4th Conference on Community Resiliency

Building the Critical Infrastructure for Resiliency

International Goals – National Strategies – Local Actions

28-30 August 2013
Congress Center – Davos, Switzerland

Agenda and Abstracts

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Wednesday – August 28, 2013 Pre-Conference Special Side Event (free access for all conference participants)

15.30 – 17.30	**Official Inauguration of the Lab and Office Building** of the Physikalisch-Meteorologisches Observatorium Davos/ World Radiation Center PMOD/WRC WERNER SCHMUTZ, Director, Physikalisch-Meteorologisches Observatorium/World Radiation Center PMOD/WRC, Davos, Switzerland WALTER J. AMMANN, President Swiss Research Institute for High Altitude Climate and Medicine, Davos, Switzerland CHRISTIAN PLÜSS, Director, Swiss Federal Office of Meteorology and Climatology, Zurich, Switzerland EUGEN ARPAGAUS, Director, Economic Development and Tourism Agency, Canton of Grisons, Chur, Switzerland RETO DÜRST, Representative, Government of Davos, Davos, Switzerland **Keynote Lecture:** GHASSEM ASRAR, Director, World Climate Research Programme, WMO, Geneva, Switzerland
17.30 – 19.00	**Cocktail Reception**

Thursday – August 29, 2013

9.00 – 9.30	**Welcome and Introduction** WALTER J. AMMANN, President, Global Risk Forum GRF Davos, Davos, Switzerland JAMES BOHLAND, Co-Director, Global Forum on Urban and Regional Resilience & Interim Vice President, Virginia Tech's National Capital Region, Arlington, USA **Keynote: "Creating a Culture of Resiliency"** CHARLES STEGER, President, Virginia Tech, Blacksburg, USA

International Dimensions of Resiliency: Goals for the Future

Resilience is shaped by the context of places. Thus, efforts to create resilient communities will vary across the diverse cultural, economic, environment and social dimensions of nation states. Also, the type and scope of risks and disasters vary globally and change over time. Recent experiences have also clearly shown that disasters don't stop at borders and the need for trans-border systems' resiliency has become obvious. So it is imperative that each country and region have implemented resiliency efforts specific to their context. Presentations and discussions will focus on what should be the goals of a resilient country, region or community and on how to reach agreements on an international level. In his keynote, Dr Saifur Rahman will elaborate on international perspectives and goals in resiliency.

9.30 – 10.00	**Keynote: "International Goals for Resiliency"** SAIFUR RAHMAN, Director, Advanced Research Institute, Virginia Tech, National Capital Region, Arlington, USA
10.00 – 11.15	**Panel I: "International Disaster and Risk Reduction, Sustainability and Resiliency"** *This first panel will explore what those goals might entail, and how international organizations can provide leadership in establishing useful goals, standards and indicators to address resiliency in the context of risk reduction and disaster management, and on how to link resiliency and sustainable development?* Chair WALTER AMMANN, President and CEO, Global Risk Forum GRF Davos, Davos, Switzerland

Speakers STEFAN PICKL, Professor for Operations Research, University Bundeswehr, Munich, Germany

JAMES MARTIN, Chair, Civil Engineering, Clemson University, Clemson, USA

WOLFGANG KROEGER, Executive Director, ETH Risk Center, ETH Zurich, Switzerland

JERRY VELASQUEZ, Chief of Advocacy and Outreach of UNISDR, Coordinator for "Making Cities Resilient", Geneva, Switzerland

11.15 – 11.45 **Break**

11.45 – 13.00 **Panel II: "Approaches to Infrastructure Resiliency in Different National Contexts"**

Panel II will examine current practices in different national contexts to help develop some basic insights into what practices currently exist and which gaps must be addressed in the future.

Chair PAUL KNOX, Co-Director, Global Forum on Urban and Regional Resilience & University Distinguished Professor, Virginia Tech, Blacksburg, USA

Speakers RALPH HALL, Assistant Professor, Urban Affairs and Planning, Virginia Tech, Blacksburg, USA

KRISHNA VATSA, Regional Disaster Risk Reduction Advisor, South Asia UN Development Programme, Bangkok, Thailand

JAFFER KHAN, Director, MARG Institute of Design and Architecture Swarnabhoomi –MIDAS, Chennai, India

DANIEL KULL, Senior Disaster Risk Management Specialist, The World Bank, Geneva, Switzerland

13.00 – 14.00 **Lunch**

14.00 – 14.15 **Keynote**

THIERRY COURVOISIER, President, Swiss Academy of Arts and Sciences, Berne, Switzerland

Building a National Strategy for Addressing Resiliency

The responsibility for enhancing the resiliency of its communities falls initially on national governments although risks vary regionally within a nation. Regional or local efforts must be contextualized to be appropriate to time and place. It is national governments' responsibility to craft policies and approaches that will reduce risks to their populations, improve the ability of communities to adapt to major events, and continue to grow and prosper in new post event norms. In her keynote, Dr Lauren Alexander Augustine will outline a national strategy for the United States.

14:15 – 14:45 **Keynote: "The National Imperative"**

LAUREN ALEXANDER AUGUSTINE, Associate Executive Director, Division on Earth and Life Studies, National Research Council of the U.S. National Academy of Sciences, Washington D.C., USA

14:45 –16:00 **Panel III: "Appropriateness of Resiliency as a National Strategy"**

The panel will discuss the role of resiliency in national strategies to reduce risks and manage disasters and on how to focus national strategies, engage citizens in shaping them, and to create implementation plans that still allow to adapt to local conditions.

Chair JACK HARRALD, Associate Director, Global Forum on Urban and Regional Resilience, Virginia Tech, Blacksburg, USA

Speakers SIMIN DAVOUDI, Professor, Environmental Policy and Planning, Newcastle University, Newcastle, UK

JOAO RIBEIRO, General Director of the National Disasters Management Institute (INGC), Maputo, Mozambique

STEFAN BREM, Head of Risk Analysis and Research Coordination, Federal Department of Defence, Civil Protection and Sport, Federal Office for Civil Protection, Berne, Switzerland

SUSAN CUTTER, Director, Hazards and Vulnerability Research Institute, University of South Carolina, Columbia, USA

16.00 – 16.30 **Break**

16.30 – 17.45 **Panel IV: "Translating National Strategies to Practice"**

The second panel will focus on one of the conundrums embedded in national approaches to resiliency; in the majority of instances environmental events are regional or local in scope rather than national. The issues of managing recovery in a regional context are particularly vexing because of potential jurisdictional conflicts. The panel will address how regional implementation can be accomplished effectively while allowing local control.

Chair JAMES BOHLAND, Co-Director, Global Forum on Urban and Regional Resilience & Interim Vice President, Virginia Tech's National Capital Region, Blacksburg, USA

Speakers GERRY GALLOWAY, Research Professor, Department of Civil and Environmental Engineering University of Maryland, Maryland, USA

BIJAN KHAZAI, CEDIM-KIT, Karlsruhe Institute of Technology, Geophysical Institute, Potsdam, Germany

JAMES KENDRA, Director, Disaster Research Center, University of Delaware, Newark, USA

PEDRO BASABE, Senior programme officer, UNISDR, Geneva, Switzerland

19.00 – 19.45 **Cocktail Reception**

Hotel Morosani, Promenade 50, 7270 Davos Platz

19.45 – 22.00 **Keynote: Welcome speech**

MAURO DELL'AMBROGIO, Secretary of State for Education and Research, Berne, Switzerland

Conference Dinner

Friday – August 30, 2013

Public and Private Sectors Resiliency Approaches

The session will focus on good practice example and on actions required to advance resiliency from goals and strategies to actions on all levels. In his keynote, Martin Powell will address challenges and opportunities in critical infrastructure sectors' collaborations and on how the private and public sectors can collaborate to enhance the resiliency of both sectors.

8.30 – 9.00 **Keynote: "The Resilient City of the future – a public and private affair!"**

MARTIN POWELL, Head of Urban Development, Siemens AG, London, UK

9.00 – 10.15 **Panel V: "Building Critical Public Private Sector Partnerships"**

Panel V will provide insight in practical experiences in different critical infrastructure sectors and outline the potential in public-private partnerships for enhancing resiliency. Prerequisites for successful cooperation and some of the problems that must be overcome in creating effective collaborations will be identified.

Chair STEFAN BREM, Head of Risk Analysis and Research Coordination, Federal Department of Defence, Civil Protection and Sport, Federal Office for Civil Protection, Berne, Switzerland

Speakers MARTIN POWELL, Head of Urban Development, Siemens AG, London, UK

JOHN ZEPPOS, Head Business Continuity Management, Cosmote Telecom, Athens, Greece

SUSANNE KRINGS, German Federal Office of Civil Protection and Disaster Assistance, Bonn, Germany

ROLAND FRIEDLI, Senior Risk Engineer, Swiss Re Ltd., Zurich, Switzerland

CHLOE DEMROVSKY, Director Global Operations, DRI International and Associate Business Continuity Professional (ABCP), USA

10.15 – 10.45 **Break**

Scientific Approaches to Resiliency

Moving resiliency forward requires science that can better ground action in theory. In his Keynote Address, State Secretary Mauro Dell'Ambrogio will highlight the importance of evidence based science to be key for society to become more resilient.

Dr Dirk Helbing will provide insight into a systems approach in resiliency that will help to focus future scientific efforts.

The subsequent panel VI provides both a critique of a systems approach and offers their perspectives on the scientific gaps in resiliency research, and on how to best address them. Setting new directions in research is a desired outcome of the panel, thus contributing to set the research agenda for the post Hyogo Framework for Action (HFA2) period.

10.45 – 11.15 **Keynote: "The System Approach in Resiliency"**

DIRK HELBING, Professor, Chair of Sociology, in particular of Modeling and Simulation, ETH Zurich, Zurich, Switzerland

11.15 – 12.30 **Panel VI: "Creating a Scientific Base for Resiliency – the Road to HFA2"**

Chair CHARLES STEGER, President, Virginia Tech, Arlington, USA

Speakers CHRIS BARRETT, Virginia Bioinformatics Institute, Virginia Tech, Arlington, USA

REGINALD DESROCHES, Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, USA

MERLE MISSOWEIT, Fraunhofer Institute for Technological Trend Analysis, Euskirchen, Germany

DENNIS WENGER, National Science Foundation, Washington D.C., USA

12.30 – 12.45 **Signing Memorandum of Understanding: Virginia Tech and GRF Davos**

CHARLES STEGER, President, Virginia Tech, Arlington, USA

WALTER AMMANN, President and CEO, Global Risk Forum GRF Davos, Davos, Switzerland

12.45 – 13.45 **Lunch**

Fostering Resiliency Through Social Networks

The session highlights the importance of social networks in building resilient communities. In his keynote, Dr Ortwin Renn provides context for understanding the importance of social networks and social capital.

Panel members expand on current research in social capital that bears on community resilience. Of particular importance is whether directed government actions can enhance the formation and retention of social capital, or is social capital the consequence of a long history of trusted relationships that cannot be stimulated by public actions.

13.45 – 14.15 **Keynote: "Social Capital and Resiliency"**

ORTWIN RENN, Professor and Chair, Environmental Sociology and Technology Assessment, University of Stuttgart, Stuttgart, Germany

14.15 – 15.30 **Panel VII: "Resiliency and Social Systems"**

Chair LIESEL RITCHIE, Assistant Director, Natural Hazards Center, University of Colorado, Boulder, USA

Speakers DANIEL ALDRICH, Associate Professor, Purdue University and Fulbright Research Professor, Tokyo University, West Lafayette, USA

DILANTHI AMARATUNGA, Professor, School of the Built Environment, University of Salford, Salford, UK

KEITH SHAW, Professor of Politics, North Umbria University, Newcastle, UK

15.30 – 16.00 **Break**

Governance and Resiliency

The session focuses on the important role of good governance in implementing resiliency. In his keynote, Dr Carlo Jaeger will outline the contextual framework of good governance and resiliency.

A central question for the panel will be whether governments are willing and able to implement the policies required for fostering resiliency. Also, what roles, if any, can we expect from non-profit organizations such as professional associations to enact standards that become part of our planning and building codes for the future. Included in the panel's discussions are issues pertaining to barriers to building resilient communities, the relative roles of local, regional and federal jurisdictions, and an examination of current best practices.

16.00 – 16.30 **Keynote: "Governance and Resiliency"**

CARLO JAEGER, Chair, Global Climate Forum (Germany), Co-chair of IHDP-IRGP, Beijing, P.R., China

16.30 – 17.45 **Panel VIII: "Governance and Resiliency"**

Chair JACK HARRALD, Associate Director. Global Forum on Urban and Regional Resilience, Virginia Tech, Blacksburg, USA

Speakers JAMES KENDRA, Director, Disaster Research Center, University of Delaware, Newark, USA

JACK BROWN, Director of the Arlington County Office of Emergency, Arlington County, USA

BADAOUI ROUHBAN, GRF Davos Senior Research Fellow, Former Director, UNESCO Unit for Disaster Reduction/ Disaster Risk Management, Paris, France

DEBORAH BROSNAN, President, Brosnan Center and Adjunct Professor of Biology Virginia Tech, USA

17.45 – 17.55 **Concluding Remarks**

Abstracts are listed in alphabetical order by the speaker's surname.

Building Resilience: Social Capital in Post-Disaster Recovery

Daniel P. Aldrich / Panel VII / Friday 14:15

Using micro- and neighborhood-level data from four disasters in three nations over the 20th and 21st centuries, this talk will investigate standard theories of recovery and resilience. Bivariate, time series cross sectional, and matching analyses show that more than factors such as individual or personal wealth, aid from the government, or damage from the disaster, the strength of social capital best predicts the ability of local communities to reform. Social capital works through three main mechanisms: elevating voice and suppressing exit, overcoming collective action barriers, and providing informal insurance. Should social networks prove the critical engines before, during, and after disaster, this suggests a new approach to disaster mitigation for NGOs, individuals, and governments.

[Panel IV: Translating National Strategies to Practice]

Pedro Basabe / Panel IV / Thursday 16:30

Translating polices to practical disaster risk reduction activities on the ground is a challenges. In Africa thanks to the collaboration and the political will of the Africa Union Commission, Regional Economic Communities, countries, UN partners, donors and scientific-technical community, the continent has a Strategy and Programme for Disaster Risk Reduction till 2015, mechanisms for coordination, as well as policies and programmes at Sub-regional covering West, Central, Souther and Eastern Africa.

To implement those policies and programmes, some projects have emerged since 2009. For instance, the ECHO funded project for drought risk reduction in the Horn of Africa has been implemented in collaboration between governments, UN and civil society. National policies and institutional capacities have been developed as the basis to support concrete disaster and drought management activities that can contribute to build the resilience of communities to disasters. UNISDR presentation will facilitate some examples.

Switzerland's National Strategy for the Protection of Critical Infrastructures: Identification of CIs, Risk Analysis, Protection, and Comprehensive Resilience

Stefan Brem / Panel III / Thursday 14:45

The presentation covers Switzerland's national CIP strategy which has been approved in June 2012. The main goal of the strategy is to strengthen the resilience of Switzerland's critical infrastructures. Resilience is being improved by several measures to strengthen the robustness and flexibility of the critical infrastructure on the one hand as well as, on the other hand, measures to improve cooperation across and beyond critical infrastructure sector in order to strengthen the robustness and flexibility of society, the economy, and the state (federal, cantonal, and municipal level) and ensure that effective and rapid relief and redundancies are available in case of an adverse event. In a second part, particular measures of the strategy are presented such as the identification and prioritisation process of the critical infrastructure objects (like airports, data centres, power substations), the CIP Guideline on integral protection concepts, and a process to allocate key resources based on the CI inventory and the specific situational awareness. In conclusion, the presentation shows how the challenges and complexities of a comprehensive CIP approach can be addressed by an inclusive, all-hazard risk assessment process.

Resilience as the Transformational Process: Facing the opportunities and challenges when resilience is not a rebound but an evolution.

Deborah Brosnan / Panel VIII / Friday 16:30

Resilience has its roots in ecological science, where the term describes the ability of biological systems to rebound after a disaster. But sometimes ecosystems do not recover to their previous states. They are transformed by the disturbance into an entirely new system with new rules, structures, and novel forms of resilience. Our systems and communities no longer have the same resilience they once had to weather disturbances. Instead of managing recovery from extreme events, we must manage for unprecedented change, where resilience means different types of communities, supporting ecosystems and social systems. We must build resilience for an evolving planet, and where there are few experiences to guide us. Scientists, governments, private sector and communities face new challenges and opportunities to find solutions. This presentation explores resilience as an agent of transformation and discusses types of new approaches that can be evaluated and tried.

[Panel VIII: Governance and Resiliency]

Jack Brown / Panel VIII / Friday 16:30

Jack Brown will discuss current and planned emergency preparedness initiatives at the local government level designed to foster a resilient community. Engaging the community as individuals, families, businesses and schools provides an opportunity for conversation and planning that does not occur with traditional public outreach efforts. Mr. Brown will discuss on-going partnerships with academia to blend the academic world with the real world through research in an operational environment. Arlington County, Virginia (USA) and Virginia Polytechnic Institute and State University (VA Tech) have a long and established relationship recently enhanced by the opening of the Center for Community Security and Resilience (CCSR). This "living lab" partnership promotes learning and operational improvement with benefits to:

Virginia Tech

- Establishes an internationally known center on secure and resilient communities
- Attracts world-class researchers and graduate students
- Leverages new research facility in Ballston to enable a unique public-private collaboration

Arlington County

- Directly benefits from creative solutions to real-world community security and resiliency problems
- Enhances Arlington's position as a scientific epicenter, complementing existing research and development on homeland security
- Showcases Arlington as exemplar for other communities nationally with its complex mix of local, state and federal risks and exposures
- Helps to create and sustain high tech employment opportunities

[Panel V: Building Critical Public Private Sector Partnerships]

Roland Friedli / Panel V / Friday 9:00

Based on examples of past critical infrastructure failures the challenges of designing, constructing and operating critical infrastructure is illustrated. Interdependencies and cascading effects, the ageing of infrastructure as well as running of infrastructure at the limit of capacity are seen as the characteristics that can have a significant impact on reliable infrastructure services. Long lead times in the planning and construction of infrastructure is seen as an additional factor that increases complexity of reliable infrastructure. The examples presented will be discussing failures or near misses that occurred in the transportation industry (aviation, metro), utilities (power distribution, drinking water supply) and the food industry.

In a second part the presentation will briefly discuss the role of the reinsurance and insurance industry in embracing risks from critical infrastructure. Insurance is vital for the erection and operation of critical infrastructure. However there are limitations of insurability: risks with unforeseeable consequences or very new prototype technologies are just two elements which limit the (traditional) insurability of critical infrastructure.

Overcoming National-Regional State Local Tensions in Building Community Resilience

Gerry Galloway / Panel IV / Thursday 16:30

With each new disaster, recognition of the importance of resilience is increasing among not only those directly affected by the disaster but also those who observe the consequences through around-the-clock media coverage. At the national level in the United States, the President has emphasized the importance of building resilience through the issuance of two Presidential Policy Directives that direct federal agencies to take steps necessary to support resilience building in US communities. At the same time, those at local, state and regional levels are working to better understand their responsibilities for resilience. While, clearly, preparedness for, response to, and recovery from disasters begins within the community, higher levels of government control most of the resources (dollars) and develop and implement the laws, regulations and guidelines that shape the actions taken. It is in the execution of resource distribution and program execution that tensions most arise. Several recent studies have pointed to the need for clear delineation of responsibilities and identification of barriers that interfere with resilience activities at the community level. Lessons learned during the great Mississippi flood of 2011 and Superstorm Sandy are helping to shape these relationships. While at the President's level the federal message is clearly "support the locals," getting federal bureaucracies to examine and then streamline procedures to support local primacy, developing ad hoc regional organizations to deal with disasters that have broad geographic consequences, and educating officials at all levels is not simple and will take time to complete. As long as there is a common belief that the federal government should be supporting and not doing and that local communities must be responsible for actions, moving to a national disaster resilience paradigm will be possible. State and regional efforts following Sandy illustrate that it can be done.

Creating an International Partnership for Resilient and Sustainable Infrastructure Development

Ralph P. Hall / Panel II / Thursday 11:45

The IITK-VT partnership for "Sustainable Infrastructure Development" is an international collaboration between the Indian Institute of Technology in Kanpur (IITK) and Virginia Tech (VT), funded by the Obama-Singh 21st Century Knowledge Initiative (OSI). The partnership was established to create the next generation of sustainable infrastructure development professionals. At IITK, there is a need to advance the curriculum to provide graduates with the skills necessary to address the significant infrastructure development and management challenges facing urban and rural areas of India. At VT, there is a need to internationalize the education of engineering, planning, and public administration graduates to enhance their awareness of global issues and challenges, enabling them to perform in an international setting. The three-year partnership is structured by a series of meetings, workshops, and graduate student exchanges that are linked together by a knowledge platform (www.iitk-vt.com) developed to support virtual and digital exchange of information and data. The infrastructure challenges facing India and the U.S. present opportunities for research collaborations that leverage and advance best practices and theory.

At one year into the IITK-VT partnership, Dr. Hall will review what has been accomplished and present a vision for how the partnership's future research could focus on resilient and sustainable infrastructure service delivery. A core argument is that sustainability cannot be achieved without resilience, and resilience cannot be achieved without sustainability. Dr. Hall will also consider whether disruptive innovation is a necessary

condition for both resilience and sustainability. This raises the challenging question of how to stimulate disruptive change in the context of infrastructure systems.

Economics 2.0: Towards a Self-Regulating, Participatory Market Society to Counter Complexity and Extreme Events

Dirk Helbing / Keynote / Friday 10:45

Most 21st century challenges, including climate change, financial stability, or energy supply, cannot be solved by technology alone. They have an important behavioral and social component. Some of the problems even occur if everybody has good intentions, is well equipped, and highly motivated to do the right things. These problems can be a result of systemic instabilities, eventually resulting in cascade effects and extreme events.

Typical examples are phantom traffic jams, crowd disasters, financial meltdowns, conflicts, or wars. Moreover, while cooperation in social dilemma situations would be favorable for everyone, it is often unstable. This can lead to "tragedies of the commons". The classical approach to overcome such tragedies is to introduce laws, regulations, punishments, taxes, or other mechanisms, which, in the best case, change the nature of the interaction.

However, so far these mechanisms have largely failed to reduce carbon emissions or overfishing, for example. As an alternative, I will demonstrate the power of social mechanisms to change the behavior of people in favorable ways. I will show that evolution has, in fact, created a "homo socialis"

with other-regarding preferences besides the self-regarding "homo economicus". But while humans have developed a science and institutions for the "homo economicus", we currently lack suitable institutions to support the "homo socialis". Therefore, there is a need for an innovative kind of socio-economic organization, which I will call "socionomy" or "participatory market society" or "economy 2.0". The transition to this new organization will be enabled and catalyzed by emerging information and communication technologies, particular social technologies. Overall, I expect a fundamental paradigm shift in our current socio-economic approach and thinking. It will open up a very exciting perspective for the 21st century, which I anticipate to be an era of creativity and participation.

Community Resilience: An Indian Perspective

Jaffer Khan / Panel II / Thursday 11:45

In the past two decades India has been in the growth path economically. The set back in world economy and the recession has affected India comparatively less. But this growth also saw major development in real estate sector with an ever-expanding Indian city which has seen unforeseen urban pressure. The year 2007 became environmentally critical as this year defined that one half of the world's population was living in the cities. The cities in India expanded to such an extent that the environmental factors became mostly disregarded due to various socio-cultural, economic and political parameters. In the past few decades India faced many disasters from earthquakes to over flooding of cities due and more so Tsunami mostly on the East Coast. Urbanization is inevitable but the chaos in India continues due to the ignorance of this fragile ecosystems.

The community has time again faced the difficulty in tackling the situation and one could see the systemic failure leading to loss of life and property. The recent calamity at Kedarnath, Uttarakhand, North India is one of the greatest disasters since Independence in 1947. Thousands of lives lost due to this is "man made" disaster. The state machinery, the army and the community could not anticipate the level of destruction and it is estimated that it will take more than two years to normalize life there.

India has a bigger challenge in the future particularly with the coastal community. The Indian coastline stretches about 5700 kms on the mainland and about 7500 kms including the two island territories and exhibits most of the known geo-morphology.

The tsunami of the Indian Ocean during December 2004, which exacted a devastating toll in human suffering and the destruction of the affected coastal areas, was a painful reminder to all of us. The coastal communities are vulnerable to unforeseen events that can bring about massive changes. It is seen that the coastal communities here are not even resilient to normally occurring hazards and this places these communities at high risk. The important question is, how to increase community resilience and particularly in Indian perspective. With the wide-ranging hazards taking their toll all over the region, these communities need to respond to the issues in a more holistic and integrated manner. The paper will discuss on the aspects of coastal community resilience particularly with respect to the tsunami affected communities and how the multi-sector development planning program will solve the complexity of these hazards which are critical to the communities that thrive along the coastline.

Near real-time Forensic Analysis of Disasters – the Case of 2013 German Floods

Bijan Khazai / Panel IV / Thursday 16:30

To obtain additional, wider and more fundamental explanations for factors which influence loss patterns and explain (lack of) resilience to disasters, more penetrating investigations must be developed and enacted in a more explicitly designed and multidisciplinary framework with a common set of fundamental questions (Lavell, 2012). The need for this type of research which requires new methodological approaches, institutional arrangements and transdisicplinary teams gave momentum to the design and conduct of a set of internationally organized case studies of disasters – the Forensic Investigations of Disasters (FORIN) by the Integrated Research on Disaster Risk (IRDR). In adopting the FORIN approach to comprehensive understanding of disasters the Center for Disaster Management and Risk Reduction Technology (CEDIM) adds a time-critical component to the evaluation process. The goal is to understand and assess in near real time the evolution of the event where information may be sometimes scarce or unclear. This requires new tools and methods for event-based in-depth analysis of natural disasters and interdisciplinary teams and processes for analysing the related complex interactions and cascading effects in and between the natural, social, economic and infrastructure systems. The presentation will draw on actual experience and developments at CEDIM for conducting near real-time forensic analysis, with a particular focus on the 2013 June floods in Germany.

Cooperation in Critical Infrastructure Protection

Susanne Krings / Panel V / Friday 9:00

Following the definition in the German National Strategy for Critical Infrastructure Protection (CIP-Strategy), the term critical infrastructures (CI) covers "organizational and physical structures and facilities of such vital importance to a nation's society and economy that their failure or degradation would result in sustained supply shortages, significant disruption of public safety and security, or other dramatic consequences". The German CIP-Strategy was adopted in 2009 and has ever since served as the framework in which the Federal Ministry of the Interior (BMI) coordinates the CIP-activities at Federal level. The Federal Office of Civil Protection and Disaster Assistance (BBK) provides expert advice, conducts research on a number of questions related to CI and supports the implementation of the strategy at all levels. It is the central aim of the strategy to strengthen risk and crisis management procedures with regard to CI.

The German strategy understands CIP as a shared responsibility of public and private stakeholders. Authorities of all administrative levels – from the federal to the local level – count among the public stakeholders that are meant to contribute according to their specific competences. As a lot of services for the public are provided by private enterprises, CIP necessarily involves the private sector. Although the strategy includes a paragraph on legal instruments, the German CIP-strategy strongly emphasizes voluntary measures and favors a cooperative approach. The constellation of the stakeholders that are participating in the implementation of concrete measures or the clarification of distinct questions may vary according to the appropriate level of description or the respective infrastructure sector. A number of examples provide insights into different forms of public-private cooperation in the implementation of CIP in Germany.

Source: Federal Republic of Germany, Federal Ministry of the Interior (17th June 2009): National Strategy for Critical Infrastructure Protection (CIP-Strategy). http://www.bmi.bund.de/cae/servlet/contentblob/598732/publicationFile/34423/kritis_englisch.pdf (accessed: 25th July 2013)

Mainstreaming Infrastructure Resilience into Development

Daniel Kull / Panel II / Thursday 11:45

Mainstreaming resilience considerations in development planning can reverse the current trend of rising disaster impacts. By quantifying risks and anticipating the potential impacts of hazards, governments, communities, and individuals can make informed prevention decisions to set priorities for development and adaptation strategies, sector plans, programs, projects, and budgets.

Many developing countries however do not have the tools, expertise, and instruments to factor the potential impacts of adverse natural events in their investment decisions. Few systematically assess the risk from adverse natural events, and even fewer have institutional mechanisms to take risk information into account. This means that they are unable to direct the necessary resources to protect their investments and reduce their exposure to disaster impacts and climate change. Additionally, without access to the latest expertise to ensure compliance with modern technical standards, investment is often sub-optimal and infrastructure is built without appropriate materials, design and construction.

Government ownership and leadership are prerequisites for building resilience. Strong institutions, policies and regulations provide the essential framework for integrating risk reduction into infrastructure modernization and construction programs. A comprehensive and targeted approach is needed, including portfolio analysis of vulnerable infrastructure stock; hazard/risk assessments for site selection; cost-benefit analysis to evaluate interventions; development and enforcement of building standards; design reviews and feasibility studies; structural strengthening, retrofitting and construction; and promotion of modern and proactive maintenance regimes. More consistent strategies are needed across all sectors, also during post-disaster reconstruction.

These actions have the capacity to produce significant benefits; although initial cost may be greater than in more traditional approaches, it is inevitably much less than the ultimate cost of inaction or inadequate action. Capacity building and financing for different government, non-government and local actors on hazard resistant construction methods are to support these processes.

Innovation in Crisis Management needs room for experimentation

Merle Missoweit / Panel VI / 11:15

The UNISDR Global Assessment Report 2013 states that "our ability to build resilience has not kept pace with our ability to grow" when talking about economic losses in recent years through disasters worldwide. One could add that it has not kept pace with our ability to complicate things, since globalization as well as technical and economic interconnectedness add new challenges to traditional hazards that, at the same time, are aggravating through climate change.

As societies become more complex, increasing scope

and unpredictability of potential crises as well as the rapid dynamics of incidents to be managed obviously also demand crisis management (CM) of an ever higher level of complexity. The frequency of crises will not necessarily increase, but unless research is up to the challenge of producing solutions, which fully exploit modularity, flexibility and adaptivity, then either the cost of CM capability development or the costs due to inadequate management of crises will grow.

At the same time resilience research has to realize that radical changes to the current CM system would be very costly and likely incur unacceptable loss of CM capability during a long transition phase. Consequently, research has to develop an ability to adapt the national and international CM system to new challenges as they emerge, while also respecting legacy systems.

On the basis of this thinking the EU FP7 project ACRIMAS (Aftermath Crisis Management System-of-Systems, phase I) developed the concept of creating room for experimentation and a pre-operational evidence-base for CM. The implementation of this idea as a distributed pan-European test-bed is practically proposed by the demonstration project DRIVER (Driving Innovation for crisis management and European Resilience) which is currently under negotiations.

International Goals for Resiliency

Saifur Rahman / Keynote / Thursday 9:30

Every country or region has their own priorities to protect life, property and livelihood against natural and man-made disasters. Recent events – flooding in central Europe, hurricane Sandy in northeastern United States, severe flooding in India, tsunami in Japan, etc. – have laid bare the vulnerabilities citizens of the world face in their day-to-day lives. While the protection of life and property is of utmost concern to governments, a sustainable operation of the infrastructure that allows the means of livelihood to continue after any disaster is an extremely important goal. In addition to highlighting how different countries address the resiliency issues against man-made and natural disasters, this lecture presents a cross-sector and multi-jurisdiction strategy to improve capabilities to deal with any major incident or disaster. It highlights infrastructure interdependencies and potential cross-sector impacts, and focuses on priority issues that should be considered to build a resilient socio-technical system.

Resilience as an 'Ordinary Superpower': A Transformational Approach to Community Resilience

Keith Shaw / Panel VII / Friday 14:15

'Creating resilience is up to you. No one is going to do it for you. No experts can say exactly how it should be done in your community. You are the experts on what you think will work in the places and with the people you know best. It will take courage to ask big, difficult questions. It will take creativity to use our assets in new ways. It will take compassion and time to build communication, trust, and solidarity between all members of our communities, some of whom may come from very different backgrounds and traditions. Hopefully, it also will be inspiring and often fun' (Bay Localize, 2009).

The rise of resilience, as both an explanatory concept and 'plan for action', has seen its application move beyond the disaster management literature to be a key component of the lexicon of the "new austerity". Within this context, economic recession and public expenditure crisis, the depletion of natural resources and the challenge of mitigating and adapting to climate change can be viewed as constituting a 'crisis' of an altogether different order, and one in which individuals, communities and localities are profoundly affected. This presentation, necessarily, includes a more holistic approach to resilience which incorporates social, economic and public policy insights to develop a 'bottom-up' view of community/local resilience. Building on research undertaken by the author, the presentation will aim to re-formulate the debate on resilience in terms of a contrast between discourses of 'recovery' and 'transformation'. In this context, resilience can be seen as a normative, politically-laden term, within which 'conservative' narratives of uncertainty, vulnerability and anxiety compete with a more 'radical' focus on hope, adaptation and transformation. In highlighting the relevance of the latter, the presentation will identify a range of examples where local organisations and communities have enhanced their adaptive capacity through creativity and imagination, and in this sense, developed their own resilience. Thus, resilience is seen as an 'ordinary superpower' in which the intuitive, 'sense-making', approach to unfamiliar or chaotic situations developed by individuals and communities remains a crucial community resource in an era of profound uncertainty.

Community and Household Resilience to the Impacts of Climate Change: Lessons from Floods and Inundation in South Asia

Krishna Vatsa / Panel II / Thursday 11:45

In South Asia, several countries such as India, Pakistan, Bangladesh, and Nepal have experienced prolonged flooding and inundation due to increase in precipitation, shifting rainfall patterns, and disruption in natural drainage, largely an outcome of climate change. These floods have damaged houses and destroyed livelihoods on a large-scale, particularly in rural areas. As huge tracts of agricultural lands are ravaged by silt and salinity, the production of foodgrains and availability of drinking water are seriously affected in the flood-prone areas.

As a result of flooding, the work opportunities for the rural populations have reduced considerably, forcing a large number of people to migrate to other areas to find work. A lack of alternative employment and income-earning opportunities has a serious impact on households' capacity to recover. The people affected by floods have not been able to reconstruct or repair their houses, and their access to civic amenities such as electricity and sanitation has reduced considerably. Though the direct deaths and injuries attributed to floods have been relatively fewer, indirect and long-term health impacts have been widespread.

In 1960s and 1970s, a large number of embankments were constructed along the rivers to control and regulate floods. The maintenance and regulation of these embankments has emerged as an important challenge for the governments. It is also becoming clearer that engineering solutions as offered through embankments and polders are not sustainable strategies for avoiding flood catastrophes. There is a need to create engineered spillways, which can channel the escaping floodwater, thus restricting the geographic extent of inundation, and facilitating early warning to the population in danger.

A suitable response to the challenges posed by climate change impacts needs to be based on appropriate policies, regulations, and institutions. There is an urgent need to recommend policies and measures which are centered on improving natural drainage, early warning systems, and floodplains management, as compared to an excessive reliance on flood protection structures.

One of the important strands of intervention must focus on strategies which allow households or communities to move out of poverty. Recovery Assistance becomes critical for households, though access to such assistance based on rights and entitlements is a contentious issue. It is, however, clear that households' resilience to the impact of these shocks can only be achieved through long-term livelihood strategies, control over their assets, and access to social services such as education and health.

[Panel I: International Disaster and Risk Reduction, Sustainability and Resiliency]

Jerry Velasquez / Panel I / Thursday 10:00

The 10-year international disaster risk reduction plan, The Hyogo Framework for Action 2005-2015 (HFA) – Building the Resilience of Nations and Communities to Disasters, is the inspiration for knowledge, practice, implementation, experience and the science for disaster risk reduction. The United Nations General Assembly Resolution 66/199 requested UNISDR to facilitate the development of a post-2015 framework for disaster risk reduction. This process will culminate at the Third United Nations World Conference on Disaster Risk scheduled to take place in March 2015 in Sendai, Japan.

In May 2013, the Forth Session of the Global Platform on Disaster Risk Reduction called for an immediate start of work to be led by UNISDR to develop targets and indicators to monitor the reduction of risk and the implementation of HFA2.

It is now becoming evident that a considerable focus of the HFA2 should be local level DRR action. UNISDR has used the Making Cities Resilient Campaign as one of the main vehicles for the local level consultations on the development of the HFA2. As the consultations develops to discuss and formulate the elements of the HFA2, the perspectives of local governments on how local perspectives should be integrated becomes more important.

[Panel VI: Resiliency and Social Systems]

Dennis Wenger / Panel VI / Friday 11:15

As a focus for scientific research, the concept of resilience has become a topic of extreme importance and interest. Observations will be made regarding the focus of resilience research and the implications of this concept for basic, scientific and theoretical progress regarding disaster risk reduction. The value of basic research on resilience will be assessed.

Speakers are listed in alphabetical order by surname.

Daniel P. Aldrich is an associate professor of political science at Purdue University who is on leave as a Fulbright research fellow at the University of Tokyo's Economics Department for the academic year 2012-2013 and who was an American Association for the Advancement of Science fellow at USAID during the 2011-2012 academic year. He has been a Visiting Scholar at the University of Tokyo's Law Faculty in Japan, an Advanced Research Fellow at Harvard University's Program on US-Japan Relations, a Visiting Researcher at Centre Américain, Sciences Po in Paris, France and a Visiting Professor at the Tata Institute for Disaster Management in Mumbai, India. He is a board member of the journals Asian Politics and Policy and Risk Hazards and Crisis in Public Policy and a Mansfield U.S. Japan Network for the Future Alumnus. He is the section organizer for the American Political Science Association's Disasters and Crises Related Group. His research interests include post-disaster recovery, the siting of controversial facilities, the interaction between civil society and the state, and the socialization of women and men through experience. Daniel's first book, Site Fights: Divisive Facilities and Civil Society in Japan and the West, was published by Cornell University Press in 2008 and was republished (as a 2nd edition paperback) in May 2010. He has published more than 25 peer-reviewed articles along with more than 60 book chapters, articles, book reviews, and op-eds for general audiences in five main areas: disaster recovery, controversial facility siting, countering violent extremism, fieldwork practices, and sex differences in political behavior.

Walter Ammann is the Founder, and CEO of GRF Davos, a foundation focused on risk reduction, disaster management, sustainable development and climate change mitigation and adaptation. He is the chairman and organizer of the biennial IDRC Conference in Davos to be held for the 5th time in 2014 in Davos, Switzerland, and is director of the GRF Risk Academy, a think tank offering knowledge management, R&D and continuous education worldwide. His interest in current R&D is risk reduction and disaster management, in particular methods and technologies on how to reduce vulnerability and increase resilience and their harmonization with climate change in all their facets. He has been lead author of the Strategy on "Dealing with Risks and Disasters" for the Swiss Government and is advisor to numerous national and international institutions.

He is author and co-author of over 250 papers, books and scientific reports and is a member of various national and international professional associations and expert consulting groups like the UNISDR Science and Technology Council. He is a Permanent Visiting Professor at the Harbin Institute of Technology in Harbin, China.Walter Ammann got his MSc and PhD in structural dynamics and earthquake engineering at ETH Zurich. He started his professional career in various consulting companies, was responsible for the R&D in construction technology in a globally acting company, and for 15 years Director of the Federal Institute for Natural Hazards in Davos and Deputy Director of the Federal Research Institute on Forest, Snow and Landscape in Birmensdorf, Zurich.

Dilanthi Amaratunga is Professor of Disaster Management at the School of the Built Environment, University of Salford, UK where she leads the University's Centre for Disaster Resilience, responsible for supporting research on disaster management portfolios. She is also the Associate Head of International Development for School of the Built Environment. Her research interests include post disaster reconstruction including conflict mitigation, gender and projection; Capability and Capacity building in managing disasters; Socio-economic measures for conflict-affected re-construction and women in construction. An interdisciplinary background in Quantity Surveying, Facilities and Business Continuity Management, Education and Training, Gender and Disasters and Disaster Mitigation and Reconstruction provides her the opportunities to work across a broader disaster management research agenda including developing partnerships of international research teams, government, NGOs and communities. She is the Co-Editor of International Journal of Disaster Resilience in the Built Environment, the only journal to promote research and scholarly activity that examines the role of building and construction to anticipate and respond to unexpected events that damage or destroy the built environment.

She has secured a number of significant, high profile grants thereby continuing research to improve the knowledge gap between the short term recovery and long term re-construction efforts associated with major disasters; raise awareness and develop skills; set up mechanisms for the transference of knowledge to the market, government and professionals; develop tools specific to each type of disasters; map gender relations and time use; assess access to and control of resources, and the different coping strategies, vulnerabilities and capabilities of men and women; and enhance the role of women as owners, users and creators of the built environment, including situations associated with pre-disaster and post-disaster. She is the Principle Investigator of "CEREBELLA: Community Engagement for Risk Erosion in Bangladesh to Enhance Life Long Advantage", an international collaborative project with Patuakhali Science and Technology University, Bangladesh which is INSPIRE (International Strategic Partnerhsips in Research and Education) British Council funded.

She has presented widely at international conferences, has led international disaster management workshops and seminars and is working actively with the United Nations. She is an Advisory Panel Member of United Nations International Strategy for Disaster Reduction Campaign on Resilient Cities 2010 – 2015. She has supervised and supported a wide range of Post Graduate Research students. To date she has produced over two hundred publications, refereed papers and reports, and has made a large number of presentations in around 25 countries. Dilanthi is also a Member of the Royal Institution of Chartered Surveyors (RICS).

Lauren Alexander Augustine is the Director of the Disasters Roundtable and the Program of Extreme Events at the National Academies and the Country Director in the National Academies' African Science Academy Development Initiative (ASADI). Lauren came to the National Academies in 2002 as a study director for the Water Science and Technology Board in the National Research Council, after working as a policy analyst in Department of Interior, Office of the Secretary; as an ecologist at the US Geological Survey, Water Resources Division, studying Coastal Plain wetlands; as a lobbyist for biofuels; and as a consultant in the private sector on environmental policy on issues related to the Oil Pollution Act of 1990 and CERCLA (Superfund). At the Water Science and Technology Board, Lauren directed many studies on a range of water resources and policy topics, including Texas instream flows, endangered species in the Klamath and Platte River Basins, and forest hydrology. Lauren also serves as the country director for the National Academies ASDAI project, where she works directly with staff and members of African academies of science to build capacity in those academies to provide evidence-based policy advice to their respective national governments. The ASADI project works in seven countries in sub-Saharan Africa. Dr. Augustine earned her B. S. in applied mathematics and systems engineering and her Masters degree in environmental planning and policy from the University of Virginia; she completed her Ph.D. from Harvard University in an interdisciplinary program that combined physical hydrology, geomorphology, and ecology. Lauren most enjoys her time spent with her kids and family with her camera in hand.

Christopher Barrett is Director of the Network Dynamics and Simulation Science Laboratory (NDSSL) at Virginia Bioinformatics Institute (VBI) and a Professor in the Department of Computer Science at Virginia Tech. Specializing in large-scale modeling, this laboratory conducts broadly applicable research on biological, information, social and technology systems, designing and analyzing simulations of extremely large systems and implementing them on high-performance computer systems. Diverse research areas for the NDSSL include epidemiology and the spread of infectious diseases, social networks, settlement infrastructures and related social and population dynamics, integrated next-generation telecommunications systems and economic analysis in the financial and commodity markets. This simulation modeling, for example, can play a key role in shaping public health policies and mitigating the potential impact of a disease outbreak. By incorporating transportation data into the system, the ability exists to develop real-time modeling of public health epidemic data on large-scale city health systems holding the potential to mitigate the impact of a disease outbreak. In 2004 Barrett retired from Los Alamos National Laboratory, where he led the Basic and Applied Simulation Science Group and had built a research program active in theoretical and applied research in intelligent systems, distributed systems and advanced HPC-based computer simulation, then came to VBI to set up the NDSSL.

Dr. Barrett received his Ph.D. in bioinformation systems from the California Institute of Technology and has been widely recognized for his work.

Pedro Basabe, geologist and Dr. ès Sc.in hydrogeology, has vast expertise in applied geology, natural hazard identification, mapping, monitoring systems, research and project management since 1979. During the nineties, he formulated and implemented several international projects on disaster risk management in Latin America for the Swiss Agency for Development and Cooperation, Humanitarian Aid (SHA) in coordination with the UN. He is also UNDAC and SHA member since 1995 participating in number of disaster preparedness, evaluation and coordination missions.

He joined the UN Office for Disaster Risk Reduction (UNISDR) in November 2001, where has have increased responsibilities, contributing to DRR knowledge and capacity development, publications, partnership development, drought risk reduction practices and linkages with humanitarian sector to promote holistic and integrated disaster risk management. The last five years he has been heading the UNISDR Regional Office for Africa in Nairobi, actively developing collaboration with the Africa Union Commission, Regional Economic Communities, 38 countries, UN partners, donors and scientific-technical community. As result, Africa has a continental Programme for Disaster Risk Reduction, mechanisms for coordination, Sub-regional policies and/or programmes, some of them implemented in several countries.

Mr. Basabe is currently back at the UNISDR headquarters, in charge of science, technology and expertise for disaster risk management, water and disasters and partnership development to translate policies into practices.

James Bohland is Co-Director for Global Forum on Urban and Regional Resilience & Interim Vice President of Virginia Tech's National Capital Region (NCR) Operations. In this position, he worked with the NCR senior management team to develop and implement new strategic directions and to help coordinate services and program initiatives for the university's six sites in the region. He was also a full professor in Urban Affairs and Planning.

Bohland served as chair of the Urban Affairs and Planning program from 1984 to 1995. He was the founding director of the School of Public and International Affairs and served in that capacity until the spring of 2001. From August 2000 to August 2001 he served as interim provost for Virginia Tech and in September 2001, he was appointed Senior Fellow for Biomedical, Bioengineering, and Health Projects by the university, a position he held until 2005. From 2000 to 2008, he served as director of the Institute for Community Health.

He earned a Ph.D. in geography from the University of Georgia and accepted a position at the University of Oklahoma, where he stayed until joining the faculty at Virginia Tech in 1980.

With primary research interests in health policy and planning, community and population health, and in the social aspects of information technology, particularly as it relates to health, Bohland has authored more than 75 referred articles, book chapters and technical reports on topics ranging from community health, digital divide, and Community Technology Centers. He has received grants from NSF, Exxon, National Telecommunications and Information Agency, NIH and NASA.

Stefan Brem joined the Federal Office for Civil Protection within the Swiss Federal Department of Defence, Civil Protection and Sport in March 2007, where he leads a section on Risk Analysis and Research Coordination. Prior to his current position he served four years at the Federal Department of Foreign Affairs' Centre for International Security Policy, where he was responsible for international aspects of Critical Infrastructure Protection (CIP), Security Sector Reform, Border Security and Private Military Companies. He has organized several international conferences on CIP and Border Security and has published on arms control, intelligence studies, CIP and other security issues. He completed his dissertation in Political Science with the University of Zurich in 2003.

Deborah Brosnan is a marine ecologist working on the interface of natural hazard science and policy. She is President of The Brosnan Center and Professor (adj) of Biology at Virginia Tech. She has convened teams of multi-disciplinary scientists to find solutions to pressing environmental science and poliy challenges for US governments, She works globally to research and find solutions to ecological and social resiliences. She has worked around on many natural and human-caused hazards and the communities that they impact including Montserrat volcano, Indian Ocean Tsunami, Hurricane Rita and Gloria in the souther USA states. and tsunami forecasting in California. She has testified before US Senate and Congressional Commitees. She is a member of several scientific and non-profit Boards.

Jack Brown is the Director of the Arlington County Office of Emergency Management, which is responsible for the County's strategic emergency priorities. Specifically, OEM plans and coordinates County emergency services, including operation of the County's Emergency (9-1-1) Communications Center and Arlington's Emergency Operations Center during crises and major incidents. In 2012, Virginia Governor Bob McDonnell appointed Brown to the Secure Commonwealth Panel's 9-1-1 Sub-Panel, charged with reviewing the reliability of Virginia's 9-1-1 services in the wake of widespread failtures during the June 2012 "super-derecho" storms.

Jack Brown's public safety career includes 29 years with the Fairfax County, Virginia Fire & Rescue Department, where he retired as Assistant Fire Chief of Operations and served as a Planning Section Chief and Task Force Leader for the Fairfax County Urban Search and Rescue Task Force. He deployed to Nairobi, Kenya as Plans Chief in response to the 1998 embassy bombing and led the task force on a deployment to Taiwan in response to an earthquake in 1999.

Upon his retirement from Fairfax County in 2000, he became the Assistant Chief for the Loudoun County Department of Fire, Rescue and Emergency Management, where he led a team of firefighters to the Pentagon on 9/11 and assisted the Arlington County Fire Department as the initial Planning Section Chief for the incident. Brown served as Planning Section Chief on a Northern Virginia multi-jurisdictional emergency management task force that reestablished the New Orleans Emergency Operations Center just after Hurricane Katrina. He retired from Loudoun County in 2006.

He retired from the Coast Guard Reserve in late 2008 as a Chief Warrant Officer, specializing in Port Safety and Security. From 2003-2007, he served 15 months in a combat zone supporting Operation Iraqi Freedom and was awarded the Bronze Star Medal for actions in Baghdad, Iraq in 2007.

Brown holds 2 associate degrees from the Northern Virginia Community College, a bachelor's degree in Fire Science Administration from the University of Maryland and a master's degree in Quality Systems Management from the National Graduate School, Falmouth, Massachusetts. He is a 1997 graduate of the National Fire Academy's Executive Fire Officer Program at the National Emergency Training Center, Emmitsburg, Maryland where he is also an adjunct instructor in fire prevention programs. Brown is a 2011 graduate of the Executive Leadership Program at the Center for Homeland Defense and Security at the Naval Postgraduate School, Monterey, CA.

Thierry Courvoisier is the President of the Swiss Academy of Sciences and professor for astrophysics at the University of Geneva, Switzerland. As a member of the Swiss Academy of Sciences he focuses on sustainable solutions for national and global problems such as renewable, sustainable energy and sharing his expertise with policy and society, thus strengthening the interaction between Arts and Natural Sciences.

He was born in La Chaux-de-Fonds and grew up in Geneva, Switzerland. He holds a physics diploma in Theoretical Physics at the Federal Institute of Technology in Zürich (ETHZ) and has finished his PhD in theoretical physics with Prof. N. Straumann at the University of Zurich in 1980. After research stays in Germany at the European Space Operations Center (ESOC) and Space Telescope European Coordinating Facility at ESO (European Southern Observatory) and in England as a Senior scientist SERC fellow in Preston he has been teaching at University of Lausanne and Geneva as well as at CERN and in numerous specialized schools. He has become a full Professor of Astrophysics at University of Geneva in 1999 and has been supervising 16 doctoral theses. His fields of interest lie in; high energy astrophysics, observations using satellites and ground based telescopes, modeling of accretion processes onto black holes and neutron stars. Respectively his main research is the Active Galactic Nucleus (AGN). Besides being an author/co-author of over 400 publications he is an author of 2 books. Since 1995 he is chairing the INTEGRAL Science Data Centre (ISDC) which is analyzing the data of the ESA's Satellite INTEGRAL. Moreover, Thierry Courvoisier is President of the Swiss Academy of Natural Sciences (SCNAT), President of the European Astronomical Society (EAS) and President of the Swiss Academies of Arts and Sciences. Additionally, he is a member of numerous other unions and serves as an expert for ESO, ESA, PPARC (UK), the Swedish national space board, Belgian Science policy, Science Foundation of Ireland, Fonds National Suisse, SRON (The Netherlands) and the Swedish Academy of Sciences. In 2009/2010 he was skipper of the sailing yacht CERES around the Atlantic Ocean.

Susan Cutter is a Carolina Distinguished Professor of Geography at the University of South Carolina. She is also the Director of the Hazards Research Lab, a research and training center that integrates geographical information processing techniques with hazards analysis and management. She is the co-founding editor of an interdisciplinary journal, Environmental Hazards, published by Elsevier.

Dr. Cutter has been working in the risk and hazards fields for more than twenty-five years and is a nationally recognized scholar in this field. She has authored or edited eight books and more than 50 peer-reviewed articles. Her most recent book, American Hazardscapes, for the Joseph Henry Press/National Academy of Sciences, chronicles the increasing hazard vulnerability to natural disaster events in the United States during the last thirty years.

In 1999, Dr. Cutter was elected as a Fellow of the American Association for the Advancement of Science (AAAS), a testimonial to her research accomplishments in the field. Her stature within the discipline of geography was recognized by her election as President of the Association of American Geographers in 1999-2000.

Simin Davoudi is Professor of Environmental Policy and Planning at the School of Architecture, Planning and Landscape and the Coordinator of Environmental Justice and Governance theme at Newcastle Institute for Research on Sustainability (NIReS), at Newcastle University, UK. She is past President of the Association of the European Schools of Planning (AESOP) and an Academician with the Academy of Social Sciences. Simin has led the UK Office of Deputy Prime Minister's Planning Research Network and served as a member of the expert panels for three UK government departments (climate change, environment and planning) and two EU Directorate Generals (Environment and Regional Policy) as well as two Presidency Seminars. She has served as member of research councils' assessment panels in the UK and several other European countries and sits on Built Environment Sub-panel of the UK Research Excellence Framework. Simin has held visiting professorships at the universities of Amsterdam, Karlskrona and Nijmegen and has served on several advisory councils such as, the Irish Social Science Platform, University of Hong Kong, and BTH Swedish School of Planning. She is one of the editors of Journal of Environmental Planning and Management, founding member of the editorial team of the Journal of the Academy of Social Sciences, and member of editorial boards of 10 international journals. Her research which focuses on planning and

environmental governance has been funded by a range of international and national research funding bodies and is published widely. Her work on resilience is published in the journals of Planning Theory and Practice [2012, 13(2):299-307]; Planning Practice and Research [2013, 28(3)] and disP: The Planning Review [2013, 49(1)].

Mauro Dell'Ambrogio, the holder of a Doctorate in Law from the University of Zurich, held a number of public offices in canton Ticino from 1979 to 1999 after passing his bar exam: Judge, Chief of the Cantonal Police, Secretary-General for Education and Culture, project manager for the creation of the University of Lugano (USI), and Secretary-General of the USI.

After four years heading up a group of private clinics, he was made Director of the University of Applied Sciences of Southern Switzerland (SUPSI) in 2003. He has been mayor of Giubiasco, a member of the Ticino cantonal parliament and chairman of the Ticino electricity works.

From 2008 to 2012 he has been State Secretary for Education and Research.

In January 2013 he took up the post of State Secretary for Education, Research and Innovation.

Reginald DesRoches is the Dean's Professor of the College of Engineering, and Professor and Associate Chair of Civil and Environmental Engineering at the Georgia Institute of Technology. His primary research interests are seismic design of buildings and bridges, seismic risk assessment of lifeline systems, and application of innovative materials in rehabilitation of structures. He has published more than 200 articles and reports in the general area of structural and earthquake engineering.

DesRoches has served as chair of the ASCE Seismic Effects Committee (2006-2010), and chair of the executive committee of the Technical Council on Lifeline Earthquake Engineering (2010). He is currently a member of the executive committee of the National Academy of Sciences Disasters Roundtable, and is on the board for the Earthquake Engineering Research Institute (EERI).

DesRoches has been a key technical leader in the U.S. response to the 2010 Haiti Earthquake. He led a team of 28 engineers, architects, city planners, and social scientists, to study the impact of the earthquake with the goal of informing the Haitian government on effective ways to rebuild Haiti to be more resilient and sustainable. He has continued to assist the U.S. Government, USAID, and the United Nations on the rebuilding efforts in Haiti.

DesRoches was born in Port-au-Prince, Haiti and grew up in Queens, N.Y. He earned his Bachelor's of Science in Mechanical Engineering, Master's of Science in Civil Engineering, and Ph.D. in Structural Engineering – all at the University of California, Berkeley.

Chloe Demrovsky is the Director of Global Operations at DRI International and an Associate Business Continuity Professional (ABCP). She is responsible for overseeing DRI International's Global Network that conducts courses in over 50 countries on 6 continents. She is responsible for DRI International's global education growth, which since 2009 has resulted in DRI teaching more people outside the United States than inside and in 2011 resulted in a certification increase of 72%. She created an international version of DRI's audit course that encompasses both United States and international standards. As part of her role at DRI, she has presented at conferences on four continents. She founded the DRI BCM Glossary Committee and serves as International Editor for Thrive International Magazine and Thrive Iberoamerica Magazine, DRI's premier publication of original content in the Spanish language. She holds a Master's summa cum laude in International Business from New York University, where she served as External Relations Co-Chair for the Society of International Business and Development, and a Bachelor's summa cum laude from Bard College at Simon's Rock. Passionate about economic development, she has traveled to India and Kenya to work on private sector solutions for poverty alleviation and social inclusion. Follow her @ ChloeDemrovsky.

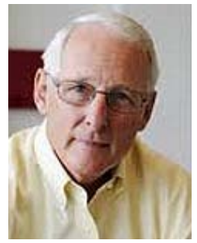
Roland Friedli joined Swiss Re Risk Engineering Services in 2006. He is responsible for assessing risks in the construction, utility, machinery and transportation industry. He also assists in the area of nanotechnology, emerging risks and environmental liability.

Before this he worked as project manager in engineering companies in Switzerland and in the US. There he was responsibilities for risk assessment of natural hazard and for the investigation and the remediation of contaminated sites. In Swiss Re's Internal Environmental Management Roland Friedli was responsible for the energy efficiency and CO2 reporting of Swiss Re's operations and infrastructure.

He holds a Masters Degree in Environmental Sciences from the Swiss Federal Institute of Technology Zurich in Switzerland.

Gerry Galloway is a Glenn L Martin Institute Professor of Engineering and Affiliate Professor of Public Policy at the University of Maryland where he teaches and conducts research in national water resources policy and management, flood mitigation, and disaster management. He has served as a consultant to national and international government and business organizations. He is currently a member of the Louisiana Governor's commission on coastal protection, an advisor to The Nature Conservancy on its Yangtze River Program and to the WWF-China Flood Risk Management Initiative, a member of a team studying the impacts of climate change and dam construction in the Mekong River Basin and was recently appointed by The Secretary of State as one of three inaugural Energy and Climate Partnership of the Americas Fellows. He has been Presidential appointee to the Mississippi River Commission and was assigned to the White House to lead a study of the 1993 Mississippi River Flood. He served in the US Army for 38 years retiring as a Brigadier General and Dean of Academics at West Point. He is a member of the National Academy of Engineering and a Fellow of the National Academy of Public Administration.

Ralph Hall is an Assistant Professor of Urban Affairs and Planning in the School of Public and International Affairs at Virginia Tech. He joined Virginia Tech in 2009, following a two-year postdoc at Stanford University. Ralph has over a decade of academic and professional experience in applying the concept of sustainable development to large-scale infrastructure systems with a specific emphasis on transportation and rural water supply and sanitation systems. In 2011, he completed a textbook with Nicholas Ashford (MIT) entitled Technology, Globalization, and Sustainable Development: Transforming the Industrial State. This textbook argues for the design of multipurpose solutions to the sustainability challenge that integrate economics, employment, technology, environment, industrial development, national and international law, trade, finance, and public and worker health and safety. Ralph is currently working with several transportation academics on a new textbook. This textbook will provide students and practitioners with a deep understanding of the basic concepts of sustainability as well as a coherent framework for how to apply them consistently in the context of transportation planning, management, and decision making at different levels. Ralph also has an active research agenda that studies the impact of water and sanitation projects in developing regions. Since 2008, he has led large-scale studies in Colombia, Senegal, and Mozambique.



John (Jack) Harrald is the Associate Director for the Global Forum on Urban and Regional Resilience at the Virginia Tech. He is the Director Emeritus of The George Washington University Institute for Crisis, Disaster, and Risk Management. Dr. Harrald is a member and Chair of the National Research Council Disasters Roundtable Steering Committee. He was the founding Executive Editor of the electronic Journal of Homeland Security and Emergency Management and is the immediate Past President, The International Emergency Management Society (TIEMS). He has been engaged in the fields of emergency and crisis management and maritime safety and security and as a researcher in his academic career and as a practitioner during his 22 year career as a U.S. Coast Guard officer, retiring in the grade of Captain. Dr. Harrald received his B.S. from the U.S. Coast Guard Academy, a M.A.L.S. from Wesleyan University, a M.S. from the Massachusetts Institute of Technology where he was an Alfred P. Sloan Fellow, and an MBA and Ph.D. from Rensselaer Polytechnic Institute.

Dirk Helbing was born on January 19, 1965. He studied Physics and Mathematics, but was always interested in other fields of science as well. In the year 2000, he became Professor and Managing Director of the Institute for Transport & Economics at Dresden University of Technology, and in 2007 he was appointed Professor of Sociology, in particular of Modeling and Simulation, at ETH Zürich. Since 2008, he is elected member of the German Academy of Sciences "Leopoldina".

More than 200 publications in different scientific fields, 300 talks and more than 300 reports in the public media reflect his wide field of interest, reaching from traffic science over crowds and disaster management to biologically inspired logistics. He also had projects with Xerox PARC, Volkswagen, SCA Packaging, Siemens, PTV, further companies, and various foundations.

Helbings team developed a traffic assistance system and patented the principle of a self-organized traffic light control, which implements massively parallel, decentralized control concepts for the optimization of traffic flows. The resulting increase of performance and the higher flexibility are based on latest developments in the understanding of complex systems. Companies and societies are other examples of such complex systems. This is also the reason why Dirk Helbing is interested in sociology.

As scientific coordinator of the FuturICT project, he is promoting the collaboration of natural, social and engineering sciences to address the challenges of the complex and strongly interdependent global techno-socio-economic-environmental systems we have

created. He believes that we need to develop a global systems science, a new data science and a systemic risk calculus. Therefore, he is also the founding vice chairman and strategic head of the ETH Risk Center.

Carlo C. Jaeger is co-founder and the chairman of the Global Climate Forum, leading GCF's Green Groth research process. He holds a Profesorship at Beijing Normal University (BNU) and was Professor for Modelling Social Systems at Potsdam University in Germany and chair of the research domain 'Transdisciplinary Concepts and Methods' at the Potsdam Institute for Climate Impact Research.

Developing climate impact reseacrh guided by stakeholder dialogues and using mathematics as a tool to meet conceptual challenges is the focus of his work.

He was Professor at the University of Darmstadt and Head of the Human Ecology Department at the Swiss Federal Institute for Environmental Science and Technology. He is a member of the Scientific and Technical Council of the International Risk Governance Council, and has served on the boards of various scientific organizations. He holds degrees in economics (PhD, frankfurt University, Germany) sociology(diploma, university of Bern, Switzerland), and extensively on the interactions between technological progress and environmental problems, in particular the role of information technologies in urban development.

He has also considerable research experience in the field of stakeholder dialogue. His current research interest focuses on the positive impact of climate policy on prosperity and growth and on the role of financial markets in managing climate change.

Jaffer AA Khan is the Director of Marg Institute of Design and Architecture Swarnabhoomi (MIDAS)Chennai, affiliated to Anna University of Technology. MIDAS is promoted by MARG GROUP in Chennai, an infrastructure company with projects more than 5000Crs.

He brings in 27 years of rich international experience to the education of architecture through MIDAS. The philosophy of the school is to establish a strong symbiotic relationship between education ,research, theory and practice.

He is the gold medalist in Architecture from the University of Madras in 1983. He was awarded the most prestigious Aga Khan Scholarship Geneva to do his graduation at the Bartlett School of Architecture and Planning, UCL,University of London in 1985. Back home he started his practice in 1985 and has designed nearly 300 buildings many of them award winning at national and international level. His projects are widely published and nominated to The Aga Khan Award for Architecture during 1995 cycle and listed as a part of MIT Digital Archives under Archnet.

He maintains studios in Bangalore and Chennai and recently executed large projects with green initiatives in Bangalore. He has been a writer,critic and an academician apart from professional practice for more than quarter century and has written thought provoking articles on Environment , Heritage and Sustainable Development.

He is an advocate for "Climate Change" and has spoken on various occasions at different forums both at national and international level on the subject. He is a member of The Royal Institute of British Architects (RIBA),UK and a Fellow of the Royal Society of Arts(RSA),London. He is presently a research scholar at RMIT University Melbourne Australia.

Bijan Khazai is a Senior Research Scientist, CEDIM at the Karlsruhe Institute of Technology. He holds Masters and Doctoral degrees in Earthquake Engineering from the University of California at Berkeley. Before moving to Germany, Dr. Khazai was a post-doctoral research fellow at Kyoto University's Disaster Prevention Research Institute (DPRI) and Columbia University's Earth Institute where he was involved in the socio-economic assessment of recovery and reconstruction processes working in the field following disasters in Iran, Sri Lanka, Pakistan and New Orleans. Dr. Khazai's research interests are social vulnerability analysis, megacity and urban risk, and decision support for emergency response and recovery planning. He is Principal Investigator of the Social Vulnerability and Integrated Risk Project of the Global Earthquake Model (GEM) and also leads a collaborative research program on integrated earthquake risk assessment between KIT and Heidelberg University in Kathmandu. As a project specialist for the Earthquake and Megacities Initiative (EMI), he has worked closely with stakeholders in a number of applied disaster risk management projects in Istanbul, Amman and Metro Manila, Mumbai, Kathmandu and Dhaka.

James Kendra is an associate professor in the School of Public Policy and Administration and Director of the Disaster Research Center at the University of Delaware. Previously he was coordinator of the Emergency Administration and Planning Program in the Department of Public Administration at the University of North Texas.

His research interests focus on individual and organizational responses to risk, improvisation and creativity during crisis, post-disaster shelter and housing, and planning for behavioral health services. Projects have included research on the reestablishment of New York City's emergency operations center after the 9/11 attacks, a major study of the waterborne evacuation of Manhattan on 9/11, research on the social impacts of the Indian Ocean tsunami, and research on the organization of disaster behavioral health services.

Dr. Kendra has participated in several quick response disaster reconnaissance trips, including the 2001 World Trade Center attacks, 2003 Midwest tornadoes, the 2004 Indian Ocean tsunami, and Hurricane Ike in 2008, as well as documenting maritime relief efforts in the US following the 2010 Haiti earthquake. He has been involved in several emergency planning and exercise efforts, and he is a Certified Emergency Manager. He graduated from Massachusetts Maritime Academy with a degree in marine transportation, and served several years at sea, attaining a Master Mariner license. His master's degree is in geography from the University of Massachusetts, and his PhD is in geography from Rutgers University. He is a member of the US Coast Guard Auxiliary, with interests in boating safety and public education.

Susanne Krings joined the German Federal Office of Civil Protection and Disaster Assistance (Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, BBK) in 2010 as a policy advisor in the Critical Infrastructure Policy Issues division. Although the division covers a wide range of different topics related to critical infrastructures, one of the key aspects of her work is adaptation to climate change with a special focus on civil protection. Before joining the BBK she worked as a research associate at the United Nations University – Institute for Environment and Human Security (UNU-EHS). In the Vulnerability Assessment, Risk management and Adaptive Planning section of the institute she contributed to research projects focusing on the vulnerability of critical infrastructures.

Wolfgang Kröger is Executive Director at the ETH Risk Center, ETH Zurich, Zurich, Switzerland. Wolfgang Kröger has been Ordinarius of Safety Technology at the ETH Zurich since 1990 and director of the Laboratory and Safety Analysis. Before being elected IRGC's Founding Rector in 2003 he headed research in nuclear energy and safety at the Paul Scherrer Institute (PSI), where he was also on the board of directors. After his retirement at the beginning of 2011 he has become the managing director of the newly established ETH Risk Center.

Daniel Kull is a Senior Disaster Risk Management Specialist with the Global Facility for Disaster Reduction and Recovery (GFDRR) of the World Bank. Based in Geneva, Switzerland, Mr. Kull represents the World Bank in inter-agency and inter-governmental disaster risk management, climate change adaptation and humanitarian coordination mechanisms. He also provides technical expertise to the GFDRR Hydromet Program, helping to formulate and guide World Bank and partner investments in modernizing weather, climate and hydrologic service delivery. Before joining GFDRR, Mr. Kull was the global coordinator for disaster risk reduction at the International Federation of Red Cross and Red Crescent Societies (IFRC), a research scholar with the International Institute for Applied Systems Analysis (IIASA) where he pursued cost-benefit and impact analysis of disaster risk financing and management, Senior Disaster Risk Reduction Advisor for the Swiss Agency for Development and Cooperation (SDC) in Tajikistan and Technical Advisor for UNISDR Africa in Kenya. He also served as a hazard specialist for the Swiss Reinsurance Company, having started as a hydraulic engineer for both the Swiss Federal Institute of Technology (ETH) and the Hydrologic Engineering Center (HEC) of the US Army Corps of Engineers. A dual Swiss-American national, Mr. Kull holds a MSc in Water Resource Engineering from the University of California (Davis) and a BSc in Civil Engineering from Union College.

Paul Knox is Co-Director for the Global Forum on Urban and Regional Resilience & University Distinguished Professor at Virginia Tech. Between 1997 and 2006 he served as Dean of the College of Architecture and Urban Studies. In 2009 he served as Director of the Virginia Bioinformatics Institute. As a member of the Department of Urban Affairs and Planning he has taught courses on urban and regional development theory and comparative urbanization. He currently teaches courses on European Urbanization and Urbanism, and on Cities and Design. He is a member of the editorial board of seven international journals and has served as Co-Editor of Environment and Planning A (1991-2000), Co-Editor of the Journal of Urban Affairs, (1986-1991), and book review editor for Environment & Planning C: Government & Policy (1984-1991). He is a Trustee Emeritus of the Virginia Center for Architecture and a member of Virginia Tech's Ut Prosim Society. Knox has received numerous honors and awards, including the 2008 Distinguished Scholarship Award of the Association of American Geographers, the Textbook Excellence Award for the Humanities and Social Sciences, Text and Academic Authors Association, for World Regions in Global Context: Peoples, Places, and Environments, with Sallie Marston and Diana Liverman in 2005; honorary membership in

the American Institute of Architects, for services to the profession in 2000; the Textbook Excellence Award for the Humanities and Social Sciences, Text and Academic Authors Association, for Human Geography, with Sallie Marston in 1999; the Association of Collegiate Schools of Architecture Service Award in 1999; and the Virginia Social Science Association Scholar Award "For Expanding Horizons of Knowledge in Geography" in 1998.

James Jimmy Martin is Professor of Civil Engineering and Director of the university-level Disaster Risk Management Institute at Virginia Tech. Dr. Martin specializes in disaster risk assessment, earthquake and foundation engineering, and soil & site improvement. He is a frequent investigator of worldwide disasters, and has led disaster-related research programs for major funding agencies and organizations for over 20 years. He has been closely involved in the advancement of building code and seismic design provisions in the US and abroad. In addition, he frequently serves as an international engineering consultant on major infrastructure projects. Dr. Martin has received numerous national, state, and university awards including the American Society of Civil Engineer's Norman Medal.

Merle Missoweit is a Senior Researcher at the Fraunhofer Institute for Technological Trend Analysis. She has a background in biology and physics and is coordinating the international defense and security research in her unit. In her current work on the security side she has been focusing on Crisis Management research & innovation planning, being Co-Sherpa of ESRIF working group 4 'crisis management' and Co-Coordinator and Project Quality Manager of the FP7 Demonstration Phase I project ACRIMAS. She is engaged in several other FP7 security research projects and will be the Scientific Coordinator of the upcoming FP7 Crisis Management Demonstration Project DRIVER – Driving Innovation in European crisis management and Resilience (currently under negotiations). She was a member of the Societal Security Expert Group to the European Commission and is Programme Manager of the Fraunhofer Future Security Conference 2013 in Berlin. On the defence side, her work is centred on R&T planning support for the Armament Branch of the German Ministry of Defence with a focus on international R&T cooperation, including the support of the German MoD's participation in the development and implementation process of several EDA initiatives (European Defence R&T Strategy, Capability Development Plan etc.). Furthermore, she is active in in the field of gender equality in science and plays an active role in the DG Research & Innovation campaign trying to encourage you.

Stefan Wolfgang Pickl is the Chair for Operations Research and Director of COMTESSA – Core Competence Center for Operations Research Management – Strategic Planning Safety & Security Alliance at UBw Munich, GERMANY.

Stefan Wolfgang Pickl was born in Darmstadt, Germany on 29th September, 1967. He studied mathematics, electrical engineering and philosophy at the Technical University of Darmstadt (Diploma in 1993; ERASMUS-scholarship at the EPFL Lausanne); doctor's degree at the TU Darmstadt in 1998 followed by his habilitation at the University of Cologne in 2005.

From the years 2000 to 2005 Mr Pickl was scientific assistant and project manager at the Center for applied Computer Sciences in Cologne (ZAIK); among various other functions he was holding main responsibility in the field of "Modelling, simulation and optimizing conflicts involving resources – analysis of complex systems". Since July 2005 Mr Pickl holds a chair for Operations Research at the UBw Munich.

In 2000 Mr. Pickl received the phd-thesis award by the German Society for Operations Research; followed by international "best-paper awards" in the years 2003, 2005 and 2007. He is leading the working group "Simulation and Optimization of Complex Systems" of the German Society for Operations Research (GOR). Furthermore he is vice-coordinator of the European Operations Research Society (EURO) for "Experimental Economics/ OR".

He is counsellor to the "Center for the Advanced Studies of Algorithms (CASA)" at the University of Nevada, Las Vegas, as well as an associated member of the "Center for Network Innovation and Experimentation (CENETIX)" of the NPS Monterey, CA (USA).

His main research issues are located in the area of analysis, control and optimization of complex systems and discrete structures. Furthermore he is interested in the field of IT-supported process optimization as well as issues regarding decision and game theory, particularly with a view to the background of international experiments, service-orientated reachback-conceptions and safety & security operations.

Mr Pickl was one of the first mathematicians who developed a model for the simulation and optimization of the CO2-conflict. Respectively Mr Pickl is a member of the Excellence-Cluster "HUMTEC-Energy" at the RWTH Aachen since 2008. He released 120 publications and furthermore as editor he participated in the preparing and editing of several international conference volumes.

Since 2008 Mr Pickl is Vice-Chair of the international Committee for Controlling Theory in the range of IFAC (International Federation on Optimal Control Section: Technical Committee on Optimal Control). He was furthermore voted on the board of the German Society for Operations Research. Since 2010 he is chair of the advisory board of the German Society for Operations Research. Furthermore Mr. Pickl is director of the Academy for Highly Gifted Pupils at UBw Munich.

The conference OR2010 attracted academics and practitioners working in various fields of Operations Research and provided them with the most recent advances in Operations Research and related areas to the general topic "Mastering Complexity" and "Safety & Security". Stefan Pickl is member of Munich Aerospace and NITIM (International Ph.D. Consortium on Networks, Information Technology & Innovation Management) with a special focus on Aviation Management and Humanitarian Logistics.

Martin Powell is Head of Urban Development within Siemens Global Cities Centre of Competence. This role involves working with City Leadership across the globe and providing expert advice and support to help ensure cities can meet economic, social and environmental targets.

Martin was previously The Mayoral Advisor on the Environment to the current Mayor of London, Boris Johnson, responsible for policy development for Energy and Climate Change, Adaptation, Water, Air Quality and Waste. He was also Director of Environment at the London Development Agency, the Mayor's agency for economic development in London where he had responsibility for delivery of the agency's Major Programmes.

Martin was Managing Director of Cambridge Management & Research, an organisation working with a number of cities and a Special Advisor to the c40 cities climate action group, Chaired by Mayor of New York, Michael Bloomberg.

Martin speaks extensively on the topic of future cities and the economic models of delivering solutions at scale and the city governance required to deliver these solutions.

He is a contributing author to the Wiley Guide to Project Management and Project, Programme & Portfolio Management also published by Wiley. He has also presented for NBS Learning Channels.

Saifur Rahman is the founding director of the Advanced Research Institute (www.ari.vt.edu) at Virginia Tech where he is the Joseph R. Loring professor of electrical and computer engineering. He also directs the Center for Energy and the Global Environment (www.ceage.vt.edu). He is a Fellow of the IEEE and an IEEE Millennium Medal winner. He is the founding editor-in-chief of the IEEE Electrifications Magazine. He was the founding editor-in-chief of the IEEE Transactions on Sustainable Energy. He is a vice president of the IEEE Power and Energy Society (PES) and a member-at-large of the IEEE-USA Energy Policy Committee. Currently he is serving as the chair of the US Naitonal Science Foundation Advisory Committee for International Science and Engineering. He is a Distinguished Lecturer for the IEEE PES, and has lectured on smart grid, energy efficient lighting solutions, renewable energy, demand response, distributed generation and critical infrastructure protection topics in over 30 countries on all six continents.

He received his Ph.D. in electrical engineering from Virginia Tech in 1978. His industry and government experience includes work with the Tokyo Electric Power Company in Japan, the Brookhaven National Laboratory in New York, Progress Energy, and consultancy for the World Bank, the United Nations, US Agency for the International Development and the Asian Development Bank.

Ortwin Renn serves as full professor and Chair of Environmental Sociology and Technology Assessment at the University of Stuttgart (Germany). He directs the Stuttgart Research Center for Interdisciplinary Risk and Innovation Studies at the University of Stuttgart (ZIRIUS) and the non-profit company DIALOGIK, a research institute for the investigation of communication and participation processes in environmental policy making. Renn also serves as Adjunct Professor for "Integrated Risk Analysis" at Stavanger University (Norway) and as Affiliate Professor for "Risk Governance" at Beijing Normal University.

Ortwin Renn has a doctoral degree in social psychology from the University of Cologne. His career included teaching and research positions at the Juelich Nuclear Research Center, Clark University (Worcester, USA), the Swiss Institute of Technology (Zuerich) and the Center of Technology Assessment (Stuttgart). Among others he is a member of the Scientific Advisory Board of EU President Barroso, the Scientific and Technical Council of the International Risk Governance Council (IRGC) in Lausanne, the National Academy of Disaster Reduction and Emergency Management of the People's Republic of China and several national and international Academies of Science. In the past he served on the panel on "Public Participation in Environmental Assessment and Decision Making" of the U.S.-National Academy of Sciences in Washington, D.C. (from 2005-2007) and on the German Federal Government's "Commission on Energy Ethics" (2011). In 2012 he was elected president of the Society for Risk Analysis (SRA).

His honours include an honorary doctorate from the Swiss Institute of Technology (ETH Zurich), an honorary affiliate professorship at the Technical University Munich, the "Distinguished Achievement Award" of the Society for Risk Analysis (SRA) and several best publication awards. In 2012 the German Federal Government awarded him the National Cross of Merit Order in recognition of his outstanding academic performance.

Renn is primarily interested in risk governance, political participation as well as technical and social change towards sustainability. Since 2012 he co-directs together with Armin Grunwald the German Helmholtz-Alliance: "Future infrastructures for meeting energy demands. Towards sustainability and social compatibility". Renn has published more than 30 books and 250 articles, most prominently the monograph "Risk Governance" (Earthscan: London 2008).

João Tiago Meneses Machado Ribeiro is the INGC General Director. He was born in Quelimane, Zambezia Province, Mozambique, and holds a Degree in Forestry Engineering, on Renewable Natural Resource & Alternative Energy Sources, by the Faculty of Forest Engineering – Federal University of Paraná (Brazil). He is currently General Director of the National Institute of Disaster Management in Mozambique (INGC), where he has been working since 2006. Its main roles and responsibilities is to manage the INGC whole process and the system of disaster risk reduction at the national level, as well as coordinate the preparation of plans, policies and implement multisectoral response operations for emergencies caused by natural hazards such as floods, earthquake, cyclones, drought and wild fire and associated consequences. He is one of the founders of the National Center for Emergency Operations (CENOE) and the National Unit for Civil Protection (UNAPROC) in Mozambique. He is one of the forerunners of the Study on Climate Change Impact on Disaster Risk in Mozambique. Under his leadership, the Beira city won the first ever RISK Award at the International Disaster and Risk Conference (IDRC) in Davos, a project submitted by IP Consult/Ambero aimed at reducing the risk of flooding in slum districts of the city of Beira in Mozambique. He worked as advisor in the field of agriculture and rural development and served as Provincial Director of Agriculture and Rural Development and Director of the Board of Directors in Sugar factory in Mafambisse, Sofala Province.

Liesel A. Ritchie is assistant director for research at the Natural Hazards Center. She has served as either principal investigator or senior researcher on more than 70 projects since 1996. Since 2001, Liesel's focus has been on the social impacts of disasters with an emphasis on technological disasters, social capital, and renewable resource communities.

Liesel currently directs three National Science Foundation projects—one on the social impacts of the high stakes litigation resolution associated with the Exxon Valdez oil spill, one on the 2008 TVA Kingston Fossil Plant ash release, and one on social impacts of litigation and settlement activities related to the 2010 BP Deepwater Horizon oil disaster. Liesel is also leading evaluation efforts associated with the USGS's Science Applications for Risk Reduction Tsunami Scenario Project; the Department of the Interior's Strategic Sciences Group; and is

co-PI on a NOAA-funded project to incorporate social science into its tsunami program. More recently, she has been involved with social impact assessment efforts regarding oil pipeline development activities in northwestern Canada.

Liesel is coeditor of the January 2012 issue of American Behavioral Scientist on the BP disaster and is author or coauthor on five recent articles related to her work on that event, the Exxon Valdez oil spill, and the earthquake in Haiti. Between 2006 and 2012 she served as chair and program co-chair of the American Evaluation Association topical interest group on disaster and emergency management evaluation. She currently serves on the Earthquake Engineering Research Institute's Learning from Earthquakes committee.

Badaoui Rouhban is a specialist in disaster risk management. He advises public services, civil societies and non-goverrnmental organizations on capacity-building for disaster resilience. He served for several years at UNESCO, Paris, in the Programmes on natural hazards and the environment and is the former Director of UNESCO's Unit for Disaster Reduction. He is a Global Risk Forum GRF Davos Senior Research Fellow. Dr Rouhban holds a Doctor of Engineering degree from the University Paris VI and has carried out post-doctoral research in engineering seismology at the Tokyo Institute of Technology.

Keith Shaw is Professor of Social Sciences at Northumbria University, Newcastle, UK. He has undertaken research and consultancy for a range of national and international organizations on sub-national governance, urban regeneration and the role of the voluntary and community and voluntary sectors in governance and public service delivery. His recent work has critically examined the application of the concept of resilience at the local level, focusing on the climate change and emergency planning agendas, and how a more radical understanding of resilience as 'transformation' can be usefully applied to the role of local organisations and local communities facing environmental, economic and social threats. He has recently published on resilience in a number of journals, including: Local Environment; Local Government Studies, Public Policy and Administration; and Planning Theory and Practice.

Charles W. Steger is the 15th president of Virginia Tech. Under his leadership, the university has charted a course to expand its research enterprise and establish Virginia Tech among the nation's top research universities. He has served as chairman of the Virginia Council of Presidents and has been appointed by five governors of Virginia to serve on various boards dealing with higher education, homeland security, information technology, and international education. He was recently named to the Governor's Commission on Higher Education Reform, Innovation, and Investment and to the Innovation and Entrepreneurship Investment Authority. In addition, he serves on the boards of a number of public and private organizations, including the board of the Jefferson Science Associates, which oversees the Jefferson National Lab, and the Senior Advisory Group of the Northern Virginia Technology Council Board of Directors. He was recently elected to the Board of the National Institute of Building Sciences. He is also p-president of the Council of Presidents of the Southeastern Universities Research Association (SURA) and a member of the Economic Club of Washington. Steger is the 2009 recipient of the Chief Executive Leadership Award conferred by the Council for the Advancement and Support of Education (CASE), District III, for outstanding leadership and service in support of education, and the 2010 recipient of the Michael P. Malone International Leadership Award from the Association of Public and Land-Grant Universities (APLU).

Krishna Vatsa is UNDP Regional Disaster Risk Reduction Adviser, South Asia part of the Centre's CPR practice team and based out of Delhi, India, Krishna assists Country Offices in South and South West Asia on disaster risk management issues such as disaster mitigation and recovery. He provides policy review and development advice, technical backstopping for planning and management activities and applied research services.

Krishna has worked for more than 15 years on disaster risk reduction and recovery issues. Over the last 10 years, Krishna has held leadership positions and consulted for a number of international organizations including UNDP, World Bank, International Federation of Red Cross and Red Crescent Societies, Inter-American Development Bank, Asian Development Bank and the Secretariat of International Strategy for Disaster Reduction. Prior to joining the Centre, Krishna worked as Early Recovery Coordinator with the UNDP Philippines. As a career civil servant from India, Krishna has held the positions of Secretary, Rural Development and Secretary, Relief, Rehabilitation and Disaster Management in the Government of Maharashtra from 2003 to 2007. He implemented the World Bank-funded Maharashtra Emergency Earthquake Rehabilitation Programme during 1995-99.

Jerry Velasquez is Chief of the Advocacy and Communications Section and Head of the Making Cities Resilient Campaign of the UN Office for Disaster Risk Reduction (UNISDR). He previously worked for the United Nations Environment Programme (UNEP), the Global Environment Information Centre (GEIC), the United Nations University (UNU), and the United Nations Centre for Regional Development (UNCRD). He received his M.S. and Ph.D. on Water Resources Management from Nagoya University in Japan. His published work includes edited books, UN reports, journal articles, interactive software, and policy briefs on MEA synergies, environmental governance and social vulnerability. His latest publication is titled "Reducing Vulnerability and Exposure to Disasters – the Asia Pacific Disasters Report 2012" published in October 2012.

Dennis Wenger is the Program Director for program element 1638, Infrastructure Systems Management and Extreme Events, at the National Science Foundation (NSF). He is also the Acting Program Director for the Civil Infrastructure Systems program. He had previously been at NSF from 2001-2005. Dr. Wenger was a Professor from Texas A&M University from 1989-2007. At Texas A&M, Dr. Wenger was a Professor of Urban and Regional Science and an Adjunct Professor of Sociology. He was also the Founding Director and Senior Scholar of the Hazard Reduction & Recovery Center. Prior to his arrival at Texas A&M in 1989, Dr. Wenger was on the faculty of the University of Delaware where he served as Co-Director of the Disaster Research Center from 1984-1989 Dr. Wenger has been engaged in research on hazards and disasters for over 40 years. His research has focused upon the social and multidisciplinary aspects of natural, technological, and human-induced disasters. Specifically, he has studied such topics as local emergency management capabilities and response, police and fire planning and response to disasters, search and rescue and the delivery of emergency medical services, mass media coverage of disasters, warning systems and public response, factors related to local community recovery success, and disaster beliefs and emergency planning. He undertook the only empirical study of the evacuation of the World Trade Center towers after the first terrorist attack in 1993 and served as the principal investigator for the first project to Enable the Future Generation of Hazard Researchers. He is the author of numerous books, research monographs, articles and papers. Dr. Wenger currently serves as one of the nine members of the United Nations Scientific and Technical Committee to the International Strategy for Disaster Reduction. At NSF Dr. Wenger serves as the foundation s representative to the Roundtable on Disasters of the National Academy of Science. He also represents NSF on the Subcommittee

on Disasters (SDR) which is associated with the Office of Science and Technology Policy. Dr. Wenger serves as the Co-Chair for Science of the SDR.

John N. Zeppos is Group BCM & ERM Deputy Director of COSMOTE Mobile Telecommunications S.A., Maroussi in Greece. He is a dynamic and dedicated senior management professional having acquired more than 18 years of experience, responsible for Business Continuity Management (BCM) and Enterprise Risk Management (ERM) in 4 countries. Possesses excellent interpersonal skills and the ability to communicate and negotiate persuasively at Board and Group Audit Committee level, presenting BCM & ERM programme status as well as budget reports. Very attentive to detail with a practical approach to problem solving and the organization required to ensure that effective plans are devised and achieved. Superior planning skills ensure that every risk is accounted for and mitigated against, to ensure stability and secure continuation for business operations.

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