic and Urban Development

- 028
Paul Collier
Global Development
- 032
Francois Bourguignon
Economic Disparities
- 036
Ananya Roy
Megacities
- 046
Suketu Mehta
Urban Future
- 048
Global Young Faculty Project
Essen/Istanbul
- 050
Deljana Iossifova
Urban Planning
- 051
Nnaemeka Ikegwuonu
Transmitting Development
- 052
Rumin Luo and Ludger Pries
Talking about Migration

056 Global Health and Molecular Medicine

- 060
Colin D. Mathers
Life Expectancy
- 063
Rudi Balling
Big Biology
- 070
Global Young Faculty Project
Equitable Global Health
- 071
Fidele Ntie Kang
Burden of Disease
- 072
Elizabeth Blackburn
Age Limits
- 074
Luis Guachalla, Natalia
Gavrilova and Leonid Gavrilov
Talking about Population Growth
- 077
Constance Walyaro
Educating Peers





080 Climate Change and Energy

- 084**
Ottmar Edenhofer
A New Global Deal
- 088**
Wolfgang Kinzelbach
Resource Allocation
- 092**
Nebojsa Nakicenovic
Green Energy
- 102**
Liadi Mudashiru and Claire
Saunders
Talking about Climate Change
- 105**
James Evans
Green Urban Design
- 106**
Global Young Faculty Project
Facing Climate Change
- 108**
Klaus Töpfer
Climate Governance

112 Future Technologies

- 116**
Justine Cassell
Virtual Communication
- 120**
Daniel Sperling
Postfossil Mobility
- 125**
David Simchi-Levi
Smart Production Management
- 134**
Global Young Faculty Project
Being 3.0
- 136**
Bob Jeffery
Transportation
- 137**
A. Idil Gaziulusoy
Industrial Design
- 138**
Luc de Ferran
The Brazilian Model

142 Human Rights and Global Values

- 146**
Antjie Krog
Reconciliation
- 151**
Steven Vertovec
Crossing Borders
- 154**
Pippa Norris
Society and Secularism
- 164**
Global Young Faculty Project
Interfaith Pavilion
- 166**
Wei Shen
Intellectual Capital
- 167**
Philip Jenkins
Christianity - from South to North
- 168**
Liav Orgad
Integration and Values
- 169**
Ashis Nandy
Embracing Religion
- 170**
Joseph Cardinal Zen Ze-Kiun
Cardinal Values

Closing the Gap

by Andrew Curry

As **humanity** moves into a new millennium, it's important to remember that science and scholarship do not exist in a vacuum.

Prominent thinkers have always worried about humanity's common future. Take Martin Luther King Jr., America's best-known civil rights leader. In 1964, he had just been awarded the Nobel Peace Prize. The world around him was changing fast – not just in terms of society and politics, but in terms of technology as well.

Speaking to an audience in Oslo on a December night, King surveyed the amazing scientific and technological progress made in the two decades since the end of the Second World War with concern. "In spite of these spectacular strides in science and technology, and still unlimited ones to come, something basic is missing," King said. "There is a sort of poverty of the spirit which stands in glaring contrast to our scientific and technological abundance. The richer we have become materially, the poorer we have become morally and spiritually."

Nearly a half-century later, hundreds of scholars and scientists gathered in Hannover and Essen for a four-day conference on Our Common Future (OCF), hoping to address and bridge some of the gaps between science

and society. To be certain, they faced a different world; one where technologies never dreamed of in 1964 now enable us to communicate instantly with people across the globe, carry entire libraries in the palms of our hands, and reach into the very fabric of life to alter organisms to suit our needs and live longer lives.

And yet the gap between our material achievements and our moral ones remains. More than a sixth of the people in this world still live in crushing poverty. Women in many societies remain disenfranchised and subjugated. Preventable diseases like malaria and tuberculosis stalk wide swaths of the globe. Corruption and neglect perpetuate vast inequalities in material wealth. And mankind's drive for material comfort continuously endangers the planet we live on,

research

driving its climate into dangerous disequilibrium.

moral humanity

As humanity moves into a new millennium, it's important to remember that science and scholarship do not exist in a vacuum. Looking up from their lab benches and laptop screens, researchers must ask themselves what should be a troubling question: Is access to the fruits of modern science a human right, or a luxury for the rich and the lucky? Are scholars obliged to engage in public debate, or should they stand apart, acting as no more than neutral advisors to policy makers and politicians? In short, what role should researchers play in solving the world's most pressing problems, like climate change, infectious diseases, and economic inequality?

The answer is far from clear-cut. Many scientists argue that a scholar's job is to do good, unbiased research, providing solid data to policy makers who are then respon-

sible for interpreting and acting upon it. Others eagerly dive into the public debates over the issues of the day and suggest remedies, from global warming to health care. Each camp seems to view the other as suspect – and public opinion on the role of scientists and the impact of their research results is just as divided.

When the public perceives scientists taking an activist role, the backlash can be significant. The recent “Climategate” scandal, in which a group of climate researchers in the UK were accused of massaging data to make a stronger case for global warming, is a classic example of research being attacked for political reasons. Multiple independent reviews deemed the charges unfounded – but the damage was dramatic nonetheless. “A lot of people out there would rather shoot the messenger than change anything in their lives,” says Joachim Schellnhuber, a pre-eminent climate scientist who led one of the OCF conference sessions on Climate Change and Energy.

There's no doubt that in the highly charged debates over our common future that play out in the world's parliaments and

equality

In short,
what role can
researchers
play in solving
the world's
most pressing
problems?

science

responsibility

legislatures, science is often twisted to political ends. But researchers must decide whether that is an argument for abandoning the public realm entirely, or for stepping up and taking vocal and visible positions in advocating for their conclusions.

There is also a need to strike a balance between basic and applied science. Just as pharmaceutical companies have a responsibility to research not only high-profit drugs for the world's wealthy, but also cures for neglected tropical diseases, malaria, and tuberculosis, researchers from all fields should think about how their work can help lift the world's "bottom billion" out of poverty.

Despite many advances, great gaps in technological and basic infrastructures remain. Communications and budget problems hobble researchers in the developing world, for example in drug research, relegating many of the diseases that have the greatest impact on the global South to second place in the race for cures.

Technology for technology's sake may not be the answer. Scientists should be aware of the potential uses of their work, and strive to make their research part of a better common future. The American poet Henry David Thoreau disparaged many of the advances of his day as "improved means to an unimproved end." By the same token, today's scientists should ask whether they have a responsibility to research primarily things that will improve humanity's lot, or whether science is an end in itself.

There's no doubt the fruits of science and technology can be a tremendous force for good when harnessed properly, sometimes beyond all ability to predict what they might one day be good for. Take, for instance, the Web's power to bring people together – embodied most recently by Facebook and Twitter – making it possible for democracy and civil rights activists in the

future

Middle East and North Africa to initiate protest movements that opened

the door for profound change in their societies. Though the results have been decidedly mixed and the dramas are still playing out on the streets of Damascus and in the deserts of Libya, there's no arguing that the situation has changed dramatically.

There's no doubt **the fruits** of science and technology can be a tremendous force for good.

ingenuity

By the same token, access to mobile phones, considered a luxury for the ultra-rich just a few decades ago, has transformed the lives of billions in the developing world by bringing rural areas out of isolation and spreading information about markets to every farmer.

But it's not enough to count on lucky accidents and trickle-down technological applications. Science must be applied in smart, sustainable ways to the problems we face down the road – and the backing of good policy can help. Subsidies for drug research and public outreach could solve many of the basic health problems plaguing Africa and Asia. Renewable energy, supported today by subsidies and tax breaks, can take us into a future without carbon-belching smokestacks and cars. And by consciously nurturing networks of young researchers from around the world through grants and exchange programs, it's possible to forge the scientific alliances of the future today.

policy

Though the future remains unknowable, the overall message of the participants at the OCF conference was positive. Speaker after speaker had the same message: Man has the ability and the ingenuity to make our planet a better place for us all when thorough research is combined with common sense and humanity. What we lack right now is the political will to make hard choices and sacrifices.

In his 1964 speech, King was at once optimistic and wary. “Enlarged material powers spell enlarged peril if there is not proportionate growth of the soul,” King said. “When the ‘without’ of man’s nature subjugates the ‘within,’ dark storm clouds begin to form in the world.” The OCF conference made clear that to reach a common future, people from different walks of life and from different fields of research will have to work together. And while scientific progress by itself can be a dangerous thing, ingenuity and hope are also forces that can make a better world for us all.

Andrew Curry is an American journalist and chief editor of this report.

Man has the ability and the ingenuity to make our planet a better place for us all.

The Conference

Facing Our Common Future

At the beginning of the 21st century, social, environmental, cultural, and technological changes are all happening at an unprecedented pace. The best approach to the challenges posed by this fundamental change is to confront them, develop new concepts and measures, and actively shape the future. Covering five big issues – Global Health and Molecular Medicine, Economic and Urban Development, Climate Change and Energy, Future Technologies as well as Human Rights and Global Values – the Our Common Future conference provided a platform for leading intellectuals, researchers, businesspeople, and politicians as well as a cross-section of young and future leaders to enter into a dialogue, present perspectives, and – last but not least – suggest solutions for the way ahead.



Worldwide Science

Young researchers from all over the world were invited to Hannover and Essen. The marks on the map show where they are pursuing their academic careers.



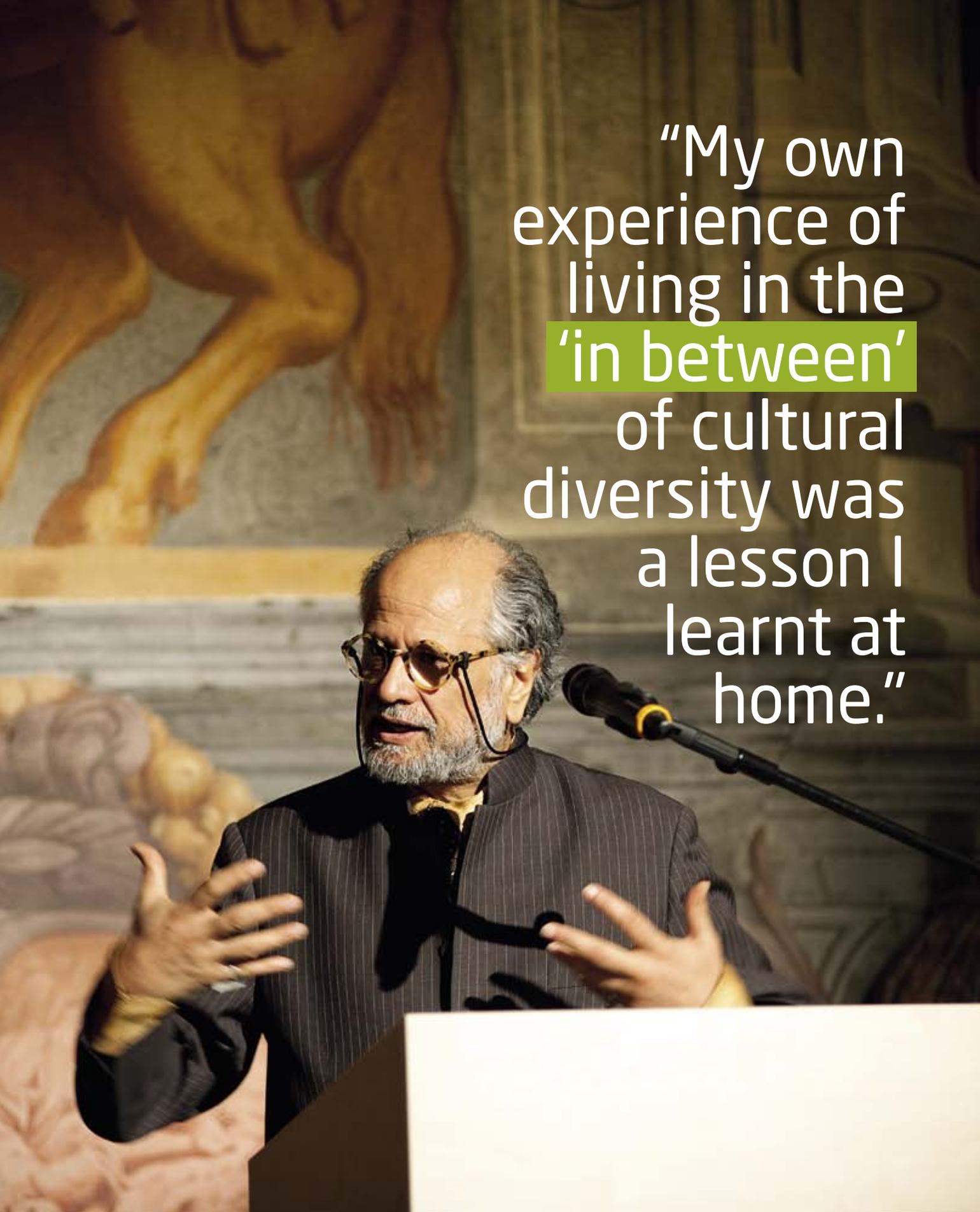
Global Young Faculty

The Global Young Faculty was an interdisciplinary network of around 100 postdoctoral researchers from the German Ruhr region. Funded by Stiftung Mercator, they had the opportunity to present their solutions to the challenges of our globalized world and to collaborate with international experts. Members of the Global Young Faculty worked together in five groups: Climate, Technology, Economics, Health, and Culture and Society. The groups each consisted of 10 to 25 researchers, all with different academic backgrounds and expertise. The Global Young Faculty was an initiative of Stiftung Mercator, coordinated by the Institute for Advanced Study in the Humanities (KWI) in Essen. It was a contribution of these two institutions, the University Alliance Metropolis Ruhr, and the extra-university research institutes to the European Capital of Culture Ruhr.2010. Additional support came from the Ministry of Innovation, Science, Research and Technology of North Rhine-Westphalia. For more, visit: www.global-young-faculty.de



> Our Common Future Fellows 

Global challenges should be approached by bridging different cultures, nations, disciplines, and generations. To this end, the VolkswagenStiftung invited 100 young researchers from all over the world to participate in the conference "Our Common Future." In 2010, these young researchers were given the opportunity to pursue an intensive intellectual exchange with one another and with members of the Global Young Faculty in the lead-up to OCF. During the conference they presented their contributions in workshops and panel discussions. For more, visit: www.ourcommonfuture.de



“My own
experience of
living in the
‘in between’
of cultural
diversity was
a lesson I
learnt at
home.”

Homi K. Bhabha

Homi Bhabha is director of the Humanities Center at Harvard University and delivered the welcome address at the Reception of the City of Hannover for the OCF conference participants at the Gallery in the Royal Herrenhausen Gardens.

Multidimensional Future

“Our common future is not only multicultural, it is also multivocal and multidimensional. And it is a common future that is part of a world that is lived ‘at the limits,’ facing asymmetrical pressures and anachronistic forces. ... Doubt and perplexity are also our common future. We frequently live in the midst of worlds of information and identification that lie ‘in between’ cultures and customs.”

Inter-cultural Interpretation

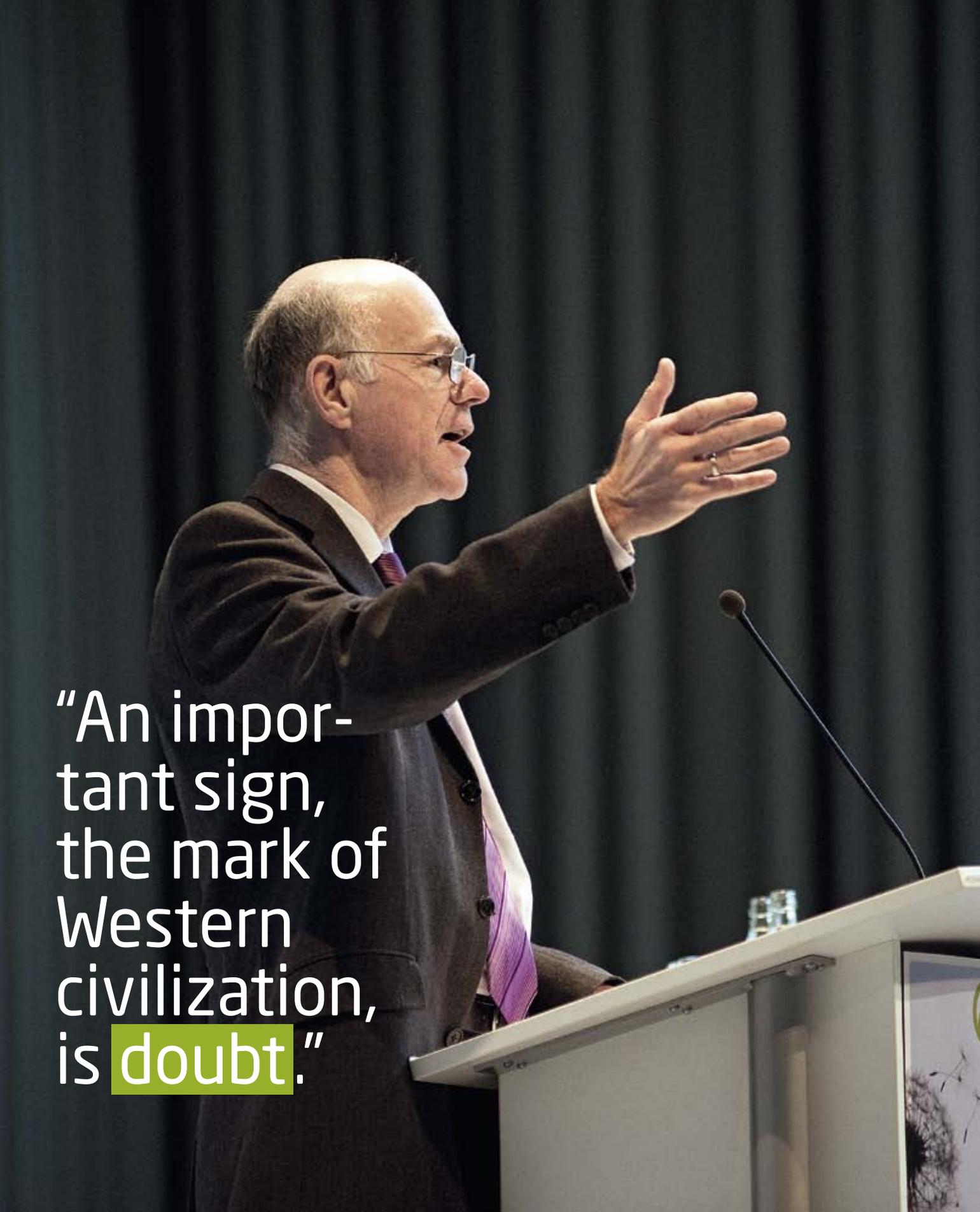
“A renewed sense of civic or civil belonging in a globalized age demands a language of intercultural interpretation as well as the policy-oriented prose of social integration. It must be a language rich in metaphor and imaginative power; a language that evolves towards a sense of consensus or community by being able to sustain the public representation of social conflicts and political contradictions.”

Global Citizens

“Languages of constitutional reform and political rationalism lack a vocabulary that addresses the affective life of global citizens – their sense of public anxiety, ambivalence, uncertainty, indecision – as they ponder choices that emerge inbetween cultures and their varied practices.”

Imagined Communities

“There is a kind of global cosmopolitanism, widely influential now, that configures the planet as a concentric world of national societies extending to global villages Global cosmopolitans ... frequently inhabit ‘imagined communities’ that consist of silicon valleys and software campuses; although, increasingly, they have to face up to the carceral world of call centers and the sweatshops of outsourcing.”

A man with glasses, wearing a dark suit and a purple tie, is speaking at a podium. He has his right hand raised in a gesture. The background is a dark, textured curtain. A microphone is positioned in front of the podium. The text "An important sign, the mark of Western civilization, is doubt." is overlaid on the left side of the image, with the word "doubt" highlighted in a green box.

“An important sign,
the mark of
Western
civilization,
is **doubt.**”

Norbert Lammert

Norbert Lammert has served as President of the German Parliament since 2005. He also teaches political science at the Ruhr-University Bochum. These quotes are drawn from his keynote speech opening the Essen part of the OCF conference.

Responsibility

“The decision on what kind of future we want isn’t a question for science alone. Rather, it’s a question for us all – for scientists, politicians, economists, and engineers alike. No one has plausible grounds for claiming such decisions for themselves, just as no one has a right to abandon their share of the responsibility.”

Evolution

“One of the obvious changes that define the time in which we live is that the modern world has increasingly taken charge of its own evolution. The natural structures of our world are in decline, while the artificial ones are on the rise. Whether that’s progress on the part of mankind or whether it’s the biggest threat the world has ever seen is by no means merely an interesting philosophical issue. It is the very concrete question of what our common future will be like.”

Diversity

“A free society can never be free of conflicts. Conflicts are the inevitable, predictable cost of a society’s freedom. But a society can only afford conflicts if a consensus exists on the rules governing how they should be handled. And without a minimal amount of consensus, without a minimum of common beliefs and principles, a society is also unable to cope with diversity.”

Truth

“The futility of any attempt to find a conclusive answer to the question ‘What is the truth?’ is, in fact, the prerequisite for democracy. The logical prerequisite for the central principle of democratic decision-making – namely, majority voting – is that no claim is made to absolute truth, or at least that claims to absolute truth are not accepted as a justification for decisions. You can’t vote on the truth.”

Doubt

“One important aspect of Western civilization, in my view – indeed, its hallmark – is doubt. Since the days of the Enlightenment, doubt has placed a question mark instead of an exclamation point behind every claim to a supposedly absolute, eternal truth.”

"Homo sapiens
has become an **urban**
species."

Suketu Mehta

Economic and Urban Development

Introduction

► A billion people on the Earth still live in poverty while a small segment of the world's population enjoys relative luxury and wealth. But in the middle, surprising things are happening. Contrary to the doom-and-gloom headlines, many of the world's developing countries are seeing their fortunes rise – along with the prosperity of their cities. The opportunities and challenges of economic changes for social inclusion around the world were a central subject of discussion at the OCF conference sessions on Economic and Urban Development.

A diverse, counter-intuitive global picture was a key theme. “Everybody from the rich countries thinks the financial crisis was a terrible thing, but for much of the rest of the world, it didn't matter so much,” says Stephan Klasen. The professor of Development Economics and Empirical Economic Research at the University of Göttingen and one of OCF's scientific advisors points out that the Western perspective is too narrow. “We tend to think

everything that happens to us is a global phenomenon, but it's just not true.”

Klasen points to Africa as a prime example of a region standing in stark contrast to some of its lagging trading partners. In Africa, the world's demand for natural resources has yielded ten years of growth. “Africa came through the economic crisis very well,” says Klasen. “It is still unclear whether this is sustainable, but things in Africa look better than they have for decades.” Workshop participants from developing countries also stressed that leveraging that precarious prosperity using well-thought-out development strategies that account for local culture will be critical to maintaining the trend.

A key feature of the societies of the future is the city. “Mankind has entered the urban age,” says Volker Kreibich, a former professor of Spatial Planning in Developing Countries at the University of Dortmund and the scientific advisor for the OCF Metropolis

session. “For the first time in history the majority of the human population on planet earth is living in urban settlements.”

OCF participants argued that this phenomenon will increasingly define different domains of our common future as the world's population continues to converge in urban areas: Demographers showed how metropolises are expanding as rural populations move from the country to the city looking for work, while other experts analyzed the megacities' role as the mass dream of the global South. Led by scholars from the fields of sociology and urban studies, participants also took a hard look at the growth of slums, and what it might mean for the development of future cities and societies.

The various impacts of this “urban transition,” as Kreibich calls it, make smart urban planning on a sound scientific basis – from efficient and clean public transport to a realistic appraisal of how internal migration works – eminently important. ◀

50%

The reduction in global poverty since 1980.

42,000,000

people will live in one city when China's "Turn The Pearl River Delta Into One" project unites nine large cities into one.

60%

of the world's population will live in cities by 2030.

\$300,000,000,000

Amount of money 150 million migrants sent from the countries where they work to their (developing) home countries in 2006. This total is greater than all the foreign aid and direct investment from rich countries to the developing world that year combined.

2,000,000,000

Number of people living in slums by 2030.

Help for the World's Poorest

“The case for concentrating international attention on the bottom billion has become stronger.”



Paul Collier, CBE is professor of economics and director of the Centre for the Study of African Economies at the University of Oxford, and author of the 2007 book *The Bottom Billion*. From 1998 to 2003, he was director of the Development Research Group of the World Bank.



Poverty is everywhere, but some people – the “bottom billion”, a phrase coined by Oxford economist Paul Collier – are in particularly desperate danger of being left behind for good by rising prosperity. Yet even when the world’s rich muster the will to help, aid efforts are often squandered because of ill-thought-out policy measures and political expediency. In his keynote lecture at the OCF session on Economic Development for Global Inclusion, Collier argued that international development aid must be wielded like a scalpel to target the neediest countries most effectively.

► The period 2000 – 2008 was, in retrospect, a remarkable global boom during which developing countries converged rapidly on the countries of the Organisation for Economic Co-operation and Development, or OECD. Even the countries of the bottom billion took part in this growth, in contrast to the previous two decades during which they had stagnated.

Approximating this group of nations using the official category of “Least Developed Country,” per capita income rose on average by an unprecedented 4 percent per year, and this was reflected in some of the fundamental indicators of well-being: Infant mortality, for example, dropped by around 11 percent. Consistent with these improvements in outcomes, measures of governance also advanced: The average score on the widely used International Country Risk Guide (ICRG), a measure of risk to investors in 150 different world economies, improved by nearly 4.5 points.

However, despite this absolute progress, the bottom billion continued to diverge from the rest of mankind. In countries above the bottom billion line, per capita income rose faster, by over 5 percent per year, so that the income differential between them and the world’s poorest countries widened. In absolute terms, per capita income in the bottom billion rose by just under \$100, whereas in other developing countries it rose by

over \$600. Similarly, in other developing countries infant mortality dropped even more rapidly, by an astonishing 18 percent. Similarly, in terms of governance, while the bottom billion advanced absolutely on the ICRG measure, they did not succeed in closing the gap with other developing countries.

Indeed, since the turn of the millennium the case for concentrating on international attention on the bottom billion has become stronger. China and India have demonstrated that their spectacular growth is robust. The Asian crisis which beset some other major emerging market economies such as Indonesia proved to be temporary. Brazil finally began to achieve the promise it had long failed to harness. Meanwhile, the international community demonstrated repeatedly and embarrassingly that effective international cooperation on any objective is extremely difficult. We should learn from this to economize on the tasks that we place before it. Of course, there remain many poor people in India, China, Indonesia, Brazil, and the other emerging market economies. Were we to be guided by the composition of the annual global poverty headcount, international development efforts would be widely (and hopelessly) dispersed. Poverty needs to be seen in a dynamic context: The children of poor households in China have credible hope of a transformed life, whereas the children of similarly poor households in Chad do not. The case for international intervention also needs to be seen in the context of the scope for domestic strategies of poverty reduction. Middle-income societies have the option of reducing extreme absolute poverty through redistribution, and this choice is essentially a matter for each society itself to resolve. Low-income societies do not have this option: Equitable redistribution would simply leave everyone poor, and so it is in these societies that international assistance is warranted.

I would like to suggest an agenda for assisting the countries of the bottom billion, focused on new opportunities arising from recent changes in the world economy. The most important opportunity will be the

surge in extraction of natural resources from their territories: The scale of the financial flows will be without historical precedent. However, this will pose huge challenges of economic governance. A second opportunity is the consequence of the rapid rise of the middle-income developing economies as industrial powers. As skills and wages rise rapidly in these countries, there may be “room at the bottom” for some of the poorest countries to break into global markets for labor-intensive manufactures such as garments. The crisis in the OECD has worsened prospects for conventional development assistance but opened prospects for more commercial forms of finance. Finally, I will discuss how the bottom billion might access new forms of international finance.

Natural Resource Exploitation

The countries of the bottom billion have long been heavily dependent upon natural resource exports. This is both a problem and an opportunity. It is a problem because natural resource extraction does not directly employ many people and so has only limited direct impact on the incomes and well-being of ordinary citizens. Indeed, resource extraction may foreclose opportunities for industrialization that would have stronger transmission mechanisms for poverty reduction. Further, revenues are volatile, making macroeconomic management difficult and increasing the need for social protection.

Natural resource exploitation is, however, increasingly becoming an opportunity. High commodity prices increase the rents on resource extraction more than proportionately. In addition to this direct effect, high prices induce discovery. Until recently, there has been much less prospecting in the bottom billion than in the richer countries. As of 2000, beneath the typical square kilometer of the bottom billion countries, only one-quarter of the subsoil assets had been found compared to the typical square kilometer of the OECD countries. This is not because less is there, but because there has been less investment in prospecting by resource extraction companies.

Over the next decade, the extraction of natural resources from Least Developed Countries (LDCs) is likely to expand both in value and in volume. It is a unique opportunity for LDCs, but the history of resource extraction is not encouraging: Harnessing the opportunity requires a capacity to resist pressures of both corruption and populism. Primarily, the problems and opportunities call for distinctive domestic policies by the governments of the bottom billion. However, some actions of the international community can also be helpful, like international financing of prospecting and other geological information, OECD initiatives against corporate corruption, and international standards for companies extracting mineral and other resources from LDCs.

The fight against corporate corruption can start in the OECD countries themselves. Governments are dependent upon individual officials and ministers to negotiate deals with resource extraction companies. Companies can gain immensely by bribing these individuals. This gives rise to an “agency problem” for the societies of the bottom billion. While widely recognized, to date it

“The fight against corporate corruption can start in the OECD countries themselves.”

has been addressed by a variety of ad hoc international initiatives. One such is the Extractive Industries Transparency Initiative, started in 2003 and now with over thirty signatories among the governments of resource-rich countries, indicating concern for the problem. It aims to counter corruption in contracts by requiring companies engaged in resource extraction to report all their payments, country by country; thereby forcing illicit payments into the open. Another initiative has been the pan-OECD anti-bribery legislation which has made it a criminal offense for an OECD-based company to bribe government officials anywhere in the world in order to win a contract.

One consequence of this OECD legislation has been the rapid emergence of a two-

stage system of negotiations for the rights to resource extraction. In the first stage, a company which is either too small to face scrutiny, or not OECD-based, negotiates with the respective government. In the second stage, this company sells on the rights to a major OECD company that has the technology and finance to undertake exploitation. A third and related international initiative has been to coordinate the laws relating to money laundering, and a fourth initiative has been the Kimberley Process, which has curtailed illegal international transactions in diamonds through certification of the source of origin. The government of Nigeria has recently proposed that an equivalent system of certification be put into place to curtail the large-scale theft of crude oil from the Nigerian Delta. The latest initiative is the Lugar-Cardin Amendment, now enacted into US law, whereby all companies listed on the New York stock market engaged in resource extraction must report all payments made associated with contracts in considerable detail. Potentially, such legislation could so discourage the major companies from entering into prospecting contracts with the governments of the bottom billion, and that the only companies left as partners for governments

would be cowboy operations.

Neither the interests of the OECD countries, nor those of the emerging market economies, are the same as the interests of the LDCs; nor are the available models of OECD “best-practice” particularly appropriate for LDCs: They need norms and standards appropriate for their own circumstances. These are now provided by the Extractive Industries Transparency Initiative (EITI), and the Natural Resource Charter. The EITI is a multi-stakeholder international organization that focuses exclusively on the transparency of revenues. Currently around 30 governments are using it as a commitment technology. The Natural Resource Charter is an information guide on the decisions involved in harnessing natural

resources for development. It sets out the entire decision chain involved in harnessing natural resources for development on a Web site (www.naturalresourcecharter.org) intended for governments, citizens and companies. Its 12 precepts propose standards for resource extraction companies, the governments of the countries which are home to such companies, and the governments of the countries in which resources are extracted.

The Challenge of Diversification

Trade preferences for LDCs continue to be part of the world trading system. Under the Generalised System of Preferences, LDCs have access to most OECD markets, and historical ties have been recognized in schemes such as the EU’s Lomé and Cotonou agreements. Recent years have seen several extensions of preference schemes. The EU’s Everything but Arms scheme, initiated in 2001, gave duty-free access to LDCs in (almost) all products. The United States introduced the African Growth and Opportunities Act in 2000, improving market access for eligible sub-Saharan African countries. The United States also operates the Caribbean Basin Initiative and the Andean Trade Promotion Act.

These schemes have two main elements. One is the trade preference – the granting of market access at reduced tariff rates and with less restrictive quotas, possibly going all the way to duty and quota-free market access. The other is the constraints on participation. These define eligible countries and products, and also impose rules of origin (ROOs). There has frequently been a tension between these elements, with the constraints severely reducing the effectiveness of preferences as an instrument of economic development. These constraints are likely to be particularly important for manufactured products, and redesign of preferences is needed if they are to facilitate developing country participation in a globalized world trading system.

The importance of manufacturing and other modern sector exports to the wider process of economic growth is now supported by a good deal of evidence. The Asian

experience is well documented, and a number of recent studies point to the role of exports in growth accelerations. Another showed that particular growth accelerations are associated with an average 13 percentage point increase in the share of trade in income (over a 5-year period) as well as an acceleration of the rate of transfer of labor into manufacturing. Another study points to the association between growth accelerations and trade growth in sub-Saharan Africa.

How can trade preferences be designed to maximize their effectiveness in stimulating a manufacturing supply response? Manufacturing supply response is not a simple matter of moving up a supply curve, but depends on a wide range of complementary inputs, some of which can be imported and some of which have to be developed domestically, often involving increasing returns to scale. Trade preferences can have a catalytic role, but will only perform this role if they are designed to allow import of complementary inputs, and to operate in countries with the skills and infrastructure to be near the threshold of global manufacturing competitiveness.

For the bottom billion, to diversify their exports into manufacturing may require a catalyst to create clusters of activity and lift them to threshold productivity levels. Forty years of African domestic protectionism have failed to induce such clusters. However, the evidence suggests that – given the right conditions – it is possible for African countries to accelerate their modern sector export growth in sectors like the apparel and textile industries. Designing policy to promote such growth requires recognition of a number of features of modern global trade; fragmentation, increasing returns, and the consequent “lumpiness” of development. Domestic policy and international policy are complements. Domestic policy needs to ensure a good business environment and infrastructure, but this can be spatially concentrated. International policy needs to redesign trading arrangements with rules of origin that do not penalize narrow specialization.

The experience of trade preferences has demonstrated that they are largely ineffective as devices for transferring income (“rents”) to poor countries. For this purpose alone, they are simply not worth prioritizing as an objective. However, the experience has also demonstrated that as devices for pump-priming the entry of a country into global manufacturing, in particular the manufacture of apparel, they can be useful.

The Challenge of Declining Aid

Until recently, the only financing for government permitted to the bottom billion was overseas development aid, or ODA. The prospects for aggregate ODA are not encouraging: Unprecedented fiscal pressures in OECD countries are reducing aid budgets. There is a need both to sharpen the focus of ODA onto the bottom billion, and to look to alternatives.

Given that the prospects for total aid are discouraging, a sensible strategy for the governments of the bottom billion is to focus attention on its allocation. While the ostensible rationale for aid is to address poverty, most aid goes to other developing countries. Indeed, large aid flows are going to middle-income countries that are already growing rapidly. If aid were focused on the bottom billion it would permit a major expansion in the aid flow to them without requiring any increase in OECD aid budgets. As the category of “emerging market economy” expands, it is important that these countries cease to be aid recipients so that aid can be concentrated on those countries that really need it.

There are a few ways to address this problem. International Monetary Fund programs explicitly require governments of the bottom billion not to borrow commercially. However, this condition is now being rethought. This will open up options for financing. One approach might be for the World Bank to create an International Bank of Reconstruction and Development (IBRD) – like a club of borrowers designed for low-income countries with reasonable economic governance. When the IBRD was created it was designed for countries that

were not so different from where such low-income countries are today. Over the years, the IBRD club has, in effect, collectively moved up. In the process its members have become less risky and so are now able individually to borrow commercially: The IBRD club has become less necessary other than at times of financial crisis. A second approach, which might well be combined with the above, is for the rate of return on the bonds issued by the bottom billion to be linked to some aspect related to their ability to repay. A final link between returns and performance is to move the focus from the national level to the project level.

Investing Competently

The post-boom global economy looks to have some important differences with the half-century since the bottom billion gained independence. As other developing countries rapidly converge on a crisis-ridden OECD, the countries of the bottom billion are becoming increasingly distinctive. The OECD economies are in crisis and so aid is set to decline relative to the Gross Domestic Product of the bottom billion: New types of international finance will need to be developed. However, the most important source of finance is likely to be the money generated by resource extraction. Because other developing countries are growing rapidly, commodity prices are likely to remain high, and this will make the management of natural resources by the governments of the bottom billion critical. If governments can invest this money competently within their own economies, some of them stand a chance of diversifying into light industry. The international community can enhance this opportunity by granting privileged market access to the manufactured products of the bottom billion. ◀

This is a condensed version of a speech given at the OCF conference’s session on Economic Development for Global Inclusion. More can be found at www.ourcommonfuture.de/collier

Reducing Inequality

“There is something new happening in the global economy.”



Francois Bourguignon is the former chief economist at the World Bank and director of the Paris School of Economics.



It's a difficult conundrum: Global inequality is going down overall, the gaps between the world's richest and some of the poorest nations are continuing to grow. Francois Bourguignon, former chief economist at the World Bank, says that trade, investment, aid, technology, and policy must all play a part in turning this situation around. At the same time, Bourguignon told participants in the Our Common Future conference's Economic Development session that countries must beware of the rising inequalities within their borders if development is to flourish in the future.

► We are at a turning point in history. Inequality in the world, which has been increasing for more than four centuries, is now going down. This means that there is something new happening in the global economy.

Not only is global inequality going down, but it is going down at a time when global growth is extremely rapid. The change is not because growth in rich countries is suddenly slowing down, but because growth in the developing world is speeding up. The combination of less inequality and fast growth means that global poverty rates are falling very rapidly, too.

Strikingly, at the same time global inequality is going down, inequality within countries is on the rise. It seems that domestic inequality is partly replacing international inequality, which is a threat to the whole process of global development. If inequality goes up too fast and by too much in too many countries, and if this change is attributed in the public opinion to globalization, as it is often the case today, then this might act as a brake on the globalization process and the gains from globalization.

Global inequality has been increasing basically since the early 19th century until the 1980s. Then it flattened out. And there even was a slight improvement in the disparity between the top 20 percent of the world's population and the bottom 20 percent. But when you look at the period since 1997, the

global inequality trend dips downward very steeply. There is clearly a big change taking place.

What is behind this changing inequality? There has been a lot of discussion about whether we live in a world where what is going on in the North is decoupled from what is going on in the South. This is not true of economic cycles and the recent crisis is good proof of it. One thing is remarkably clear, however: The North–South divergence in growth trends, which started in the early 1990s and in which developing and emerging countries begin to develop much more rapidly than high-income countries.

The drop in global inequality is due to this divergence in growth rate. Even during the big recession, in the depths of 2009, the difference in terms of growth rates between the South and the North was more or less the same as when the global economy was peaking. Gradually, the developing world is catching up. In the evolution of the global economy, this is something new.

This has had dramatic consequences for the world's poverty rate. Between 1980 and 2005, global poverty was halved. If we were to extend the trend to 2015, then the Millennium Development Goal on global poverty will most likely be reached thanks to a combination of fast growth and declining inequality in the world.

What's next? It is always difficult to do long-range forecasts, but the first important point is that growth in developed countries will stay slow as a result of public indebtedness. Many important countries in the world are in the middle of a fiscal contraction because of their high public debt. Unemployment is also high and may take some time to come back to normal.

Long-Run Trends

But there are also long-run forces for slow growth: New regulation of the financial sector, which is just getting started, for example. Even more importantly, there is a long-term adjustment process away from manufactur-

ing in the developed world that is causing serious problems for the countries of the global North. In the United States, five percent of the labor force has lost manufacturing jobs just in the last decade. Just transferring five percent of the labor force from one sector to another sector produces a lot of frictions. In Germany, the problem is much less acute, but in the rest of Europe the problem is quite serious. Because of that, for the next 10 years the growth rate of those countries will be low.

By contrast, in big emerging countries, growth is likely to continue, yet at a slightly slower pace. Those countries will rely on growing domestic markets, which are developing very quickly. At some stage, China will have to reorient its development strategy more toward the domestic market, simply because the growth rate in the North will not be that great. Growth then will have to focus on its domestic market or on exports to other developing countries rather than exports to developed countries.

But there is no denying that emerging countries will be affected by slow economic growth in the North. Despite the fact that

“Growth in developed countries will stay slow as a result of public indebtedness.”

developing countries are growing very quickly, developed countries still represent between 55 and 72 percent of global GDP, depending on whether purchasing power parities are taken into account or not. One-half or even three-quarters of the global economy slowing down will have a substantial impact on the rest of the world.

Global equalizing is thus likely to continue because of this combination of regulation, long-term adjustment in labor markets in rich countries, and dynamic growth in emerging economies. What we have observed over the last 20 years is not just a cyclical event. It is a very strong central force in the global economy.

There are several caveats, of course. Poor countries, in particular sub-Saharan African

countries, may be in a slightly different situation. It may be misleading to simply lump sub-Saharan Africa together with other emerging economies. The numbers show that growth in sub-Saharan Africa has become strongly positive and faster than growth in high-income countries over the last decade, but this is potentially deceptive.

According to some analysts, recent growth in Africa is due to better policies and better governance. It is true that policies have improved and in many countries governance has made progress. But many other analysts argue that what is happening today in sub-Saharan Africa is simply the reflection of very high commodity prices, and the day those prices go down the situation will take a turn for the worse. The latter explanation seems convincing. When we look at the evolution of the structure of the African economies, we see very little change. Manufacturing has remained at 10 percent or less as a share of the overall economy. As long as there is no change in the structure of GDP

“Within-country trends are not enough to reverse the equalizing trend between the global North and South.”

in those countries, it is not possible to say that there is autonomous growth taking place. Rather, growth that is witnessed today might be essentially the result of high commodity prices.

Basic economics dictates that there will be a supply response to those very high commodity prices. High prices will encourage more commodity production, bringing prices back to some lower level. Unlike Gulf countries, sub-Saharan Africa is too populous and its population is growing too fast to live on commodity rents alone. The region needs to diversify its economy. This must be done primarily through the manufacturing sector and through trade with the rest of the world or, at least, with neighboring countries through regional integration.

It is not impossible to combine exports of natural resources and manufacturing production. A country like Indonesia, which has huge resources of oil, was able to grow a very dynamic manufacturing sector. The problem of sub-Saharan African countries is that their markets are not big enough whereas Indonesia has a domestic market of 250 million people. To keep growth going in Africa, larger markets must be created. Part of that creation must include regional integration through true free trade areas and trade policies that would open up markets in the global North to African products.

The Hidden Threat

At the same time, as we observe this fall in global inequality, we observe a very noticeable increase in inequality within a large number of countries over the last 20 years. When we look at OECD countries, inequality has significantly increased in more than half of them. You have an increase in Italy, in Germany, or in Japan. You have a big increase in the UK and still a bigger one in the United States. Some of these changes may be due to reforms of tax-benefit systems. Others are due to an increase in the inequality of market incomes.

Really dramatic figures are observed in the United States. According to a congressional report, the total increase in the income of the bottom 20 percent has been 6 percent over the 25 years between 1979 and 2005. The richest 20 percent have seen their real income grow by 70 percent. And if you look at the top 1 percent, then the increase in their real income has been 176 percent.

Many people would think that such a dramatic increase in economic disparities would not be really possible in European countries, but who knows? When we look at the very top of the distribution pyramid, executives and traders are increasingly paid in Germany, France and the UK what they are paid in the United States. Upward-spiraling executive pay is creating huge

inequalities at the top, while people at the bottom struggle with unemployment and stagnant wages.

So what is the risk here? Because inequality is increasing, there may be some resistance to globalization which is often seen as the cause of increasing disparities. This would then reduce the benefit that the global community can get out of globalization through some kind of return toward protectionism.

Surprisingly, the same trends hold true when we look at developing countries. Sixty percent of developing countries (where the data are available, at least) show an increase in inequality. Probably the most obvious case is China, where inequality has increased very substantially. In India, too, there are signs that inequality is increasing. Yet, a counter-example would be Brazil where inequality went down, even though still at a very high level.

When we look at global inequality, these within-country changes are not enough to reverse the equalizing trend between the global North and South. But what is happening at the country level may be more important from a political point of view. An increase in inequality at the national level might become a real obstacle for further progress in global development if it is associated in the public opinion to the globalization process, which is actually the case and is certainly not totally wrong. Because of that, we cannot ignore domestic inequalities.

One way of trying to avoid this negative evolution towards more inequality is enhanced social protection at the country level. Even in some developed countries, particularly the United States, there is not enough of this sort of social safety net. Because of that, the adjustment within countries due to increasingly globalized economies may be more painful, and politically more difficult. Extra social protection in both some developed countries and in developing countries, improving international redistribution instruments and global development assistance could go a long way towards smoothing the transition.

The development of cash transfers or micro-credit in developing countries, which seemed almost impossible 15 years ago is a good example of the kind of progress that can be made along this line.

We should also add what is called “development policy coherence.” It does not

“In some developed countries...there is not enough of this sort of social safety net.”

make very much sense to have generous official development assistance policies on the one hand when there are trade policies which undo their results on the other hand. Following Nordic countries, European countries and the European Union could analyze more systematically the consequences of their trade policies on developing countries or develop new trade facilities for those countries that find it hard to access European markets. An initiative like “Everything but Arms” which is giving trade preferences to Least Developed Countries (most of them in sub-Saharan Africa), is a good start. However, it is too modest and too restrictive through the rules of origin it imposes on exporters. The US initiative AGOA (African Growth and Opportunity Pact) was, from that point of view, more effective but is very limited in size.

In sum, we should not simply stop and relax because the whole world is equalizing. There are formidable obstacles ahead if we are to ensure continuing global development that benefits all countries and all people within countries. 

This is a condensed version of a speech given at the OCF conference’s session on Economic Development for Global Inclusion.

“An increase in inequality at the national level might become a real obstacle for further progress in global development.”

Mass Dreams of the Modern Metropolis

“The Third World slum ... is the iconic geography of this urban and human condition.”



Ananya Roy is professor in the Department of City and Regional Planning at the University of California, Berkeley, where she teaches urban studies and international development.



Regarded from the North, many cities of the global South are understood through their vast, informal urban spaces – their slums, in short. Hit movies feature the slums of Mumbai, reality tours take in the favelas of Rio de Janeiro and the townships of South Africa, and Nigeria’s mushrooming “make-do” megacity of Lagos has become a symbol for the future of Africa. Speaking at the OCF’s session on Metropolis, urban planning expert Ananya Roy explained how the term slum is an oversimplification – and made some guesses as to how the world’s cities might look in the future.

► The 21st century will be an urban century, one where the human condition will also be an urban condition. The 21st century will also be a Southern century and perhaps even an Asian century. Much of the urban growth and urbanization of this century will take place in the cities of the global South, including those of the newly emergent economic powerhouses, India and China. I am interested in understanding how the making of urban futures, the making of collective futures, the making of common futures is at stake in the 21st century metropolis. To understand this it is necessary to conceptualize the 21st century metropolis as a mass dream. I borrow this term from Suketu Mehta, who has argued that “just as cinema is a mass dream of the audience, Mumbai is a mass dream of the people of South Asia.” What does it mean to study the future itself as a mass dream? To answer such questions we have to, of course, pay attention to how the cities of the global South are narrated in academic and popular discourse.

In the urban imagination of the new millennium, the “megacity” has become the shorthand for the human condition of the global South. Cities of enormous size, they are delineated through what Jennifer Robinson has called “developmentalism.” Their herculean problems of underdevelopment – poverty, environmental toxicity,

disease – are the grounds of numerous diagnostic and reformist interventions.

And it is the slum, the Third World slum, that is the iconic geography of this urban and human condition. It is the “recognizable frame” through which the cities of the global South are understood and their difference mapped and located. If we are to pay attention to what postcolonial critic Gayatri Chakravorty Spivak has identified as the “worlding of what is now called the Third World,” then it is necessary to confront how the megacity is “worlded” through the icon of the slum. In other words, the slum has become the most common itinerary through which cities of the global South are recognized.

I do not use the term itinerary casually. Today, the Third World slum is a touristic itinerary, with reality tours available in the favelas of Rio, in the townships of South Africa, in the kampungs of Indonesia, and featured in travel guides ranging from Frommer’s to Lonely Planet.

Such itineraries of recognition are interesting because they disrupt apocalyptic stereotypes of the megacity. Against academic and popular renditions of the megacity as a planet of slums, marked by the warehousing of surplus humanity, slum tours present the Third World slum as places of enterprise and economic activity. Here for example is how Pukar, an experimental research group based in Mumbai, presents Dharavi, Mumbai’s famed slum:

Dharavi is probably the most active and lively part of an incredibly industrious city. People have learned to respond in creative ways to the indifference of the state ... Dharavi is all about such resourcefulness. Over 60 years ago, it started off as a small village in the marshlands and grew, with no government support, to become a million-dollar economic miracle providing food to Mumbai and exporting crafts and manufactured goods to places as far away as Sweden. No master plan, urban design, zoning ordinance, construction law or expert knowledge can claim any stake in the prosperity of Dharavi.... Dharavi is an economic success story that the world must pay attention to during these times of global depression.

This too, of course, was the theme of the controversial film, *Slumdog Millionaire*. While protested in India as an instance of “poverty pornography,” the film can be read as an allegory for the 21st century metropolis and its *dhandha*, a Hindi word that means transactions, hustles, business. In *Slumdog Millionaire*, everyone is out to make a deal: the traders in misery who maim children so that they can beg on the sidewalks of Mumbai; the traders in space who replace the slums of Dharavi with sky-high condominiums; the traders in dreams who create the television programs and films that create a world of fantasy for those who need it, rich and poor.

It is thus that the Third World slum becomes central to the making of urban futures. Suddenly, the horizon of urbanism is no longer in New York, or London, or Los Angeles, but rather in the global South.

It is thus that star architect Rem Koolhaas interprets the urbanism of Lagos as a “culture of make-do.” In his encounter with Lagos, part of Harvard’s Project on the City, Koolhaas is taken with the inventiveness of its residents as they survive the travails of the megacity. He sees such experimental responses as generating “ingenious, critical alternative systems,” a type of “self-organization” creating “intense emancipatory zones.”

It is thus that Iranian-born sociologist Asef Bayat argues that “informal life,” characterized by “flexibility, pragmatism, negotiation, as well as constant struggle for survival and self-development” is the “habitus of the dispossessed.”

And it is thus that Peruvian economist Hernando de Soto presents the Third World slum as a “people’s economy” populated by “heroic entrepreneurs.” For de Soto such economies are rich in assets, albeit in the defective form of dead capital. The “mystery of capital” is how such assets can be transformed into liquid capital, thereby unleashing new frontiers of capital accumulation.

There is a striking resemblance between such arguments of economic libertarianism and the utopian schemes of the left. For

example, in a sketch of “post-capitalism,” geographers Katharine Gibson and Julie Graham celebrate the “exciting proliferation of [...] projects of economic autonomy and experimentation.” They showcase these as the performing of “new economic worlds,” an “ontology of economic difference.”

I am highly sympathetic to these renditions of Third World urbanism – those that place the megacity and its slums at the heart of the making of urban futures. I see this approach as an important correction to the silences of urban historiography and theory, the “sanctioned ignorance” – that has repeatedly ignored the urbanism that is the life and livelihood of much of the world’s humanity. I see it as an instance of what Vanessa Watson, of the African Center for Cities at the University of Cape Town, has called “seeing from the South.”

However, in my work, I also argue that it is time to think beyond the geography of the slum. To world the cities of the global

“Urban informality is not restricted to the bounded space of the slum. It connects the seemingly separated geographies of slum and suburb.”

South through the slum means that we remain bound to the study of spaces of poverty, to essential forms of popular agency, to the habitus of the dispossessed, to the entrepreneurialism of self-organizing economies. These are ontological and topological understandings of urbanism, those that associate the slum with poverty, and that associate poverty with self-organizing economies.

I am interested then in how we can understand the inevitable heterogeneity of Southern urbanism, that which cannot be contained within the familiar metonymic categories of megacity or slum. How can we produce a different worlding of the cities of the global South and thus more broadly of the 21st century metropolis?

With this in mind, I want to briefly discuss four emergent concepts that I believe

make possible new understandings of the 21st century metropolis. The concepts are periphery, urban informality, zones of exception, and gray spaces. My claim is not that these concepts are new and therefore worthy of attention. Rather I am interested in how scholars, working in a variety of urban contexts, are using such concepts to chart new itineraries of research and analysis.

Peripheries

In a recent treatise on city life, the London-based sociologist AbdouMaliq Simone makes the case for the importance of the periphery in urban life. By periphery, he means a “space in-between” that has “never really been brought fully under the auspices of the logic and development trajectories that characterize a center.”

I am interested in the periphery as a space of both rule and insurgency. Such is the case with a periphery that often garners

international attention, the southern suburbs of Beirut, al-Dahiya, or the Shiite ghetto. Here, the de facto state is Hezbollah,

the party of God, a religious militia that has matured into one of Lebanon’s most important political parties. Al-Dahiya is the space of what Hezbollah calls the resistance society, where poor, downtrodden, and displaced Shiites can create an autonomous urbanism. With this in mind, Hezbollah has built up an infrastructure of urbanism and development that defies the logic of the center and intervention by the Lebanese state. From schools to health clinics to micro-finance institutions to Jihad al-Binaa (or “Jihad for construction”), Hezbollah’s al-Dahiya demonstrates how the periphery is a “potentially generative space – a source of innovation and adaptation ... potentially destabilizing of the center.”

Yet the periphery is also a space of rule, one where Hezbollah seeks to implement norms of civic governmentality and a vision

of the good city. As the work of urban planning experts Hiba bou Akar and Mona Harb shows, Hezbollah today is both insurgent militia and real estate developer. In its latter guise, Hezbollah supports and implements projects of urban development that can transform al-Dahiya, the Shiite ghetto, into a city center worthy of a global city. In the resistance society, no resistance is possible to the making of urban futures. The periphery then embodies the contradictory impulses of rule and insurgency that are constitutive of the 21st century metropolis.

Urban Informality

In his much discussed 2006 text “Planet of Slums,” urban theorist Mike Davis states that “informal survivalism” is “the new primary mode of livelihood in a majority of Third World cities.” In my research, I argue that the informal is not a distinct and bounded sector of labor, housing, and governance, but rather is an idiom of urbanization, a logic through which differential spatial value is produced and managed. Urban informality is not restricted to the bounded space of the slum; instead, it connects the seemingly separated geographies of slum and suburb, favela and enclave. In short, informal urbanization is as much the purview of wealthy urbanites as it is that of slum dwellers. The analytical and political question at hand is how and why in the 21st century metropolis, elite informalities are valorized and subaltern informalities are criminalized.

Take for example the case of Indian cities. In the case of Delhi, London-based urban geographer Asher Ghertner notes that a vast proportion of the land use of the city, from so-called farmhouses to shopping malls, violates some planning or building law, such that much of the construction in the city can be viewed as “unauthorized.” But while the law has come to designate slums as “nuisance” and the residents of slums as a “secondary category of citizens,” the illegal and informal developments of the urban middle classes and the urban elite have come to be sanctioned by the state as the making of urban futures.

I am arguing then that it is often through informality and illegality that, in India, the world-class city is produced. This is the story of evictions and displacement, the sheer dispossession of peasants, slum dwellers, squatters, sharecroppers that is at work in the carving out of new towns, special economic zones, and urban-industrial enclaves. But it is also the bold aspirations of what is increasingly designated, at least in India and China, as the Asian century, the sense that the future belongs to Asian economic powerhouses. In this self-referential imagination, world-class Asian cities compete with one another. Mumbai is imagined as the next Shanghai, inevitably slum-free. Singapore circulates as a frame of success.

Dubai, in particular, serves as the dream image of an Asian hyper-urbanism. Billboards lining the streets of Delhi, and photographed by Berkeley urban sociologist Gautam Bhan, mark the partnership between Indian and Dubai property capital and read: “Burj Dubai, the World’s tallest tower. The only thing taller is our dream for India.” I want to emphasize that such formations of urban meaning must be understood as mass dreams, those claimed by middle-class consumer citizens who are seeking “leisure, safety, aesthetics, and health.” But such mass dreams are also subject to contestation and informality is an important axis of such contestation.

Take, for example, Quarter no. 4/11 in Kolkata. Occupied by one single person, Shambhu Prasad Singh, this factory quarter was the last hold out in a tract of factory land that had been converted into the city’s upscale South City retail and residential complex. The workers were evicted from their living quarters with no prior notice and with meager compensation. Shambhu Prasad Singh refused to make way. For a while, with the towers of South City rising around him, he was the blockade. Soon it became evident that the South City complex had been built in violation of environmental laws and through the enclosure of some of southern Kolkata’s largest water bodies. For a moment, Shambhu Prasad Singh’s blockade

made visible the South City complex as “towers of violation,” thereby presenting a challenge to elite informality and calling into question the criminalization of subaltern informality.

Zones of Exception

I have suggested that the concept of urban informality denotes fractal geometries of metropolitan habitation and that these are quite different analytics than those that are concerned with the bounded slum and its ontologies. A similar spatial theory is provided by the work of Berkeley socio-cultural anthropologist Aihwa Ong on zones of exception. Ong studies “market-driven strategies of spatial fragmentation,” tracing patterns of “non-contiguous, differently administered spaces of graduated or variegated sovereignty,” what she calls zones of exception. From special economic zones to special administrative regions, these zones both fragment and extend the space of the nation-state. Such zoning practices have been particularly visible in China, where liberalization has coincided with “zone fever.” George Lin thus reports that the thousands of Chinese zones together cover a territory that exceeds total urban built-up area in China. Indeed, one may ask: In a territory where zones of exception proliferate, what then is the city?

This question becomes poignant in a setting like Dubai, where the entire city itself can be understood as a free trade zone, a speculative frontier of state capitalism disguised as free enterprise, an ambitious remaking of the relationship between city and nature – through islands in the sea, underwater hotels, and the transformation of the desert into mega-development. Such free enterprise zones are also of course, paradoxically, zones of bonded labor. Dubai’s towers rise on the backs of South Asian workers hoping to make their own futures in this 21st century metropolis.

But the zone of exception that most captures my attention is Shenzhen. Shenzhen after all is not only one of China’s first Special Economic Zones, it is also the “world’s workshop.” It is in Shenzhen’s factories that the world’s favorite commodities – from iPods to iPhones – are churned out. This assembly line is usually invisible to us except at rare occasions when the invisible workers, whose labor makes possible our cosmopolitan lifestyles, become visible. This happened a few years ago when a Shenzhen migrant worker, completing the assembly of an iPhone, left a photograph of herself on the phone. Dressed in a pink-and-white striped uniform, smiling, making a peace sign, she came to be known simply as “iPhone girl.”

Shenzhen reminds us that zones of exception are not only spatial configurations, but also distinctive temporalities. Widely celebrated in Shenzhen is the idea of Shenzhen Speed, a phrase that refers to the city’s incredible pace of growth – from about 25,000 people in 1980 to nearly 14 million people in 2010. But the phrase also suggests that “no other place or time has experienced the transformations that have characterized this city.” In Shenzhen today, the revolution is urban. Everywhere there is construction; everywhere the new becomes old; everywhere factories and paddy fields give way to condominiums and malls; everywhere fast-speed infrastructure inhabits the city. All that is solid melts into air. French cultural

“Mass dreams, claimed by middle-class consumer citizens who are seeking ‘leisure, safety, aesthetics and health.’”

theorist Paul Virilio had once noted that “No politics are possible at the scale of the speed of light.” In the 21st century metropolis, what politics are possible at the speed of light?

In 2010, a series of suicides have plagued Shenzhen factories, including Foxconn, the world’s biggest contract electronics supplier.

The deaths have been seen as a symbol of the dark side of Shenzhen Speed: Migrant workers working 11-hour overnight shifts, seven nights a week, forging plastic and metal into electronics parts amid fumes and dust, living eight to a room in cramped dormitories. The suicides have been seen as the symbol of a new generation of workers unwilling to make unending sacrifice for the Chinese economic miracle, a part of a rapidly changing context of labor strikes and mobilizations. After all Shenzhen too is a mass dream, the place where China's peasants come to make an urban future. But it turns out that such a future must be negotiated through what African philosopher and political scientist Achille Mbembe has called necropolitics, the politics of life and death. In the 21st century metropolis, zones of exception then are where the making of urban subjects is evident.

Gray Spaces

In his provocative and haunting work on the Bedouins of the Israeli Negev, political geographer Oren Yiftachel describes "gray spaces" as "those positioned between the 'whiteness' of legality/approval/safety, and the 'blackness' of eviction/destruction/

"The horizon of urbanism is no longer in New York ... but in the global South."

death." He notes that these spaces are tolerated and managed but "while being engaged within discourses of 'contamination,' 'criminality,' and 'public danger' to the desired 'order of things.'"

To illuminate this final concept of gray spaces, let me take a closer look at social landscapes in America, and especially at the gray space that is the global border. In America, the spring of 2010 saw the gathering storm of the "Tea Party" movement, a conservative fury against Big Government and its purported failures. As spring rolled over into summer, so in the border state of Arizona, a new law was passed. Titled "Support Our Law Enforcement and Safe Neighbor-

hoods Act," it is a bold assertion of state intrusion, of the police state. Aimed at wiping out undocumented immigration, the law initially required police to determine the immigration status of those detained, stopped, or arrested.

Arizona's law is an example of a firmly territorialized and racialized framework of citizenship, one that erodes understandings of urban citizenship based on cosmopolitanism and difference. In this sense it marks the end of the idea of the city. The Arizona law is also an example of the border, the global border. It is a remaking of the US-Mexico border, the world's most policed border, in the heart of cities and towns. It is the making of all neighborhoods as border neighborhoods. It is the creation of a series of gray spaces that remain suspended between legality and illegality, between safety and destruction.

Gray spaces proliferate in the 21st century city. But gray space is also the terrain of politics. I am interested in the technologies of crossing that can disrupt the social legislation of fear and thus the securitization of space. At the global border, artists in particular have experimented

with technologies of crossing. These experiments are perhaps visible symbols of the everyday (and extraordi-

nary) practices of border crossing, through which this space is lived and negotiated. Such ruptures are evident in the work of the transnational art project, inSITE. Taking place at various venues along the San Diego-Tijuana border, inSITE performs transient pieces of art in places where art is not typically exhibited. Each performance punctures the global border and weaves a new transnational fabric of meaning and habitation. Each performance transforms gray space into political space.

For example, in 1997, Marcos Ramírez Erre, a Tijuana artist, rolled an enormous Janus-headed Trojan Horse into the middle of traffic waiting to cross the border at San

Ysidro, perhaps the busiest international border crossing in the world. The horse appeared seemingly out of nowhere, straddled the border with two legs resting on the US side and the two other legs on the Mexican side. One head looked north, the other looked south. And after a while it vanished. Californian architect Teddy Cruz writes of the performance:

"The Trojan Horse was the fragile 'anti-monument' [...] It reminds us that the contemporary city is still able to elude the

"Arizona's law is an example of a firmly territorialized and racialized framework of citizenship."

absolute ordering devices that attempt to render it homogeneous and one-dimensional [...] that the most derelict and unexpected places have the potential to become sites for light occupations that challenge the massive colonization of traditional urbanism."

For me, the 21st century metropolis is a space that requires both critique and hope. The 21st century metropolis is a space that far exceeds the boundaries of the slum. Better understood as peripheries, zones of exception, gray spaces, and urban informality, the 21st century is made up of fractal geometries of metropolitan habitation. The 21st century is time at the speed of light and it is also dialectics at a standstill.

But most importantly, the 21st century is a terrain of politics. The fractal geometries of the contemporary city also constitute the grounds for negotiated subjectivities, contested spaces, and claims to the urban future. In this sense the 21st century metropolis may just be, to borrow Erre's allegory, a Trojan Horse.

This is a condensed version of a speech given at the OCF conference's session on Metropolis. More can be found at www.ourcommonfuture.de/roy

Urban Future



Suketu Mehta is a professor of literary reportage at New York University and the author of *Maximum City: Bombay Lost and Found*, published in 2004. He grew up in Mumbai and New York and is at work on a book about immigrants in contemporary New York.

“Mumbai is probably a better predictor of the future than New York.”

The future is urban: The number of city dwellers is forecast to reach five billion by 2030, and already exceeds half of the world’s population. Kolkata-born Suketu Mehta, author of the award-winning book *Maximum City* and a speaker at the OCF conference, understands better than most why some cities succeed where others fail and why many migrants see them as places of hope, and not despair. In an interview, Mehta talked about the future of the city.

► In your book *Maximum City* you write that Mumbai (formerly known as Bombay) is the future of urban civilization. But to many Westerners, parts of Mumbai seem medieval. There are people working, sleeping and defecating on the streets. Is that the future of cities? Squalor in ever increasing amounts?

Mehta: The world is going to be dominated by these megacities of the South, more than the established cities of the richer world.

And in many of these cities there is a tremendous amount of squalor, of people living on the streets. But there are also windows of opportunity and islands of tremendous wealth. If you look closely, you will realize that the First and the Third World are no longer separated around the globe. They coexist in places like Mumbai and also, surprisingly, in places like New York: I have been to tenements in Chinatown, just 15 minutes from where I live, where 15 migrant workers

cram into one room. But in terms of absolute numbers, Mumbai is probably a better predictor of the future than New York.

Most people who migrate to cities end up in slums. Why would you leave the countryside, where you can enjoy a clean environment, for the suffocating lack of space in a place like Lagos or Mumbai?

Mehta: Well, you and I don't like slums because we look at them and we see overcrowding and squalor. But for the people that come in from the countryside, there are three main things that draw them to the cities: One is economic opportunity, because even in the worst job they can make much more than

“Human beings, as a species, like to live in colonies. We are not solitary animals who live in caves. We are more like ants.”

they could as an agricultural worker. The second is a sense of personal freedom. For people trapped in the caste system, or in traditions of an African village, the idea that you can go into a city and remake your own life and marry a person of your choice is tremendously appealing. The third is the romantic possibility of cities. Human beings, as a species, like to live in colonies. We are not solitary animals who live in caves. We are more like ants. In America, after the Second World War, it seemed like suburbs were the answer. You'd come into the city when you were single, you'd find a mate, then you'd go and settle with your kids in the suburbs. But today, people are staying in American cities and making a go of it. There are lots of attractions: Opera, sports stadiums, being able to walk around, being able to eat many different kinds of food, being close to your job. In richer countries suburbs are fading in significance the way farms are fading in the poor countries.

But there are second-tier cities that are actually shrinking. Do you think cities like

Detroit or Duisburg could benefit from large-scale immigration?

Mehta: There needs to be a critical mass of people that sustains a city. It seems that big cities get even bigger. If there are 20 million people in Mumbai, then the villager in distant Bihar thinks, 'These 20 million people must know something, so I'm going to go join them.' In the United States the cities that are stagnating resemble Detroit and Baltimore – places that don't have a lot of diversity in terms of ethnicity or that have tied themselves to a single industry. But cities like New York, which actively encourage immigration, are doing better than ever before.

Ethnicity belongs to these intangibles that are difficult to measure in economic terms. But many of the software engineers and designers, and the creative class that make cities attractive want a choice of different kinds of food, of different kinds of music. They are widely traveled and don't want to eat sausages every evening. They also like to eat peanut stew and bhel-puri. So ethnic diversity can revitalize these old industrial cities across the richer countries.

How does New York cope so well with diversity? And why do cities in Europe struggle so much with immigration?

Mehta: I can only speak about why New York does so well: Because no one ethnicity dominates. That's very important. I grew up in New York's Jackson Heights, which is the most ethnically diverse place in the United States. There are South Americans, South Asians, East Asians, South-east Asians, Uzbeks – you name it. So no one community gets blamed for a lot of trouble. In New York, Mexicans are the fastest growing group of people, but they too find a place in the “caste system” of New York. The immigrants who come here don't automatically find jobs and opportu-

nities. If you look at a New York City restaurant for example, the chef might be French, the people washing dishes might be Mexican, the hostess might be Russian, the taxi driver bringing the customers might be Pakistani, the owner British or Canadian. They are not all equal. They earn different rates. But they work together. It's like the Hindu caste system. Everybody has their place. What I know of Europe is that in cities which are experiencing problems, single ethnicities tend to dominate. There's also much less opportunity for people coming in. If you ask Indians whether they would rather live in Europe or in America, most of them would still choose the United States. There's still an escalator here where an Indian engineer can come in and soon have a house and feed a family. The United States have a much more fluid vision of what it is to be American. It would be more difficult for a Turk to feel completely German.

Both cities you've lived in, New York and Mumbai, have suffered severe attacks by Muslim fundamentalists. What makes these two cities so hated by terrorists?

Mehta: I think that the terrorists see both New York and Mumbai as Sodom and Gomorrah. The openness of these cities is deeply threatening to people who believe that God likes some people and not others. Also, they're the economic capitals of their countries. And in both cases, the terrorists hoped that they would set off a civil war. But it didn't happen: Most of the attacks on Arabs – or

“The openness of these cities is deeply threatening to people who believe that God likes some people and not others.”

Sikhs who were mistaken for Arabs – after 9/11 happened in places like Arizona, not in New York.

More can be found at www.suketumehta.com

The Complexity of Ethnic Diversity: A Tale of Two Cities

Recently named the world’s most dynamic city by the Brookings Institution in Washington, Istanbul is a city on the rise. In 2010, it shared the designation of European Cultural Capital with Essen, another city with surprising dynamism. Separated by a wide cultural and geographic gap, the two metropolises still have much in common. As part of the Global Young Faculty, a group of young researchers from the Ruhr area examined the problems of integration and urban renewal that bring these cities together.

► Can one really compare Essen and Istanbul? At first glance, the differences between the two cities seem vast and difficult to bridge. After all, Essen is in Germany, a country that has long been recognized as fundamentally European, while Istanbul is the economic capital of Turkey—a land that literally straddles the line between East and West, Europe and Asia.

But perhaps there are more similarities than we think, says Monika Salzbrunn, a professor at the Université de Lausanne in Switzerland, who has written several publications exploring transnational and migration issues. She and the other members of the economics group of the Global Young

Faculty have spent much of 2010 looking at a range of topics, including how religious and cultural diversity is highlighted and dealt with in both Istanbul and Essen.

To begin with, both cities have celebrated 2010 as proud European Cultural Capitals, helping build naturally strong cultural linkages. Secondly, they are cities undergoing a sustained period of urban regeneration. Lastly, the two cities have a long history of ethnic and cultural interconnectedness due to immigration from Istanbul to Germany’s Ruhrgebiet. That is, perhaps, most obvious in the Ruhr area’s ethnic makeup, which is today among Germany’s most diverse. About 12 percent of the city’s population of 600,000 call themselves immigrants.

One thing the group discovered is that, despite these facts, politicians in the Ruhrgebiet aren’t promoting the region’s ethnic diversity as much as they should. “It’s surprising that it is not being put forward enough, in our opinion. What you’ve heard this year is about the cultural richness of the region and the industrial creativity. But the ethnic diversity in all its complexity is hardly being discussed,” Salzbrunn says.

Another interesting discovery is that progress toward urban regeneration in Istanbul has recently provided a way for au-

thorities and developers to put pressure on elements they perceive as being undesirable, in a way that hasn’t happened in Essen.

In Istanbul, members of the city’s Kurdish minority and members of the less privileged classes have come under intense pressure in the face of gentrification and urban regeneration. Sometimes they have been forced to move to entirely new neighborhoods to allow development projects to take place.

“The main issues in Istanbul are class issues and the ways in which the Kurdish minority group is being marginalized,” says Salzbrunn. “The very idea of urban regeneration provides a way for authorities to sweep away minority communities.”

And while both cities portray themselves as modern metropolises, sometimes people with little social or economic capital fall through the cracks, failing to be heard among the voices of the powerful. “Cities need to put forward their diversity or internationality as an asset, because it is one,” says Salzbrunn, whose research has touched on topics ranging from gender relations to transnational social spaces. “All kinds of people in Essen and Istanbul have proven their capacity for success. We all need to recognize that.”

Urban Planning

China's Problems, Chinese Solutions

With 1.3 billion people, China is the most populous country in the world. It is also home to some of the globe's fastest growing cities. Architect and urban planning expert Deljana Iossifova says that what may look to outsiders like unbridled chaos in China's urban spaces is actually a productive mix of class and enterprise. Talking to fellow participants in the OCF workshop on participative urban development, Iossifova warned that Chinese-style urban planning models might not be a good fit for other places.

► China is undergoing one of the most dramatic demographic revolutions the world has ever seen. In the last thirty years, more than a quarter of the Asian giant's population has moved from farms and small villages in the countryside to booming cities like Shenzhen, Beijing, Shanghai, and Wuhan. And the trend shows no sign of slowing. Over the next 20 years, 15 to 20 million people each year will flood into Chinese cities.

All those new city dwellers will need places to live and work, making China the world's biggest de facto urban planning laboratory. Experts estimate that more than 1,500 skyscrapers will be built in China annually for decades to come; dozens of Chinese cities will need mass transport systems. China is faced with a tremendous challenge: It must build the equivalent of one Chicago-sized city each year for the next two decades.

This heady mix of challenge and opportunity was one reason Bulgarian-born architect Deljana Iossifova, a research fellow at the School of Architecture and the Built Environment at the United Kingdom's University of Westminster, worried about what she would find when she journeyed to Shanghai, China, about four years ago to research how city dwellers were grappling with rapid change in their urban environment.

"I started off thinking there is this very scary fragmentation and segregation between different classes of people in Shang-



Deljana Iossifova, born in 1977, is a research fellow at the University of Westminster and teaches architecture and urban design at the University of Nottingham.

hai," Iossifova says. "But I found the reality is different." She found one constant in the Chinese urban environment: Forced class coexistence, created largely because of internal migration from the countryside to the cities. By observing how Shanghai neighborhoods changed over the course of many years, Iossifova discovered that the rich, the middle class and the poor live side by side in the new, rapidly urbanizing China.

The close quarters mean people of different income levels must work together to find solutions to existing problems and somehow be of service to each other. Rural-to-urban migrants, for instance, have found

unique niches in cities repairing bicycles or selling food to both the rich and poor.

Iossifova argues out that the dynamic and constantly shifting nature of large Chinese cities like Shanghai make them perfect fodder for experimentation in how to solve the problems our world will face in the future.

Yet the Chinese model isn't right for everyone. One of the things that has made it so interesting for urban planners is the political system, which allows officials to make sweeping changes without interference by various groups of stakeholders. When it comes to making rapid decisions, central planning accelerates the process.

As problematic as that is for advocates of participatory democracy, from a purely urban planning point of view it might be seen as an opportunity. "There are major possibilities tied to the specific political structure of the country which makes it possible to change the ways in which the built environment is produced and appropriated," Iossifova says.

Yet the autocratic urban planning system at work in China can be a double-edged sword. Some of these experiments are already threatening the things that make Chinese cities so unique. As a new middle class has sprung up in cities around China, many poor inner-city residents are being displaced to make way for urban redevelopment projects directed by the Chinese state, erasing the vibrant mixed neighborhoods Iossifova found when she first came to Shanghai.

It's clear to OCF-fellow Iossifova that the Chinese model won't work for everyone, and probably shouldn't. "A city that functions within one particular cultural, ecological or geographical context may be a complete catastrophe when you try to reproduce it someplace else," she says. "I think we should get away from the idea that there can be perfect solutions. You have to look at every city by itself and try to find solutions for every case." 

Transmitting Development

Radio's Role in Ending Rural Poverty

In countries with little or no communications infrastructure, radio isn't just a form of entertainment. It's also a way to distribute information on new farming techniques far and wide. Nnaemeka Ikegwuonu, founder of Smallholders Farmers Rural Radio in Nigeria, contributed to a workshop at the Our Common Future conference's session on Economic Development about radio's critical role in lifting farmers out of poverty.

► Growing up in a rural part of Nigeria's Imo state, Nnaemeka Ikegwuonu spent much of his childhood tending to cattle and other farming tasks.

So the 29-year-old Ikegwuonu, who holds bachelor degrees in history and international relations and a master's degree in cooperation and development, knows the challenges faced by rural Nigerian agricultural workers firsthand.

"It's a difficult life. Many people have knowledge that could help others by, for instance, improving efficiency. But it's hard to spread the information around," he says.

The solution? In 2003, at the age of 21, Ikegwuonu created a unique organization called the Smallholders Foundation from scratch. Its goal is to help build the capacity of the area's burgeoning agricultural sector by offering information to improve productivity and efficiency and by creating a forum where workers can share their knowledge with others.

Since, then, he has been running the organization, making a living off the proceeds and promoting its goals and achievements.

The need for the Smallholders Foundation is particularly urgent because rural workers in Nigeria have little access to knowledge transmitted through technology the rest of the world takes for granted, like the Internet or television. This makes it almost impossible for farmers to learn cutting-edge techniques that could improve crop quality or yield.



Nnaemeka Ikegwuonu, born in 1982, is the director and founder of the Smallholders Foundation in Nigeria.

"We have many people who are entrapped in poverty, and the only way to get out of it is education," Ikegwuonu says. "This fills the gap." The organization, focused in southeast Nigeria's Imo state, where nearly 3 million people work in the agricultural sector, offers a range of services, from live demonstrations of the latest technologies in crop cultivation to establishing school gardens at primary and secondary schools.

But the core of the Smallholders Foundation is its radio programming. Almost everyone in Nigeria has a radio, meaning broadcasting over the airwaves is the most effective way to reach rural workers – many of whom have had limited formal education.

The radio programs, mostly designed and produced by farmers themselves, cover basic business skills and offer advice on common issues in the agricultural sector, such as how to deal with erosion as well as the safest and most effective pesticides and fertilizers. Perhaps the most interesting aspect of the project, however, is its emphasis on interactivity. The Smallholders Foundation distributes solar-powered devices to listener groups, allowing them to provide voice feedback that gets sent directly to radio broadcasters. Their listeners' advice and ideas are then broadcast during radio programming for other farmers to learn from.

Ikegwuonu sees his work as a simple model others in the global South can follow to promote productivity, while ensuring that local people have a strong participatory voice. The Smallholders Foundation model may be particularly effective in countries like Nigeria and Uganda, where many people are illiterate but have radios at their disposal.

Preliminary data shows that the foundation's work has made a real impact. In some cases, farmers have seen a 50 percent increase in output after listening and participating.

And as he has overseen successes – he has been given a prestigious Rolex Award for Enterprise, among other honors – Ikegwuonu is excited about ambitious plans to expand beyond the state's borders to cover all of Nigeria and eventually other countries, such as Ghana. Right now the radio programs have about 250,000 listeners. Ikegwuonu envisions millions listening, participating and improving their lives.

"I am ready to replicate this all over," he says. "I want people to know that there are individuals making a difference throughout Africa." 

“You cannot fulfill or
empower all of your
people in a country
of 1.3 billion.”

Rumin Luo

“The traditional ways
of doing politics have
to **change**.”

Ludger Pries

Migration isn't what it used to be. The familiar scenes of workers flooding from poorer countries to work in richer ones are increasingly a thing of the past, as the flows and currents of migration become steadily more complex. At the OCF conference, renowned German sociologist Ludger Pries and the young Chinese migrant – and immigration scholar – Rumin Luo came together for an inter-generational dialogue on what the future has in store for migrants and their destinations.

► **How important are national borders for migrants today?**

Pries: I lived in Mexico for six years, and did a lot of empirical research on Mexican migration to the United States. That was a relatively simple case. But now we cannot easily distinguish between internal and international migration, as we could in the past. Both are completely intertwined. We see this in the case of China: There is a huge volume of Chinese people who are internal migrants, more than 200 million people each year. But we also have a lot of influx into China right now, from surrounding countries like Vietnam, Cambodia and Laos, which is a relatively new phenomenon. And we have a lot of outflow migration from China to other countries. Patterns of migration are getting more and more complex and entangled with other aspects of transnationalism and globalization.

Luo: I totally agree. In the past people talked about illegal or undocumented immigrants, like the ones headed to the United States from Mexico. But this phenomenon is very similar to what's going on in the Chinese domestic case, where we have the special household registration system that tries to control migration to urban areas. When I look at how people integrate into urban areas in China, I learn a lot from the case of Mexican immigrants – in China we're also trying to determine whether to empower migrants who come to urban areas.



Rumin Luo, born in 1980, is a PhD candidate at Bielefeld University's Graduate School in History and Sociology and a visiting researcher at Boston University. Born in China, she earned her bachelor's degree at the China Agricultural University in Beijing.



Ludger Pries is a sociologist specializing in migration, participation and transnationalism at the Ruhr University Bochum.

Is the rural-urban dynamic replacing the border in migration?

Pries: It is not rural, urban or international, but thoroughly mixed. In the US case, it is traditionally rural Mexico to urban United States. But if you look at California right now, immigrants are going from urban areas in Mexico to rural areas in California to pick strawberries.

How can politicians best address these changing types of migration?

Pries: I think if migration gets much more complicated then the traditional ways of doing politics have to change. We have to develop procedural mechanisms to help people to organize themselves. The Chinese state will not be able to manage and control all the tensions and problems arising from internal and international migration. One lesson for me is we have to invite people to organize and to participate in resolving their problems.

Does that mean more democracy?

Pries: More democracy, more participation. We have to invite people to participate so they are part of the solution, not the problem.

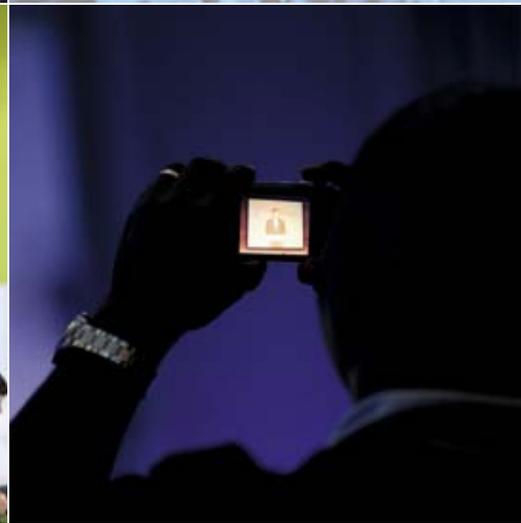
Luo: In some ways I cannot fully agree with you. China is really facing these problems, but China is still a developing country. You cannot fulfill or empower all of your people in a country of 1.3 billion. It's true, China has many high-skilled international migrants, and if we go back to China we may bring new ideas – but they should be incorporated into the current policy framework.

Pries: My argument was not liberalization and leaving the state out of this. States are very crucial. If we look at states which were successful in the last 30 years, it was always the ones with strong states – like China. There needs to be a combination of the state and civil society institutions.

Luo: All of the countries are improving governance and management, but we need to work out the process. It's not a problem we can solve in one day. ►



Impressions from the conference.



4 Questions, 8 Answers

“What fact makes you **the most optimistic** about our common future?”

Klasen: The world in 2000 was a very divided place. We had the rich and the rest. Now Africa, China and Latin America are seeing dynamic growth. We live in a world where people’s lives are better than they have been for a long time.

Kreibich: Human ingenuity. I think people will be able to overcome the problems political institutions are creating for us through new inventions and organizational resources.

“What is the greatest **challenge facing us** in the next 25 years?”

Klasen: There are still islands of chaos and bad governance. In 2000, these conflicts were the majority. Now they are the minority but they could flare up again.

Kreibich: We need to control the increasing consumption and exploitation of natural resources by segments of the world’s population.

“What piece of advice would you give **young researchers** in your field today?”

Klasen: Economic development researchers need to think beyond the paradigm that the North gives aid and the South receives it. We now live in a multipolar world. We need to, for example, learn about South-South social protection programs like those spreading from Latin America to Africa.

Kreibich: Don’t separate yourself from practical issues and normal life. In our discipline, the nexus between academic research and urban development should be very close, even in our own individual lives.

“What was the most **surprising insight** you had at this conference?”

Klasen: I was very impressed by the African policy makers at the conference. Their world has changed completely. They have steered their countries towards a much brighter future recently. But they are also unsure whether the good times will last and so they want to create smart, cautious economic policy.

Kreibich: It was interesting to see what was going on in the neighboring disciplines, but I would have provided more opportunity for dialogue.

Stephan Klasen and Volker Kreibich served as scientific advisors for the OCF sessions on Economic and Urban Development. Klasen is a professor of development economics and empirical economic research at the University of Göttingen, where he also heads the Ibero-American Institute. Kreibich was, until his retirement in 2005, professor of spatial planning in developing countries at TU Dortmund University.

Global Health and Molecular Medicine

Introduction

► Every year, human life expectancy increases. More sophisticated technology, better nutrition and greater access to care all contribute that people in many regions of the world having a chance of staying healthier longer. This should be great news. But with greater longevity comes a different set of problems. Our bodies now have more years to manifest diseases in new ways. Older people not only need treatment for chronic illnesses and conditions, but also more intensive care every day. Treatment has to be carefully coordinated and financed. While health care in the developing world is still unable to meet basic expectations, the global North is already striving to develop ways to reshape its health care system to deal with demographic changes to come.

As participants at the OCF conference made clear, in developing countries the great killers are still present. People living in economically and politically fragile regions of Africa and Asia are often denied medicine and preventive care. AIDS, infectious diseases and the lack of basic nutrition stalk people young and old. There is often little

regulation as to how care is distributed, and the aid that comes is sometimes delivered by international agencies without a clear focus or ability to connect with local populations.

“We have to help politicians on a national and international level to remember that many countries do not have adequate medical services,” says Axel Haverich, head of Cardiothoracic, Transplant and Vascular Surgery at Hanover Medical School. “There needs to be more equal access in places like Africa, South America, and China.”

On the other hand, for people living in developed countries there are promising cures on the horizon. A stem cell expert says that pioneering therapies may dramatically alter outcomes for some of our most pernicious diseases, like diabetes. Understanding our genetic building blocks better could help turn back our bodies’ clocks. Targeted cancer treatments might delay or even defeat the full impact of the disease.

The sessions’ scientific advisors and numerous speakers emphasized that to continue making progress at both the macro and molecular level in medicine, people

need to talk across specialties and continents. The OCF conference was an opportunity for participants to look past the boundaries of their expertise and day-to-day work: Policy makers talked with doctors on new strategies to care for quickly aging populations. Epidemiologists and development specialists crafted solutions for people who die long before their time because of poverty and preventable disease. Representatives of large health agencies sought the help of grassroots players to better understand the differing needs of populations in different regions.

“Interdisciplinary meetings are difficult to conduct but they are what is needed now,” says Karl Rudolph, Director of the Institute of Molecular Medicine at the University of Ulm and, like Haverich, scientific advisor for the sessions on Global Health. “We need to discuss not only basic aspects of science but also look at social impact in different areas of the world.” Only through collaborative efforts can medicine make the progress we need to offer people better, sometimes longer and often more comfortable lives. ◀

25,000

people in the European Union die because of a serious resistant bacterial infection each year.

75%

of Africans live in villages or communities with inadequate or no sanitary facilities.

20,000-30,000

genes are in the human genome, coding for up to 500,000 proteins.

3,000,000

people would not die from diarrheal diseases each year if they had access to safe drinking water.

9,000,000

children worldwide under the age of 5 die every year, most from easily preventable causes.

A Graying World

“The average person will be living longer than ever before.”



Colin D. Mathers is a senior scientist at the World Health Organization in Geneva. He works in the Evidence and Information for Policy Cluster.



Development in human health is going through parallel transitions. As richer countries begin to worry about diseases of old age, the developing world is pushing past the point where its primary concern is child mortality and communicable disease. Will we ever live in a world where everyone can hope to live to old age? Colin Mathers, a senior scientist for the World Health Organization, shed some light on this question at one of the OCF sessions on Global Health.

According to our best estimates, there's been a dramatic increase in life expectancy in all regions of the world since 1950. In high-income countries, it's gone from a bit over 60 years to around 80 years when you average male and female life expectancies together. In low-income countries, it's much lower – life expectancy has gone from around 40 years in 1950 to close to 60 years today. These statistics can be a bit deceptive, of course: Average life expectancy at birth takes into account the impact of infant-child mortality, early adult mortality and mortality at older ages. That means when a country's average life expectancy is 40, the statistic includes a lot of people who die in their first year of life as well as those who live longer.

I'm not going to dwell on the demographic transition, but rather explore the epidemiological transition from high mortality to low mortality and the associated transition from high fertility rates to low fertility rates. The combination of these two phenomena leads to a dramatic shift in the population age structure. The difference between Yemen, where 44 percent of the population is under 15, and Japan, where only 13 percent are, is very striking in terms of the age distribution of the population.

Over the past few centuries, there have been dramatic declines in both child and adult mortality in developed countries. More people are living to old age. Premature adult mortality and child mortality have

both declined dramatically, e.g. in Sweden and other developed countries.

As a result, the population of developed countries has aged dramatically, as in the case of Japan. Currently, around 22 percent of people in high-income countries are aged over 60. By the middle of the century it'll be around 30 percent. The transition will be even more dramatic in developing countries. Today, around 7 or 8 percent of the population of developing countries is over 60. By 2050, it's projected to rise to around 20 percent. That's similar to the developed countries today, but with a steeper curve and more difficult transition as a result.

The developing world is undergoing what scholars in the 1970s first described as an epidemiological transition, or a characteristic evolution of mortality that has been observed in different regions of the world. Initially, populations are at risk of dying from infectious diseases and related diseases like under-nutrition, high levels of maternal mortality and high levels of child mortality due to poor birth conditions. As societies develop, the risk of death from infections and those maternal and child causes diminishes dramatically, and the risk of death from degenerative diseases rises. In part, that's because people are living through the younger ages and so they're getting to older age, where the accumulated damage results in degenerative diseases – in particular, cardiovascular disease, cancer and respiratory disease. The age balance of the population changes as well, as more people make it to old age thanks to a decline in communicable diseases.

Impacts on Mortality

Child mortality – the risk of dying under the age of five – is on the decline all over the world, according to the latest analysis of global trends in child mortality from UNICEF and the WHO. The trend has varied across all regions, and in fact in terms of percentage decline, the decline is actually

lowest for sub-Saharan Africa, with around a 30 percent decline over 20 years. Some regions have had declines of 60 or 70 percent since 1990. In most places, the risk of dying under the age of 5 has been halved since 1990. Still, the United Nation's Millennium Development Goal is to have a 75 percent decrease by 2015, and the world is not going to achieve that, although some countries and regions will.

Maternal mortality is also dropping. Africa, India, and parts of Asia still have dramatically higher maternal mortality rates than the rest of the world. India alone accounts for more than a quarter of the world's maternal mortality deaths, for example. In developed countries, however, maternal mortality is so low that it's essentially nonexistent – take Australia, for example, which has 10 or 15

“Child mortality is on the decline all over the world, according to the latest analysis of global trends.”

deaths per year, each of which is obviously very carefully looked at individually.

HIV obviously has had a dramatic impact on global health, and particularly African health and mortality. In parts of Africa, there have been significant reductions of life expectancy due to HIV of 20 years or more. But our best estimates now are that the epidemic, at least in global terms, appears to have peaked and is on the decline. Part of that is associated with antiretroviral therapy, which keeps people alive much longer. Widespread antiretroviral coverage may well be also impacting incidents in that it reduces the viral load and reduces the risk of transmission. So if you have everyone on antiretrovirals, even if they're not practicing safe sex, you will reduce the epidemic.

When it comes to tuberculosis, there have been major efforts to scale up coverage with “directly observed short-course therapy”, also known as DOTS. These efforts have had some impact, but have been slower than anticipated, in part because tuberculosis is an opportunistic infection in HIV-positive people.

The high levels of HIV in Africa, therefore, have kept tuberculosis levels relatively high.

So, turning now to look at adult mortality or the causes of death and the levels of mortality risk for adults between 15 and 60, there is a dramatically high death rate in Africa, which is to a large part due to HIV/AIDS and other infectious diseases, not to mention hunger and malnutrition. In Europe, there remain gaps between the lower-middle income countries of Europe, predominantly former Soviet countries, and their richer neighbors. Eastern Europe has the second-highest level of premature adult mortality in the world, largely due to cardiovascular disease and injuries. In Russia, for example, mortality rates due to cardiovascular disease, injuries, and so on remain extremely high. Whether there's a political will to tackle those at a population level in the short term remains to be seen. In South-East Asia, which is dominated by India, there are also reasonably high levels of infectious diseases. But other developing regions have largely passed through the epidemiological transition in terms of the impact of communicable diseases, maternal diseases and other factors. Most importantly, China and India are amongst the countries that will have passed through this epidemiological transition.

"It's reasonable to expect research breakthroughs on things like cancer, Alzheimer's, and regeneration and rejuvenation technology."

China, in fact, already has. Its adult mortality rates are lower than in parts of Eastern Europe, and child mortality also is quite low.

As populations' age and life expectancy increases, we're going to more intensely focus on the fatal and nonfatal diseases of aging. Money will be rolling in for dementia research and for therapies to prevent damage that leads to these diseases.

Narrowing the Gap

Can the mortality gaps between developed and developing countries be substantially

narrowed? There are a number of new technologies that may accelerate progress, some of them available primarily to the rich: Nanobots will clean our bloodstream in the near future, and it's reasonable to expect research breakthroughs on things like cancer, Alzheimer's, and regeneration and rejuvenation technology. Such technology will benefit the rich, and will perpetuate the gap between rich and poor in terms of health – although if developing countries can learn from the best of the experience of developed countries, maybe they can catch up.

On the other hand, climate change and environmental degradation may have significant negative impacts. I'm involved with a WHO group trying to model the health impacts of climate change. It's really

hard to do. For example, some of the models are fairly simplistic: If temperature rises, then the malaria mosquito will start breeding, for example. Well, maybe. But maybe not. I don't think Switzerland will have a malaria problem, however hot it gets, because the Swiss have lots of money and they'll just kill the mosquitoes. It's really an issue of adaptation and the ability of societies to adapt. And there are harder issues with climate change around the extreme climatic events, which may severely impact parts of Asia and elsewhere in the form of heat waves, diseases tied to floods, and other unpredictable forces.

For the time being, continued global financial instability is thought to be a blip on the horizon, having no long-term impact. Certainly, in the short term, it has had a significant impact on the WHO and other international agencies' abilities to fund some of their primary activities. The global fund for tuberculosis, malaria, and HIV have all had significant shortfalls, partly due to the global financial crisis. That may translate directly into a shortage of bed nets in the next couple

of years, which will lead to a resurgence of child deaths in Africa due to malaria.

The projections essentially assume that the risk trajectories in developing countries will be similar to what's been seen in developed countries over the last 50 years. But if the risk trajectories in developing countries end up being worse because they fail to control tobacco, alcohol, blood pressure, and other public health threats, things may well be substantially worse than in high-income countries down the line. Already, the age-specific risks of cardiovascular death are higher in many middle-income countries

"As diseases mutate and shift in response to antibiotics ... there's a risk that we'll face new killer diseases."

than in high-income countries, in part because of poorer health systems and uncontrolled primary risk factors.

And there's always the risk of new or resurgent infectious diseases. The devastating toll of HIV over the last three decades is a warning on that front. As diseases mutate and shift in response to antibiotics and other countermeasures, there's a risk that we'll face new killer diseases – drug-resistant tuberculosis, for example – in the future.

It is almost certain that the developing world will largely pass through the epidemiological transition and also contend with aging populations in which chronic conditions dominate. This should not be seen as a bad thing, since the average person will be living longer and most likely with lower mortality risks than ever before. But such optimistic trends may be offset to unknown degrees by climate change, population and resource pressures, and the potential emergence of new diseases.

This is a condensed version of a speech given at the OCF conference's session on Global Health and Molecular Medicine. More material can be found at www.ourcommonfuture.de/mathers

Fighting the Diseases of the Future

“The revolution in information and communication technology opens up new possibilities.”



Rudi Balling is a German geneticist and director of the Luxembourg Centre for Systems Biomedicine.

> Infectious disease is one of the greatest threats facing the world in the decades to come: unpredictable, fast-moving, difficult to track, and potentially more deadly than anything we've ever seen before. Rudi Balling, a German geneticist and director of the Luxembourg Centre for Systems Biomedicine, says the solutions to the epidemics of the future are cooperation between scientists and a holistic approach to biology that accounts for the complexities of today's world.

► Infectious diseases have had a major influence on the course of history. More than once, the casualties in wars from infectious diseases outnumbered those from man-made weapons. Up to the end of the 19th century, not much could be done. The development of public health hygiene principles, the discovery of penicillin, and the development of vaccines, however, have dramatically changed this. The public health measures were so efficient that in 1967 the Surgeon General of the United States declared the end of the era of infectious diseases.

This was, of course, premature, as we know by now. Today we are not only faced with newly emerging pathogens, i.e. HIV, SARS or avian influenza, but also with pathogens that we thought we had eliminated, such as tuberculosis and malaria. The most serious of all is the increase in antibiotic resistance. Multi-resistant bacteria are now identified in many hospitals and even in public places outside of hospitals. Our antibiotics have started to fail and for many of the viruses, i.e. HIV or hepatitis C virus (HCV), we do not have any vaccine or efficient antiviral.

The consequences are very severe. Over the last 30 years, more than 25 million people have died from AIDS. Respiratory diseases and diarrheal infections have killed more than 5 million people, most of them children, according to the WHO's senior scientist Colin Mathers. The SARS epidemic, which spread within a few weeks and caused the shutdown of entire cities, such as Toronto, has demonstrated the vulnerability of our society in times of high mobility. Today Boston, tomorrow Hong Kong or New Delhi, and back to Frankfurt, is not an uncommon travel agenda for many people. Viruses often travel along with these passengers. Whereas we enjoy our increased mobility, the global nature of travel and business is one of the major drivers of global infectious disease epidemics and pandemics. Our world is small and for infectious diseases this means that it is easier for them to spread. In addition to increased mobility, climate change has the potential to alter the distribution of infectious diseases on our planet. As a result, malaria may spread into geographic areas where it was far too cold for the parasite to survive.

At the same time that globalization increases the chances of infectious disease transmission, the revolution in information and communication technology opens up new possibilities to fight infectious diseases. Today it is much easier to set up efficient surveillance programs, supporting early countermeasures. We are faced with several main challenges in our attempt to understand, prevent and treat infectious diseases.

Uncertainty

When we try to predict how many cancer, cardiovascular or neurodegenerative disease patients we will see in our hospitals 20 to 30 years from now the demographics of our population does give us a fairly good estimate. Many Western countries still enjoy an increasing life expectancy. This will be followed by an increase in chronic age-related diseases. We already know that in two to three decades the number of Alzheimer's and Parkinson's disease patients will be more

than double what it is now. We can also predict that as a result of our changing lifestyle, obesity and diabetes will rise. This is not only a problem for Western countries, but also for many developing countries.

Unfortunately, it is much more difficult, if not impossible, to predict when and which infectious disease epidemic will hit. HIV was first discovered in 1981, but the infection took off rapidly after that. SARS arrived almost overnight, without any warning signal. Scientists had been warning of new influenza viruses for quite some time. Nevertheless, when the swine flu appeared in Mexico and California, the world was not prepared. This unpredictability and the stochastic nature of infectious disease emergence are the largest challenges that we face. This is somewhat comparable to tsunamis or earthquakes. There is an urgent need to come up with "early warning signals" that can better predict when and which pathogens might emerge.

One of the most promising measures to cope with this uncertainty is the fostering of international relationships between scientists and other professionals. In many cases, when political dialogue has broken down or failed, scientists are still able to maintain constructive relations.

Some of the unpredictability can be reduced through these international personal networks. They can lead to an increase in the quality of infectious disease surveillance, the speed of information flow from one continent to the other or the exchange of key information about the nature of a specific pathogen. Awareness helps to increase preparedness.

Complexity

Almost all diseases are multifactorial and multigenic in nature. It is well-known that individual people can differ dramatically in their susceptibility or resistance to infectious disease. According to British geneticist Adrian Hill, our "genetic background" can

have a strong effect on how effectively we are infected, how quickly and efficiently we mount an immune response or whether we become immune after a first infection. There are more than 20,000 genes in our genome, coding for more than 100,000 proteins. The result is a combinatorial explosion when we try to model and simulate the response of infectious diseases to new drugs or vaccines.

Systems Biology

Infectious diseases are the result of extremely complex interactions between two evolving genomes, that of the host and that of the

"Systems biology not only looks at components, but tries to address the characteristics of the entire system."

pathogen. These interactions are strongly influenced by environmental factors, such as nutrition or stressful situations. For this reason, knowing the components of a complex system such as an emerging infection is insufficient. The design and development of new vaccines or antivirals require an understanding of the entire system, especially the topology and dynamics of the underlying molecular and cellular networks. It is currently impossible to predict the behavior of a pathogen to evolutionary pressure, such as chemotherapy.

As a result of the Human Genome Project and the technological advances in DNA sequencing, transcriptome, proteome and metabolome analysis, we have made great progress in identifying most of the components in the human body and importantly of the pathogens that infect us. However, we are far away from understanding the mechanisms of infectious disease pathogenesis. Without this understanding we cannot expect to be able to design efficient drugs that not only kill or slow down the pathogen, but that also avoid the development of antibiotic resistance.

Biomedical research during the last 50 years has succeeded by focusing on increas-

ingly smaller parts of the systems and by an attempt to reduce complexity by an analytical approach. We now realize that this approach is limited if we want to understand and predict the behavior of entire multi-scale emerging systems, such as those that we find in living organisms. Complex systems such as infectious diseases often show a highly nonlinear behavior. It is for this reason that we now see a strong interest in systems biology.

Systems biology not only looks at components, but tries to address the characteristics of the entire system. Systems approaches have been very successful in engineering, social sciences, and many other disciplines. This approach is now also moving into the life sciences, mainly because of the revolution in genomics. A key factor was the development of technology to sequence DNA. Within a decade, the cost of sequencing an entire human genome has come down from tens of millions of dollars into the range of a few thousand dollars. This trend will continue and has also moved into the high-throughput generation of RNA expression data. Single molecule sequencing and mass spectrometer-based proteomics and metabolomics will further accelerate the transformations in biology and biomedicine.

University of Washington researcher Jay Shendure and his Stanford University colleague Hanlee Ji have argued that it will not be long before genomic sequencing will become a commodity and, as a result, constitute an integral part of biomedical research, medical routine diagnostics and therapeutics. These developments will have a great potential to improve our understanding of the mechanisms of infectious diseases. This will guide future vaccine and antiviral drug design and enable the development of effective public health policies and measures. The challenge will be whether and how we are able to transfer these technologies to the developing world. Rapid DNA sequences of pathogens at the “point of care” has tremendous potential, but as described requires a rather high tech environment, which is often not available in less-developed countries.

Interdisciplinarity

High-throughput functional genomics and genetics need to be combined with information technology, mathematics, computational biology and engineering approaches. It is a combination of experimental and theoretical approaches that will be necessary to describe, analyze, and predict the behavior of complex biological systems. Most biologists do not have adequate training in mathematics, statistics, or physics, all of which are required for successful modeling and simulation of infectious diseases. It will be necessary to change the curriculum of the next generation of students. Biological systems and human diseases can only be understood using a highly interdisciplinary approach. This will not be restricted to the classical natural sciences such as biology, chemistry, or physics, but also needs to encompass an understanding of our climate and the changes we observe using the social sciences, psychology and economy.

Top-Notch Infrastructure

Research in the life sciences has undergone another change within the last decade. Collaboration and resource sharing have become an important element not only in the design and implementation of the experiments per se, but also in the establishment of large-scale, capital- and human resource-rich infrastructure. Top-notch infrastructure is a key attractor for becoming competitive on an international level and staying that way. As a result of the progress in sequencing the human genome, the analysis of biological systems has largely been driven by efforts to automate and miniaturize individual assays. This has led to “Big Biology” – laboratories which are characterized by major capital investments, i.e. in robotics, automatic imaging capture devices and IT infrastructure. The costs for equipment and human resources to operate and manage high-throughput infrastructure are substantial and the replacement cycles become shorter and shorter. We need to come up with solutions to enable developing countries to participate in the potential and op-

portunities in the biotechnological and biomedical area.

As a result of the increasing efficiency in genomics, proteomics and metabolomics, we are currently witnessing an explosion in the amount of data derived from biological experiments and clinical research. This requires the development of new bioinformatics tools. The challenge of data-rich biology and medicine is not only in pattern recognition, but becomes increasingly a problem in data security, data handling and data archiving. The increase in the amount of data produced greatly exceeds our storage capacity. Individual institutions are not able to maintain the fast and expensive cycles in equipment and infrastructure necessary for genomic, proteomic or bioinformatics analysis of biological data. For this reason it is necessary to share technology platforms, i.e. in bioinformatics, high-throughput fast sequencing, proteomics or metabolomics, which serve not only a few research centers, but also increasingly a larger number of research institutes, i.e. within a region, a country or even beyond. This demands new modes of international cooperation.

Outlook

Infectious diseases will never be completely eliminated. Fighting them will always be an arms race, driven by evolutionary forces, between the infected host and the infecting pathogen. Uncertainty and complexity are the hallmarks of infectious diseases. Our best counterattack is probably the ability to work across disciplinary boundaries in order to understand in detail the underlying mechanisms. Maybe we will discover and understand general rules of complexity and new ways to dissect complexity. This will not only be relevant for biology and infectious diseases, but will touch upon many other areas. 

This is an edited version of a lecture given at the OCF conference’s session on Global Health and Molecular Medicine. A full version and bibliography can be found at www.ourcommonfuture.de/balling

African Researchers Join Forces to Solve Continent's Troubles

In Africa, the continent where basic drugs are needed most, home-grown research moves slowly due to a lack of infrastructure, funding and coordination. Cameroonian drug design researcher – Fidele Ntie Kang hopes that a new effort will get more Africans involved in drug development, from sorely needed anti-malarial drugs to therapies for AIDS and other illnesses. Addressing participants at the OCF conference's session on Global Health, Kang explained how joined forces of scientists and other players could help the continent.

► In 2003, Fidele Ntie Kang watched his 31-year-old sister die of tuberculosis in a Cameroonian hospital.

The experience was transformative. Now a drug design researcher at the University of Doula in Cameroon, Kang's work to develop treatments for common maladies that still kill countless Africans each year is motivated by the memory of his sister.

The numbers are stark: Although Africa has 11 percent of the world's population, it is beset with more than 25 percent of the world's disease burden. It accounts for 60 percent of the world's AIDS cases. Malaria, a disease virtually unknown in the global North, is endemic in 42 of the continent's 46 countries and kills a million Africans each year. The tuberculosis that killed Ntie Kang's sister claims the lives of half a million more. The results put some of the region's countries at the extreme end of the world's demographic tables: A girl born in Lesotho can expect to live 42 years less than her counterpart in Japan.

The health situation in Africa causes untold human suffering, as well as a negative



Fidele Ntie Kang, born in 1976, is a researcher in drug design and development at the University of Douala in Cameroon with a special interest in promoting trans-African cooperation.

impact of tens of billions of dollars to African gross domestic product. Yet Africans play a negligible role in developing drugs for scourges such as HIV/AIDS, malaria and tuberculosis. And because there's little money involved in treating the world's poorest people, the diseases are low on the priority list for major drug companies.

Kang is one of a growing number of researchers trying to fight that trend. He's working with colleagues to create new drugs and acting as a sort of unofficial spokesman for the African Network for Drugs and Diagnostics Innovation (ANDI), a newly formed group sponsored by the World Health Organization, that aims to increase collaboration between African scientists. "We have to take care of our own," he says. "We have to figure a way to make things better here."

The Cameroonian knows the challenges faced by African drug researchers first-hand, because he lives with them every day. At the

University of Douala, there are regular power outages and the computers Kang uses are often not powerful enough to do the analyses he needs.

A lack of lab infrastructure means key drug compounds must often be sent overseas for testing, leading to weeks-long delays. An unreliable phone network can make communication between colleagues difficult, let alone contact with researchers abroad.

The toughest problem for African drug researchers, Kang says, is a lack of funding not only for research, but also for basic scholarship. Because the University of Doula suffers from perpetual funding crises, the faculty is short-staffed and there are often more students than professors can handle. Many students also struggle to pay university fees – Kang himself had to work for a few years after high school in order to be able to afford his education.

Nonetheless, Kang says he and his colleagues are making incremental progress. He's especially interested in finding new ways to battle tuberculosis and is conducting computer-assisted research on new tuberculosis drugs. And he hopes ANDI and programs like it will help foster collaborative research in African universities.

Project leaders hope to have ANDI firmly established by the end of 2011. They are working to create a governance structure, recruit staff and plan an innovation fund to spur African drug development. Once in place, the fund could receive money from governments, the private sector or non-governmental organizations. "A few years ago, we didn't have any direction," Kang says. "Now we have a plan to move forward and change things." ►



Elizabeth Blackburn is a professor of biology and physiology in the Department of Biochemistry and Biophysics at the University of California, San Francisco. In 2009, Blackburn won a Nobel Prize for her work on telomeres, together with her colleagues Carol Greider and Jack Szostak.

Body Clock: Telomeres, the Indicators of Aging

Telomeres are to chromosomes what aglets are to shoelaces: They are like little end-caps that keep the string of DNA from unraveling. Telomere discoverer and Nobel Prize winner Elizabeth Blackburn talked to participants in the OCF session on Global Health about how telomeres have emerged as a good indicator of cellular aging – and have been connected to chronic diseases of aging like cardiovascular disease, diabetes, and cancer. Recent studies show that stress can interfere with telomere maintenance, while meditation may boost these chromosome caps. In an interview, she also pointed to the responsibility scientists have to society at large and the policy implications of her research.

► **Are telomeres a natural mortality device?**

Blackburn: We don't know if that's what they evolved for. But in humans, who live far longer than what we were necessarily selected for evolutionarily, one sees clear relationships between diseases of aging, risks of aging and shortness of telomeres. So they are an indicator of diseases of aging. They're not necessarily an indicator of longevity, but they have emerged in elderly cohorts as a measure of how many years of healthy life a person has, which is really quite interesting. Years of healthy life is the number of years one has before succumbing to one or another of the things that happen in old age – be it disease or frailty or lack of functionality in one way or another.

So are shorter telomeres indicators of aging, or causes?

Blackburn: Well, they're certainly indicators. I think the science challenge is to try to sort out what is causal and what isn't. There are very good reasons to think there's causality, as shown by the somewhat more extreme cases of rare genetic mutations that prevent telomeres from regenerating. There are many people on the planet who have telomerase gene mutation defects, which very clearly cause extreme forms of diseases that mirror a lot of the things that do happen in the more general population as they age. So that kind of causality is clearly genetic.

Are there examples of the reverse situation, where people have unusually resilient telomeres?

Blackburn: People have looked into the situation for centenarians, and there have been surveys of the genetic variants that you find in centenarians. A few things have shown up, and they include telomere maintenance genes – but they include other things as well. How they all play together is unclear, but there's a definite smoking gun there. In terms of wider implications, I'm still very cautious, because centenarians are a pretty rare group. Their numbers are going up, but they're still a minority.

In the gray middle zone, the vast majority of humanity – we have to be cautious about overinterpreting from the extremes about how much is causal, and how much is interacting with other pathways. But if you draw a line between the extremes, it's an extremely reasonable one.

Are there factors besides genetics that come into play when it comes to telomeres?

Blackburn: A lot of us die of heart disease, of cancer, of diabetes – illnesses where there's not a strong genetic input in the majority of the population. But beyond genetics, that's where things get extremely interesting, because there are further factors that affect heart disease, like chronic stress. You can quantify the effects of chronic stress on telomere maintenance.

How do you eliminate confounding factors that might confuse the picture?

Blackburn: I come from the molecular cellular research world, so I need to collaborate with people who have great expertise in clinical studies. It's important to collaborate with people bringing in really different expertises. I've learned from them that it's important to remember that confounders are not necessarily confounders – they can be interactors, and those can be informative. We're looking very closely at those things as well. We have studies looking at depression, post-traumatic stress, adverse childhood events and telomere maintenance, and there are some very clear links.

Has enough research been done to conclusively say depression and stress have a direct effect on telomere maintenance?

Blackburn: It's just beginning. One has to first of all do the studies and see what shows up, and then push it further and further. But there are clear relationships between chronic stress, extreme forms of clinical depression, and various other syndromes and telomere maintenance. We still need to understand these links.

Are there policy implications to that knowledge?

Blackburn: In the medical and scientific and policy communities, it's often about what we can measure, whereas nursing professionals often say that the gold standard is how the patient feels. Chronic stress, for example, sounds very vague to a lot of people. Yet we have studies of people who are caregivers for people who are chronically ill – mothers of chronically ill children, or caretakers for people with Alzheimer's or dementia, and their telomeres are especially short. These individuals are not the patients, but they are under a lot of stress that goes on for a long time. Their perception of stress is quantitatively related to cardiovascular disease risks, which is a pretty expensive disease when you get it.

Anything you can think of as a policy that gives tools for these caregivers to cope with this stress sounds like a no-brainer, but the health care systems in the United States don't work like that. You can't always take stressful situations out of people's lives, but if they have real disease consequences you can say OK, maybe it's worthwhile putting things in place that treat stress as a serious situation as well.

So the idea is to prove to policy makers that by measuring telomeres you can develop new methods to deal with stress?

Blackburn: You can say someone's just whining, and shouldn't be taken seriously. Some people are born whiners. But if you have quantitative measures of stress, like

telomere maintenance, you can give it an objective measure. As we look at health care, there are a lot of situations that may not look that severe individually but add up to quite a large burden. These are worth taking seriously, and we've stumbled into this by having a set of measures.

How deeply should scientists be involved in the larger public debate on these questions?

Blackburn: To me, the primary job of scientists is to do really good science – we must never lose sight of that. But being able to articulate your science is important, and a side effect is you learn to think more clearly. It's a double bonus.

On the other hand, if you're just going out and being articulate all the time, you're not really spending the time to do the science well. Everybody says you should be out communicating all the time, but I think you need to be in the lab, too – and spend time really thinking. That's the hard part, to spend time thinking.

Are today's scientists doing a good enough job, and how could the next generation do better?

Blackburn: The difference between my generation and a lot of younger scientists now is that when I was at a comparable stage in my career, we had fewer research technologies to use, so we had to figure out our own ways around the problems. And we generated so much less data that we had to really think about what we had. Now you can do so much in the lab, that stopping and really thinking is really the hard part.

It's a wonderful dilemma that it's now easier to generate data than to force yourself to really grapple with what it means. In the biological sciences, the older generation scientists can encourage people to think about their results. 

More can be found at <http://biochemistry.ucsf.edu/labs/blackburn/>

“Usually demographers **underestimate** longevity.”

Natalia Gavrilova

“There’s a lot of effort to extend **life span**.”

Luis Guachalla

Leonid Gavrilov and Natalia Gavrilova are population biologists who specialize in the mechanisms of mortality, longevity, and aging. Their research has unearthed surprising and intriguing demographic trends. At the OCF conference, they spoke with OCF Fellow Luis Guachalla – a post-doctoral researcher in molecular medicine whose work involves uncovering the biological causes of aging and death – about the links between longer lives and global population growth.

Guachalla: It's not that common for younger researchers to have an opportunity to sit down and interview senior scientists, so I'm really happy to be here. I was interested in your latest paper that showed the consequences of extending life span. There are many fears that extending life span will lead to overpopulation of the world, but your results indicate that may not happen. In fact, your model suggests that in 100 years, there won't be any change in the world's population, partly because people are having fewer children even as they live longer lives. But how would it be in a longer time frame – for example, 200 years, 300 years, 400 years? Would it still be the same trend?

Gavrilov: Well, it depends on the particular model. For example if you consider the situation where you have less than two children per family, the population growth increment keeps decreasing. But in other specifications, there might be different scenarios. The key issue is the number of children per family, on average. Overpopulation depends more on fertility than on mortality. Even in the most radical life span extension scenario, you cannot get big population growth.

Gavrilova: I met the chair of our session, Professor Karl Lenhard Rudolph, director of the Institute of Stem Cell Aging at Ulm University, and I found out that he, for example, is more interested in realistic scenarios of increases in life span up to 100



Luis Guachalla, born in 1980, works at the Research Center for Molecular Medicine at the Austrian Academy of Sciences.



Population biologist Natalia Gavrilova is a research associate at the Center on Aging, NORC (National Opinion Research Center) at the University of Chicago.

years than in the very radical forecasts of life span extension. So, I made a prediction program for another scenario, which shows continuation of the current increasing trend in life span expectancy ...

Gavrilov: She worked with her computer overnight, and produced completely new data. One of the great benefits of conferences like OCF is not just people coming and presenting their results, but interacting with each other during the conference to produce new results.

Gavrilova: ... The consequence will be that the population will still decline, but there will be more very long-lived people and 100 years from now it will not be surprising to find people who live up to 120. But what is interesting is that usually demographers underestimate longevity, and they underestimate the growth of life expectancy. Demographers are usually afraid to assume that people will live past 110, and for this reason they usually underestimate future populations. I made no such assumptions in my predictions. This is simply a continuation of the trend of increasing life expectancy.

Guachalla: In your paper you use the example of Sweden, a very well-developed country. You're already showing a declining population. Can extending longevity maintain the population, or do Swedes need to increase their reproduction rate as well?

Gavrilov: This is very important, because people are very concerned about overpopulation, and often objections to life extension are made on the basis of "there will be too many people in the world." What they do not understand is that in developed countries like Sweden and Germany, the real problem is not overpopulation but on a long time horizon you have a drastic decline in native-born population. You have a demographic catastrophe. Of course you can solve this problem with immigrants, but then you can lose your cultural identity, you can lose your language. Life-extension technology is not a part of the problem, but part of the

solution. Any intervention that increases healthy human life span would really help in this situation.

Guachalla: One observation to this point – extension of life span is not always associated with improved health quality. If human beings reach 130 years of age, what would be your recommendations on retirement age? There’s a hot debate in Europe right now on this topic. The French for example, are complaining that they are not willing to work two, three or five years longer. But if people live to be 130 and keep the current retirement age, it means that they will only spend half their life working.

Gavrilova: The main consequence of longevity is accelerated population aging. Current societies are not ready for this challenge. But I believe that it is not only a challenge, it is an opportunity. Older people have more experience and knowledge, maybe require only short education for new jobs. This is an asset to society. But current regulations do not encourage older people to work, and sometimes there is even forced retirement after a certain age. Governments are doing this in a not very gentle way, just raising the retirement age without giving people a choice. But you could, for example, give people who want to work longer some incentives and let people who are frail or don’t want to work that option. Currently, though, Western societies are not ready for the challenges of an aging population.

Guachalla: Ideally, it would be nice to not only live longer but also have a good quality of life. The aim is being 80 or 90 but still being able to do tasks a young person can do. We can live until we’re 130 or 140, but we don’t want to be trapped in bed connected to oxygen tubes. I think there’s a lot of effort to extend life span and also improve quality of life in the elderly.

Gavrilova: The few people who survived to old ages in the past were much healthier at age 80, because otherwise they would have succumbed to disease at an earlier age.



Leonid Gavrilov is a research scientist at the Center on Aging, NORC at the University of Chicago.

Guachalla: I come from a developing country, Bolivia. Would you say the same rules would apply for life span extension in a developing country as in a developed country?

Gavrilov: This is a more political question than scientific. It seems to me there is a lot of low-hanging fruit, so to speak. It is much easier to clean water to avoid cholera epidemics, for example, than apply expensive antiaging treatments. There are so many things that can be done in developing countries to increase healthy lifespan that it would be a waste of resources to push the idea of anti-aging interventions at this point. In many countries with short life span, there are much easier ways to add years of healthy life than high tech antiaging interventions.

Gavrilova: It’s interesting, because the trends are diverging in the developing world. Take Malaysia: We found that in Malaysia the life expectancy is close to Western countries. They’re really healthy, even though it’s a rapidly developing country. On the other hand, Russia, which is considered a highly industrialized country, has a very, very low life expectancy. For men it is 59 years, lower than in China.

Gavrilov: It has to do with heavy, heavy alcoholism. It would be insane to make some antiaging intervention before you eradicate alcoholism from the culture in Russia. They simply refuse to do the easy part.

Guachalla: Talking about external factors, something that has been discussed a lot is climate change. Do you think climate change will have an impact on life expectancy?

Gavrilov: Just recently, there were extreme heat waves near Moscow that hadn’t been seen in 100 years. There was a spike in mortality among older people, and there are different estimates but the most conservative estimate is that the death rate increased by a factor of two. Climate, if it becomes a systematic problem, really adds to the pressure on life expectancy.

Educating Peers

Youth Education and the AIDS Crisis

The global fight against AIDS is waged on many levels. International, national and local advocacy organizations all try to educate people about the disease and fight its spread. But for years there has been a major flaw in AIDS advocacy: Organizations rarely engaged young people in the process. Kenyan Constance Walyaro, a member of the Global Youth Coalition on HIV/AIDS, points out that a key to solving the African AIDS crisis is engaging the young in spreading public-health messages. Invited as OCF Fellow to the conference she talked to workshop participants at the session on Global Health.

► How do AIDS and HIV specifically impact young people?

Walyaro: Well, in 2003, about half of all new HIV infections in Africa were among people between the ages of 15 and 24 and they were the most vulnerable population. Right now, we have made progress, but young people still remain vulnerable. In terms of infection rates, those numbers have gone down thanks to better information, treatment and care.

What tactics have made an impact when it comes to education and prevention?

Walyaro: One thing that has been working well is the capacity building and technical assistance. We, at the Global Youth Coalition on HIV/AIDS, have been providing a lot of free online courses. We have been providing young people opportunities to attend health conferences, where they get to meet with professionals who have more information about what is happening. We also give them an opportunity to showcase what they are doing. At the same time, we have made it possible for international aid conferences to actually have a section that just focuses on people under 25. This is much more engaging. Before, many youths attended these conferences, but there was no space for them. Right now, people under 25 are driving the process much more.



Kenyan Constance Walyaro, born 1979, is the president of Citron Wood Foundation, a nonprofit devoted to empowering poor communities. She is working towards a PhD in health economics, policy and law.

How has involving youth in the process changed AIDS/HIV advocacy?

Walyaro: We found in the past that governments, donors, and big organizations realized that young people were vulnerable to HIV, but that segment of the population was only brought in during the implementation stage of projects. So we did a lot of advocacy work and insisted that under-25s be involved not just at implementation stages but at the decision-making, planning, monitoring and evaluation stages. It turns out they had a lot to contribute to the processes.

What was the first thing that the young people changed about the process? What had adults overlooked?

Walyaro: One of the simplest things that came from it was that young people like to hear from other young people. They'd rather hear about HIV/AIDS and sexual reproductive rights from their fellow peers as opposed to having people who represent their parents telling them to use condoms, practice safe sex and get tested. So having peers talk to each other about HIV prevention and advocacy has really helped and pushed the agenda forward.

Do you find that commitment is flagging?

Walyaro: Absolutely. In the beginning, everyone was talking about HIV and AIDS. That was a major focus. There was so much support. But right now, it is just like any other disease. So it has lost a lot of the clout that it used to have. It is a bit worrying, because if the general trend continues and people begin to forget where we've come from with regard to HIV and AIDS, we could see ourselves regressing and losing some of the gains we've actually made.

How has your youth impacted your work? Do you think you bring a fresh outlook to these issues?

Walyaro: I think a lot of us young people – like the OCF fellows – bring a different perspective because there definitely is a generational gap. It is very refreshing to find young people who are interested in development issues. Because I think sometimes the older generation has this picture of young people that they are rowdy – that they really have no concern for the future and for the world. But there are many people who are doing something positive and contributing to the future of the world.

That sounds like a tenet of your youth-to-youth education: Policy makers should have more trust in young people. Young people have the capability to make impact and be the leaders of tomorrow.

Walyaro: Yes – and not tomorrow. We are actually leading right now. ◀

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Impressions from the conference.

4 Questions, 8 Answers

“What fact makes you **the most optimistic** about our common future?”

Haverich: Younger scientists are more willing to look beyond the boundaries of their own research and collaborate with experts in other specialties and regions.

Rudolph: Medical care has improved dramatically over the last 100 years. I think, in principle, we can handle new challenges. Human intelligence will find solutions to the most pressing issues.

“What is the greatest **challenge facing us** in the next 25 years?”

Haverich: We have to remind politicians to strengthen aid to countries that don't have adequate medical and social support. There needs to be more even distribution and access to medical treatment.

Rudolph: In the medical sector, the biggest challenges are aging and cancer. I also think we need to make sure that industries take better care of the environment. Wasting the planet's resources will ultimately affect health.

“What piece of advice would you give **young researchers** in your field today?”

Haverich: I would advise young researchers to develop a broader understanding of concepts outside of their fields. Personally, I get most of my ideas when I go to meetings of other specialties.

Rudolph: We need more physician scientists. In order to have further increases in health span, we need physicians who understand the molecular causes of disease.

“What was the most **surprising insight** you had at this conference?”

Haverich: Elizabeth Blackburn's discussion about biochemical changes in cells and aging was fascinating. She gave some very good examples of how physical exercise can help us live longer and reverse the aging process.

Rudolph: I was really excited to see how stem cell research is translating into medical applications, for example, in the treatment of cancer.

Axel Haverich and Karl Lenhard Rudolph served as scientific advisors for the OCF sessions on Global Health. Haverich is head of the Department of Cardiothoracic, Transplant and Vascular Surgery at Hanover Medical School (MHH). Karl Lenhard Rudolph is director of the Institute of Molecular Medicine and head of the Max Planck Research Group for Stem Cell Aging at the University of Ulm.

Climate Change and Energy

Introduction

► With the Kyoto Protocol expiring in 2012, will the global community manage to negotiate a new, binding climate treaty? The meager results of the last few climate summits offer slim hope. Part of the problem is that binding limits on greenhouse gas emissions must be global, and not just applied to industrial nations. Politicians and scientists agree that's the only way to get the problem of global warming under control. It will take other measures too, of course. That's as certain as the fact that nothing will happen without an entirely new approach.

Nevertheless, a subliminal reluctance to trust authority in general has manifested itself in an unwillingness to listen to researchers' urgent warnings. "This kind of irrationalism, in whatever form, can be very dangerous in our society," says Hans Joachim Schellnhuber, founding director of the Potsdam Institute for Climate Impact Research who acted as the scientific advisor for the first session on Climate Change and Energy.

At the OCF conference, participants joined together to come up with ideas on how to overcome the problems of the world's changing climate. On the one hand, experts discussed ways to halt or even roll back the damage already done. Known as mitigation, this approach involves strategies ranging from capturing carbon from power plants and natural gas wells deep underground, to developing technologies for mobility and manufacturing that use less fossil fuels and have a smaller carbon footprint.

On the other hand, international academics and representatives of relevant institutions joined to discuss different options of adaptation. Adaptation involves the clear-eyed realization that climate change is coming, whether we curb emissions or not, and the sooner we learn to deal with it the better. "Mitigation and adaptation are two aspects of one problem," says Reinhard Huettl, scientific director of the German Research Centre for Geosciences in Potsdam, who

was the scientific advisor for the second session on Climate Change. "Just reducing emissions can't stabilize the climate now and for ever – we need to also adapt to changes that occur, now and in the future."

No matter what their area of study, how to communicate better with the world's politicians – and the public they represent – was high on the list of priorities for the experts at the climate sessions. Participants noted that as multilateral negotiations flame out and fail, one common theme in the discourse has been the lines drawn between developing nations, who have an interest in raising the standard of living for their citizens to levels long enjoyed in the global North, and developed countries, hoping to preserve what they have without sacrifice. With speakers and attendees from both sides of the divide, the OCF conference was a hopeful sign that science and rationalism can endure in the face of denial and narrow-mindedness – and, in the end, overcome them. ◀

1/2

of the world's wetlands have been lost since 1900.

442

nuclear power plants around the world
produce 375 gigawatts of energy.

845

plant species in the EU may lose their habitat due to global warming, 1/20th of the continent's total.

12,000,000,000,000,000

tons of carbon, mostly in the form of coal, is left on Earth.

900

liters of water are needed to produce 1 liter of wine.

Keys to Curbing Climate Change

“We have to leave the majority of the reserves of coal, oil, and gas underground.”



Ottmar Edenhofer is deputy director and chief economist of the Potsdam Institute for Climate Impact Research and co-chair of the mitigation working group of the Intergovernmental Panel on Climate Change.



Everyone knows something must be done about climate change. The question is, what – and how? As the nations of the world debate what the future will bring, issues of justice inevitably arise. Does the developed world have a responsibility to sacrifice some of its prosperity to help the poor of the world achieve higher standards of living without further damage to the environment? Renowned climate expert Ottmar Edenhofer says cooperation and technology are both key to navigating the perilous future we face together.

The world's leading climate researchers agree that the Earth's system has certain tipping elements sensitive to global warming. Once specific temperatures are exceeded, events might be set into motion that we cannot reverse – receding ice caps leading to rising sea levels, melting permafrost in Siberia emitting substantial quantities of methane into the atmosphere or significant changes in ocean currents, for example. The dimension of these impacts on the planetary machinery has a profound impact on how economists think about climate policy and the whole climate change issue.

These events are hard to determine precisely. Even if their probability would be low, the impacts are very high. This is what some economists call a “fat-tail” distributed event. This has a very important implication: cost-benefit analysis cannot be applied if you are confronted and challenged by these kinds of events.

To deal with the potentially high impact of those tipping elements, we need a kind of precautionary principle. One such principle is that in order to avoid dangerous climate change, the increase of global mean temperature must be limited to two degrees Celsius, compared to preindustrial levels. This would hopefully result in avoiding large-scale risks to the planet. We have already increased the global mean temperature by 0.8 degrees over the last centuries, so we can afford an additional 1.2-degree

rise over the next century. But even if the actual concentration of greenhouse gases in the atmosphere could be stabilized right now, global mean temperature would still rise by 0.6 degrees. This adds up to already 1.4 degrees – just a little lower than the limit of two degrees the United Nations agreed upon.

We have already seen the implications for emission reduction profiles. In an ideal world, the only thing we as scientists would have to do is to communicate these insights to the policy makers. They then have to choose reasonable climate and energy policies in order to reduce emissions.

However, there's another risk, a very important one, emphasized in particular by the developing countries. And this is what I would like to call the risk of dangerous emission reduction.

If you look at the world's distribution of capital stock per person over the last five decades, the results aren't much of a surprise: The United States is very rich, Latin America is poor, Africa is very poor, and Europe is also relatively rich.

This distribution becomes a little bit more interesting if you compare it to how much CO₂ different countries have deposited in the atmosphere over the last five decades. The countries which have been successful in promoting economic growth and overcoming poverty are the same countries which have used the atmosphere to a large extent. And this is a one-to-one relationship. Historically, increasing capital stock per capita by one percent, also increased emissions by one percent.

Tragic Trade-off

We have never successfully decoupled economic growth from emissions. We are confronted with a tragic trade-off. A world where we have climate protection means emission reductions and sacrificing economic growth. Or we have economic growth without climate protection, and risk dangerous climate change. It seems that it has been

burnt in the memory of humankind that well-being, welfare, and economic growth are associated with burning coal, oil, and gas. This historical experience is the reason why so many developing countries are reluctant to accept binding commitments.

The crucial question is: Are we able to decouple economic growth from emissions growth in the next century? “Business as usual” leads to an increase of global mean temperature of around four to five degrees. So we risk really dangerous climate change. To achieve the two degree Celsius target, on the other hand, requires that we peak our emissions around 2020, then reduce emissions substantially by the end of the century. In the long run we have to achieve negative emissions.

There is a gap between what will happen and what should happen. Do we have the technologies, and can we transform our energy system to achieve the two degree Celsius target?

Our energy system is a fossil-fuel based energy system dominated by oil, coal, and gas. There's a little bit of nuclear power, a lot of traditional biomass (largely firewood), and a very tiny part of the mix is renewables. From now on, we have to transform our energy system substantially.

Renewables will be an important part of any future energy system. Another impor-

“The crucial question is: Are we able to decouple economic growth from emissions growth in the next century?”

tant element will be negative emissions. This means some kind of carbon extraction technologies like the almost CO₂-neutral use of biomass combined with carbon capture and storage, and nuclear power. The costs of implementing these solutions are between one and two percent of world GDP – in other words, postponement of economic growth for a few months between now and 2030.

Is this realistic? Can we expect such a transformation, based on what we have seen regarding the evolution of our international institutions, the Copenhagen Accord and the ongoing evolution of our energy system? I would argue that we cannot expect such a transformation unless we have international binding agreements.

Over the last five years, the carbon intensity around the world actually increased. After the recovery of the world economy we will have an even higher growth rate, and an increase in carbon intensity. This will lead to an increase in emissions.

But we need carbon intensity and emissions to go down, not up. It is quite clear that the scarce resources in the 21st century are not coal and gas, and oil; the limited resource is the capacity of the atmosphere. This is, from my point of view, the most important insight of the economics of climate change: We have to leave the majority of the reserves of coal, oil, and gas underground.

“We have to ... manage the atmosphere, one of the most important assets we have.”

This will reduce the profits for some companies and nations. And this is the reason why they will oppose any global binding agreement: Because such a treaty would reduce their resource rents. What we have to do, in one way or another, is transform their profits. We have to transform their resource rents into a kind of a climate rent, which is then the property right to the atmosphere for humankind as a whole.

Therefore it seems to me that we need global institutions that allow us to manage this transformation. These institutions consist of an international cap and trade system: A kind of atmospheric trust; promotion of climate-friendly technologies; funds to avoid deforestation; an international adaptation fund and a new kind of development policy, as outlined below.

Managing the Atmosphere

First of all, we have to recognize that the atmosphere is a global common. We have around 12,000 gigatons of carbon as exhaustible resources underground. And we can deposit just 230 gigatons of that in the atmosphere if we want to achieve the two degree Celsius target. That’s why the atmosphere is the limited resource, not carbon. We have to establish a kind of an earth atmospheric trust to manage the atmosphere, one of the most important assets we have, on behalf of humankind.

Innovative Technologies

Then the crucial question becomes how should we distribute, in a fair way, these emission rights over the course of the next century? To highlight these issues of fairness and justice, let me tell you a little fairy tale.

Think about ten people in a desert. These ten people have a limited amount of water. Two people drink a lot of water, and they have already used half of the water.

At some point, the whole group realizes water is a scarce resource.

So the two who have already drunk

the most come up with a splendid idea. They argue, “let’s distribute the rest of the water in a fair way so everybody gets the same amount of water.” Two people in the group are quite happy with that plan. The other eight people are not happy. They point out that the first two have already used half of the water.

In the end, it doesn’t matter: If the ten people in the desert start fighting about the proper way to distribute the rest of the water, in the end they will all die of thirst.

This is what economists call a serious zero-sum game. And zero-sum games cannot be solved. A philosopher could probably solve the problem, but there are no philosophers in the desert: They’re all sitting at home writing marvelous essays about why

it is not a good idea to walk through a desert with a limited amount of water. So philosophy cannot help us.

Instead, we need a bunch of people who undertake a trip to the next oasis together. The next oasis, in this case, is a carbon-free economy with a reasonable portfolio of mitigation options and new technologies. Without climate-friendly technologies, without innovation, I believe we cannot solve the climate problem. We have to distribute the water in a way which allows the whole trip to the next oasis. It might be plausible that the whole trip will reach the next oasis if the water is distributed equally among the group. However, without new technologies, this climate problem becomes a purely distributional zero-sum game. And humankind doesn’t have the capability to solve zero-sum games.

Analyzing the climate problem with the eyes of an observer who would like to see much more innovation, it is quite worrisome that research and development investment in renewable energy technologies is not as high as it should be. And R&D investments do not have the right composition to bring the appropriate technologies forward in the long run. In particular, we need new storage technologies for renewables and also investments in carbon capture and storage.

Stop Deforestation

Thirty percent of carbon emissions come from land use and land use change emissions, in particular deforestation. The south-

“To protect the forests, we have to think about how to compensate people who do not use them.”

ern hemisphere, in particular, is responsible for these kinds of emissions. Here we are challenged by another global common: The forests. To protect the forests, we have to think about how to compensate people who do not use them. But, again, such a compensation scheme is quite tricky.

This entire process is especially difficult given the interconnected nature of the global economy and its links to forests around the world. Even efforts to produce greener fuels seem to be backfiring. Increasing oil prices, for example, have led to an increasing rise in maize prices. Why was this the case? Due to the increasing oil price, it becomes incredibly competitive for the farmers all over the world to produce biofuels – in particular bioethanol and biodiesel. This means that the opportunity costs to protect the forests increased, because now the demand for food and the demand for biofuels have increased the land rents. That is an additional incentive for farmers not to protect the forests, but to chop them down.

This aspect is quite worrisome. Now the energy markets, in particular the oil market, are the most important force behind what happens in the agricultural market. The increasing demand for biofuels has led to an increase in deforestation. This is simply first-semester microeconomics.

However – and this is quite important – people who are designing the compensation mechanism to protect the forests have not taken into account the fact that oil prices determine what happens in the agricultural markets.

Adapting to Climate Change

Adaptation is quite an important issue. Even if we are able to limit the increase of global mean temperature to just one degree Celsius, there will be some climate change. In particular, poor countries have to adapt to climate change. And therefore an international adaptation fund has to help these countries redesign their infrastructure.

But if we take only into account infrastructure investments, we're not sufficiently understanding adaptation. We need also a new agricultural policy. An increase of global mean temperature beyond two degrees will have a severe impact on agricultural productivity, particularly in poorer coun-

tries, and in particular in Africa. Here, again, we need a redesign, in particular of the European agricultural policy. To deal with a decline of food production we need an integrated agricultural market where poor countries have access. Otherwise, I do not think we can prevent food crises in the future.

Finally, we need to redesign development policy. When we distribute our emission rights according to equal shares per

“The energy markets ... are the most important force behind what happens in the agricultural market.”

capita – let's say by 2020 each person on earth has the same right to emit CO₂ – across the globe, it is quite obvious that the poorest countries, particularly in Africa, will substantially benefit from this scheme. We should use the international cap and trade system as an important tool to redesign and to enhance development policy. An international cap and trade system is an important device to mobilize money, which then can be invested in the poor countries.

This is, from my point of view, the global deal we need. Even if you are not so interested in climate policy, these kinds of global institutions are necessary to manage our global commons. The atmosphere and the forests are some of the most important examples of a global common resource.

We need these institutions in order to manage other global crises, like the food crisis and the migration problem. While it seems to me these kinds of global institutions are absolutely necessary, I have to say I do not know if it is likely global institutions like this will be implemented in the next five years. In the end, it is up to us to make it likely. 

This is a condensed version of a speech given at the session on Climate Change and Energy. More can be found at www.ourcommonfuture.de/edenhofer

Water in a Global Perspective

“Sustainably solving the world’s water problems will come at a high price.”



Wolfgang Kinzelbach is a professor of hydromechanics at ETH Zurich. His research focuses on sustainable water resources management in arid and semiarid regions, mainly in Africa and China.



With all the discussion about the world's dwindling supply of fossil fuels, another critical substance is often overlooked. Life on Earth depends on water, and yet the world is well on its way to a water crisis. All across the globe, farmers need more water to supply food for a growing world population. Water expert Wolfgang Kinzelbach of ETH Zurich says a combination of political will and creative technology is needed to get us safely through the decades to come.

In South Africa, there's a popular slogan: "Save water, drink wine." Sadly, the slogan is completely wrong. To produce one liter of wine, you need about 900 liters of water. That's water for the vine to grow and the leaves to develop, water for the grapes to ripen, and water to wash the bottles before you fill them.

This false slogan illustrates a problem in the public debate over water resources. When we talk about water, most people just think about drinking water. Drinking water is a minor, even negligible, problem as far as water quantity is concerned: What we really need water for is to grow plants and, more specifically, food.

Banking Water

In truth, we have two types of water. One is the surface water you see in lakes and rivers. The other is ground water hidden under the surface. They're very different, in two ways: Surface water has a relatively small volume but a large renewal rate, while groundwater has huge volume but a very small renewal rate. Surface water takes, on average, two to three years to exchange once, while groundwater takes thousands of years to exchange once.

Think of it in terms of a bank account. When setting a budget, the important thing is our monthly paycheck, not the money in our savings account. Savings are for when we get into trouble and need to fix the car – just like groundwater is important when we

have a drought and have to pull up water to save the harvest. But we should base what we really do on the rapidly renewing surface water. Groundwater is not something which goes well with large-scale irrigation.

Another difference is between blue and green water. Green water is the rainwater which is stored in the root zone of the plants and released into the atmosphere again through the plants' evapotranspiration. Blue water is runoff left on the land. It collects on the surface or comes out of springs, flows into channels and rivers, and then on to the ocean.

When we look at rain-fed agriculture, we talk about green water use. It's the rain which is stored in the soil and then evaporated by the plants. Irrigated agriculture is blue water use.

Only blue water is easily managed and distributed. Green water can be managed only indirectly by land-use change.

Finally, we distinguish between nonconsumptive water use and consumptive water use. If I wash my hands, the water is, for example, coming from the Rhine River. It will go down the sewage canal. It will go to the sewage treatment plant. And it will return to the Rhine. It has just made a detour. I didn't use the water: I used its cleanliness, maybe its low temperature, but not the water itself.

This is different in agriculture, where water is evaporated. It's not lost, but it probably doesn't come down as rain in the same catchment area it was taken from. So, as far as the catchment is concerned, it may be lost, or consumed. This consumptive use will have a consequence. If the people upstream use a lot of water for agriculture, they evaporate it and the people downstream will lack that water.

Water into Wine

Finally, there's virtual water. This is a term coined by John Anthony Allan, a British geographer and economist. We call it virtual water because there is water which has been

used in the production of a good which is afterwards not contained in the good, like the 900 liters it takes to make one liter of wine.

To put this in perspective, most people drink two to five liters of water a day. Yet one kilogram of grain takes in its production 500 to 2,000 liters of water, making grain essentially concentrated water. If you use that grain to feed animals, then the water is doubly concentrated, or more. And one kilogram of animal products – meat or milk – consumes 5,000 to 15,000 liters of water.

Should we become vegetarian? I think if we look at this question a bit more scientifically, then we should differentiate care-

"In 2025, there will be three billion people living in areas with scarce water resources."

fully – if we told countries like Mongolia, Botswana or Argentina not to eat meat but to grow food on their prairies, they would ruin their countries, just as in the Dust Bowl in the United States almost a hundred years ago. Usually, the only reasonable way of turning a prairie into edible calories is to put cows or sheep on it.

Competition for Resources

But in most of the world, the intense water use that comes along with agriculture contributes to a growing, and urgent, problem: Water scarcity. According to the UN, serious water scarcity starts when there are less than 1,000 cubic meters per year, per person in a region. That's not just water for drinking, it's water for everything from agriculture to industry. According to that definition, we had about 400 million people who fell into this category in the year 2000. In 2025, there will be three billion people living in areas with scarce water resources – more than a sixfold increase.

Scarcity is growing for four reasons. Reason number one is population growth to about 9 billion by 2050, when hopefully it will stop and decline again. Our task is not really to fight against the exponential curve,

it's to make it to 2050 – if we manage that, then afterwards things will become better again. Second is an increase in living standards. The fact is that the last doubling of population caused a tripling in water use. We eat better, we drink better, we do more for our hygiene – we each use more water. Third is the water required for agrofuels. Fourth, and finally, there's climate change. Climate change does not change the amount of water we have on Earth, but it changes the distribution of rain on the surface of the Earth.

Due to all of these factors, global demand could double in the future. That makes water security a global problem. How do we make global water consumption sustainable and avert a water crisis? First we must look at the ways in which our water use today is deficient. There are many practices today for which there is no simple alternative, but which at the same time cannot go on indefinitely without running into a crisis.

One example is the depletion of a finite resource which cannot be replaced. If a country lives on groundwater alone because there is no other perennial water source, and this groundwater is pumped out faster than it can be replaced, you have an unsustainable situation. The same goes for soil: If we erode it faster than it is formed, we will have none left in the end. And the same goes for biodiversity. You cannot recreate species which are extinct.

Another example is the accumulation of substances in the soil or groundwater. Salt accumulation may be a very slow trend. But

“How do we make global water consumption sustainable and avert a water crisis?”

if you go on accumulating, you reach a limit where plants cannot do their osmotic work and the soil becomes sterile. Salts and heavy metals are “ingredients” which could accumulate and carry us over game-changing thresholds. Unfair allocation of a resource is also a situation which might not

be sustainable. If users upstream are taking all the water, people downstream might have a problem – maybe even to the point of an armed struggle. The breakdown of institutions due to bad governance is also unsustainable. And runaway costs for water would be as well.

So what are the largest problems of unsustainable water use on Earth? The first is of course the depletion of aquifers. One-quarter of all withdrawals are nonrenewable. It's fossil water, which is not renewed. And 40 percent of irrigated agriculture in the world is affected by declining groundwater levels.

The two worst places are in India's Ganges valley and in the North China Plain. In the North China Plain, the pressure on underground water resources is so heavy that the price of water has gone up, because more electricity is needed to get the water up from the lowered groundwater table. As a result, it is no longer economically feasible to grow irrigated wheat in the North China Plain. The irrigated wheat farming is migrating to the country's northeast, where it can be grown with rainwater. That is one way of adapting to the situation.

The situation in India is more critical. In India, unsustainable water use is encouraged by the fact that electricity is free for the farmers. Whenever something is free, there's no incentive to conserve or value it. And that is what is happening with water: Indian farmers pump it from the ground excessively because the electricity is free. No exit strategy is on the horizon. Politicians are reluctant to impose unpopular tariffs on electricity in the countryside.

The important thing to remember is that you can do things which are not sustainable, but only for a while. You can do them to gain time, and as a temporary fix. But you need an exit strategy. China's exit strategy is two-

fold: Number one is the water transfer from Southern China to Northern China. And number two is a land grab in Africa, where food for Chinese cities will be grown in African fields instead of on Chinese land. This is a way of adapting to the situation, but whether it's a good way is another question.

Damming Diversity

Another growing issue is the decreasing flow of rivers in low-flow season. Many rivers which used to be perennial – the Nile, the Yellow River – have become seasonal rivers. On the Yellow River, for example, reservoirs have been built to an extent that their combined storage volume now equals the average annual flow of the river. That means that

“The world's wetlands have shrunk by 50 percent over the last century ... due to competition.”

in an average or below-average year you can retain every drop of the river's water within the watershed, and not leave anything to the sea.

Damming the river's upper stream, of course, has a lot of repercussions on the lower reaches of the river. The most tragic example for upstream use leading to downstream misery is the Aral Sea, where water is now evaporated in agriculture upstream instead of in the lake. As a result, what was once a vast inland sea has almost vanished, except for a small basin which is saved by a dam.

The world's wetlands have shrunk by 50 percent over the last century. In the first part of the century, wetlands disappeared in North America and Europe. In the second part of the century, it's Asia and Africa that are losing their wetland biospheres at a rapid rate due to competition from agriculture both for land and water. With the loss of the wetlands we lose biodiversity, which may be very important for our survival in the future. An example of a wetland, which can still be saved, is the Okavango Delta in Botswana, where I've been doing research for the last 12 years or so. If the interna-

tional community can help the upstream countries save water, the decrease of the swamp area could still be stopped.

Hope for the Future

All this is not to say the situation is hopeless. If we want to solve these water problems, we must start with the biggest user: Agriculture. There is no other way. We could make dramatic strides in water conservation – on the order of 1,000 cubic kilometers per year – by implementing improved technology. Nowadays, if a Pakistani farmer takes one cubic meter of water out of a reservoir and brings it to his or her field, half is lost on the way. Half of that is lost in the field itself to non-productive evaporation from the bare soil or seepage. And when you bring the grain to your granaries, about 40 percent of it is lost to fungi, rats, and other avoidable pests, making a final efficiency of water use of around 10 percent. It could be easily doubled, which means producing the same amount of food with half the water. Food losses occur also in rich countries like Germany or Austria, where food worth 300 euros is thrown in the garbage per person, per year. About 10 percent of the food sold in supermarkets is thrown away before the package is ever opened. These are all places where we can really save a lot with smarter management.

Another important technological application is increasing the yield of rain-fed agriculture. A big chunk of our food comes from rain-fed fields, and making this area more efficient through the use of biotechnology – for example by breeding drought-resistant and high-yielding strains, perhaps using genetically modified organisms – will be an important tool.

Division of Labor

And then, of course, there is the increasing efficiency of the international division of labor. We should grow wheat where there is a marginal advantage of growing wheat, rather than growing wheat in the desert

where we ruin the water resources as a result. In water terms, that means that for some countries increasing imports of “virtual water” in the form of grain will play a big role.

There are less sweeping, more local options, like rainwater harvesting, new dams and the desalination of seawater. Wastewater recycling can increase the water we have at our disposal. And resettlement of people and birth control are ways to reduce demand for water and the products made from water. But of course these all carry costs, whether in terms of energy or political capital.

Water Saving

How much more water do we really need? Taking into account population growth, unsustainable practices, and mitigation of climate change, plus agrofuels, we will need 4,000 to 6,000 cubic kilometers more per year. If we cut out agrofuels, which at present are disastrous for the world’s poor, we still need 3,000 to 4,000 cubic kilometers more per year, either in increased resources or water saved. The task is enormous, if we consider that the present blue-water use of about 4,500 cubic kilometers per year cannot

“There’s no doubt ... the water resources remaining for natural ecosystems will further decrease.”

be increased substantially. The potential of all water-saving and resource-enhancing options is on the order of 3,000 cubic kilometers. Any remaining discrepancy will most probably be covered by taking green water from natural ecosystems.

There are already serious regional water problems. We don’t have to wait for the future to see water scarcity. But these problems are increasing in intensity for the reasons I have described. Part of our present water supply is not sustainable. And climate change will increase the pressure on water sources.

The only way to avoid a global water and food crisis, in my opinion, is to do without agrofuels and to use our water much better than we do today. This involves not only the

solution of technical problems but also of socioeconomic problems which, as a rule, are more difficult to solve and time-consuming. Sadly, there’s no doubt in my mind that the water resources remaining for natural ecosystems will further decrease in favor of agriculture.

Generally, I think humankind will have to allocate a larger portion of its income to food and water in the future. Food has become less and less expensive over the last century. This is not a natural law – the food price fluctuations we have seen in the last few years are an indicator that this time is over. If we allocate enough of our resources to the problem, we can do anything; but sustainably solving the world’s water problems will come at a high price, and that means more money spent on food.

As an engineer, I’m optimistic about our ability to overcome the water problems, given the political will to do it. But I’m less certain that we can allocate the resources on the Earth in an equitable way to all of its inhabitants. That’s the really big problem, and unfortunately I have no answer for that.

This is a condensed version of a speech given at the OCF conference’s sessions on Climate Change and Energy.

More can be found at

www.ourcommonfuture.de/kinzelbach

The Third Revolution

“We stand today on the verge of another grand transformation.”



Nebojsa Nakicenovic is deputy director of the International Institute for Applied Systems Analysis (IIASA) and professor of energy economics at the Vienna University of Technology.



Nebojsa Nakicenovic argues that we need nothing short of an energy revolution comparable with the Neolithic and the industrial revolutions to achieve further development in the world and goals of a sustainable, equitable future. Addressing the Our Common Future conference session on Climate Change in Hannover, Nakicenovic – an expert in long-term patterns of technological and climate change – said the next revolution will take investment in research and deployment, sound policy, ingenuity and above all commitment.

Before discussing possible future developments it is instructive to first look at our past. Humanity has evolved in the more recent history through major revolutions. Going back a few million years, human beings lived as hunters and gatherers. This way only a few million people could be sustained on the planet. The Neolithic revolution, some five to ten thousand years ago, led to the domestication of plants and animals. This innovation resulted eventually in the development of agriculture and city-states, both of which enormously expanded the niche of humans on this planet. This transformative change can be also seen as the first energy revolution: Enhanced productivity in agriculture enabled to harness human and animal muscle power and thereby provide the essential mechanical energy for basic human needs, from building settlements, infrastructures required for essential activities from water pumping to mobility and food processing.

By the year 1700, there were about 900 million people on the Earth exceeding one billion shortly after the 1800s. About this period came the Industrial Revolution, the second major energy transformation in the Earth's history. The inanimate sources of energy with the development of the steam engine and other innovations were able to replace human and animal work and thereby further expand global population to seven billion people today. The “age” of coal

and steam was followed by the “age” of oil and gas, internal combustion engine, electricity and numerous other technologies, institutional and social changes. The explosive development initiated with the industrial revolution is still under way.

The last two centuries of this unprecedented development in the world have improved the human condition enormously. The gross world product now stands at almost ten thousand dollars per capita, which is sufficient to provide for a good average quality of life. However, at the same time, inequities are increasing and the “bottom billion” has to live on barely a dollar a day. A predominant social issue that is increasingly becoming a major preoccupation for world leaders is addressing social inequality and poverty, especially in the developing world. These contrasting developmental patterns have not only resulted in increasing gaps between the poor and the rich but also in adverse environmental impacts on all scales, from indoor air pollution to climate change and biodiversity loss.

We stand today on the verge of another grand transformation or revolution. In terms of demographic change, we are at a crossroads: Most population projections indicate another 50 percent increase in the global population, to about nine billion people by mid-century, followed by a decline to about or below the current level of seven billion. All of that increase will essentially be in cities. Already, more than 50 percent of the global population lives in cities. Urban population will probably double to about six to seven billion people in the second half of the century.

The combination of rapid urbanization, end of population growth and approaching planetary boundaries mark the possible emergence of the third grand transformation to emissions-free development pathways. One of the major challenges is to provide sustainable access to energy and ecosystem services. These include food and water for the half of the humanity that's essentially excluded from global prosperity.

Universal Access

In many ways, the industrial revolution has propelled only half of the global population into affluence. About three billion people still have to cook with solid fuels, about half a billion with coal and two and a half with noncommercial biomass. Of these, about half a billion live in sub-Saharan Africa; the rest are mostly in Asia. Many of these people either have no or inadequate and unreliable access to electricity.

Universal access to energy services is a prerequisite for development and is thus an essential development goal in itself. There is another, little-known dark side to this lack of access. The World Health Organization estimates that on the order of one and half to two million children die prematurely each year from respiratory diseases related to indoor air pollution that is caused by cooking with an open fire in enclosed rooms. Providing access to energy will have a health co-benefit as well. The challenge is to provide both upfront investments and adequate subsidies for “priming the development pump” until access can enable productive activities that generate income and make energy services more affordable. Other co-benefits in addition to health would include time released from collecting solid fuels for other productive activities.

The problem is not one of lack of energy resources or renewable potentials. From coal and oil shale to frozen methane, there are ample occurrences of hydrocarbons, many of which could be economically tapped in the future provided that appropriate technologies are deployed and environmental compatibility resolved. The vast quantities of carbon in resources also indicate that the planetary boundaries associated with climate change would indeed present the ultimate limit to future extraction of hydrocarbons. This means that in the future there is an urgent need to use alternative, non-carbon sources of energy or decarbonize fossil energy sources. This can be done by carbon capture and storage technologies. Many of the components have been in use by the oil industry for enhanced

oil extraction, however the quantities of separated carbon to be stored in the case of fossil energy decarbonization would be truly gigantic (in orders of gigatons of carbon dioxide). Storage possibilities can pose limitations as well as potential risks and the need to store carbon for millennia to come.

Uranium resources are also vast and with advanced fuel cycles practically infinite. In this respect the nuclear option could lead to a substantive reduction of carbon dioxide emissions by replacing fossil energy. The limitations however are due to risks of accidents as the Fukushima plants have experienced in the aftermath of the gigantic tsunami in 2011. Furthermore, there are inherent risks of proliferation of fissile materials and the need to store the waste products for millennia.

Fortunately, renewable energy potentials are also vast. The economic potential of renewables is in the range and may even exceed the current global energy requirements. The technical potential is truly huge and for obvious reasons solar energy potential is practically inexhaustible.

A robust conclusion is that we are not really limited in terms of energy potentials or resources. We may be limited by our ingenuity, by the capability of our economic system, and by the will of our political institutions to achieve the energy revolution under way toward a more sustainable future. But, in principle, energy resources and potentials are there.

Vigorous Decarbonization

The real limitations to future energy use are the environmental and planetary boundaries, particularly climate change. To keep the Earth's climate within two degrees of its preindustrial temperature, future global emissions need to reach a peak this decade, proceed to decline by about 80 percent by the middle of the century, falling to zero or even becoming "negative" in the second half of the century. The later the peak, the more "negative" the emissions need to become. By negative emissions we understand the situation where carbon is effectively removed

from the atmosphere. A possible technology is sustainable biomass with carbon capture and storage. From the energy point of view, nothing short of a revolution is necessary to bring the changes required to achieve such radical emissions reductions. The key question is whether the vigorous decarbonization is possible over the next four to five decades and whether this transformational change would bring other benefits beyond the direct ones for the energy system and climate.

Transformational Change

Fundamental, game-changing energy transformations are needed for a shift toward more sustainable development paths. By significant investment in new technologies and decarbonization multiple co-benefits may be achieved – from provision of affordable access to energy services and creation of new business and economic opportunities to averting the threat of climate change. Decarbonization of the global economy is such a paradigm-changing transformation. In the energy area, this implies a shift from traditional energy sources, in the case of those who are excluded from access, to clean fossils and modern renewable energy. It also requires a shift from fossil energy sources to carbon-free and carbon-neutral energy services in the more developed parts of the world.

In all cases, the transformational change means a vigorous improvement of energy efficiencies, from supply to end use, expanding shares of renewables, more natural gas and less coal, vigorous deployment of carbon capture and storage, and in some cases (where it is socially acceptable and economically viable) also nuclear energy.

All of these energy technologies need to mesh with emerging innovations in energy networks and end use in the direction of smart integration. There is enormous potential for most renewables such as solar energy. High shares of intermittent renewable energy require development of smart grids to harmonize supply and demand that would also include storage and gas power plants as reserve capacity (or virtual storage). There are even

projects in the works to tap the solar energy from remote deserts such as from the Sahara to supply power to Europe and sub-Saharan Africa or from the Gobi desert into metropolitan areas of coastal China. With advanced nuclear technologies, in principle we could do the same. This kind of revolutionary change would occur at a number of levels, from local and distributed to centralized generation. The very nature of energy end use would be undergoing fundamental transformation toward more self-organization and Internet-like structures and integration.

The emerging new energy systems require two complementary co-evolutions – one is technological and the other institutional. With new technologies and systems, new business models and institutional arrangements will emerge. All of these complementary and co-evolving transformations would imply and require market, regulatory and behavioral changes.

Sustained Investments

Using a holistic and integrated approach, researchers at IIASA (2011) have identified management and policy options that could bring about the transformational change of energy systems. The possible benefits of this transformation, or energy revolution, would include:

- Vigorous reduction of greenhouse gas emissions in order to avert dangerous climate change;
- Universal access to affordable energy services by 2030;
- Improved air quality and improved human health and life expectancy;
- Improved energy security (reducing reliance on energy imports and reliability of energy systems);
- Avoided costs associated with the adverse impacts of climate change; and
- Avoided energy subsidies.

Preliminary analyses indicate that these additional benefits outweigh most of the investments associated with achieving the revolutionary energy transformation. Fur-

thermore, in many cases, the benefits are demonstrable in the short term and on national and local scales. Thus, there is a strong argument for an integrated development strategy, focusing on energy and climate as the key entry points with many co-benefits that achieve other environmental and social objectives.

The above-mentioned benefits can collectively be seen as the motivation for a “green growth” and decarbonization devel-

“Negawatts’ are cheaper than ... kilowatts.”

opment pathway, one that is necessary to move both mature and emerging economies toward a more sustainable future.

The most cost-effective greenhouse gas mitigation measures are increased energy efficiency and energy conservation. Energy efficiency improvements are among the most cost-effective options. “Negawatts” are cheaper than capacities for additional kilowatts. They lead to significant and long-term energy and emissions savings.

Increased use of renewable energy, expansion of nuclear capacity, and improvements in energy efficiency and conservation would reduce both greenhouse gas emissions and other airborne pollutants such as sulfur dioxide, nitrogen oxides, and particulate matter. This would not only reduce the investment required for pollution control, but the resulting improved air quality would improve human health and lower health costs.

The estimated co-benefit value of reducing the emissions of air pollutants – including particulate matter, sulfur dioxide and nitrogen oxides – is in the range of US\$400 to \$500 billion per year and that up to 50 percent of air pollution emissions could be avoided by deep cuts in greenhouse emissions.

Many energy scenarios include additional costs for improving energy security through limiting energy imports and supporting larger domestic energy production, often despite higher costs. The co-benefits of an integrated energy and climate strategy would avoid energy security costs of some

US\$100 to 300 billion per annum. This does not include economic impacts that could result from ensuing political instability such as in North Africa and the Middle East or other disruptions to oil and gas supplies.

The development of technologies to reduce greenhouse gas emissions, such as carbon capture and storage or solar photovoltaics, serve as an example of how “green growth” can stimulate economic growth. Green development pathways also generate

local employment, particularly in the case of sustainable energy options such as renewables and efficiency improvements. The co-benefits, including avoided costs, associated with the transformational change associated with the next energy revolution offset most of the investment costs.

These policies also advance the broader UN Millennium Development Goals. Energy is cited as the missing MDG, recognized by ministers and government representatives from 71 nations, including Africa, Latin America, and India in a declaration calling for 2012 to be designated by the United Nations as the “International Year of Energy Access” and the General Assembly Resolution to declare 2012 the “International Year of Sustainable Energy for All.” These calls were reiterated at the Cancun climate talks in 2010, further reinforcing the relevance of energy to climate objectives. Energy would be an important entry point for addressing sustainable development at the Rio+20 Global Summit in 2012.

The policies and decisions on future energy sources, the efficiency of their conversion into energy carriers such as electricity, and the changing nature of energy end use in providing goods and services for human well-being, will profoundly enhance our ability to reduce poverty, improve health, minimize adverse environmental impacts, and avert dangerous climate change, whilst still empowering development. Progress, however requires a diverse and integrated portfolio of actions and

policies applied at local, regional, and national scales and across sectors.

Conclusions

Greenhouse gas mitigation through an integrated energy and climate strategy is environmentally, socially, and economically viable if the many co-benefits and avoided costs are considered. Governments must look beyond short-term costs and consider both the short- and long-term benefits. This would bridge the “gap” that exists today between the needed investments for the energy transformation and the possible co-benefits that today cannot be fully appropriated by those who would provide the necessary finance.

The cumulative nature of technological and associated institutional changes, all compounded by deep uncertainties, require innovations to be adopted as early as possible in order to lead through experimentation and evolutionary changes to lower costs and wider diffusion in the following decades. The longer we wait to introduce these advanced technologies, the higher the required costs and emissions reduction will be as well as the “lock-in” into the old structures. The transformational change toward more sustainable futures requires enhanced research, development and deployment (public and private) efforts as well as early investments to achieve accelerated diffusion and adoption of advanced energy technologies and systems. The possible benefits of such revolutionary change would outweigh the needed investments. Achievement of universal access to energy services represents a humble and doable portion of the total investment needs.

The evident crisis of the “old” development patterns is an opportunity for the “new” ones to emerge and a possible beginning of the third energy revolution. 

This is an updated version of a speech given at the OCF conference’s sessions on Climate Change and Energy.

“As scientists, we want to be as **neutral** as possible.”

Liadi Mudashiru

“We should find **positive** metaphors to communicate.”

Clare Saunders

Research results and respective news about climate change have become so common that the topic threatens to fade into the background. At the OCF conference, we asked two young researchers from different fields – British political scientist Clare Saunders and chemist and energy researcher Liadi Mudashiru – to discuss ways researchers could boost public understanding and engagement in this important issue.

► In the field of climate change, there's always new research coming out that trumps the old assumptions. Sorting through that can be overwhelming for the average person. How do you break through to people who are desensitized to this topic?

Mudashiru: It is part of our responsibility as researchers to be able to communicate what we do in the laboratory and behind the scenes to the public. Over the past five years, I've been a UK Science and Engineering ambassador. As part of the program, young people like me go to secondary schools. We use our energy, enthusiasm and passion for science to introduce a new young generation to the subject. We also have a national organization called the British Council for the Advancement of Science. We host an annual science festival in the Houses of Parliament. This has given us the opportunity and the platform to talk directly to the policy makers.

Saunders: I've gone to schools to do some outreach work. I try to give lively talks and relate things to people's individual lifestyles. Also, more of my work now is shifting towards understanding behavior change. General research on behavior change shows that we should find positive metaphors to communicate about environmental problems. So if we have headline articles saying, "Danger! Danger! We're all going to die!" people



OCF Fellow Liadi Mudashiru, born in 1972, is a research associate at Newcastle University. His background is in chemistry and geosciences. For the past three years, he has focused on the clean use of fossil fuels.



OCF Fellow Clare Saunders, born in 1975, is a Research Council UK Fellow in energy and climate politics at the University of Southampton. She is a passionate advocate for the climate in her private life as well, organizing protests and training camps for environmental activists.

just switch off and bury their heads in the sand. So instead of saying "we need to avert dangerous climate change," we say "we need to look after this wonderful planet that we've got."

Dr. Saunders, you're a social scientist. Dr. Mudashiru, you deal primarily with energy research. What can you learn from each others' academic disciplines?

Saunders: I would really like to know more about carbon capture and storage on the basis of some of the things I've been studying. For example in 2008 in Kingsnorth in Kent, there was a big demonstration with around 2,000 protestors. They were there to protest against new coal-fired power stations being built. It was called partial carbon capture storage. I don't know if the activists knew exactly what partial carbon capture storage is. I'm curious whether the activist discourses make sense from a scientific perspective. Which science do they draw from to create their arguments? And how? And why?

Mudashiru: I do agree with you, there is a lot of synergy. What we are trying to do is not downgrade the risk but better communicate the risk to the public. There have been various disasters but public engagement has been very successful. For instance, in France, the oil and gas company Total successfully built a carbon capture storage facility without any protests. It's because from day one the company embedded public engagement in the project management. It was very transparent. You could go on the Internet to see what they will do with the factory. So I think there is room for a lot of collaboration when it comes to communicating with the public.

Is there a danger of oversimplification when it comes to explaining climate science?

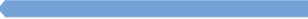
Saunders: Policy makers want to know: "What is the truth? Where do we stand?" But



science is always this continually evolving process. There is no such thing as smooth facts. When you communicate to school-children, you can really simplify the message. When you communicate with the government, there is a real danger in saying, “This is what we know. This is the definitive fact on this.” Also, it’s important to take the human factor into account with anything that’s technological. All technological solutions have to become politically acceptable and socially acceptable as well. Therefore, some social scientists suggest that what we need is a more discursive forum. That way, when a carbon capture and storage facility is proposed, for example, you can expand the conversation.

Mudashiru: I think that has always been the danger. People in the scientific community, we think we know it all. But the public doesn’t like that. They want to be part of the process. They are very skeptical. They think we oversimplify risk – that we cover things up – especially when your research is being funded by big corporations like Shell. But as scientists, we want to be as neutral as possible.

Saunders: But it’s so hard isn’t it? Because you can say “the science shows this, but this is the confidence interval we have.” And the minute you say that it loses the headline impact. And there’s no way around it. It’s the difference between making something snappy and being truthful and neutral at the same time.

Mudashiru: I think there are lessons to be learned. I think it will be in our own interests to be as transparent as possible. And people like Clare in her profession can help us do that. Because we scientists – we are not very good at communicating. But things are changing. 

Green Urban Design

Cities, the Labs of the Future

Cities only occupy about two percent of the Earth's surface, but they consume the majority of the planet's resources. Balancing the demands for food, fuel, and water with a finite natural supply is a tough equation to solve. Yet cities are also fertile spaces for change and experimentation. Environmental governance expert James Evans, a participant in the OCF workshop on Climate Justice, says when we stop looking at cities as the problem, we may be able to unleash city dwellers' capacity to solve the issues of the future.

▶ James Evans has a message for the world: The prevailing image of cities as giant masses of concrete has to change.

That perception doesn't fit reality in many cities, which actually demonstrate incredible environmental diversity. Birds build nests in the eaves of apartment buildings. Trees crack through concrete sidewalks. Flowers sprout on the embankments of busy roads. When given the opportunity, nature flourishes in cities.

The diverse city landscape can provide rich resources like cleaner air and water and access to healthy locally grown foods. For scientists, the city is potentially a ready-made laboratory for ideas that have the power to change the world for the better. The density and diversity of the cityscape lends itself to innovative solutions to challenges involving global warming and climate change, says Evans, an urban sustainability researcher at the University of Manchester.

Cities are suited to this kind of experimentation because researchers have access to diverse populations of people with a variety of needs and expectations. There is also usually more money and infrastructure to draw upon.

Take urban gardening: Brazil's largest southern city, Curitiba, pays residents to plant indigenous plants in their gardens in order to preserve biodiversity and prevent soil degradation that could lead to floods or



OCF Fellow James Evans, born in 1977, is a lecturer in the geography department at the University of Manchester and author of *Urban Regeneration in the UK: Theory and Practice*.

droughts. The indigenous plants also provide natural filtration of water and air tainted by pollution.

A food program in Vancouver, Canada, connects residents willing to share their yards with amateur farmers who want to raise crops. Those crops are then sold cheaply at local markets. Innovative community-led approaches like this improve quality of life for residents.

"Residential gardens can be amongst the most biodiverse habitats on the planet," says Evans, who grew up on an English farm. "There's more biodiversity in many gardens than in parts of rural England that we have

romanticized as being so natural." Transport is another area where cities have the capacity to lead the way for the rest of the world. "You could just use electric cars in the city, but only hire a petrol car when you want to drive long distances. Or you could simply improve high-speed rail lines between cities. Or you could have electric taxi vehicles in a city pool," Evans says. "It's about changing how people think. If you get them to buy into it, it'll happen."

Hamburg, Germany, for instance, is in the midst of an environmental experiment with its hydrogen-powered bus program. Hydrogen has the potential to reduce greenhouse gas, pollution, and improve energy security in Europe, so the city supported implementation of a hydrogen-powered bus fleet. The innovative program works because there's already a public transport network in place, the buses only need to make short trips, and locals are open to change. By initially experimenting with this technology in a city, scientists work out problems first, and can then spread the program to other places that don't have the same level of preexisting infrastructure.

But to turn urban spaces into effective laboratories, Evans says, individual cities need to create public and private partnerships to encourage such experimentation. "The lesson of my research would be that we need to make it possible and easy for people to try new things – I'm talking about residents living on a street, neighborhood associations, municipal governments, or a company that wants to deploy new technology," says Evans.

Supporting experimentation in the area of urban sustainability can include rewarding companies and individuals who cut down their energy use or better educating residents on ways to shrink their environmental footprints. "We need a social transformation in how people think and work," Evans says. "But this is feasible. The problem is helping people understand that another way is better." ▶

Turning Google Earth Into a Global Warming Teaching Tool

Using a tool that’s high tech, easy to use and – most importantly – free, members of the Global Young Faculty put together a way to reach out to the public over the Internet. The result is called “Facing Climate Change,” and it could be coming soon to a computer screen near you.

▶ When the members of the Global Young Faculty Climate Change team came together in 2009, one thing was immediately clear for their common project: An in-depth scientific project targeted to the academic community wouldn’t make a lot of sense.

“We all came from very different disciplines,” says team member Florian Leese, a researcher in the Department of Animal Ecology, Evolution, and Biodiversity at the Ruhr-Universität Bochum. “Many of us didn’t necessarily have a lot of specific expertise in climate change. But we wanted to close the gap between scientific knowledge and public perception.”

The team decided their project would have to reach out to the masses. And the obvious choice to do that? That free high-tech tool called Google Earth.

In 2010, the team created a Google Earth “layer” – a sort of overlay on the Google Earth map that gives users specialized information – focusing on the different local and global faces of climate change, its implications, and best-practice examples to confront it.

Called “Facing Climate Change,” the layer aims to get basic scientific information

across to the public in an accessible and eye-opening way.

Click on a spot in Brazil, for example, and a documentary on the country’s role in climate change pops up. Click on another spot in the Arctic and there’s a simulation of changes in sea ice coverage as global warming happens.

Other spots on the world map offer presentations by or interviews with prominent scientists, among other neat features.

The idea is to give laypeople the most current scientific information on climate change without forcing them to slog through complex academic papers, decipher tough equations, or attend a seminar far from home. Instead, they can just point and click to explore the changing world from the comfort of their home or office. By improving communication, unconventional and successful strategies to confront climate change in remote parts of the world may become best-practice examples for others.

While “Facing Climate Change” appears slick and easy to use, creating it wasn’t so simple. Team members had to figure out how to program the layer, which is similar to Google Earth layers that automatically display all the restaurants or hotels in an area, for example.

It was also hard work coordinating with colleagues from around the world to create the necessary content. Much of it is original and created exclusively for the layer. “Facing Climate Change” isn’t ready to be officially released yet due to some copyright issues,

but it should be ready to go online soon. Once it goes live, users will be able to download the layer and install it into Google Earth themselves. A future goal is getting Google to include it in downloadable releases of Google Earth, something the team is currently negotiating.

And if the public finds it useful, there are all kinds of possibilities for future incarnations of “Facing Climate Change.” More case studies from other regions and simulations of the consequences of global warming are potential add-ons.

For now, though, Leese and his colleagues are just happy that they created a successful project. Even among the hard-charging academics, there was always a niggling fear that they might not be able to pull the thing off. Indeed, much of the most important work on the layer happened in just the last few weeks and months before the Our Common Future conference.

Demonstrating the team’s work at a mammoth touch-screen station in the lobby of the Essen Philharmonic during the Our Common Future conference, Leese sounded as proud as he was relieved. “I think we planted a seed for something pretty cool and important,” he said. “This may really going to help educate the public on climate change realities.”

More can be found at
www.facing-climate-change.org

Climate Governance



Klaus Töpfer was German Federal Minister from 1987 to 1998, headed the United Nations Environment Program from 1998 to 2006, and is currently director of the Institute for Advanced Sustainability Studies in Potsdam, Germany.

“Take small steps, make incremental changes, and you’ll see the world is changing much faster than you expected.”

In a world where pessimism reigns, it takes real leaders to keep pressing for change. Former German environment minister Klaus Töpfer chaired the workshop on Climate Justice and Climate Governance at OCF. He challenged the leaders of the future to attack the issue on multiple fronts and talked about some of the obstacles to progress faced by politicians trying to negotiate a global climate agreement.

► **Has it become harder to push for climate justice in this economic climate?**

Töpfer: Without any doubt, the financial and economic crisis concentrated a lot of political focus away from climate change. More and more people are saying, ‘Maybe first we have to solve the economic crisis, and then we can come back to the climate.’ We are fighting very hard against this position. We know that we can only solve both

“We must make a green economic solution possible. We must create a green industrial revolution.”

crises together. We must make a green economic solution possible. We must create a green industrial revolution. I believe more and more people are aware of these necessities, and understand this is not a prescription for destroying our way of life, but for changing it in a way that is less energy-intensive and consumes less than we did before. But there’s still a lot to do.

Was the failure of the Copenhagen negotiations a sign that there’s a fundamental disconnect between the developed and developing world on climate change issues?

Töpfer: I’m not as pessimistic about the Copenhagen outcome as some. Whoever’s aware of the real situation in the world couldn’t have expected a legally binding agreement coming out of the conference. My

very, very critical assessment is that this outcome is now misused by people who say ‘first the politicians and the diplomats need to find a solution, and then we can act against climate change.’ Developing countries are afraid that first the developed countries overused the environment, and now they want to misuse their sins as a blocking instrument against the development of developing countries. We have to change this mentality drastically.

Is it possible to achieve all this within the existing climate-negotiation system?

Töpfer: I’m always afraid that when you go to change the whole system, you go nowhere. Holistic approaches are destined to fail. I’m much more interested in having a clear direction and then going that way. Take small steps, make incremental changes, and you’ll see the world is changing much faster than you expected. All those asking for the “Big Bang” change, they’ve been asking for years, and they forget to act.

Can serious progress be made without the United States?

Töpfer: No. Of course we need the United States. That’s easy to understand – the United States leads the world in consumption and production, not only of CO₂ but of a lot of other things. It is the superpower in the world, and therefore it would be absolutely unconvincing to go forward without the United States. It would be very hard to convince politicians and the public in other countries to do something the United States is not doing. It’s in the best interest of the United States to lead the fight against environmental destruction.

“It would be hard to convince politicians and the public in other countries to do something the United States is not doing.”

Are young scientists energized enough about this issue?

Töpfer: I think so. From what I’ve seen at the OCF conference, they are really enthusiastically linked with fairness, with justice, with the fact that you cannot have a peaceful world in the future without stabilizing the gaps between rich and poor. That injustice is a recipe for conflicts and wars. If we can overcome these differences while making sure the environment is not punished and misused we will have a good basis for the future as well.



Impressions from the conference.



4 Questions, 8 Answers

“What fact makes you **the most optimistic** about our common future?”

Hüttl: We’re globally investing more in research and education, and the better we are educated the more research we can do. Whether the research will be applied is not in the hands of scientists, but in the hands of politicians and business leaders.

Schellnhuber: I’m optimistic about the potential humankind has to overcome crises. But I’m pessimistic that we will make use of it.

“What is the greatest **challenge facing us** in the next 25 years?”

Hüttl: Higher consumption in the future means more pressure on resources, which makes resource efficiency the real challenge.

Schellnhuber: We don’t have anything that might be called a global government, just a lot of nation-states playing poker. What we need is a bottom-up movement, supported by electronic media, to organize global citizens.

“What piece of advice would you give **young researchers** in your field today?”

Hüttl: Young researchers need soft skills – communication, management, leadership, teamwork – because the science of the future will mainly be done in teams.

Schellnhuber: Try to get training in a field which shows you how the scientific method works, but don’t lose sight of the big picture.

“What was the most **surprising insight** you had at this conference?”

Hüttl: It was clear that people really understand our common future lies in our hands, and we are responsible for it. We can influence it, and in a sustainable way.

Schellnhuber: I found it surprising we didn’t have a better turnout. To me, that shows people don’t care that much about our common future right now.

Hans Joachim Schellnhuber and Reinhard Hüttl served as scientific advisors for the OCF sessions on Climate Change. Schellnhuber is director of the Potsdam Institute for Climate Impact Research. Hüttl is scientific director of the German Research Centre for Geosciences (GFZ) in Potsdam.

Future Technologies

Introduction

► In the world's laboratories and research departments, the technologies of tomorrow and the day after tomorrow are being developed: Cars that can be steered with the voices and glances of their drivers and that warn of slippery streets ahead or maintain a safe distance from other drivers. Refrigerators that keep track of their own contents and create shopping lists when something's about to run out. Shipping containers that are tracked by satellites and can be remotely monitored to maintain their internal temperatures and external security. Cell phones that simultaneously translate what conversation partners are saying. And humanoid robots programmed to talk with people in a lifelike way.

Modern technology will revolutionize communication between people, between people and their machines, and even between machines themselves. Wolfgang Wahlster, director of the German Research Center for Artificial Intelligence and scientific advisor for the OCF session on Communication, is sure of it: "Most of the urgent problems of humankind can be solved using information and communication technology," he says. It's already clear to him that these developments are well under way. Says

Wahlster: "The application of these innovations is already changing our lives."

In their presentations, OCF participants gave a long list of examples that showed how high tech is routine already, or will soon be making our everyday lives easier. Electronic pill bottles can monitor a patient's daily dosages and remind patients to take their medicine. And GPS systems can be harnessed to help the elderly call for help any time they need it. "There are more and more people over 60 who can now use these technologies to ensure their mobility and independent living," says Wahlster.

Participants in the sessions on "Mobility" and "The Factory of the Future" stressed the need for a broader perspective, including social responsibility when developing new technologies. Just as it's impossible to know all the implications of an invention, it is important to think about both the social and economic impacts technological developments may have, ideally through collaboration between academics and politicians across disciplines and geographic locations.

For instance, mobility researchers are collaborating with environmental engineers and urban planners to think about new and better modes of transportation. Some of the

solutions include different fuel systems, smart cars and unorthodox ideas to get people out of their auto-centered lifestyles – from new forms of car sharing to traffic taxes.

Although inventing technologies in the realm of communication, mobility or production takes great creativity, researchers say the most difficult part is not the idea phase – it is implementation. This also applies to new manufacturing technologies, product design, and the organization of global supply chains. To design technology that improves our future while taking resource efficiency and sustainability into account, OCF speakers say we must dismantle old ways of doing things and re-imagine what is possible.

The technology is ready – the only question is whether society will have the foresight and will to adopt seemingly inconvenient solutions to pressing problems. "Everybody is obviously aware that changes are essential," says Fritz Klocke, scientific advisor for OCF and a renowned professor of manufacturing technology and engineering at RWTH Aachen University. But is the public truly prepared to hop on and take a ride into the future? ◀

1,966,500,000

people in the world were connected to the Internet in 2010.

1,000,000

Number of electric cars China plans to have on its roads by 2015, supported by \$15 billion in investments.

50%

of air pollution is caused by traffic.

37%

of Internet users were located in Europe and North America in 2010.

5,000,000,000

Estimated number of mobile phones in the world in 2011.

Putting a Friendly Face on the Technology of Tomorrow

“Are virtual humans
attractive conversation
partners?”



Justine Cassell is the director of Carnegie Mellon University's Human Computer Interaction Institute and a former researcher at the MIT Media Lab. She co-authored the 1998 book *From Barbie to Mortal Kombat: Gender and Computer Games*.



As computers grow ever more prevalent in our daily lives, there is a growing sense of unease about the toll computer-assisted communication is having on our society. In her keynote speech at the OCF conference, Carnegie Mellon University professor Justine Cassell said only by studying how humans communicate with each other, can we design machines that emulate the complexities and subtleties of human interaction. That way, future technology can wear a more human face, setting users at ease and bringing us closer together as a society.

There was a time when communication was about talking face to face, person to person, in close proximity, in real time. There was a time when collaboration was about working together in the same room, assisting each other in concrete tasks. Today, communication is about iChat or Skype or leaving each other messages on the Facebook wall. And collaboration is about using a robot to do surgery in South America while I move a robot arm in Sydney, Australia; it is about a group of people collaborating to create an article on Wikipedia.

While the communication and collaboration technologies of today are exciting and raise our hopes about what will be possible one day, they also raise fears about the future. They raise fears about a day in which we might lose the skills of personal relationships and the ties to community that make us human. In my work I ask how we can preserve and develop those skills that are most representative of our human existence, those values we take to be most important.

I pursue these questions by asking how we can use what we know about the human body, about human social interaction, and about the human mind to develop new technologies – that we don't sacrifice what we hold most dear about human existence. And I rely on the fields of anthropology, developmental psychology, literary theory, and linguistics to inform the development of

those newest technologies so that we maintain a link with the past.

My methodology in pursuing these questions through the multidisciplinary lens outlined above is to begin with the study of real humans and then to model virtual humans on those real humans. I begin by trying to understand those things that we take for granted about ourselves and our interactions with others. Simple things, like what we do with our eyebrows when we talk, and more complex things like how our eyes smile when we are truly happy, whereas only the corners of our mouths turn up when we want to look happy. Why do I sometimes look you in the eye and sometimes look away when we are talking? It turns out that eyebrow raises accompany important points in conversation, and that eye gaze is a way of managing turn taking.

Studying these minute behaviors of human communication microscopically serves two purposes: First of all, it allows us to better understand humans themselves – how we function, how we differ from other animals, how we interact with one another. And, secondly, only by studying these minute but utterly human details of communication can we maintain them in our virtual human interlocutors of the future. In turn, only by maintaining these utterly human details of communication in virtual humans can we ensure that virtual humans will draw out the very human patterns of communication in us. By watching real humans interact with the virtual humans, I get a sense of where the gaps lie in our knowledge of real humans. Then I can return to studying real humans, and the iterative process of study begins again.

In looking at conversational behavior over the years, it has become clear that meaning is made up out of language and intonation and hand gestures and posture and facial movements, among other sources. Virtually all people use their faces and their hands and their bodies and their eyes (and so forth) to make meaning in conversation. And in all people in all countries, these embodied resources join in tight con-

figurations to convey particular meanings and particular stances. The meanings that we make may differ from person to person and from culture to culture, but the ways that we make meanings are the same. So, for example, it appears to be the case that virtually all people in all cultures use gesture in order to clarify what they are saying in words. And virtually all people use eye gaze to manage the conversation. And virtually all people modulate the tone of their voices to add meaning to the content of the words they are saying.

These kinds of studies of human communicative behavior have been carried out for decades, but only 17 years ago did we first use such studies of human communicative behavior to build a virtual human that behaved in the same way as we do. And only 15 years ago did we first use these studies of human behavior to build a virtual human that could communicate with real humans in some of the same ways as humans communicate with one another.

For example, we watched hundreds of people describing a house. From those observations, we were able to draw generalizations about how people use speech and gesture together to contribute to their communicative goals – communicative goals which have to do with describing a house to the person sitting across from them. Based on this model of communication, we were able to implement a virtual human – a realtor, in fact – who understood the questions of the people talking to her, and who responded to them, based on the model of human – human speech and gesture.

It is important to note that the virtual human's speech and gesture were not scripted, they actually came from her understanding of what the human asked her, her reasoning about the best answer to make in response to him, her knowledge of human language and gesture and facial movements, and her ability to synthesize all of those into conversation.

Now, you will notice that REA (the Real Estate Agent) is not as beautiful as the actresses from the movie *Final Fantasy* – in

fact, she does not even look as realistic. However, while Final Fantasy was filmed by animating the performance of real actors, REA is her own woman (one might say!). REA is based on an artificial intelligence engine and a natural language generation engine that understands the notion of thinking about space and communicating one's own representation of the world.

REA constituted a breakthrough in how humans and computers communicate with one another. But the REA system was just a first step in understanding what makes us human through the use and study of virtual humans, and in maintaining those abilities and values in the digital world. In the years since REA was introduced in 1996, we have pursued the methodology described above to further analyze human behavior, and to implement it into virtual humans. No human conversation only concerns facts and goals; all of our conversations have a social component. So a later version of REA gave her the ability to engage in small talk, or social chitchat.

In order to understand those abilities we followed a genuine real estate agent around and analyzed the ways in which she used social chitchat on the job. We found that the realtor – and other people we observed – used small talk in a very subtle way to establish a relationship, to avoid embarrassment, and to get past conversational impasses. On the basis of those data, we were able to build a model of the places in the conversation in which she was likely to use small talk and the places in which she was likely to stick to the

“Virtual humans are an important aspect of human-computer interaction today.”

task. And that model of small talk that we built from hundreds and hundreds of hours, not just looking at this real estate agent but also looking at sales people, allowed us to build a virtual human who used small talk in her interactions with real humans.

By this stage, we were fairly confident in the accuracy of our models of human communication, based on the way in which we collected the data, the hundreds of hours of video we analyzed, and the accuracy of the models we implemented. But at this point we had to ask ourselves whether the virtual humans we were implementing were effective. That is, are virtual humans who act like real humans attractive conversational partners? Do they get the task done? Are their skills judged in the same way as real human skills are judged?

In order to evaluate our real estate agent we therefore asked people to work with REA to look at apartments for rent. Some of the people worked with a version of REA with social skills and some worked with a version of REA who got right down to business. In

“Technologies of today raise fears about the future.”

fact, even though none of the experimental participants knew about the differences between the two versions, and none of them knew the purpose of our study, we discovered that there was quite a difference between the two REAs. People preferred the version of REA who was able to use small talk; they thought she was smarter, and that she understood their needs better – just like in the real world! Even more strikingly, however, when we looked at the personality of the people in our study, it turned out that it was extroverts who most preferred the version of REA who used small talk, while introverts didn't care which version they used.

And this, too, is very similar to what happens in the real world, where extroverts engage in small talk and appreciate small talk, while introverts might prefer to be left alone.

For example, an extrovert who used the version of REA that engages in small talk, and who did not know about the purpose of the study, said to us:

“I thought she was pretty good. You know, I can small-talk with somebody for a long time. It's how I get comfortable with someone, and how I get to trust them, and understand how trustworthy they are, so I use that as a tool for myself.”

And an introvert said:

“REA exemplifies some things that some people, for example my wife, would have sat down and chatted with her a lot more than I would have. Her conversational style seemed to me to be more applicable to women, frankly, than to me. I come in and I shop and I get the hell out. She seemed to want to start a basis for understanding each other, and I would glean that in terms of our business interaction as compared to chitchat. I will form a sense of her character as we go over our business as compared to our personal life. Whereas my wife would want to know about her life and her dog, whereas I really couldn't give a damn.”

We were pleased to have been able to evoke such strong feelings in the people who interacted with our virtual humans, and pleased that our study of human behavior resulted in virtual humans who were so realistic in their behaviors (even if not in their looks!).

As time has gone on, our study of human behavior, and our implementation of models of human behavior into virtual humans, has advanced beyond the building blocks of turn-taking and acknowledgement and introducing new topics, past gesture and eye gaze and posture, to more social phenomena such as social chitchat and, most recently, culture and identity. We have been able to understand more and more about those phenomena that make us most human, and that we most value, and the behaviors that signal those phenomena. And as we understand more about these phenomena in humans, and as we collect more data about the behaviors that make them up, we are better able to build those behaviors into virtual humans.

Most recently, we have begun to think about the thorny but preeminently important questions of identity and culture. How do we show others who we are? How do we

demonstrate our alliance and affiliation to particular groups? As we have begun to study this, and to read the literature from social psychology and anthropology, it has become clear that “national origin” is only one aspect of who we are – in fact, each of us belongs to a number of different “cul-

“We needn’t fear that we will lose the face-to-face nature of interaction.”

tures.” I am American, and I am also female, a professor, from New York City, with years of living in France. Each of these aspects of my identity is more important to me, and to the people around me, at some moments than others. And I highlight the importance of each aspect of identity as I move from context to context throughout the week. Not only do I dress differently, but my accent changes, my gestures adapt, I move with more excitement or with more reserve.

I might speak differently with my elderly parents than with the college students I teach. From this perspective, cultural identity can be seen as the demonstration in a particular context of a set of behaviors and practices that show other members of the group, and members of other groups, one’s cultural community membership.

With this in mind, we set about exploring issues of identity and culture that were more subtle than national origin, and that come up frequently in people’s perceptions of who they are. Most languages are spoken in different ways in different parts of the country. In Germany, for example, German is spoken quite differently in the north than in the south, and the way one speaks German plays quite an important role in how others see you, and how you identify yourself.

The United States is no exception, and so we studied some American subcultures and dialect use. Of course, while language is spoken differently in different parts of the country, it is often the case that one dialect is felt to be the most appropriate for use in

school. In the United States, this dialect is called “mainstream American English,” or MAE.

How do children use the different dialects they hear around them? Do they learn to switch between the dialect spoken at home and the dialect spoken at school? We read in the educational literature that children who do learn to switch into MAE at school are more likely to do well on their schoolwork – not because MAE is a better version of English, but because it is more accepted. Following our usual methodology, we asked if we could observe how dialect is used in culture, if we could build a model of its use, and of switching between dialects, and then if we could build that model of dialect and cultural identity into a virtual human.

Our research with this virtual peer showed that children recognize the cultural identity of the virtual peer as being the same as their own cultural identity. And when we built the ability to switch dialects into the virtual peer, we found that children are willing to switch dialects to match the dialect of the virtual peer. We believe that by maintaining the important aspects of cultural identity that we all prize, we may have built an educational tool that could help children learn the mainstream dialect that they need for school.

In order to maintain those aspects of human identity that we prize, virtual humans must have minds, they must have social skills, and they must fit into communities of identity. In the long run, we needn’t fear that we will lose the face-to-face nature of interaction and be consigned to only using text to communicate. Virtual humans are an important aspect of human – computer interaction today, and their importance continues to grow. And we needn’t fear that we must give up our humanity to live in the future. Studies of real humans can and do play an essential role in the development of future technologies. And studies of those technologies can shed light on our human behavior, as well as helping us develop technologies that maintain those

behaviors and values that we prize. In fact, communication between real and virtual beings can be important for teaching and learning.

In 1772, the Droz brothers, Swiss clock-makers, built a series of automatons that were able to carry out real human tasks, such as writing and drawing, in the way that humans do. Others followed the same path, and automatons became quite popular. Although these automatons were based on gears rather than software, they were not so different from the virtual humans of today – and their presence as entertainment in drawing rooms of the time began to worry people. As the German novelist E. T. A. Hoffmann wrote, “The story of the automaton had struck deep root into their souls and, in fact, a pernicious mistrust of human figures in general had begun to creep in.”

Every time a new technology comes on the scene, whether it’s an automaton or a

“No human conversation only concerns facts and goals.”

virtual human, our tendency is to fear it. But if we make sure that those automatons or virtual humans are based on us and not solely on the capacity of gears or computers, without reference to our minds, hearts and communities, then we will carry our humanness far into the next century and beyond.

This is a condensed version of a speech given at the OCF conference’s session on Communication. More can be found at www.ourcommonfuture.de/cassell

A Vision For Sustainable Transportation

“We must begin to create something more efficient.”



Daniel Sperling is the founding director of the Institute of Transportation Studies at the University of California, Davis.



A green future is a future without cars – or at least without internal combustion engines. Yet experts agree vehicle ownership in the future will rise. Daniel Sperling, director of the Institute of Transportation Studies at the University of California, Davis, says innovative strategies are needed to transform behavior, vehicles, and fuels. In an OCF conference keynote, Sperling told participants in the session on Postfossil Mobility it will take consumers, local governments and entrepreneurs working together to develop the needed transformations.

► Imagining a transportation world of 2050 can give us an inkling of what is required to dramatically reduce oil use and greenhouse gas emissions. What might this future look like? With sustainability as the goal, it most certainly will not continue to embrace the American car-centric model – near universal ownership of big, powerful, gas-guzzling cars in mega-garages and suburban enclaves. We must begin to create something more efficient, affordable, and civilized.

This future world would not depend on internal combustion engine cars and oil and would be populated by a wide range of mobility services. In this world, suburbs have come to resemble villages or urban neighborhoods, with commercial and recreational centers aesthetically integrated so that residents can walk, bike, or take a neighborhood electric vehicle to jobs, schools, doctors, playing fields, and local merchants of food, clothing, home wares, and entertainment. For urban and suburban dwellers alike, a powerful, pocket-sized computer serves as an electronic travel agent arranging for mobility beyond the immediate neighborhood. The list of menu items includes car-sharing, ride-sharing, and jitney service, all of which can be lined up automatically and instantaneously – thanks to advanced technology.

Imagine garages that once housed gas-guzzling SUVs now sheltering zero-emission

electric vehicles, plug-in hybrids, and e-bikes. Imagine being able to recharge these with the neighborhood's intelligent renewable-energy grid, which automatically switches from recharging to feeding electricity from the battery back to the system. Imagine easy access to bus rapid transit (BRT) with your neighborhood electric car or a smart jitney that picks you up within five minutes of your electronic call. A typical traveler might use one form of transportation or mobility service one day and another the next, depending on the nature of the errand, time available, distance, weather and traffic conditions, and personal considerations. And imagine banking credits for all of the carbon you save to use later for a special travel vacation.

In this future world, electric-drive vehicles have supplanted most of those old-fashioned gasoline cars with internal combustion engines. These electric-drive vehicles are powered in part by electricity generated by power plants with near-zero emissions, along with hydrogen made from a mix of renewables and natural gas. The remaining electric-drive vehicles are very efficient hybrids getting well over 100 mpg and powered by biofuels – not the old kind made from corn, but from grasses, wood, algae, and various waste materials. Choices have expanded. Convenience and sustainability have become primary considerations. Transportation with near-zero carbon emissions has replaced the carbon-laden transportation monoculture.

Essential Underpinnings

For this future world to take root, an entirely new set of incentives must be put in place. These incentives will motivate consumers, governments, and business to respond rationally to the carbon and energy constraints that increasingly bind us.

These incentives will work alongside an expanded set of technological gadgetry to

realize a new array of mobility options. Computers that understand the human brain, recognize individual and collective behavior patterns, and enhance intelligence will be part of this tool set. Real-time information and global communications will facilitate the transfer of ideas, enabling policymakers to replicate each others' best practices without waiting. Intelligent technology embedded in cars and other vehicles will promote eco-driving, helping travelers reduce their carbon footprints.

The new incentives will motivate socially rational behavior by giving tomorrow's consumers much clearer signals about the impacts of their choices. Personal carbon budgets will be set up for individuals and families. Carbon accounts will be credited and debited based on travelers' decisions. A portion of the balances that accrue from low-carbon lifestyles can be spent by individuals or sold to others. Taxes and fees will

“Imagine garages that once housed gas-guzzling SUVs now sheltering zero-emission electric vehicles.”

be indexed to carbon, so that those making greener choices will pay less for goods and services. Heavier polluters will help finance the low-carbon purchases of others by paying a surcharge that goes to provide rebates for less-polluting cars and fuels.

Local officials and developers will follow consumers' lead. As demand for low-carbon products and lifestyles increases, sprawl will cease and smarter development will ensue. Cities, businesses, and even developers will also have carbon budgets to adhere to. The decisions will be theirs to make, but with changes in tax laws and federal financing to reward compact development, local governments will be motivated to reduce sprawl and offer creative ways to reduce vehicle travel. In the United States, decades of zoning and permitting rules that had codified sprawl into law will be reversed.

Cities and individuals will be motivated and empowered to find ways to reduce energy use and carbon emissions. Not only will they be rewarded with lower energy bills – and in the case of cities, more funding for low-carbon transportation (spent on a wide selection of new mobility options) – but they’ll also be able to sell their excess credits to other governments, businesses, or individuals.

As for state and national governments, not only will they alter transportation funding formulas to favor low-carbon mobility services and low-impact infrastructure, but they’ll also alter the tax code and the vast array of rules and standards they administer to reward energy efficiency and low-carbon investments and behavior. Mortgage deductions, sales taxes, and much more will be tied to environmental impact. Comprehensive regulations will replace piecemeal policies to guide the development of low-carbon vehicles and fuels. These regulations will be fuel and technology neutral, taking governments out of the business of picking winners

“New policies are needed that spur energy companies to invest in low-carbon fuels and necessary infrastructure.”

and instead setting clear targets so that the most promising technologies will advance.

Investments in clean tech R&D will ramp up to buoy companies in their competition for global markets. Entrepreneurs will become even more engaged in the green energy and vehicle race. Their efforts will be rewarded by global communications that halo them, new collaborations that inspire them, and new markets for novel products that enrich them. With higher oil prices and vibrant carbon markets, paybacks will be high on their low-carbon technology investments. In good times and bad, the most innovative entrepreneurs will advance a diverse portfolio of smart bets and pie-in-the-sky dreams.

Needed Changes

Three sets of changes are needed to realize this vision of the future: Vehicles must become far more energy efficient, the carbon content of fuels must be greatly reduced, and consumers and travelers must behave in a more eco-friendly manner. By mid-century, we envision a massive shift under way in all three realms. Electric-drive vehicles will have largely supplanted internal combustion engine vehicles, low-carbon fuels will have nearly vanquished petroleum, and the transportation monoculture will be fragmenting, even in car-centric America.

The automotive transformation is already beginning. Automakers are shifting toward electric-drive vehicles that use electric motors for propulsion and to control steering, braking, and acceleration. They are moving from a mechanical engineering to an electrical engineering culture. The first generation of electric-drive vehicles, gasoline hybrids, are still fueled by petroleum, with the fuel converted into electricity on-board the vehicle. But several major auto-

makers are about to unveil battery electric and plug-in hybrid vehicles that will operate mostly or totally on electricity – motivated in part by California’s zero-emission vehicle

program. And automakers continue to invest in hydrogen-powered fuel cell vehicles that could reach mass commercialization in the next decade and beyond. There’s little uncertainty about this evolution toward efficient, electric-drive vehicles – it’s more a question of how fast it will occur.

With transportation fuels, the path to the future is less certain and probably slower. While biofuels are already well established in two regions, America’s farm belt and Brazil, these biofuels of today are not likely to play important future roles. In this vision, biomass will contribute a modest chunk of future transport fuels, some of it from Brazil’s sugar cane but none from corn or other food crops. Biofuels of the future will

come mostly from waste materials – crop residues, forestry wastes, and urban trash – plus grasses and trees in areas where food crops don’t grow well. The more important fuels will be electricity and hydrogen, used in battery, plug-in hybrid, and fuel cell vehicles. But the transition to these latter fuels will require major transformations of the very large companies that dominate the automotive and oil industries, and thus will proceed slowly.

In this time frame, the two other big energy stories are unconventional oil and coal. A big challenge of policy is to head off oil companies’ embrace of oil sands, very heavy oil, and oil shale as conventional oil supplies become less available. The other big challenge, the one that requires more nuanced treatment, is coal. Because it’s so abundant and so cheap to extract, coal will be an important energy source for a long time. It will continue to be a principal source of electricity and will be a tempting source of future transportation fuels. Its CO₂ emissions are so inordinately high, though, far more than petroleum, that dramatic changes are needed in how coal is processed and used. Coal conversion must become much more efficient and, most critically, the embedded carbon must be prevented from entering the atmosphere. For transportation fuels, that means converting the coal into carbon-free fuels such as hydrogen and electricity, capturing CO₂ emitted at the production facility, and then sequestering that CO₂ underground – with the understanding that “cleaner” coal is a half-century stopgap measure awaiting low-cost renewable hydrogen and electricity.

The third arena, eco-friendly travel behavior, is the most problematic. Cars are firmly entrenched in our culture and modern way of life. Reducing inefficient car-dependent vehicle travel requires reforming monopolistic transit agencies, anachronistic land use controls, distorted taxing policies, and the mindsets of millions of drivers who’ve been conditioned to reflexively get into the car every morning. It’s much more challenging than transforming a small

number of energy and car companies. But even in California, the birthplace of car-centric living, the realization is starting to settle in that mobility must be more sustain-

“Automakers can ultimately build efficient vehicles.”

able. Spurred by escalating gas prices and accelerating evidence of climate change, consumers are already beginning to recognize that the transformation of the car-centric monoculture is long overdue.

The really big changes in travel will come slowly. By mid-century, it’s possible that the transportation monoculture will be fragmenting. A myriad of electronic, communications, and mobility innovations – including carsharing, dynamic ridesharing, smart paratransit, bus rapid transit, and advanced telecommunications services, all coupled with small neighborhood cars, revitalized transit providers, enhanced pedestrian and bicycling facilities, and smarter land use – will enable a new transportation system that better serves the diverse needs of all people, including those less fortunate, the aging, and the disabled. This transport system will be less expensive, more efficient, and more sustainable than today’s.

This vision of the future might have seemed far-fetched even a few years ago, but much has already changed. If we had to pick one year when the world seemed to turn a corner, when it began to be motivated to make large changes, it would be 2006. It will be a decade or more before history will be able to confirm this observation. But it was in 2006 that the United States, the laggard among rich nations, finally accepted that climate change is a threat to humanity. Oil and car companies, politicians of all stripes, and voters finally accepted mounting scientific evidence that climate change is real. Led by California, the national debate shifted from “if” to “what.”

But realization and understanding are just a first step. The world is still in denial

about the staggering challenge it faces and the radical transformation it must undertake. Achieving a 50 to 80 percent net reduction in greenhouse gas emissions isn’t something that businesses, consumers, and politicians can fully imagine. Life after cheap oil evokes images of crises to come. There’s no escaping that there will be winners and losers, but strong leadership and good policy can ease the transition. Because CO₂ resides in the atmosphere for a hundred years and because investments in energy and infrastructure endure for decades, it’s important to get started immediately.

To realize this future vision of a lower-carbon, less oil-driven future, we need a strategy for getting there – a pragmatic, action-oriented approach inspired by innovation, fueled by entrepreneurialism, and sensitive to political and economic realities. This approach must be rooted in and responsive to the realities of today, but with an eye to the future.

The recommendations that follow constitute a strategy for achieving this vision of the future. The recommendations are guided by two overarching principles. First, enact policies to align consumer and industry interests with the public good. And second, develop and advance a broad portfolio of efficient, low-carbon technologies to transform transportation.

Transforming Vehicles

The most effective and least costly way to reduce transportation oil use and greenhouse gas emissions is to improve the energy efficiency of vehicles. And yet, it’s surprising, even appalling, how little the United States and many other areas have done. For twenty-five years, from the early 1980s to 2008, the fuel economy of new cars and light trucks remained stagnant. Vehicle technology improved dramatically, but the energy-efficiency improvements have been diverted to serving private desires for bigger and more powerful cars – especially in the

United States. The challenge is to capture more of the benefit of technology improvements to serve the public interest, even if that means scaling back vehicle size, weight, and especially power and performance. Sizeable fuel economy gains are possible through incremental improvements to today’s technology; even more gains are possible with an accelerated transition to electric-drive vehicles.

Transforming Fuels

Dramatic changes are needed in the energy sector. Given the flawed marketplace and absence of guiding policy, today’s oil industry is maximizing private gains. But that behavior isn’t in the public interest. Oil mar-

“The challenge is to capture more of the benefit of technology improvements to serve the public interest.”

kets are unresponsive to prices, largely ignore greenhouse gases, and invite geopolitical conflict. Massive investments are being directed toward high-carbon unconventional petroleum.

New policies are needed that spur energy companies to invest in low-carbon fuels and necessary infrastructure. Large oil companies need to be encouraged to transition into broader energy companies that are less dependent on fossil energy. Many politicians and companies across the United States and other affluent nations are embracing the need for a more coherent approach to energy. But, alas, the public debate is focusing on corn ethanol and policies unlikely to have much effect on transport fuels, including carbon taxes and cap-and-trade programs. And where policies have been adopted – the biofuels directive in Europe and the renewable fuel standard in the United States – they’re deeply flawed.

Consumer Behavior

Automakers can ultimately build efficient vehicles, and energy companies can supply

low-carbon fuels. But unless consumers are willing to buy more-efficient vehicles that use low-carbon fuels and to reduce vehicle travel, there's no hope of reducing oil use and greenhouse gases. Thus, the focus here is on consumer behavior, plus one other player, local governments, since they operate and manage – and indirectly influence – much of the transportation system, particularly transit services. They also regulate land use, which has a large effect on vehicle usage. Only with enhanced transport choices and smarter land use can individuals and cities reduce their carbon footprints.

Realizing the Vision

As we head toward a future world of increasing vehicle ownership, innovative strategies are needed to transform behavior, vehicles, and fuels. We can look to innovative policymaking in California for new ideas on how to proceed. We can learn from innovative cities in Europe, such as Freiburg, Paris, London, and Stockholm. We can invoke novel ways to stimulate China and other

awakening giants to be part of the solution and not part of the problem. We can align incentives to motivate consumers to act for the greater public good. We can rewrite the rules so local governments make decisions that further low-carbon transportation options. And we can invite entrepreneurs to develop the needed transformations in transportation.

Indeed, the first transformation, that of vehicles and fuels, is already under way, albeit tentatively. It will take many years for this transformation to play out. It will undoubtedly happen in surprising ways, calling for open-ended policy approaches that don't pick winning technologies but instead establish fair but tough, escalating goals. The second stage of the transportation revolution, a complete rethinking of how we move about, will evolve more slowly. Both transformations will require incentives, mandates, research, and demonstrations.

Change will happen. It must happen. The days of conventional cars dominating personal mobility are numbered. There

aren't sufficient financial and natural resources, or climatic capacity, to follow the patterns of the past. Consumers, governments, and companies all have essential roles to play in making the needed changes. The sooner we get on with addressing the issues, the better. And a durable framework is a better approach than the haphazard and ad hoc road we've been on. Adopting a strategic, long-range view is the key.

The road to surviving and thriving is paved with low-carbon fuels and electric-drive vehicles, new mobility options, and smarter governance. Enlightened consumers, innovative policymakers, and entrepreneurial businesses worldwide can drive us to a sustainable future. 

This is a condensed version of a speech given at the session on Mobility. More can be found at www.ourcommonfuture.de/sperling

Greening the Global Supply Chain

“Executives face ... pressure to look at sustainability.”



David Simchi-Levi is a professor at the Massachusetts Institute of Technology and author, most recently, of *Operations Rules: Delivering Value through Flexible Operations*.

➤ Whether stretched around the world or around the block, supply chains are tremendously sensitive to movements in the costs of labor and fuel. Using real-world examples, MIT professor David Simchi-Levi explains how supply chains can be levered by savvy policymakers to make manufacturing processes more environmentally friendly – and, ultimately, make the world a greener place.

➤ Global market and supply chain challenges are well-known. At the top of this list of challenges are rising and shifting customer expectations. On the one hand, customer demand is difficult to predict. On the other hand, there is a lot of pressure to increase service levels.

On top of that, in the last few years there has been a significant increase in labor costs in developing countries. To illustrate this, just look at China and Mexico. In the last five years, labor costs in China increased by an average of 20 percent each year. In Mexico they’ve gone up by an average of five percent. In the United States, the increase is about three percent, year over year. Those numbers mean that if a company made production-sourcing decisions five years ago, they may need to revisit some or all of these decisions in light of changing costs.

Not only have we seen significant increases in labor costs in developing countries, but we have also seen significant increases in logistics costs. One reason is energy prices; a second reason, at least in the United States, is limited rail capacity. That increases rail transportation costs, but also

means that companies start moving shipments from rail to the trucking industry. As a result, transportation costs in general go up.

In addition, we have seen a significant increase in the level of risk assumed by many companies. The reason for that, surprisingly, is precisely successful implementation of strategies like lean production, outsourcing and offshoring. What does lean mean? Lean implies a low level of inventory. A low level of inventory suggests that if there is a disruption, the supply chain will not be able to meet demand. Similarly, outsourcing and offshoring imply that the supply chain is geographically more diverse – and as a result, open to all sorts of potential problems.

The level of volatility, especially in just the last two to three years, has increased

significantly. And when I talk about the level of volatility, I don't focus only on volatility in demand, I also focus on volatility in supply – in particular, the impact of commodity price volatility.

The oil price is an illustration of this. Between January 2009 and November 2010, oil prices almost doubled. In fact, this is true not only for oil prices, but for almost every commodity that you can think of.

Thus, companies face increases in labor costs in developing countries, increases in risks and volatility both on the demand side and the supply side. And at the same time, there is an increased pressure to focus on sustainability. So it's interesting to understand where this pressure is coming from and how it affects supply chain strategies, manufacturing strategies, and logistic and distribution strategies.

Supply Chain Efficiency

The first driver is supply chain efficiency. When you talk to executives who are thinking deeply about their logistics, you realize that many of them correlate supply chain efficiency with sustainability. What they think about is that when the carbon footprint is high, when carbon emissions are high, that is an indication that the transportation system is not efficient. Inefficiency motivates them to try to improve supply chain efficiency, and this also leads to a re-

“Insurance companies ... associate risk with sustainability. Some executives are looking at this as an opportunity.”

duction in the overall carbon footprint.

In fact, they are right that the logistics sector is a large and growing emitter of carbon dioxide, and the data suggests that logistics contribute about six percent of total emissions. Out of this, almost 90 percent is associated with transportation-related activities.

Different modes of transportation have different emission efficiencies. Rail, for example, is six times more efficient in terms

of CO₂ emissions than trucks. Ocean transportation is almost 50 times more efficient than air transportation in terms of its carbon footprint. So it's not only about production. It's also about selecting the mode of transportation in your supply chain that will affect the level of emission associated with a specific company.

Public Policy's Power

The second driver that has got executives focused on sustainability comes from public policy and regulations. The Kyoto Protocol has forced companies, especially in Europe, to look at the level of carbon associated with the production and delivery of products. In the United States, there has been a lot of discussion, but no significant change in policy. Still, many executives are concerned that this is soon coming.

Even without regulations in the United States, executives face a lot of pressure to look at sustainability as an important area. This pressure comes from three different directions. Some – not a lot – comes from consumers. There's pressure from supply chain partners. And probably the most important source of pressure is from insurance companies, which associate risk with sustainability.

Some executives are looking at this as a competitive opportunity. What they are worried about is that their competitor will

introduce a greener product and this will shift market demand. In fact, a number of surveys indicate that consumers in

general prefer greener products to other products. That's not surprising. The problem is that none of these surveys show at what price point consumers prefer to switch to greener products. The second thing surveys suggest is that people in developing countries are the most concerned and ready to act.

In response to all this, retailers are putting pressure on their suppliers. And these come in general in two different ways.

Some retailers introduce environmental scorecards that they use to compare the performance of different suppliers. They already rate the performance of their suppliers based on quality, cost and service, and now they're starting to look at the environmental scorecard.

Other retailers require their suppliers to add a label on the product providing information not only on where the product is made, and what material goes into the product, but also what levels of carbon emission it takes to produce and deliver the product to the retail outlet.

Finding the Right Metric

Introducing the environmental scorecard suggests a question: What is the right metric to use? Some companies are focused on carbon footprint. That's a direct way to measure the impact on the environment. Others are focusing on what is called “dead-end distance.” This is the nonproductive movement of trucks, or movements where the truck is empty. And we've seen some who use product-miles, the total distance the products travel to the retail location, especially in the media, as criteria.

But this can be a very misleading indicator. The impact on the environment has nothing to do with distance. Take a simple example: You're in a nice restaurant in New York City and you're about to order a red wine. You're trying to choose between two different types: One from the Napa Valley, and one from the Loire Valley. Surprisingly, from the carbon footprint point of view, the one from Napa Valley generates more carbon, because it is trucked to the East Coast, whereas the French wine is shipped over the ocean – a more efficient means of long-distance transport. This suggests that the supply chain network has a huge impact on carbon footprint and therefore on the environment.

Some companies are focused on finding the right trade-off. An example of a company that made a big difference is Walmart. At the end of 2005, they announced a plan to reduce energy use, cut waste and cut greenhouse gas emissions. Their objective

was a 20 percent cut by 2012, not only on emissions associated with their supply chain but also the emissions associated with their suppliers' supply chain. To do that, Walmart started rating their suppliers based on an environmental scorecard that has eight dimensions, including greenhouse gas emission levels, recycled content and renewable energy.

"If oil prices increase, you will see a move from global manufacturing."

This made a big impact. Their largest third-party logistics company in Canada changed the way they distribute products to Walmart stores, switching from road to rail and changing some of their trucks to electric power, both of which significantly reduced the carbon footprint and reduced the amount of fuel used by the trucks. Surprisingly, the two measures not only reduced the impact on the environment but also reduced costs for the third-party logistics companies and as a result for Walmart customers.

When companies start to look at carbon footprint in their supply chain they need a lot of data. They need data on the carbon footprint associated with different transportation activities and information about the carbon footprint associated with warehouses, plant and production activities. Carbon emissions by fuel type, average fuel efficiency, electricity consumption by building characteristics because building size, geographical region, the number of workers, the age of the facility – all these inputs have an impact on carbon footprint.

In my research and consulting projects, I have tried to identify the right way to balance cost, service, and carbon footprint. One example is a US manufacturer of office furniture with two plants, one in Iowa and one in Delaware. They have two distribution center warehouses at the same locations. There were two objectives: One was focusing

on reducing costs and improving customer service. And the other one was focused on reducing carbon footprint.

Though their plants were in Iowa and Delaware, their customers are all over the country. What should this company do to reduce costs and improve service? You can see that we started with two distribution centers, but if you want to improve costs and service, the best strategy is to add two additional warehouses, one on the West Coast and one in the South. This will reduce supply chain costs and improve customer service by reducing average time to market by almost 50 percent.

The question is: What is the impact of additional distribution centers on the carbon footprint associated with this company? As you add distribution centers, you start to reduce average distance to the market. Reducing average distance to the market implies that you reduce transportation costs from the warehouses to the customers – but at the same time you increase transportation costs from the plants to the warehouses.

In this supply chain, transportation from the warehouses to the customers is done by trucks, whereas transportation from the plant to the warehouses is done by rail, yielding a reduction in the carbon footprint. The problem is that you now have more facilities. More facilities consume more energy.

It turns out that the right balance between, cost, carbon footprint, and response time was achieved by adding four distribution centers. This allowed the firm to reduce costs by two percent, cut average distance to the customers by almost 60 percent and cut carbon footprint by about one-third.

Sustainable Thinking

Now when you talk to executives about carbon footprint and sustainability you realize very quickly that the higher the oil price, the more interest they have in focusing on sustainability. When the oil price is low, on the other hand, there is very little interest. Therefore, it's important to understand what the impact of oil prices are on manufacturing, on logistics and supply chains. As the oil price increases, the transportation cost

goes up, and so transportation becomes more expensive relative to inventory and relative to warehousing cost. Similarly, as the oil price increases transportation cost becomes more expensive relative to manufacturing cost. If transportation becomes more expensive relative to inventory and warehouse costs, that suggests you need more warehouses. And because transportation costs become more expensive than manufacturing cost, you need to move manufacturing closer to market demand.

This tells you something about the discussion around public policy. Many people talk about taxation and the impact of policy on manufacturing and supply chain strategies. That suggests that if there is an additional tax on fuel in the United States, you will see a change in manufacturing and supply chain strategies.

It also suggests that if oil prices increase because of limited resources, you will see a

"Companies are focused on finding the right trade-off."

move from global manufacturing – where manufacturing is done in low-cost countries – all the way to local manufacturing, where manufacturing is closer to market demand.

This is a completely different way of thinking about manufacturing and supply chain strategy. Whether green policies are implemented because of government regulations, pressure from supply chain partners or consumers, or changes in oil price, such policies are making or will make a huge impact on how companies design and manage their supply chain. 

This is a condensed version of a speech given at the OCF conference's session on The Factory of the Future. More can be found at www.ourcommonfuture.de/simchi-levi

Taking Technology Use to the Next Level: Being 3.0

Concerned about the disparity between technology and its responsible use, researchers from the Global Young Faculty came together to find out just how Germans were using the Internet – and what lessons could be learned for the future. Their results, in the form of a survey of over 1,000 Germans, were surprising. Awareness of the dangers lurking on the Internet was high, even if people didn’t always act in their own best interests online.

► In the beginning, there was man: Naked and alone, with no idea how the environment could be harnessed (with the help of some sharp rocks and a few sticks) to make life easier.

Then came Being 1.0, and with him the first hints of modern humanity: Man, the toolmaker, shaping his surroundings. That wasn’t the end of man’s development, though. “Being 1.0 is the simple toolmaker, not aware he is influencing his environment. Being 2.0 is a different level, in which a person realizes he is part of his environment and a larger group,” says Roberto Avanzi, a professor of mathematics at the Ruhr University-Bochum.

Together with other like-minded members of the OCF conference’s Global Young Faculty, Avanzi wondered if the flood of digital technology that has pervaded every aspect of life over the last few decades promised yet another phase to humanity’s development.

Talking to friends, co-workers and family, Avanzi and his colleagues noticed that the power of technology often outstripped people’s preparedness for the results. One particularly worrying example is data protection. Says Avanzi: “There are lots of people who use the Internet but are not concerned about the consequences of their data.”

The group coined the term “Being 3.0” for people who were both adept at using technology and conscious of the risks involved. “Being 3.0 is what we want to achieve – people who are aware of the risks, but also responsible for their actions,” Avanzi says.

To see where on this imagined continuum the average German stood, the group put together a survey of 1,004 Germans. To their surprise, the survey indicated that most Germans were remarkably astute and aware Internet users. A whopping 80 percent of the people they surveyed were aware of the risks to personal data posed by the Internet.

“Quite a lot of them are already there, so to speak,” says Sandra Sülzenbrueck, a GYF member and researcher at the Leibniz Research Centre for Working Environment and Human Factors in Dortmund. “They seem to be behaving, and seem to know about the risks. Most people, it turns out, are more active than passive.”

The telephone survey suggested that the users of the future – “digital natives,” or young people who have grown up with information technology permeating every part

of their lives – were the least careful with their personal data online. The group’s survey showed that young people are willing to post personal information on sites like Twitter and Facebook, or on publicly accessible blogs, that they might later regret. “The interesting thing is why people do this,” Sülzenbrueck says. “Maybe it’s like being your own pop star – everyone wants to be meaningful and relevant.”

Discussions with other group members raised topics for future research. The gradual creep of technology into every corner of our lives is eroding skills previous generations once took for granted, for example. Take what Avanzi calls “digital dementia.” “There are plenty of people who rely too much on machines and do not remember data” like telephone numbers, appointments and addresses, “just how to search for it.”

The group’s members shared little except a common interest in the future of technology. When it came to deciding on a project to pursue, that diversity was an obstacle that the group transformed into an asset. “I never, ever would have expected to work with an art philosopher, a production designer or a bionics researcher,” Avanzi says. “Yet we were able to do something, and do something surprising. That’s the most rewarding for me personally.”

Transportation

Missing the Bus

Caught between a lack of transportation and sprawling cities, many people living in Europe's impoverished inner cities can't change their situations because they can't get to jobs, supermarkets or universities. The solution lies not in more cars, but in sound investment in buses and other forms of accessible, affordable public transport, said OCF Fellow Bob Jeffery at the OCF conference's workshop on Postfossil Mobility.

► Mobility defines our lives in myriad ways. Access to safe and affordable transportation can connect us to higher-paying jobs, cheaper food and better education. But many cities struggle to bring that freedom of movement to their citizens.

Bob Jeffery, a PhD candidate in sociology at the University of Salford in Greater Manchester, UK, was invited to the conference to contribute to the session on Mobility. Among other things, he researches the impact of transportation on quality of life and the way attitudes towards mobility are perpetuated from generation to generation.

"An important part of this discussion is suburbanization – which in the UK is a more extreme phenomenon than in the rest of Europe," says Jeffery.

Suburbanization is the growth of commerce and development on the outskirts of cities – sprawl, in other words. Jeffery says that as services move to cities' edges, those citizens who rely primarily on public transportation like ethnic minorities, the elderly, and the impoverished are affected the most.

"The UK has a fully deregulated, fully privatized transport system which encourages car growth for those who can afford it, but leads to the continuing exclusion of those who cannot," says Jeffery.

Examples of this from the UK government's own research include the fact that every two out of five job seekers report that transport is a barrier to getting a job. Half of all 16 to 18-year-olds experience difficulties



Born in 1983, Bob Jeffery is a sociologist focusing on transportation and social justice at the University of Salford in Greater Manchester, UK.

accessing college, and 1.4 million people per year miss, turn down or choose not to access medical help because of transport problems.

A sad irony is that while many inner cities lack adequate public transportation options, they also have the highest density of roads. So while people have difficulty moving from one community to another using public transport, they still have to deal with traffic noise and pollution in their neighborhoods.

This can cause serious public health concerns. Jeffery says the neighborhood he's researching in Greater Manchester has sig-

nificantly lower life expectancies – eight years lower than the national average. Children of those from the lowest social class are more than five times more likely to be killed on the roads than those from the highest social class. This is not limited to the UK, in Germany children from lower social classes (and especially Turkish children) are also more likely to be victims of road traffic accidents.

That's only one reason why Jeffery supports the Campaign for Free Public Transport in the UK. He describes it as "an embryonic activist group which is campaigning for a radical solution to the UK's transport problems." Jeffery concedes this movement is marginal, but he thinks social science should place priority on addressing people's needs, not moving in lockstep with policymakers' agendas.

Jeffery's interest in the subject is more than academic. For him, there's a personal element as well. He says early experiences with the impact of poverty, drugs, and crime motivated him to study social science. That's also why he wants to stay involved with community groups and local politics.

"I actually live in the deprived community which has been the focus of my research," says Jeffery. "I think one of the problems with the social science that studies deprivation is that people are very much kind of coming in from the outside trying to tell these communities what their problems are. I don't think there is enough listening going on."

Jeffery plans to edit a book in 2011 on debates around free public transport, spreading the word about cities where low or no-cost mobility solutions have been implemented to positive effect. ◀

More can be found at:

<http://www.freepublictransport.org.uk>

<http://salford.academia.edu/BobJeffery>

Industrial Design

Products for a Better Future

Too often, companies respond to the market's demands by churning out simple products that yield immediate profits. But that kind of thinking overlooks the potential gains of taking a longer view. Instead, companies should innovate for future needs. Auckland University of Technology lecturer Ayse Idil Gaziulusoy argues profits can be sustainable if companies take a broader view, and look more creatively at what part their business – and their innovations – will play in a complex world.

► Industry often takes a short-term approach when it comes to sustainability issues, settling for small tweaks rather than sweeping reinventions. Take the common washing machine: Product developers work to make it better each year, introducing features that lower the unit cost, use less energy or save water. Such steps are progress, to be sure – but not much.

Instead, product developers should come up with new ways to wash. What about a public laundry where neighbors can meet and pool resources, or a fabric that repels dirt, or a wardrobe that cleans clothes automatically? We don't need incremental improvements, we need sweeping change that leads to less wasteful living, says Ayse Idil Gaziulusoy. She joined the conference as an Our Common Future Fellow contributing to the session on the Factory of the Future.

This approach doesn't always come naturally to companies focused on making the biggest profits for the smallest investment. Corporate short-term thinking leads to long-term problems, from the well-known example of climate change resulting from human-induced carbon-dioxide emissions to depleted fisheries, clear-cut forests, and the deluge of electronic waste shipped to developing countries.

"In order to achieve a sustainable society, we have to change everything in society – and industry has a key role to play," Gaziulusoy



A. Idil Gaziulusoy is a lecturer at the Auckland University of Technology in New Zealand. She was born in 1978.

says. "We must ask ourselves how product development can be aligned with the long-term transformation that needs to take place in society."

Gaziulusoy was born in Turkey. She says the enormous disparity she observed there between rich and poor made her want to be an agent of change. She's trying to change the world through changing how businesses

work, and today is a passionate advocate of what she calls "system innovation": Designers must acknowledge that the world is interconnected and complex, and products should support a sustainable society.

To illustrate her point, Gaziulusoy recalls a speech she heard in 2005, at the Sustainable Business Network Conference in Auckland. The New Zealand executive of Toyota talked about the company's hybrid Prius car. After the executive's speech, someone from the audience asked what the company could do to increase the sustainability of transport. "He said we have to build more roads to increase diffusion of hybrid cars," Gaziulusoy recalls.

That was the wrong answer. "Toyota had great foresight in anticipating that reducing carbon emissions and enhancing fuel efficiency would become major selling points and developed the Prius. But arguing that hybrid cars are the ultimate in sustainable mobility was caused by a lack of systemic understanding," Gaziulusoy says. More cars on roads means increased traffic, stress levels and a loss of biodiversity. "The company wasn't thinking about meeting a societal need, it was thinking about a specific product, the Prius. We have to get beyond thinking about specific products."

Gaziulusoy knows that only a few people in the world are trying to link product development to the broader-scale transformation that needs to take place. But she has a few suggestions on how to get there. Companies can collaborate with each other and establish partnerships with NGOs and governments.

Companies like Toyota shouldn't just focus on developing their next car, but also consider larger questions involved in societal mobility. What would a world without cars look like – and how could Toyota play a role in such a world? "Think conceptually. Then, you might start thinking about greater societal innovations and systemic shifts might become possible," Gaziulusoy says. ►

The Brazilian Model



Luc de Ferran is an industrial consultant and former vice president of Ford Latin America Group.

“It was a unique opportunity to do everything differently.”

The auto industry is in constant flux. Companies come and go. Production moves to meet demand. Models morph into ever more futuristic designs. Even the epicenters shift: Latin America, Brazil in particular, is an emerging leader. That's why many in the auto world are keeping a close eye on the Brazilian model of growth and innovation. Former Ford executive Luc de Ferran, who helped lead the automotive giant's efforts in Latin America, was invited to talk about his experiences at the session on Future Technologies. He says successful automotive companies in the future will have to change the way they approach staffing in developing countries.

► Why has Brazil experienced such dynamic growth in the auto sector?

de Ferran: First, our country is going through violent growth. Even in 2009, when the economy was very bad everywhere, Brazil broke even. And in 2010 our gross national product grew 7.4 percent. That's the projection. Brazil's per capita income takes us out of the poverty range. We are at about \$10,000 per person now. Second, the mix of

"In another five years, Brazil will be the fourth largest car market in the world."

cars is completely different. I think what damaged the auto industry in the United States was the size of the cars. You need to think about how much the vehicle will waste in comparison to how much the vehicle will carry. If you look at the Brazilian market, 75 percent is small cars.

Why are more fuel-efficient cars so popular in Brazil, while other countries like the United States still loves its gas guzzlers?

de Ferran: In Brazil, we've mostly made

small cars. Why? Because we couldn't afford bigger ones. So we started the other way around. The public income ten years ago was probably less than a thousand dollars per head per year, something like that. Now it's ten times higher. But the Brazilian auto industry actually was born ten years ago. Before that, the industry was flat at around one million cars sold a year. Now we are reaching four million and growing very quickly. In another five years, Brazil will be the fourth largest car market in the world behind China, the United States, and Japan. **How did Brazil become a major player in auto manufacturing?**

de Ferran: The Brazilian industry is not fresh. It started in the 1900s. We shipped Ford Model T's from Dearborn, Michigan to São Paulo back in the first decades of the 1900s, but the real industry started production in Brazil in 1957. Most recently, we built revolutionary new plants. Totally new processes – fully integrated with logistics processes that are benchmarks. Everything we do to build these vehicles is very productive. **You played a major role in that reestablishment of Ford in South America – specifically in the way factories are managed. What changes did you make at the Ford plant in Bahia, Brazil for example?**

de Ferran: It was a unique opportunity to do everything differently. I had all kinds of models I had studied. With all those models, I said I will do something which is unbeatable from quality, production and profitability viewpoints. And we worked on it. One of the things I found is that the involvement of human resources was incredibly important. We made it so workers were no longer workers, and bosses were no longer bosses. Workers need help, they get together and ask each other. They are all well trained to handle this responsibility. In Bahia, I took

13,500 people out of poverty and gave them 900 hours of training each.

How did this kind of approach affect the bottom line?

"In Brazil, we've mostly made small cars. Why? Because we couldn't afford bigger ones."

de Ferran: The quality improved when the workers understood that what they do contributes to the satisfaction of what their customers will buy. In the end, this is paying their salaries. Also, the level of education inside the plant was much higher. It helped tremendously. You get more dynamic ideas from the staff.

What has the impact been on the local population?

de Ferran: There is better healthcare, dental care and education. I am advocating that you cannot isolate the guy from his job or from his participation in society – you just cannot. One way or another, one ends up affecting the other. So you had better recognize that and make it work.

So you aim to build not just a factory, but a community?

de Ferran: In reality that's what it is. Now sometimes it works. Sometimes it doesn't. But what you have to have in mind is "I'm not hiring a worker, I'm hiring a person." That's a big difference, isn't it? And there is a relationship that needs to be well-done and long-term. That's the difference. That's human. You can do that any place in the world.



Impressions from the conference.



4 Questions, 8 Answers

“What fact makes you **the most optimistic** about our common future?”

Klocke: People are aware of the big challenges we face. This makes me optimistic that science and industry will find adequate solutions.

Wahlster: Our presentations showed that most of the urgent problems of humankind can be solved with the help of IT innovations, and this makes me optimistic.

“What is the greatest **challenge facing us** in the next 25 years?”

Klocke: The move towards more effective use of renewable energy sources, along with the development and introduction of new concepts for more resource-efficient production processes and products.

Wahlster: The biggest challenge for society is finding the right balance between open Internet communication and privacy. Technology can give us a better life, but it can also create new problems if we are not careful.

“What piece of advice would you give **young researchers** in your field today?”

Klocke: Go for interdisciplinary research approaches. Look beyond the borders of your discipline and join multidisciplinary research teams.

Wahlster: Try to solve not only academic toy problems but those problems that have some impact on our daily life. And focus on those topics that have a societal and an economical impact in researchers' respective countries.

“What was the most **surprising insight** you had at this conference?”

Klocke: I was surprised at how well the conference was attended.

Wahlster: I was really amazed by a young researcher who showed that elderly people can trace a line on paper faster and more accurately than young people. It turns out elderly people are used to handwriting letters, whereas young people use email keyboards and touch screens more often. If young people don't develop the dexterity of their hands, it could be a problem in the future – especially in fields like surgery and dentistry that require refined motor skills.

Wolfgang Wahlster and Fritz Klocke served as scientific advisors for the OCF sessions on Communication and The Factory of the Future under the frame topic Future Technologies. Wahlster is professor of computer science at Saarland University (Saarbrücken, Germany) and director and CEO of the German Research Center for Artificial Intelligence (DFKI). Klocke is head of the Fraunhofer Institute for Production Technology (IPT) in Aachen as well as professor of manufacturing technology and co-director of the WZL Laboratory for Machine Tools and Production Engineering at RWTH Aachen.

Human Rights and Global Values

Introduction

► The boundaries separating people and places are rapidly eroding. Yet dramatic differences remain: Between rich and poor economies, between authoritarian and democratic states, between secular and religious societies. In a world that remains divided, exploring what constitutes global human rights and values has never been more important. At the OCF conference, an inter-generational dialogue between young activists and scholars and an older, more experienced generation touched on topics like international justice and the rule of law, religion and values, as well as migration.

“People who come from countries with great economic or constitutional problems are often much more informed about opportunities for change,” says Jutta Limbach, the former president of the Federal Constitutional Court of Germany. With experience on the ground that goes beyond the theoretical, local activists “provide concrete recommendations on how state organs and nongovernmental organizations can help promote democracy in areas where dictatorships still flourish.”

The conference’s geographic diversity highlighted issues beyond Europe’s borders – especially in some of the world’s emerging economies. Deep social changes occurring

in China, for example, will define this century in pivotal ways. A migration expert predicts that China’s creative approach to bringing emigrants home will allow the country to keep its most talented creative workers and move the country from a cheap production center to a more knowledge-based economy, for example. At the same time, scholars debated whether the same approaches states use to integrate migrants from other countries might apply to the oft-overlooked phenomenon of internal migration from the countryside to urban areas.

Just as migration transcends national boundaries, the international reach of religion makes it one of the most divisive and potentially benign forces in human society. Though the headlines may be about the clash between Islam and Christianity, some political scientists and historians at the OCF conference argued that an equally significant shift may be going on within Christianity, as evangelical strains of the faith sweep across Africa and South America and replace traditional denominations.

Societies across the world will be impacted by movements like these regardless of geographic location. “Without understanding the very different historical developments, realities and challenges in developing and

developed countries, we will not understand the dynamics of their social change in the future,” says Ludger Pries, a sociologist at Ruhr Universität Bochum and, like Limbach, one of the scientific advisors.

Underpinning all of the discussions during the OCF conference was the question of how policy shapes what rights are granted and what values are protected. As boundaries shift, more international organizations, from the UN and World Trade Organization to the European Union, are stepping into a regulatory role. Yet often this power exists without the constitutional checks and balances that most nations rely on.

“The question arises as to how this decision-making power can be democratically legitimized and submitted to certain fundamental rule-of-law principles,” says Dieter Grimm, professor emeritus of public law at the Humboldt University of Berlin. “There is no equivalent to a constitution on the international level, or only a very thin one at best.”

There is no one answer to the question of how to provide human rights on a global scale. But meetings like the OCF can provide a forum for identifying problems and generating concrete ideas for a more just common future. ◀

849 out of 7,112

petitioners were granted amnesty by South Africa's Truth and Reconciliation Commission.

81

people per toilet seat in Mumbai, India.

144,000

Chinese students studied abroad in more than 100 countries in 2007.

90%

of people without basic necessities say religion is an important part of their lives.

60%

of people with their basic necessities met say religion is an important part of their lives.

33%

of U.S. citizens will be of Latino descent by 2050.

Culture, Community and Human Rights: South Africa's Lessons

“If truth has replaced justice
... has reconciliation turned
into an embrace of evil?”



Antjie Krog is a South African poet, writer and professor at the University of the Western Cape.



Addressing the Human Rights session of the OCF conference, South African poet and journalist Antjie Krog drew on African philosophy to explore how a world view that might seem alien to Europeans made the pioneering Truth and Reconciliation Commission project the right solution for South Africa.

► Is a common understanding of human rights possible? Is a shared doctrine of human rights possible and desirable? Are all human rights universal?

I will first discuss two examples of strong and devastating criticism against the basic principles of the South African Truth and Reconciliation Commission (TRC). Both these criticisms suggest that some fatal flaws within the process itself hampered and are still hampering South Africans in cultivating a culture of human rights and building a fair and just society. Then I want to explore another way of interpreting these “fatal flaws” in order to show that a different kind of reading is possible which not only broadens the concept of human rights but also makes the building of a just society more probable.

The TRC was only a few months into its two-year workload when one of the strongest, most enduring and often quoted criticisms was leveled at the Commission. Prominent scholar Mahmood Mamdani, based at University of Cape Town when the TRC was active between 1996 and 1998, criticized the fact that the TRC decided to confine its gaze to the physical and repressive dimensions of apartheid rule such as severe ill-treatment, abduction, torture, and killing instead of addressing the structural violence of apartheid.

This, Mamdani suggested, obscured the co-dependency of racialized power and racialized privilege. Instead of regarding victims as “political activists” and perpetrators as “state agents”, the TRC should have gone “beyond notions of individual harm and individual responsibility, and located agency within the workings of a system. The

result would have been to explain apartheid as an evil system, not just to reduce it to evil operatives.”

Mamdani was particularly vocal about the forced removals of three and a half million people to create racially segregated residential areas as “South Africa’s gulag.” While some 25,000 people died between 1960 and 1994 in political violence, millions more were condemned to anguished lives of racially defined poverty. With the narrow focus of the TRC their dignity could never be restored while thousands of apartheid functionaries and millions of white beneficiaries were left unscathed, off the hook, and with all their loot intact. Instead of placing the complicity and culpability of beneficiaries center stage, white South Africans by and large were able to claim a false innocence.

In an interview with me, Mamdani sharply criticized the way in which the commission was settling for truth instead of trying to exact justice for the impoverished. “If truth has replaced justice in South Africa – has reconciliation then turned into an embrace of evil?” he asked.

South African scholar Claudia Braude is also critical of the commission’s approach. Having avoided a Nuremberg route in dealing with the crimes of the past, she says, South Africa has entrenched a pervasive culture of impunity. Using the “template of forgiveness,” many South African criminals were claiming the right to be forgiven. “Since amnesty cannot be granted for crimes against humanity, descriptions of apartheid mutated from being an internationally recognized crime against humanity into a gross human rights violation,” Braude writes.

She agrees with several scholars accusing Archbishop Desmond Tutu of cloaking the commission in a language of forgiveness which allows a political compromise, also called a pact between elites, to suddenly acquire a moral overlay. No wonder, the article continues, that the democratically chosen leaders of the new South Africa, who in recent years participated in a corrupt arms deal, now demand amnesty. Using the lan-

guage of amnesty, political context and forgiveness, South Africans are being asked to let off the hook the president (accused of raping a young woman), his financial advisor (accused of corrupt dealings in the arms deal), and the xenophobic attackers (accused of attacking and looting the businesses and houses of people from other African countries).

Mamdani and Braude are saying that those who benefited from a crime against humanity have walked off scot-free. Those who have killed, maimed, and tortured got amnesty. Because the structural injustice black people suffered has not been rectified, the rights and freedoms in the constitution remain a chimera. We are therefore NOT equal before the law and will never enjoy equal benefit or protection. The TRC single-handedly destroyed the possibility of restoring human dignity which forms the foundation of freedom, justice, and peace in the world. Therefore, the commission’s critics say, all South Africans have in a way been licensed to be as corrupt and criminal as they want, to make up for what they have been denied, or in protecting that which others want to take from them.

You will agree: This is devastating.

But allow me to look at the same issues framed by a different philosophy or worldview, namely that of being part of an interconnected community.

Is Autonomy European?

First things first. Is the concept of an “autonomous person” a European invention? It is important to realize that over the years, African philosophers have defined personhood in a specifically interconnected way. The self is not something private, hidden within our bodies, modern African theologians Gabriel Setiloane and Augustine Shutte maintain. The self is outside the body, present and open to all. It is not a thing, but the sum total of all interacting forces. The human self is therefore not something that first exists on its own and then enters into relationship with its surroundings. It exists ONLY in relationship to its surroundings.

This kind of interconnectedness is not an isolated exceptional phenomenon, but part of a much broader, more general context found in a variety of forms, under a variety of names, manifesting in a variety of cultures across the African continent. In his famous 1995 essay on African philosophical thought, Ghanaian philosopher Kwame Gyekye says that communitarianism is held by most of the scholarship involving cultures of Africa, as the most outstanding trademark as well as the most defining characteristic.

Poet and Wellesley College philosophy professor Ifeanyi Menkiti also maintains that “as far as Africans are concerned, the reality of the communal world takes precedence over the reality of the individual life histories” and therefore comes to three conclusions: The community defines the individual; personhood is not bestowed on somebody simply through birth, but is something to be acquired; personhood is something at which an individual could fail.

In other words: A person is fully dependent on others. In African philosophy this is at times described as interconnectedness towards fullness. Former Senegalese poet and President Leopold Senghor underlined the Latin meaning of “conspiring” – breathing together. Our deepest moral obligation is to become fully human and that we can only do through entering more and more deeply into community with others. The goal of morality is the fullness of humanity.

Being interconnected makes it possible to acquire personhood. Personhood is not bestowed on someone simply through birth. You have to “build” yourself into a person.

“Personhood refers not to a state of being but to a state of becoming. No living self can be static.”

Personhood refers not to a state of being but to a state of becoming. No living self can be static. Stasis means social death. According to early 20th century missionary Tom Brown, who lived over forty years among

the Batswana, the moment that a person starts living in disregard of the community, according to the each-man-for-himself principle, then “the light of the mind is darkened and [his] character deteriorates, so that it may be said that the real manhood is dead, though the body still lives; when they realize that to all intents and purposes the human being is alienated from fellowship with his kith and kin.”

How does this view interact with the notion of human dignity? Here for you, in Germany, human dignity is inviolable and innate. It forms the foundation and basis from which people can access the protection

“In Germany, human dignity is inviolable and innate.”

of their human rights. Gyekye says that the basis of a caring society could be ‘caring or compassion or generosity’ rather than justice.

The Essence of the TRC

Thousands and thousands of revenge killings were executed in Europe after the Second World War. Not a single direct revenge killing of victims took place during the TRC period – many murders of course, but they were generally linked to criminal activities. Why this absence of vengeance? Why did victims and perpetrators sit together in the same room talking about their experiences? I want to suggest that it was due to this sense of being part of and dependent on one another in order to build a personhood within a new democracy.

But we are a country split down the middle: White perpetrators use the brand-new bill of human rights to protect those very rights that they previously denied their victims.

Victims and the poor did not demand rights before the TRC, but hoped that by telling their collective story a country would be moved into changing everybody’s life. How powerful this kind of interconnectedness is,

was impressively formulated by a mother whose son was killed by an apartheid hit squad. Asked what she thought about reconciliation she answered as follows:

This thing called reconciliation [...] if I am understanding it correctly [...] if it means this perpetrator, this man who has killed Christopher Piet, if it means he becomes human again, this man, so that I, so that all of us, get our humanity back [...] then I agree, then I support it all.

In simple terms she spelt out the full complex implications of being interconnected-towards-wholeness and the role of reconciliation in it.

Her words, firstly, mean that she understood that the killer of her child could, and did, kill because he had lost his humanity; he was no longer human. Secondly, she understood that to forgive him would open up the possibility for him to regain his humanity; to change profoundly. Thirdly, she understood also that the loss of her son affected her own humanity; she herself had now an affected humanity. Fourthly and most importantly, she understood that if indeed the perpetrator felt himself driven by her forgiveness to regain his humanity, then it would open up for her the possibility to become fully human again.

This remarkable formulation affirms how somebody, who would be regarded by many as not effectively literate, let alone schooled in African philosophy, intimately understood her interconnectedness and could formulate it succinctly. But this view had profound implications for the workings of the TRC.

After 18 Truth Commissions around the world, from Chile and El Salvador to Canada, the South African one has been hailed and credited for being the first to hold victim hearings in public, individualize amnesty and allow victims fighting on both sides of the conflict to testify at the same forum.

Most scholars ascribe that to motivated and innovative thinking. But all three can be traced directly back to a strong awareness of interconnectedness. Because people share each others pain, the audience has as much right to be in the presence of the testimony

as the testifier, all of it is our story and therefore may be public; because people who are prepared to apply for amnesty are admitting wrongdoing, they could therefore begin to change in order to be eventually re-admitted

“Why did victims and perpetrators sit in the same room?”

to society; and because mothers who lost their loved ones, fighting for the ‘right’ or the ‘wrong’ side, suffer alike and can only try to heal when connected to one another.

Community in African Thought

What are the implications?

Mamdani’s criticism means that exchanging truth for justice or “embracing the evil one” could be the beginning of a humanizing process in which compassion and change bring the ultimate form of justice – a restored and caring society.

In fact it is important to know that the whole notion of evil, according to African philosophers, is different. Something is considered to be evil not because of its intrinsic nature, but by virtue of who does what to whom. According to Setiloane, evil can be described as living in disregard of the community. It is when you begin to deny your interconnectedness, step out of the corporate in which you should be ‘building’ yourself that you are committing evil. So it is exactly by refusing to forgive, refusing to embrace whom is regarded as evil that one begins to deny interconnectedness and is therefore busy with evil.

In terms of not addressing the structural devastation of apartheid: Within a communitarian worldview, one may assume that forgiving and embracing the perpetrator will demand of him to change into a fellow citizen that will begin to “build his personhood” through sharing and assisting his community. In terms of apartheid’s beneficiaries, interconnectedness assumes that whites will feel themselves linked to the few identified perpetrators and that THAT will propel them into processes of change, restoring, and reparation.

That no sharing or change has happened is more an indication of a dominating non-interconnecting culture clashing with an indigenous interconnecting one, than a TRC template encouraging people to be comfortable with “evil.”

It seems that those who do not bear interconnectedness in mind find the reasoning in and around the TRC confusing. In an essay on forgiveness, the late French philosopher Jacques Derrida describes Tutu as “confused” and oscillating “between a non-penal and non-reparative logic of ‘forgiveness’ (he calls it ‘restorative’) and a judicial logic of amnesty.” Through the interconnectedness-prism however, Tutu is not simply linking human rights and amnesty to religion, but is using the foundation of interconnectedness to allow people back into humanity through processes such as forgiveness and amnesty. In other words, concepts such as amnesty and judicial logic are not added on or simply linked to forgiveness but instead interpreted through interconnectedness which profoundly changes the way these two terms are used by people like Archbishop Tutu.

Again, interconnectedness does not simply regard extracting privileges and benefits from the one group to give to the other, as justice or restoring human rights. Interconnectedness depends on everybody’s moral awareness of a deep and potentially fatal connectedness which puts an imperative on beneficiaries to share and build, in order for them to regain their humanity. Interconnectedness lit up concepts like justice into restorative justice, amnesty into admitting wrong doing, forgiveness into re-admittance into the community of humanity and human rights into responsibilities towards a more humane society. You cannot have dignity or freedom if mine is affected.

This kind of interconnected responsibility shows up countries that are quick to put African leaders on trial for human rights abuses, while they themselves and their policies sow hunger, corruption, and destruction in Africa.

Is the template of forgiveness providing impunity to the corrupt? Yes, if amnesty is regarded in a strictly individual sense, it could be seen as a dishonest way to escape punishment. But if amnesty is regarded in an interconnected way, that it is an admittance of wrongdoing and stating of a willingness “to make up” for it in order to become part of the community again, then amnesty is NOT impunity, but profound change. It is therefore too simplistic a reading to regard all the amnesty-asking of the new dispensation as purely a desire for impunity. I am suggesting that much of the support for “criminals” in South Africa is embedded NOT in a desire for wrongs to go unpun-

“Because people who apply for amnesty are admitting wrongdoing, they could therefore begin to change.”

ished, but to be allowed, through negotiated *wiedergutmachen* back in the community of respectable citizens.

At the same time, the fact that many current political leaders regard amnesty indeed as the SAME impunity granted to the beneficiaries of apartheid, is a sign of how western notions of individual rights are dominating, overriding, and corroding the indigenous notion that nobody can be without others.

The Notion of Justice

The notion of justice was not left out of the equation of the TRC, as many have argued. Justice was interpreted through the worldview of interconnectedness towards a fuller humanity. In fact, justice entered and became rejuvenated through a radical rethinking of the grammar of justice itself and through the process of human compassion and restoration that is understood to be as important as, and should become part of, the rule of law. This rethinking should be used not only during times of difficult transitions, but in European countries desperately trying to protect themselves from those whose interconnectedness had been

destroyed through colonialism and things like collateral damage, who are now flocking to European shores to share the spoils.

This conference on Our Common Future asks whether a common understanding of human rights is possible. I would say yes, but only when there is an awareness within the human rights discourse that people can think about human rights through a frame OTHER than that of the western individual.

This is a condensed version of a speech given at the OCF conference's session on Human Rights. More can be found at www.ourcommonfuture.de/krog

“Western notions of individual rights are dominating, overriding and corroding the indigenous notion that nobody can be without others.”

Truth Commissions: A Worldwide Phenomenon

Since 1974, more than 30 truth commissions were created in 28 countries. The model is being considered in the wake of mass human rights violations in other countries as well.

- Argentina (National Commission on the Disappearance of Persons, 1983)
- Bolivia (National Commission of Inquiry into Disappearances, 1982)
- Chad (Commission of Inquiry on the Crimes and Misappropriations Committed by the ex-President Habré, his Accomplices and/or Accessories, 1991)
- Chile (National Commission for Truth and Reconciliation, 1990; National Commission on Political Imprisonment and Torture, 2003)
- Democratic Republic of Congo (Truth and Reconciliation Commission, 2003)
- Ecuador (Truth and Justice Commission, 1996; Truth Commission, 2007)
- El Salvador (Commission of Truth, 1992)
- Germany (Commission of Inquiry for the Assessment of History and Consequences of the SED Dictatorship in Germany, 1992)
- Ghana (National Reconciliation Commission, 2002)
- Grenada (Truth and Reconciliation Commission, 2001)
- Guatemala (Commission for the Historical Clarification of Human Rights Violations and Acts of Violence which Caused Suffering to the Guatemalan People, 1997)
- Haiti (National Commission for Truth and Justice, 1995)
- Indonesia (Truth and Reconciliation Commission, 2004)
- Liberia (Truth and Reconciliation Commission, 2005)
- Morocco (Equity and Reconciliation Commission, 2004)
- Nepal (Commission of Inquiry to Locate the Persons Disappeared during the Panchayat Period, 1990)
- Nigeria (Human Rights Violations Investigation Commission, 1999)
- Panama (Truth Commission, 2001)
- Paraguay (Truth and Justice Commission, 2003)
- Peru (Truth and Reconciliation Commission, 2000)
- Sierra Leone (Truth and Reconciliation Commission, 2002)
- South Africa (Truth and Reconciliation Commission, 1995)
- South Korea (Presidential Truth Commission on Suspicious Deaths, 2000)
- Sri Lanka (Presidential Commission of Inquiry into Involuntary Removal and

- Disappearances of Persons in Western, Southern and Sabaragamuwa Provinces, Presidential Commission of Inquiry in to Involuntary Removal and Disappearances of Persons in the Central, North Western, North Central and Uva Provinces; and Presidential Commission of Inquiry into Involuntary Removal and Disappearances of Persons in the Northern & Eastern Provinces, 1994)
- Timor-Leste (Commission for Reception, Truth and Reconciliation, 2002)
- Uganda (Commission of Inquiry into the Disappearance of people in Uganda, 1974; and Commission of inquiry into Violations of Human Rights, 1986)
- Uruguay (Investigative Commission on the Situation of Disappeared People and its Causes, 1985; and Peace Commission, 2000)
- Yugoslavia, Federal Republic of (Truth and Reconciliation Commission, 2001)

Source: www.amnesty.org/en/international-justice/issues/truth-commissions

The Changing Face of Global Migration

“It is ... important to recognize the transnational capacities of today’s migrants.”



Steven Vertovec is director at the Max Planck Institute for the Study of Religious and Ethnic Diversity in Göttingen, Germany.

> There are hundreds of millions of global migrants each year, and their numbers are growing. But unlike the mass migrations of the 19th and 20th centuries, today’s migrants are more diverse, their destinations more varied and their reasons for leaving home more complex than ever before. In his keynote at the OCF conference’s session on Migration and Integration, social scientist Steven Vertovec explored some of the consequences of the new migration patterns.

► Most UN agencies put the number of international migrants at about 214 million people per year. Indeed, over the past 30 years, the number of international migrants has doubled. However, if we look at the proportion of international migrants, vis-à-vis the growth of the global population, we’ll see that international migration has stayed about the same – about three percent – for several decades. It is projected to continue to do so until about 2050.

Yet while the proportion of migrants is staying the same, I would argue that the nature of global migration has changed sub-

stantially in terms of its makeup in three key ways. First of all, the numbers of international migrants represent only a quarter of the estimated migrants in the world if we take internal, rural–urban migration into account. Even though we might be dealing with internal, rural–urban migration, in many countries this still entails considerable ethnic, linguistic, and religious diversity.

Second, most international migration happens within regions. In Europe, we have 31 million people moving just within the continent. Thirteen million people are moving from country to country within Africa.

And in Asia, there are 35 million people moving from region to region.

Finally, a lot of people have the idea that international migration is mainly a matter of poor people moving to rich countries. But the reality is that only about a third of international migration is made up of people from developing countries moving to developed countries. The majority is comprised of people moving from developing countries to developing countries, or moving from developed countries to developed countries.

Fundamental Shift in Patterns

Over about the past 30 years, we've seen a fundamental shift in global migration patterns. Basically, post-war migration up until the 1970s can be characterized as large numbers of people going from a few places to a few other places. Large numbers of people from Turkey and Yugoslavia came to Germany, for example; lots of Algerians went to France, and large numbers of Mexicans emigrated to the United States.

Since the 1980s, global migration has consisted of small numbers from many places moving to many places. Not only do we see more people coming in small numbers from more countries, but I suggest that over the past 30 years, we've had a proliferation of migration categories: Students, asylum seekers, environmental refugees, internally displaced people, seasonal workers, family reunification and marriage migration, contract workers and the like. I think a lot of the public debate loses sight of this proliferation in different categories.

“In Europe, we have 31 million people moving just within the continent.”

Furthermore, a lot of the public debate assumes that people from a particular country have automatically come under a certain migration category or a certain legal status: All Iraqis must be refugees; all Turks must be Gastarbeiter and descendants of Gastar-

beiter. This is a myth that needs breaking. Within the same group – indeed, within the same family – you often find people with many different legal statuses. That's a tremendously important factor to take into consideration because a person's legal status has implications on housing, jobs, families, and access to public resources. Ultimately, it impacts people's position in society, how long they're going to be there, their own strategies for integration, and so forth.

Another big change is what we can call churn, meaning something that's turning over and constantly moving. The fact is: Not only do you have varying numbers of people coming into the country, but also large numbers of people leaving the country at the same time. This is primarily felt in cities. For policy makers, this should have crucial impact: When you have populations that are turning over every year or every couple of years, it has an impact on how you have to plan.

Transnationalism's Importance

Transnationalism is another important dimension of global migration. Transnationalism refers to various kinds of intensified connections that migrants are able to sustain with their homelands now. Since the 1980s – and particularly since the 1990s – the capacity for migrants to be able to maintain various kinds of social, political, and economic connections with their homelands has reached unprecedented levels.

Migrants have always maintained connections with their homelands. But now, due in particular to cheap telephone calls, migrants can have a real-time connection with people on the other side of the world. The ability to electronically send money has also been enhanced over the last couple of years. It is increasingly important to recognize the transnational capacities of today's migrants, who are now able to have their feet in two places at least.

In certain political discourses it's assumed that transnationalism and integration represent what you can call a zero sum game. In other words, the more transnational migrants are, the less they integrate. There's a considerable amount of research that shows this is not true. Surprisingly, we

“What's the relationship between cities and the nation-states in which they are located?”

see that those who are more transnational and who maintain strong political, economic and social links with their homelands are actually more integrated. They have better employment and more to do politically in terms of engagement and participation than those who aren't. These are counter-intuitive findings that we need to get into public debates about migration and integration.

What does the future hold? In terms of global migration, flows, and diversification, I think we can, in significant ways, expect more of the same. One of the reasons we've seen more people from more parts of the world coming in smaller numbers has to do with a gradual increase in living standards around the world. Of course, terrible pockets of poverty remain, but on the whole many countries are rising up economically.

Migration's Future

It is not the poorest who migrate, but those who are economically mobile or slightly better-off. Given widespread patterns of development, this suggests that future migration will be more evenly spread around the world.

To be sure, there will be uneven effects and patterns, within nations and around the world. Some places receive more migrants under different conditions than others. Within countries, cities and their localized political economies are the engines of global migration: Frankfurt, Berlin, Hamburg, and London are going to have different patterns than other places. We are seeing rapid diver-

sification in rural areas in many countries, but nothing in comparison to the changes surrounding cities.

This raises an important question: In the future, what's the relationship between super-diverse cities and the nation-states in which they are located? Berlin already resembles the rest of Germany less and less. New York does not look like the United States, and London does not look like the rest of the UK.

How do you politically manage a situation like that? Cultural diversity is reaching a point where it is on the political agendas of most countries now. Migration-driven diversification is a core feature of contemporary global cultural transformation, just as globalization is a core aspect of economic transformation. This process has already happened. It is manageable, but it is here, and it is irreversible.

Now and in the future, a nation-state's social, political, and economic success will be determined by how well it adapts itself to increasing diversity and complexity and not by how it hides it, denies it, or fights against it. Policy makers have to make hard decisions and hard trade-offs, but they should do it with the knowledge that things are going to get more complex. They're going to get more diverse. And that is our common future. 

This is a condensed version of a speech given at the OCF conference's session on Migration and Integration.

“Cities and their localized political economies are the engines of global migration.”

The God Gap

“Rising existential security tends to bring declining emphasis on religion.”



Pippa Norris is the McGuire Lecturer in Comparative Politics with a focus on religion at the John F. Kennedy School of Government at Harvard University. She has served as an expert consultant for many international bodies including the UN, UNESCO and the World Bank.



In developing societies with rapidly growing populations, religion is strong and getting even stronger; in most advanced industrial societies, with dwindling populations, religion plays a steadily less-important role in public life. In a lecture at the OCF conference's session on Religion and Values, Harvard University political scientist Pippa Norris explains the facts behind this trend and why reducing social and economic inequality can smooth religious tensions in the future.

In recent years, debates about the role of religion have become increasingly prominent around the world. The persistence of high rates of churchgoing in the United States, the growing importance of liberation theology in Latin America, and religious conflict in the Balkans, demonstrated that religion had not faded as a potent force in many contemporary societies.

That point was reinforced by the events of 9/11 in the United States, ethnic and religious tensions in Asia, and repeated outbreaks of violent conflict between religious groups in Nigeria, Sudan, and India. In the

"The decline of religious values is not confined to Western Europe."

EU, the rapid settlement of Muslim migrants into European societies has raised important challenges for how policy makers manage cultural diversity, maintain social cohesion, and accommodate minorities.

Recently, events have intensified concern about the integration of Muslims within Europe. Sharp ethnic tensions arose in the Netherlands after the murder of filmmaker Theo van Gogh by Islamic extremists in November 2004. Heated protests broke out in many countries, following the September 2005 publication of the 'Muhammad' cartoons in Denmark: The cartoons were seen

as blasphemous in Islamic countries, while demands for their suppression raised concerns about freedom of expression in Western countries. And violent riots occurred a few months later in suburban Paris housing projects involving disaffected Franco-Maghrebi communities.

Contemporary debates in Europe vividly demonstrate the continued relevance of understanding religious values, including arguments surrounding the role of visible religious symbols, like headscarves, in public arenas in France, bans on the construction of new minarets in Switzerland, and the role of multiculturalism and *Leitkultur* in Germany. One widespread assumption is that these sorts of disparate events reflect a worldwide revival of religion.

I suggest the picture is more complex, and empirical evidence derived from scores of societies demonstrate growing religious divergence worldwide. On one hand, religious values and practices remain strong in developing societies, which have rapidly growing populations; and religion is making a comeback in many ex-communist countries, filling the vacuum left by the collapse of communism. But at the same time, secularization has been occurring in most advanced industrial societies, with dwindling populations.

This erosion of church attendance, religious values, and beliefs has been most clearly observed in Scandinavia and Western Europe, which has led some scholars to claim that Western Europe is the exception – not the United States. The depth of change does vary across societies but the decline of religious values and practices is not confined to Western Europe, by any means. Similar developments are evident in comparable affluent postindustrial societies such as Australia, New Zealand, Japan, and Canada; even in the United States, a trend toward secularization is discernable, though partly masked by the large-scale immigration of people with traditional worldviews.

The Growing Religiosity Gap

New evidence lends further support to the thesis that rising existential security tends to bring declining emphasis on religion in postindustrial societies, an argument first presented in my book *Sacred and Secular: Religion and Politics Worldwide*, written with Ronald Inglehart and first published in 2004. This – combined with the resurgence of religion in many developing countries – has led to the emergence of a growing religiosity gap worldwide. Demographic trends have reinforced this gap, with the shrinking population in secular Europe, and the growing population in developing societies. The dynamics of secularization are more complex than either the simple decline of religion that was proposed by some early

"Religions provide reassurance that ... a higher power will ensure things work out."

sociologists or the universal resurgence of religion that has been suggested by many contemporary commentators.

The central thesis of *Sacred and Secular* argued that the emergence of high levels of existential security are expected to diminish anxiety and stress, promoting feelings of psychological well-being – which, in turn, reduce the importance of religious values in people's lives. Although this hypothesis has been controversial, it can be argued that virtually all of the world's major transcendent religions provide reassurance that, even though the individual alone can't understand or predict what lies ahead, a higher power will ensure things work out. This belief reduces stress and anxiety, enabling people to focus on coping with their immediate problems. Under conditions of insecurity, people have a powerful need to see authority as both strong and benevolent – even in the face of evidence to the contrary. Through

strengthening feelings of security, the processes of societal modernization have significant consequences for religiosity; the conditions of growing security that usually accompany the transition from agrarian to industrial societies, and then into postindustrial societies, tends to reduce the salience of religion in people's lives.

Experiential Security

The empirical analysis presented in *Sacred and Secular* also demonstrated strong correlations between religiosity and national level indicators of social and economic security, such as health and wealth. But the evidence then available did not establish a direct individual level link between religiosity and measures of existential insecurity. What additional evidence would provide further confirmation of the relationship between existential security and religiosity?

Answering that question became possible in 2007 using new data which only became available after *Sacred and Secular* was first published. The 2007 Gallup World

Since cash income is only a poor proxy, especially in subsistence economies, the Afro-Barometer – an African-led series of national public attitude surveys on democracy and governance in Africa – pioneered the use of a Lived Poverty scale which measures the extent to which people have been forced to go without basic necessities during the past year. To construct a similar objective scale, the Gallup World Poll contains eight items that ask respondents to report to what extent they had enough money to buy food or shelter in the previous year, how well they are satisfied with their standard of living and state of health, whether their home has basic facilities such as running water, electricity and a landline telephone, and whether they have experienced health problems. These multidimensional items were summed and proved to form a consistent “Lived Poverty Index.”

Comparing the Gallup and Afro-Barometer results confirms that the Lived Poverty Index was indeed strongly correlated with religious values; hence some of the poorest

developing societies in Africa, such as Chad, Rwanda and Mali, gave the highest priority to religious values.

By contrast, some of the most affluent postindustrial societies in the world, led by Sweden, Norway, Denmark and Britain, showed the most secular values. There are exceptions: Many post-communist states with relatively high levels of lived poverty were secular, while many moderate income countries with low levels of lived poverty are also highly religious in their values, notably the oil-rich Gulf states and other predominantly Muslim countries such as Lebanon and Algeria.

The comparison with religious practices shows a similar and almost equally strong relationship; thus without any controls, the Lived Poverty Index proved to be a significant predictor of participation in religious services. Roughly nine out of ten people worldwide who lack the most basic

necessities of life report that religion is an important part of their daily lives, but this proportion drops to just six out of ten people who have these basic needs met. Similar disparities can be observed for at least weekly religious participation, although behavioral indicators are always lower than the expression of religious values.

Inequality Equals Religiosity

Far from being an anomaly, the existential security thesis applies to the United States as well as to most other societies. Hence, among the poorest segments of American society almost everyone reports that religion is important to their lives, but among the most affluent segment, only six out of ten do so. Churchgoing is less strongly linked with existential security, but nevertheless the poorest group of Americans, as measured by the Lived Poverty Index, are also the most likely to attend religious services. Sharp inequalities in American society help to explain its relatively high religiosity.

It could be suggested that the patterns observed so far might apply only to Roman Catholic and Protestant Christian societies, but not to other religions. But the Lived Poverty Index predicts religious values across nearly all religions, including Muslims as well as Catholics, Buddhists and Confucian/Taoists, as well as Protestants and those of Orthodox faith. Across many comparisons, using data from both the Gallup World Poll survey and the World Values Survey – and across scores of nations and many types of faith, the findings are consistent and robust. The most vulnerable populations in the world – those who lack the basic necessities of life such as food, running water and electricity – are far more likely than others to feel that religion is important in their lives; and to participate more often in religious practices.

The indicators of both religious values and religious behavior are not simply correlated with experience of lived poverty. They are also strongly related to a range of societal level demographic indices. Hence there is a robust and consistent pattern; the

“Have you attended a place of worship or religious service within the last seven days?”

Poll (GWP) provides data on living standards, social deprivation, exposure to societal risks, and religiosity among the public living in 132 societies worldwide.

Two items contained in the Gallup World Poll are particularly useful to measure religiosity. Hence religious values are monitored by: “Is religion an important part of your daily life?” Since this does not refer to any specific concept, meaning, or definition of ‘religion’, or to any particular practices and beliefs, this item is the most suitable for cross-faith comparisons. In addition, religious practices are monitored by Gallup: “Have you attended a place of worship or religious service within the last seven days?”

To measure the experience of insecurity, we monitor vulnerability to multiple risks and forms of social deprivation.

most religious societies (defined by both the importance of religion and attendance at religious services in the 2007 Gallup World Poll) are also usually the ones which have the highest fertility rates for women, the

“Most high-income countries show a declining emphasis on religion.”

greatest estimated population growth, and the highest proportion of young people in the total population.

The global contrasts are stark; hence in some of the world’s most affluent societies, such as Sweden, Japan and Russia, the average fertility rate for women is less than two, generating population decline. By contrast, in countries such as Chad, Sierra Leone, and Afghanistan, the average fertility rate for women is around six. Patterns of longevity dampen overall population growth in the poorest societies, but nevertheless the general tendency is for populations to grow most in the developing world, which is also the most religious, and to fall in more secular postindustrial societies.

Resurgence of Religion?

Early versions of modernization theory, from Karl Marx to Max Weber, held that religious beliefs were dying out and would disappear with the spread of education and scientific knowledge. More recently, it has become apparent that religion continues to play a prominent role, leading to claims of a “Global Resurgence of Religion.” The truth lies between these two extremes. When examined in the global longitudinal perspective provided by the World Values Survey, it becomes evident that religion has indeed become more important in many countries – but it has continued to decline in many others.

We do not find a global resurgence of religion, as some observers have claimed. Most high-income countries show declining

emphasis on religion. Thus the public of Norway, Spain, Northern Ireland, the Netherlands, Belgium, Switzerland, the former East Germany, New Zealand, Sweden, Denmark, and Australia all shifted toward saying that God was less important in their lives from the earliest available survey to the latest one.

But many countries show increases, and all six of those showing the greatest gains are ex-communist countries: Bulgaria, Russia, China, Belarus, Serbia, and Romania. Overall, the public of 13 of the 15 ex-communist countries for which we have a substantial time series, increased their emphasis on religion. The sharp drop in economic, physical and psychological security experienced by ex-communist societies is what we suspect caused the resurgence of religion in most ex-communist countries. This development has multiple components: The collapse of the communist ideology was a central part of this, leaving people disoriented and psychologically insecure and opening an ideological vacuum that, for many people, religion fills. Although religion has long been weak in these countries, Marxist ideology once filled the function of a religion, providing psychological security, predictability, and a sense of meaning and purpose in life for many people.

It is impossible to understand the rise to power of communist movements in these countries without recognizing the motivating power that the communist worldview once had. Many thousands of true believers sacrificed their lives for the communist cause during the Russian revolution and civil war, during the Long March in China, and during the Vietnam War. For many decades, communism seemed to be the wave of the future. The belief that they were building a better society may have given a sense of purpose to the lives of many people. But during the 1970s and 1980s, Marxist ideology began losing credibility; fewer and fewer people believed that communist regimes were building an ideal society that represented the wave of the future. By 1990 communism was generally discredited, and communist

regimes collapsed throughout the Soviet Union and Eastern Europe. In China and Vietnam, hard-line communist regimes were replaced by more pragmatic communist regimes that have become increasingly market-oriented. In the former Soviet Union and Eastern Europe, the collapse of communism was accompanied by severe economic and social decline which left an ideological vacuum everywhere.

Moreover, other factors contributing to sharply rising levels of insecurity experienced in many post-communist societies have been the social disruption caused by the transition to liberal market economies in the early 1990s, accompanied by drastic

“The collapse of communism left an ideological vacuum.”

cuts in the welfare state, rising unemployment, and falling standards of living for many social sectors. Mean levels of growth declined sharply in the early 1990s before recovering, at least in some countries, as measured by per capita GDP, but accompanied by higher inequalities of income and wealth. The most vulnerable populations, such as the low-skilled unemployed, the retired and the disabled, lost out heavily from the transition to market economies. Not surprisingly, some of the post-communist countries which made the most successful economic transitions, such as the Czech Republic, Poland, and East Germany, are also the ones where religiosity eroded.

Lastly the liberalization of expression and religious freedom also probably contributed towards the more open expression of religious values and practices, particularly in the Chinese case. In the past, communist regimes systematically repressed religion – but during the last decade, religion has been making a comeback. It has not recruited equally from all strata: It has tended to attract the least happy people – those who feel the greatest need for security, reassurance, predictability, and social support.

Religious values have indeed become more important in many countries – but this has continued to decline in salience in many others. And one finds a clear pattern underlying these changes. In recent decades religion has become increasingly important in two types of countries: Developing countries and ex-communist societies, where the collapse of communism has opened up new inequalities and insecurities, especially for vulnerable populations such as older women dependent upon state benefits. But this resurgence of religious values is by no means universal. Among the public of high-income countries – who have grown up with high levels of existential security – the importance of religious values is low and has continued to decline.

Conclusions and Implications

In recent decades public interest in religious contrasts around the world has grown tremendously, and the debate about secularization theory and its recent critiques has become increasingly relevant to contemporary concerns. The idea of secularization has a long and distinguished history in the social sciences with many seminal thinkers arguing that religiosity was declining throughout Western societies.

Yet the precise reasons for this erosion of spirituality were never entirely clear. Max Weber attributed secularization to the spread of education and scientific knowledge; our own interpretation emphasizes the role of existential security. But by the mid-1960s the claim that religion was in a state

“The world as a whole now has more people with traditional religious values than ever before.”

of terminal decline rested on flimsy evidence. Its proponents cited empirical evidence of declining churchgoing in Western Europe, and a handful of case studies that fit the thesis, rather than a systematic examination of empirical evidence from many countries.

It was not surprising, therefore, that during the last decade American sociologists mounted a sustained counterattack on the basic premises of secularization theory. This critique threw many former proponents on the defensive. The simplistic assumption that religion was in decline everywhere, common in earlier decades, had become implausible to even the casual observer. Too many counter-examples existed around the world.

The religious market argument – a set of explanations that applied supply-and-demand theories from economics to understand religion – sought to reconstruct our thinking about the primary drivers in religious faith. The attempt was long overdue, but the religious market theory was fundamentally mistaken in trying to generalize from the distinctive American experience to the world as a whole. It is clear that the U.S. public remains far more religious than the public of most other postindustrial societies, but we believe that this largely reflects other causes than those cited by religious market theory.

Security and Secularism

New evidence confirms the finding that, with rising levels of existential security, the public of virtually all advanced industrial societies tend to move toward more secular orientations. Earlier perceptions of this process gave rise to the mistaken assumption that religion was disappearing. “God is dead,” proclaimed Nietzsche more than a century ago. A massive body of empirical evidence indicates that his negative forecast for religious values was

wrong. As a result of contrasting demographic trends in rich and poor countries, the world as a whole now has more people with traditional religious views than ever before – and they constitute a growing proportion of the world’s population. The social and political divisions between those with religious and secular values, beliefs, and identities are thus growing – contributing to many of the tensions observed today in contemporary Europe.

That doesn’t mean religiosity is growing stronger in secure high-income societies. Rather, growing acceptance of divorce, abortion, homosexuality, gender equality, and the spread of secular norms have led to the political mobilization of those with traditional religious orientations. Precisely because their numbers are declining, people with traditional religious values see key religious norms as eroding – and they have become more active, making religious issues increasingly salient. Conversely, in the long term, if high levels of existential security are conducive to secularization, then expanding human security through sustainable development around the world, and economic equality within societies, may contribute to reducing tensions over religious values. ◀

This is a condensed version of a speech given at the OCF conference’s session on Religion and Values. More can be found at www.ourcommonfuture.de/norris

Promoting Religious Dialogue in the Heart of the Ruhr

Few topics are more contentious in today’s Europe than the role of religion in public life. With voters in some countries restricting the building of mosques in traditionally Christian city centers, the discussion of how best to negotiate religious divides is more relevant than ever. Drawing from the expertise of architects, artists, students, and scholars, Global Young Faculty members created a multi-media project in Essen that tried to capture the essence of this debate.

➤ As much as religion deals with the intangible, dialogue about religious rights and beliefs is often characterized by hard edges. Boundaries arise between those religious groups allowed into the heart of the community and those relegated to its fringe. In Germany, where cities are growing more diverse every day, the question of who can worship where is becoming progressively more important.

The Global Young Faculty group on Religion and Values challenged conceptions of religious identity, belonging, and place in its project *Sondernutzung*, or “special permit.” When people want to place an object in a public square in Germany, they must apply for a *Sondernutzung* permit. This means the public space is not actually public. It is limited and governed. The Global Young Faculty group says this also refers to religious communities that are not Christian. To explore this topic of religious exclusion, the

group sought the help of local artists and architects and erected an interfaith pavilion in the downtown square of Essen – the center of Germany’s diverse Ruhr region – in the summer of 2010. The center of the pavilion consisted of a tower six meters high and two meters broad. The tower was surrounded by a building fence secured with barbed wire to hint at exclusion – but with a small entrance.

“The concept behind that was to have this tower as a placeholder for different religious traditions that might stand there,” says Alexander-Kenneth Nagel, the head of the project and a junior professor of the Sociology of Religion at the Ruhr-University in Bochum. “In Germany, churches are well acknowledged in our city centers because they are seen as a legitimate part of our self-understanding. But you will hardly ever see a mosque or Hindu temple.”

The group asked passersby to imagine that a mosque was being built on the spot. Nagel says they got “a lot of controversial reactions” – from people who agreed that they would be uncomfortable with a mosque in the middle of Essen to a group of Muslim men on their way back from Friday prayer who wondered why their faith wasn’t more a part of the city’s fabric.

The Global Young Fellows wanted to spark debate among Essen residents. Inside the tower, they placed questions and left paper for people to respond.

“This turned out to be the main attraction for people,” Nagel said. “Not the main

pavilion, not the student projects. It was the conversation. I am still really quite moved by that.” That spirit of dialogue characterized the project from its inception. The Global Young Faculty group sought the expertise of artists and architects who knew how to design and build public installations.

“Scientists have a completely different way of conveying things than the artists,” says Nagel. “Scientists are trained to go for the maximum unambiguity. The artists had to create objects which had to be interpreted. These were issues of translation that we have never been confronted with before.”

Nagel and the group had to figure out what story they wanted to tell with this project. They decided to highlight the idea that many people are moved by religious questions, and because of this, societies need to develop strategies on how to mediate between people when it comes to religious dialogue. “How this religious understanding can be put into context is one of the challenges that we have to face,” says Nagel. “The earlier we start to deal with that challenge, the greater the chance that the situation will end in harmony.”

More can be found at
<http://sondernutzung.wordpress.com/>
The Sondernutzung documentary:
<http://vimeo.com/16850785>

Intellectual Capital

The Battle For the Best Minds

The West has historically led the global race for talent. Many of those students who travel abroad for their education never return to their home countries to live and work – or at least they didn't used to. China is a major example that educational patterns are changing. Chinese students abroad are going home after receiving their degrees. In an interview, immigrant expert Wei Shen, a professor of international affairs in France and a Chinese emigrant himself, explains how China is going from brain drain to brain gain.

► When economists evaluate the future prosperity of countries, education levels are sometimes overlooked or at least underplayed. How much of an impact does education have on a country's future?

Shen: I think what is more important is looking at the soft infrastructure of the economy – the people. In the end, it is people who make the economy. Winston Churchill once said, "The empires of the future are the empires of minds." So it is really the brainpower that will be important. That will differentiate between nations. That will decide who will have a better advantage for economic development.

How is this race for talent playing out?

Shen: I believe the brain race or the talent race starts from student migration. It's the competition to get the brightest students and to educate them both internally and to attract talents from outside the country. This also blends with the internationalization of higher education and in some countries the commercialization of higher education. Like what we've seen in England, Australia, America, and even Asia, getting international students has become a very important financial resource.

A lot of your research focuses on trends in Chinese migration. How has the flow of talent in and out of China changed?

Shen: Traditionally, we talk a lot about brain drain – where countries in the global



OCF Fellow Wei Shen, born in 1981, originally from Shanghai teaches international relations at the ESSCA School of Management in France's Loire Valley. He first came to Europe a decade ago as a doctoral student in the Netherlands.

south become main sending countries of talents to the global North. But my research shows that in China more and more people are returning to their home country. In China, we have a funny nickname for them. We call them sea turtles. Sea turtles leave the shore for the sea and then they come back to lay their eggs. Chinese people go to some of the best institutions in North America, Europe, Australia, and Asia to study. They accumulate knowledge and then they come

back to China. That has become a very important strategy. Some people even call this the Chinese government's calculated strategy for development.

How is China pushing return migration?

They give you a lot of titles and publicity to encourage return migration. Sometimes they give you administrative support. If you want to set up a start-up company, they give you tax breaks. They also have preferential policies for land use, so you see a mushrooming of science parks around China.

What impact will all of this return migration have? Will it result in liberalization?

Shen: I hope so! What I have told you is very positive: Win, win, win. Win for the sending countries, win for the receiving countries and win for the migrants. But some of them told me that they still have problems reintegrating. It's not just knowledge – it is also politics. A lot of them experience more culture shock in China than abroad. Most Chinese political leaders have studied abroad, including members of the top academies of science or social science. This kind of influence and impact will not change things overnight. You will see it gradually.

Do you think other countries are doing enough to keep their most gifted scholars?

Shen: There was interesting research by a foundation in the United States on why the country is losing its brightest talents. The study showed it's because the country takes it for granted that people will stay. There is not a lot of policy to encourage them to capitalize on their brainpower.

What do you think will happen in this race for talent? What does the future look like?

Shen: Whether you are traditional sending countries or traditional receiving countries, the future is being decided right now. Countries will have to get prepared because the talent war is a war without bombs or without weapons. It's a silent war. Different governments have already started developing new incentives and initiatives. The competition for the future will be fierce. ►

South to North

Changes in Global Christianity

Christianity has long been viewed as a fundamentally European-American phenomenon. But that is changing, and fast: There are now more than 400 million Christians in Africa, compared to about 300 million in North America and nearly 600 million in Europe, according to the World Christian Database. By 2050 there will be a billion African Christians, while the numbers in the West will stay relatively stable. For Philip Jenkins, a historian of religion, these demographic shifts mark a dramatic change in how the faith is practiced – and are an important phenomenon for policy-makers to consider. In a conversation at the OCF conference, he talked about how the growth of Christianity in the global South will play out.

► You're arguing traditional concepts of Christianity as a white, European-American religion no longer apply. Why is this so important to understanding our common future?

Jenkins: Partly because most people have a kind of assumption as to the direction of the world. They know religion is declining in Europe and therefore the assumption is that the religion of the future is Islam and Islam seems to be the natural religion of the non-Euro-American world. What I want to suggest is Christianity has at least as important a role. If you are interested in the state of the poorer people of the world, if you are interested in issues of development, then Christianity is the key force for understanding that.

Why is the faith growing so rapidly in places like Africa?

Jenkins: There has been a lot of conversion to Christianity: In the last hundred years probably the most important single thing that happened in Africa is a large part of the population went from animist religions to Christianity or Islam. But the most important reason is demographic. We have far higher birth rates in Africa than we do in



Philip Jenkins is the Edwin Erle Sparks Professor of Humanities at Pennsylvania State University, where he specializes in the study of history and religion, particularly Christianity.

Europe, and there's a great deal of migration and globalization. These countries are growing very rapidly.

Are these changes having an impact on how Christianity is practiced globally? Are Africans and others gravitating towards traditional Catholicism or towards more evangelical styles of worship?

Jenkins: At the moment, Christianity around the world is becoming much more charismatic. That's important because it means Christianity becomes a very liberating force, quite a radicalizing force on a personal basis. That means a distinctive kind of worship style, a belief in direct divine intervention in terms of healing and miracles. That represents quite a revolutionary social and political change.

Will the fact that Christianity is growing faster in the global South impact the way Westerners practice Christianity in the future?

Jenkins: It already is affecting the West, particularly Christianity in Europe. Because of migration, on a typical Sunday in London half the people in churches are black – either African or Afro-Caribbean. By 2050, the United States will be close to being a country in which whites will no longer form an absolute majority. That means much of the religious style in the United States will be of Latino, Asian or African origin. So when I talk about Christianity in the global South, the global South is increasingly influencing practices and theology in the North.

Has competition with other faiths, such as Islam, had an impact on the way Christianity is practiced in the global South today?

Jenkins: The normal experience of Christianity in most of the world is in the form of a minority religion or a religion coexisting with other faiths such as Islam. That position makes proselytizing and evangelizing much more difficult. It means you have to be much more conscious at every stage of your interactions with other religions. That competitive tension can have a moral impact, too. If you're in a society where Islam is the main competitor, it means you have to be much more cautious about appearing liberal and tolerating feminism or supporting gay rights issues. If you do, it may seem like you're forfeiting the moral high ground to Muslims. ◀

Integration and Values

Opening Doors, Closing Minds

Immigration is one of the key issues facing Europe in the future. Across the continent, policy makers are grappling with ways to welcome immigrants without eroding the traditions and values of the dominant culture. Can liberal values withstand the pressures of immigration? Expert in immigration Liav Orgad, who took part in the conference's session on Human Rights, argues that efforts to force immigrants to conform to European norms ultimately backfire, and a more accommodating position will have more success.

► Immigration and integration questions seem to be constantly in the news – from German Chancellor Angela Merkel's controversial claim that multiculturalism in Germany has failed to aggressive positions against Muslim immigrants taken by politicians from the Netherlands to Switzerland and Italy.

As many Europeans have become alarmed that their cultural values are being eroded, countries have created immigration policies designed to protect liberal culture values. But should they be doing so?

Liav Orgad, an OCF Fellow and assistant law professor at the Interdisciplinary Center Herzliya in Israel, says European countries need to tread carefully. "Liberal states, in order to preserve and protect their liberal values, are turning to illiberal means – and this is contradictory," he says.

As an example of illiberal means, he points to documents prospective citizens in the Netherlands must sign affirming their support of things such as homosexuality, or to requirements in some German states that immigrants have a basic knowledge of Goethe or Beethoven to pass citizenship tests. Such requirements, which he says are often intended to quietly assimilate foreigners into the majority culture, single people out because of their culture and are ultimately counterproductive, Orgad argues.



Liav Orgad, born in 1977, is a law professor at the Interdisciplinary Center Herzliya in Israel.

"The proposition here is you must be liberal in order to live in a liberal state and this goes against the very concept of a liberal state," he says. "The idea of multiculturalism is you can pick and choose whatever culture or ideas you want."

Orgad has researched a broad range of topics – everything from constitutional questions to the law of war. But his greatest passions are immigration and citizenship, particularly how to reconcile nations' right to self-determination with immigrants' interests. He's in the midst of writing a book called *Cultural Defense of Nations: Liberal Democracy and Cultural Citizenship*, which he hopes to finish in 2011.

In his book he argues that countries should define culture in a limited way when pondering what should be expected of immigrants looking to integrate.

Orgad thinks Europeans should look to the United States, where immigrants are asked to subscribe to values enshrined in the national constitution but not specific cultural values. In Germany, for example, a hypothetical citizenship test that asks immigrants to accept the concepts of the rule of law and human dignity would be appropriate, but rules that asked them to promise to eat German food or listen to German music would not. "It's more legitimate for nation-states to protect their own constitution," he says.

Orgad acknowledges some Europeans are worried that increased immigration is literally changing the cultural framework of the continent. But at the same time, there are tough questions to be asked about what it really means to be European in the first place, and whether forced assimilation actually degrades the very idea of being European.

"In Europe there is an expectation you will be integrated into one dominant culture. There is an expectation Turks in Germany will become German – but what does it mean to become German?" Orgad asks. "Does this concept include some space for multicultural ideas? We have to look at the principal ideas and European values of protecting state neutrality and rejecting discrimination." ◀

Embracing Religion

Mixing Faith and Politics

Many of history's most powerful political leaders came from a religious background. Often, their religious motivations had a great impact on the political landscape. Today, Western societies ignore the powerful influence of religion – sometimes at their peril. That's why political psychologist Ashis Nandy, one of India's most eminent intellectuals, argues that we should embrace religious discourse in the public sphere rather than relegating it to the fringe. Ashis Nandy gave a lecture on the politics of religion at the session on Religion and Values of the Our Common Future conference.

► What role does religion play in a democracy?

Nandy: Most important in any democracy is that people have a right to bring their own preferences into politics. In many societies and communities, these preferences include personal religious beliefs. You cannot deploy thought police to make sure people don't mix religion and public life. I suspect this mixture of religion and politics is frowned upon by many societies where religion has gone into decline. Religion has become a private belief system. Faith, for many decades now, has been a matter to be settled within a family or a closed small community – not something that has an important role in politics, or for that matter social and economic choices. But in some societies and in some communities, it matters. And this contradiction, this conflict, cannot be easily solved within the model of religion available to the western societies because they are used to a tamed version of religion – a housebroken version of religion.

What happens when religion enters into political discourse?

Nandy: I come from a country that produced Gandhi, who explicitly mixed religion with politics; a country where at the moment one of the most interesting characters in international politics, the Dalai Lama, derives his



Ashis Nandy is a Senior Honorary Fellow at the Center for the Study of Developing Societies in New Delhi, India.

principles from Buddhism. I look at South Africa's Truth and Reconciliation Commission, which I consider a magnificent effort. Whether it's successful or not is a different matter, but it is a superbly creative innovation. That was the brainchild of Bishop Desmond Tutu. So some of the most creative efforts in our times have been religious.

Do you think political leaders underestimate religion's role in democracies?

Nandy: Why blame politicians? The politicians have to go to the people. They have to cater to the tastes of the people. Even if they hate it, they have to take into account the preferences and the opinions of the people. What about the intellectuals? They talk as if

they're living in the 19th century. They talk about secular statecraft as if it is a God-given right of mankind, forgetting that some of the greatest killers of our times have been perfectly secular. Secular statesmen killed people or maimed them. They organized genocides on absolutely secular instrumental grounds. The United States has a very good example of that, with its campaigns against American Indians. So has the Soviet Union. So has China. So talking about secular statecraft as a be-all and end-all of human endeavor, I think is an exceedingly short-sighted and, if I might add, stupid endeavor. **Why have Western societies emphasized secularism so strongly?**

Nandy: Because Western intellectuals are guided by history. They are looking back at the times when religion led to wars. But the great wars of our time were not initiated by extremists like Al-Qaeda, whose adherents are a small, hopelessly outnumbered minority. I'm not a believer myself. I come to this position because I am coming through a democratic system and I do believe that a democracy just cannot ignore the desires of the people. If you do, then you get the worst out of religion and then you cannot deploy its strengths. You cannot get Martin Luther Kings from that kind of system – but you can always get Osama bin Ladens.

How do you open up a dialogue between the secular and religious spheres?

Nandy: By listening. Listening is a great art and I think in our times people have less time to listen. They would rather write a blog for the Internet or passively view a more entertaining speaker. I think listening to ordinary people going about their lives in ordinary ways is a great art. Often you have to read between the lines to find out what they are trying to say. Only then can you somehow summon the experiences of humankind, which do not fall within your known world. This leads to a kind of intuitive play with the unknown and the strange, which can be very creative. ◀

A Soft-Spoken Fighter for Religious Freedom

► **From the highest ranks of the Catholic Church, Joseph Cardinal Zen Ze-Kiun is keeping the world's focus on the freedoms of Chinese Catholics in Hong Kong and on the mainland. Through persistent, peaceful protest he's managed to give a voice to the underdog both inside and outside the church. His presence at the Our Common Future conference's session on Human Rights was a reminder of the challenges activists face when confronting authoritarian systems head-on.**

Since rule of Hong Kong was transferred from Britain to China in 1997, the island has become a sort of bridge to the mainland – but also a battleground where more than a century of British sensibilities and expectations clash continuously with a very different Chinese culture.

Joseph Cardinal Zen Ze-Kiun, a soft-spoken, slight man with a fierce reputation as a crusader for the rights of Hong Kong's

Zen hopes peaceful protest and consistent international pressure will change China for the better.

Catholics, has been in this mix for decades. “There were some very basic human rights problems in Hong Kong right after the handover,” Zen says now. “The British colonial regime couldn't have been called a democracy, but that regime respected many freedoms. After the handover, we had to defend ourselves from intervention from the totalitarian regime in China.”

Born in Shanghai in 1932, Zen studied theology in Rome and Hong Kong and taught theology at the Holy Spirit Seminary College in Hong Kong. He was named bishop of Hong Kong in 2002 and represented Hong Kong's 300,000 Catholics for seven years in all, ending with his retirement in 2009. In 2006, he was elevated to the College of Cardinals by Pope Benedict XVI. He remains a voice of conscience and a thorn in the side of the Chinese regime, which refuses to acknowledge the authority of the Pope in Rome and requires Catholic priests in China to answer first to Beijing.

As bishop, he took part in demonstrations against the Chinese government's interference in church affairs, from the right to organize public protests to the authority to control parochial schools in Hong Kong. “I think it's the duty of the pastor to lead the people in defending human rights whenever there's a challenge,” Zen says.

Zen has fought with the Chinese government over specific rights he feels the authorities are taking away from Hong Kong's Catholics, but he's also been a strong voice in favor of human rights beyond Hong Kong's borders. Sometimes, that means walking a narrow line between politics and religion. “The Catholic Church is never in favor of capitalism or socialism – we are against both,” Zen says. “We are in favor of the universal distribution of material goods for everybody, but also in support of disciplined market economy with a sup-

port of high human ideals.” One thing he is sure of is that China's hybrid of authoritarian control and unfettered market capitalism is a morally bankrupt system with a doubtful future, despite its rapid growth in the past two decades. “Surely we are not in favor of capitalism especially as it exists in China,” Zen says. “China has the worst kind of capitalism – it's capitalism without all those guarantees of fair competition.”

And unsurprisingly, Zen has spoken out in support of other activists targeted by authorities in Beijing. After Chinese democracy activist Liu Xiabo was prevented from accepting his Nobel Peace Prize in 2010, Zen was eager to lend his support to his imprisoned countryman. “We are happy that the commission was courageous enough to face the threat of the powerful government,” Zen said. “It's not acceptable today to condemn a man to 11 years just because he has peacefully presented some remedy to the very serious situation of a country” through his writing.

Now 79, Zen is retired from his duty as a bishop – but hardly inactive. He still teaches, writes, and attends conferences all over the world.

And he still hopes that peaceful protest and consistent international pressure will change China for the better, especially as younger, more internationally aware cadres enter the country's leadership. “In the long run, I think it will change,” he says. “I am sure in China, in the lower echelon of leadership, there are people who are looking to the world with their own eyes. They must feel the need for a change.”



Joseph Cardinal Zen Ze-Kiun served as Bishop of Hong Kong from 2002 to 2009 and was elevated to cardinal of the Catholic Church in 2006.



Impressions from the conference.



4 Questions, 12 Answers

“What fact makes you **the most optimistic** about our common future?”

Grimm: Humankind has always had a great capacity to imagine. This innate creativity will help us craft new solutions to pervasive problems.

Limbach: The readiness to think and act in global dimensions. We also shouldn't forget that the progress of science and technology should be combined with an ethical discourse.

Pries: I am optimistic that there are so many young scholars working together with senior scholars on problems that face us all. Stimulated by events like OCF they are specialists in some field and ready to intertwine with other specialists and disciplines.“

“What is the greatest **challenge facing us** in the next 25 years?”

Grimm: International organizations like the United Nations, European Union and World Trade Organization are making more and more political decisions with direct effect on state citizens. So we need to address how this decision-making power can be democratically legitimized and submitted to certain fundamental rules of law.

Limbach: I am concerned about the increasing violence of state agencies and private persons. Science gives us no clear answer as to what is the cause of this problem – whether it is television or something else – but I observe in capital towns like Berlin or Mexico City there is much more violence than ever before.

Pries: Science and knowledge is developing so fast it is increasingly difficult to keep pace. This leads us to the problematic situation where everyone is in a small box looking at small problems and no one overseas the landscape of boxes or would be able to put together all the pieces.

“What piece of advice would you give **young researchers** in your field today?”

Grimm: Up to now there is no (or only a very thin) equivalent to a constitution on the international level. We need more scholars working on this problem. A convincing solution is not yet in sight.

Limbach: Firstly, I advise studying transnational and international law; secondly, learn at least two foreign languages; and thirdly, spend some time studying abroad.

Pries: Young researchers should develop deep knowledge in specific fields while at the same time relating their findings to the big challenges of humankind and act interdisciplinary.

“What was the most **surprising insight** you had at this conference?”

Grimm: I was happy to see the young generation's passion and concern for human rights.

Limbach: The ability of the young faculty to combine theoretical thinking and empirical studies with a readiness to recommend concrete strategies.

Pries: I was struck by the deep social changes a country like China is experiencing and the lack of knowledge and sensitivity to those changes in Europe. We need to understand global developments for assessing local implications for topics like migration, global warming and social inequality.

Ludger Pries served as scientific advisor for the OCF session on Migration and Integration (together with Klaus J. Bade), Jutta Limbach and Dieter Grimm served as scientific advisors for the OCF session on Human Rights. Pries holds a chair for sociology at Ruhr Universität Bochum. Jutta Limbach is former president of the Goethe Institute and also of the Federal Constitutional Court of Germany. Dieter Grimm is professor emeritus of public law at the Humboldt University of Berlin and permanent fellow of the Wissenschaftskolleg (Institute for Advanced Study) Berlin.





Four days, two cities, hundreds of participants hailing from six continents: The Our Common Future conference was an inspiring event and a rare opportunity for researchers and policy makers to meet and talk beyond the boundaries of specialty and about some of the most pressing and complex issues of our times.

For the young scholars in attendance, especially those from the Ruhr region Global Young Faculty and the international ranks of the OCF Fellows, the conference was also the culmination of a year spent meeting and talking with colleagues in their fields. Together and individually, they explained their research to an elite audience: Renowned senior scholars in their respective fields and peers as well.

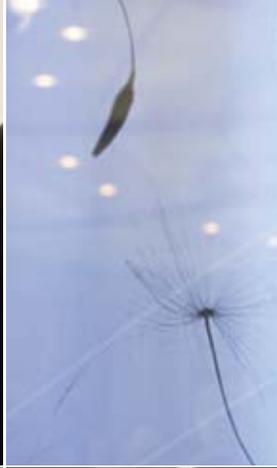
But the conference wasn't all keynote speeches and PowerPoint presentations. It was also an opportunity for busy scholars to meet and mingle in a relaxed, informal setting - a perfect environment for accidental inspiration, professional networking, and making friends.

From the ornate banquet in the Gallery of Hannover's Royal Herrenhausen Gardens to a gala evening at Essen's Philharmonic concert hall, there was an ample cultural program to distract participants from the complex topics of the daytime sessions.

On the pages to follow are some impressions of a conference that was invigorating, enlightening, and a step forward in the effort to create a better common future for us all.









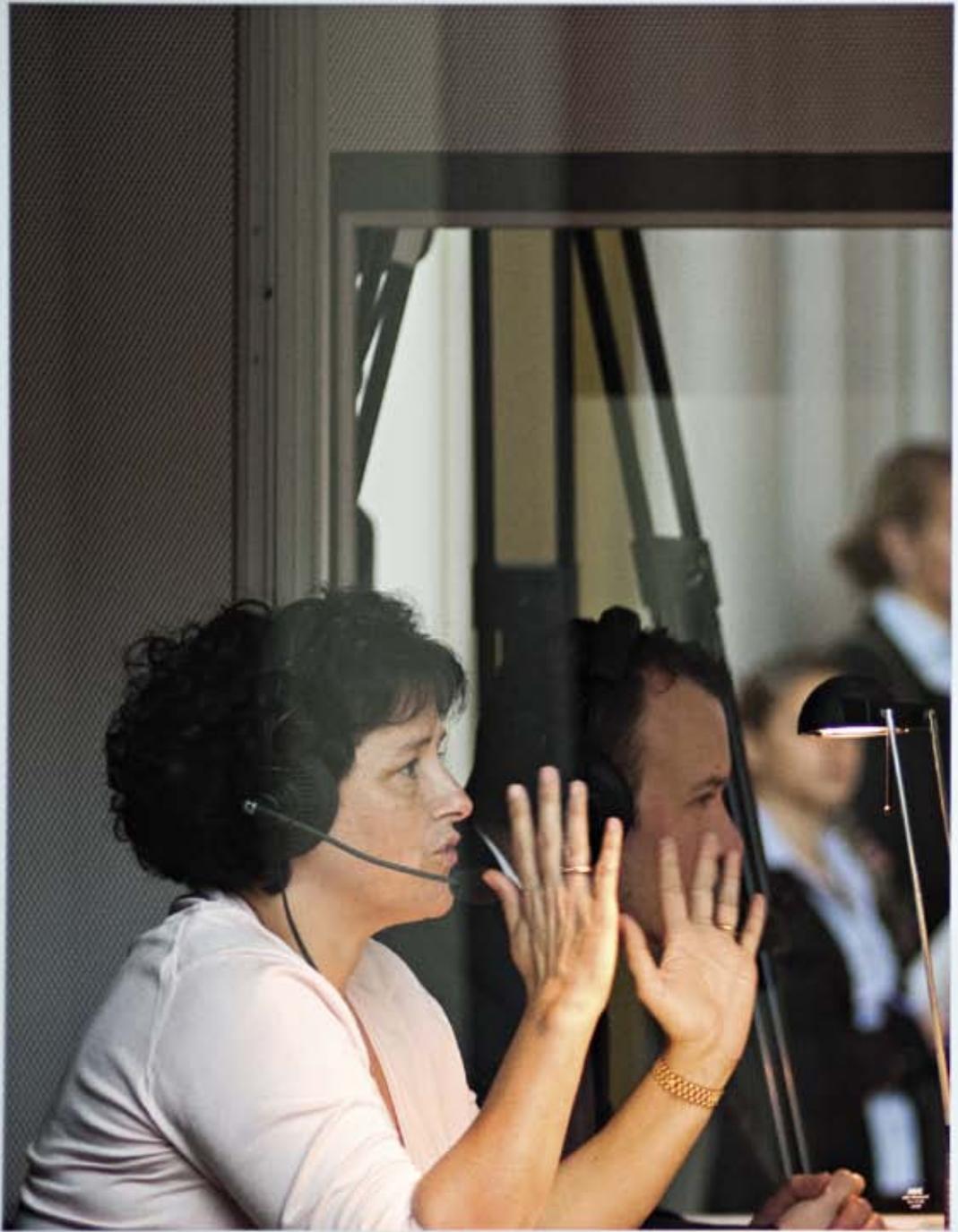


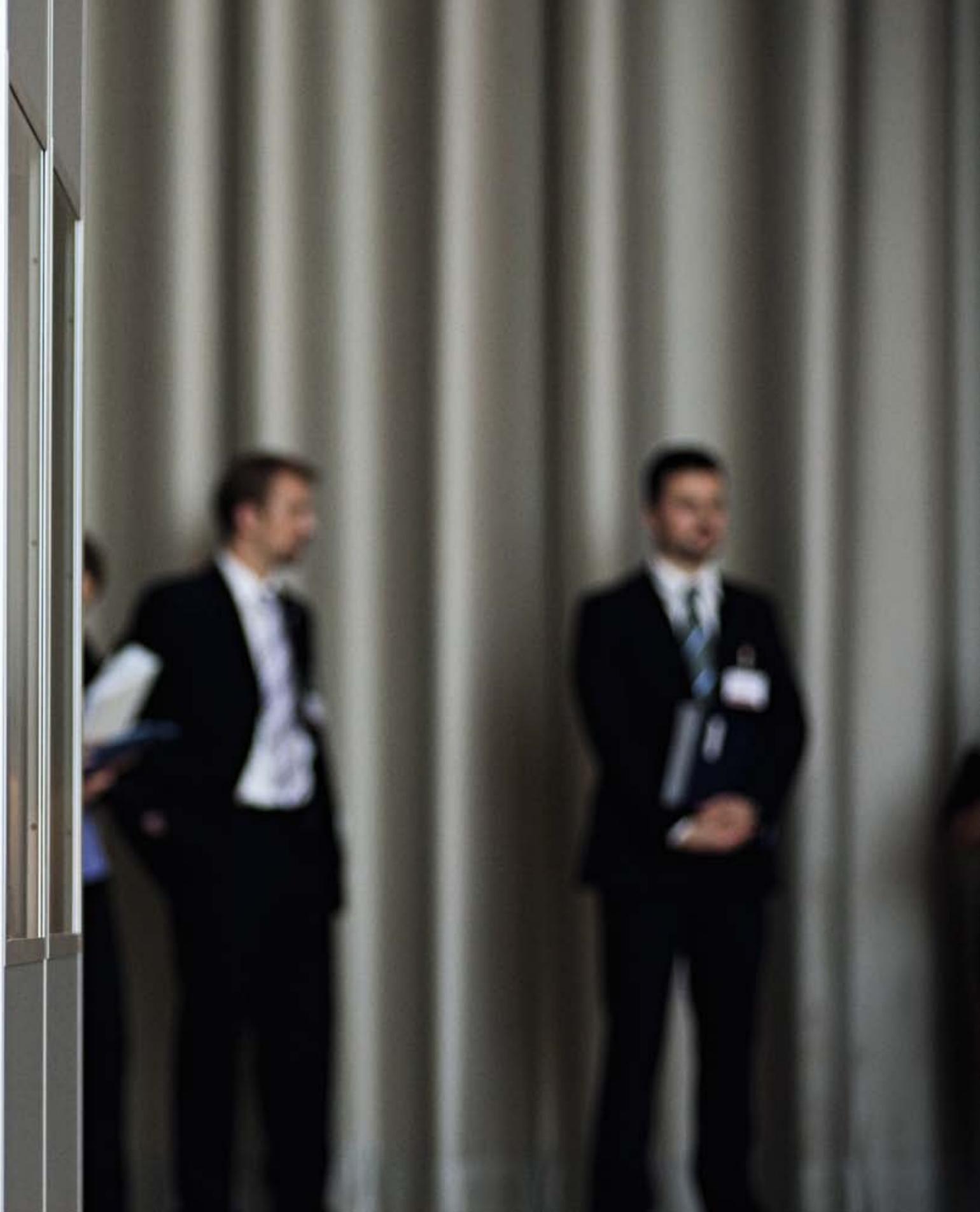
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dialogue about issues of our
common future

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Our Common Future

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The VolkswagenStiftung is an independent, nonprofit foundation under private law with its head office in Hannover. It is dedicated to the support of the humanities and social sciences as well as science and technology in higher education and research.

Since 1962, the VolkswagenStiftung has funded more than 29,300 projects with a total of over 3.6 billion euros. The money spent on grants is generated by investing the capital of the Foundation – currently some 2.4 billion euros.

The VolkswagenStiftung funds research projects in pathbreaking areas and provides assistance to academic institutions wishing to improve the structural conditions for their work. In particular, the Foundation perceives its mission as supporting the upcoming generation of researchers and promoting interdisciplinary and international collaboration.

www.volkswagenstiftung.de



Deutsche Messe develops, plans and runs trade fairs and exhibitions in Germany and abroad. It has extensive expertise and experience in planning and executing around 100 trade fairs and exhibitions in Germany and abroad every year, involving 25,000 exhibitors, 2 million visitors and 15,000 journalists from over 100 different countries.

The main emphasis continues to be on flagship international trade fairs for capital goods, run by Deutsche Messe in Hannover. The aim of these trade shows is to represent the latest markets and highlight international market trends. They are also a forum for applications-oriented demonstrations of the latest technology, as well as new launches of cutting-edge technologies and presentations of the latest research findings.

Apart from its expertise in the running of international trade fairs and the unique capacity of its exhibition center, Deutsche Messe offers exhibitors an excellent range of quality services, ensuring the best possible support before, during, and after the show.

www.messe.de



Stiftung Mercator is one of Germany's largest foundations. It initiates and funds projects that promote better educational opportunities in schools and universities.

In the spirit of Gerhard Mercator, it supports initiatives that embody the idea of open-mindedness and tolerance through intercultural encounters, encouraging the sharing of knowledge and culture.

The Stiftung Mercator provides a platform for new ideas to enable people – regardless of their national, cultural or social background – to develop their personality, become involved in society and make the most of the opportunities available to them. In this way it is committed to inspiring ideas. Stiftung Mercator takes an entrepreneurial, international and professional approach to its work.

It has a particular affinity with the Ruhr region, the home of its founding family.

www.stiftung-mercator.de

In cooperation with



Hannover on the river Leine is the capital of the federal state of Lower Saxony (Niedersachsen), Germany. With a population of more than 500,000 inhabitants, the city is one of northern Germany's major political, economic, and cultural centers. The Hannover fairground, following a series of extensions in preparation for Expo 2000, is the largest in the world and every year hosts important commercial expositions such as the Hannover Fair and CeBIT. One of the most famous and beautiful sights in Hannover are the Royal Gardens of Herrenhausen.

With its numerous museums and theaters, seven universities and colleges and a student population of 33,000, Hannover is also home to the arts and sciences, and certainly well worth a visit!

www.hannover.de

The Ruhr region was the European Capital of Culture 2010. As an unconventional "metropolis in the making," it is well on its way to becoming a new center in Europe.

In line with the motto "Change through Culture – Culture through Change," 53 towns and cities in the region joined forces. They are proud to be able to play host to all those who wish to experience the breathtaking change that has seen Europe's legendary coal and steel region become a new type of polycentric cultural metropolis.

RUHR.2010 GmbH is the organization responsible for preparing and implementing the cultural capital program and its accompanying marketing and tourism activities. Along with its partners, it supports the development of sustainable effective structures for the Ruhr Metropolis.

RUHR.2010 has brought together regional players from the areas of culture, politics, and business to form a creative alliance. Their ambitious aim is to transform the Ruhr region into an important player in the future of Europe, and give the area a new and unique branding on the map of Europe.

www.ruhr2010.de

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