Recent systemic failures in different domains such as the BP Deepwater Horizon Oil Spill, Northeast Power Blackout, Global Financial Crisis, and Hurricane Sandy’s damage to critical infrastructure, have reminded us, once again, of the fragility of complex sociotechnical systems. Although these failures were triggered by different causes, there are, however, notable failure mechanisms that are common among them. Understanding and learning from these mechanisms are essential to avoid such disasters in the future.

To accomplish this, one needs to go beyond analyzing them as independent one-off events, and examine them in the broader perspective of the potential fragility of complex sociotechnical systems. One needs to study them from a holistic systems engineering perspective, so that one can thoroughly understand the commonalities as well as the differences to manage systemic risk better in the future. Further, such studies need to be carried out in concert with public policy and regulatory experts so that all the scientific, engineering, and human decision-making lessons can be translated into effective policies and regulations.

Towards this goal, the Center for the Management of Systemic Risk at Columbia University, conducts transdisciplinary research, education and outreach programs on systemic risk modeling, analysis and management. We focus on challenges in the financial, sustainable energy & environment, infrastructure, and healthcare domains.

As part of our outreach effort, we organize symposia by bringing together world-class experts on risk management in diverse disciplines to promote discussion and cross-fertilization across domains. The first symposium, held on June 26, 2014, focused on the theme of Management of Systemic Risk in Finance, which was very successful.

This second symposium focuses on examining the technical, policy, implementation, and financial challenges at the nexus of sustainable energy, environment, and infrastructure. This symposium features leaders from academia, industry, business, and regulatory agencies as speakers, panelists, and audience members.

Image sources:
Hurricane Sandy: https://www.flickr.com/photos/that_chrysler_guy/8139116603/in/photostream/
Speakers and Panelists

Liza Abad, Enterprise Risk Manager, PRMIA
Liza Abad is Enterprise Risk Manager at Hess Corporation, a Fortune 100 E&P company, with portfolio responsibilities overseeing North America onshore, Asia Pacific and Australia regions. In Asia, Liza was responsible for roll out of the Enterprise Risk program in Malaysia, China, and Australia. Liza also served in a research and advisory capacity in Hess’ Corporate Strategy group, shepherding the country risk program and methodology development. Prior to joining Hess, Liza was at Mirant Corporation and Bank of America. Liza has been actively involved in the risk professional and strategy community, furthering risk management best practices and educational needs of energy professionals. At Professional Risk Managers’ International Association (PRMIA), she has served various global roles (Global Speaker Coordination Leader, SME and advisory roles) and chapter level roles (Houston and New York Steering Committees).

Daniel Bienstock, Professor, Columbia University
Daniel Bienstock is a professor at the IEOR Department at Columbia University. His theoretical research focuses on fundamental and computational aspects of nonlinear, nonconvex and discrete optimization. A parallel research thrust concerns the study of problems with high societal impact, such as the evolution of epidemics and in particular the study of failures of power transmission systems. He is a Fellow of INFORMS, the Editor-in-Chief of Mathematical Programming C, and the recipient of an IBM Faculty Partnership Award and an NSF Presidential Young Investigator award.

Jason Bordoff, Professor of Professional Practice in International and Public Affairs, Columbia University
Jason Bordoff joined the Columbia faculty after serving until January 2013 as Special Assistant to the President and Senior Director for Energy and Climate Change on the Staff of the National Security Council, and, prior to that, holding senior policy positions on the White House’s National Economic Council and Council on Environmental Quality. One of the world’s top energy policy experts, he joined the Administration in April 2009. At Columbia’s School of International and Public Affairs, Bordoff is a Professor of Professional Practice and serves as founding Director of SIPA’s Center on Global Energy Policy. Prior to joining the White House, Bordoff was the Policy Director of the Hamilton Project, an economic policy initiative housed at the Brookings Institution.

Miguel Centeno, Department Chair & Musgrave Professor of Sociology and International Affairs, Director of PIIRS Global Systemic Risk, Princeton University
Professor Centeno has published many articles, chapters, and books most recently State and Nation Making in the Iberian World (Cambridge 2013). War and Society will be published by Polity in 2016 and State Making in the Developing World by Cambridge in 2016. He is the founder of the Research Community on Global Systemic Risk funded by PIIRS from 2013-20 (risk.princeton.edu) and recently published “The Emergence of Global Systemic Risk” in the Annual Review of Sociology (2015). Beginning in 2012, he has served as Chair of the Sociology Department. In 2014 he produced a Coursera course on “The Paradoxes of War”.

Ron Dembo, CEO, Zerofootprint
Dr. Ron Dembo is the Founder and CEO of Zerofootprint, a company targeting massive positive social and behavioral change. Prior to Zerofootprint, Dr. Dembo was the Founder and CEO of Algorithmics Inc., growing it from a start-up to the world’s largest enterprise risk software company until it was sold to Fitch in 2005 and then IBM in 2012. Algorithmics was recognized as one of Canada’s 50 Best Managed companies during his tenure.

Michael Ferguson, Director, US Energy Infrastructure, Standard & Poor’s
Michael Ferguson is a Director in the US Energy Infrastructure group at Standard & Poor’s Ratings Services in New York City. He works on the merchant power and midstream energy team, covering a portfolio of project financed power plants, pipelines, and independent power producers. Ferguson is a Chartered Financial Analyst, a Certified Public Accountant (DC and VA), a Chartered Alternative Investment Analyst, and a Certified Fraud Examiner.
Robert Freudenberg, Director, Energy and Environment, Regional Plan Association (RPA)

Robert Freudenburg is Director of RPA’s Energy and Environmental programs, leading the organization’s initiatives in several areas. He oversees a comprehensive program of projects and policies in the New York-New Jersey-Connecticut metropolitan area. Freudenburg has been with RPA since 2006 and most recently served as New Jersey director. Prior to joining RPA, Freudenberg served as a coastal management fellow at the National Oceanic and Atmospheric Administration, where he focused on policies for the New Jersey Department of Environmental Protection.

Paul Glasserman, Jack R. Anderson Professor of Business, Columbia Business School

Professor Glasserman’s research and teaching address risk management, the pricing of derivative securities, statistics and operations. Prior to joining Columbia, Glasserman was with Bell Laboratories; he has also held visiting positions at Princeton University, NYU, and the Federal Reserve Bank of New York. Glasserman serves on the editorial boards of *Finance & Stochastics, Mathematical Finance*, the *Journal of Computational Finance*, and the *SIAM Journal on Financial Mathematics*. He chairs the Education Committee of PRMIA, the Professional Risk Managers’ International Association. Glasserman was senior vice dean of Columbia Business School in 2004-2008 and served as interim director of the Sanford C. Bernstein & Co. Center for Leadership and Ethics in 2005-2007.

Neil Hawkins, Corporate Vice President, Chief Sustainability Officer, Dow Chemical

Dr. Neil Hawkins currently serves as the Chief Sustainability Officer and Corporate Vice President for Environment, Health & Safety (EH&S) for The Dow Chemical Company. Hawkins is a global leader in the private sector in sustainable business practices, EH&S management, and national and international public policy platforms for global sustainable development. Hawkins was the Dow executive leading the development of the recently announced 2025 Sustainability Goals, which have the potential to redefine the role of business in sustainable development. During his tenure at Dow, he has also been the architect of many groundbreaking collaborations, including the Dow/Nature Conservancy Collaboration on valuing nature in business decisions.

Garud Iyengar, Department Chair & Professor of Industrial Engineering & Operations Research (IEOR), Columbia University

Professor Iyengar’s research interests include convex optimization, robust optimization, queuing networks, combinatorial optimization, mathematical and computational finance, communication and information theory. He has published in numerous journals including *IEEE Transactions on Information Theory, Mathematics of Operations Research, Mathematical Programming, IEEE Transactions on Signal Processing*, and *IEEE Transactions on Communication Theory*.

Paul Larcey, Cambridge Infrastructure, Finance, Risk & Resilience Group

Paul Larcey studied engineering and materials science at the University of Oxford, received his Master’s in construction engineering at the University of Cambridge, and holds an MBA in finance from Imperial College London. His early career was in the research of novel ceramic high temperature superconductivity and fluid mechanics/rheology, eventually moving into senior corporate management roles with global engineering and construction companies involved in the supply and provision of large scale infrastructure projects. His current research interests are related to the interactions between the risk perception of large project funding, network complexity, security, and the increasing role of resilience—physically, financially, and socially—in modern society.

Ning Lin, Assistant Professor, Civil and Environmental Engineering, Princeton University

Ning Lin is an Assistant Professor of Civil and Environmental Engineering at Princeton University. Lin’s research areas include natural hazards and risk analysis, wind engineering, coastal engineering, and climate change impact and adaptation. Her current primary focus is hurricane risk analysis. Lin received her Ph.D. in Civil and Environmental Engineering from Princeton University in 2010. Before rejoining Princeton as an assistant professor in 2012, she conducted research in the Department of Earth, Atmospheric and Planetary Sciences at MIT as a NOAA Climate and Global Change Postdoctoral Fellow.
Bob Litterman, Chairman of Risk Committee, Kepos Capital
Bob Litterman is the Chairman of the Risk Committee and a founding partner of Kepos Capital, a New York City based systematic global macro firm. Prior to joining Kepos Capital in 2010, Bob enjoyed a 23-year career at Goldman Sachs & Co., where he served in research, risk management, investments and thought leadership roles. He was inducted into Risk Magazine’s Risk Management Hall of Fame and named the 2013 Risk Manager of the Year by the Global Association of Risk Professionals. In 2012, he was the inaugural recipient of the S. Donald Sussman Fellowship at MIT’s Sloan School of Management. In 2008, Bob received the Nicholas Molodovsky Award from the CFA Institute Board.

Guy Nordenson, Professor of Structural Engineering & Architecture, Princeton University
Guy Nordenson is a structural engineer and professor at Princeton University. Recent and current projects include the expansion of the Kimbell Art Museum in Fort Worth, the National Museum of African American History and Culture in Washington, DC, and the Menil Drawing Institute in Houston. He led the research project and co-wrote the book *On the Water | Palisade Bay*, which served as the inspiration for the 2010 MoMA exhibition “Rising Currents.” In 2013, his research team at Princeton was awarded a major grant by the Rockefeller Foundation to develop “Structures of Coastal Resilience” in collaboration with the USACE.

Michael Oppenheimer, Albert G. Milbank Professor of Geosciences and International Affairs, Princeton University
Michael Oppenheimer is the Albert G. Milbank Professor of Geosciences and International Affairs at Princeton. He is also the Director of the Program in Science, Technology and Environmental Policy at Princeton. Oppenheimer is a long-time participant in the Intergovernmental Panel on Climate Change (IPCC). Oppenheimer is coeditor of the journal *Climatic Change*. He serves on the New York City Climate Change Panel. Oppenheimer is a Heinz Award winner and a Fellow of the American Association for the Advancement of Science.

Stathis Tompaidis, Professor, University of Texas at Austin
Stathis Tompaidis is a professor at the Information, Risk and Operations Management department, and the department of Finance at the McCombs School of Business at The University of Texas at Austin. His research focuses on the development of quantitative methods for solving complex business problems, especially in the areas of risk management, derivative pricing, asset allocation, energy finance, real estate finance, and real options. He has collaborated with companies such as Schlumberger, Shell and ElectroPeru. His research has appeared in journals such as *Journal of Finance, Journal of Financial Economics, Operations Research, and Management Science*.

Michelle Tuveson, Founder and Executive Director, Cambridge Centre for Risk Studies
Dr. Michelle Tuveson is a Founder and Executive Director at the Cambridge Centre for Risk Studies at the University of Cambridge Judge Business School. She brings 20+ years of corporate experience within the technology and consulting sectors to further the development of better risk models for the future. She leads the Cambridge CRO Council, chairs the Centre’s Annual Risk Summits and is an advisory board member to the World Economic Forum’s *Global Risk Report*. She has contributed to the *Financial Times Special Report* on Risk Management. Her academic research interests include modeling risk culture and governance structures in organizations. She earned degrees from MIT and University of Cambridge.

Venkat Venkatasubramanian, Samuel Ruben-Peter G. Viele Professor of Engineering, Co-Director of CMSR, Columbia University
Professor Venkatasubramanian’s research and teaching interests are in three areas: (1) risk modeling, analysis, and management in complex engineered systems, (2) “Big Data” analytics for molecular products design and discovery, and (3) design, control and optimization through self-organization in complex adaptive teleological systems. He is cited widely in these areas and has won several Best Paper Prizes. He is a Fellow of AIChE and a recipient of the Computing in Chemical Engineering award. He won the Shreve Award for Outstanding Teaching in Chemical Engineering from Purdue University three times. He is also an Editor of *Computers & Chemical Engineering*.