

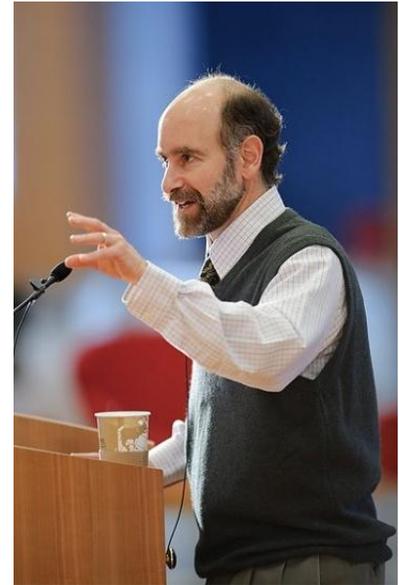
2013 Distinguished Scientist Seminar Series
Semester in Environmental Science
MBL ECOSYSTEMS, WOODS HOLE, MA

Jonathan Patz

Professor, Dept. of Population Health Sciences
Director of the Global Health Institute
University of Wisconsin in Madison.

***The Global Climate Emergency: Turning
a crisis into an opportunity for public health***

September 13, 3:00 PM – Speck Auditorium



The burgeoning human population, accelerating pace of travel, and changes in land use and climate all have profound implications for human health and the spread of disease. The ranges of tropical disease vectors such as mosquitos responsible for transmission of malaria, dengue fever, and West Nile virus will expand in a warming world (e.g. a 0.5 °C increase in temperature can cause a 30-100% increase in mosquito populations). Changes in precipitation and the frequency of drought may reduce crop production. At the same time, more frequent intense rainfall events, flooding and sea level rise could increase the prevalence of waterborne diseases such as cryptosporidium. Jonathan Patz has devoted his career to understanding the implications of global change on public health. In this talk, he will argue that interventions to combat greenhouse gas emissions offer potentially enormous health dividends and could save many lives.

Patz is trained as a medical doctor, receiving his MD from Case Western Reserve School of Medicine in 1987. After completing a residency in at University of South Carolina, he practiced clinical family medicine for four years before embarking on the study of environmental and public health. He earned a Masters Degree in Public Health at Johns Hopkins School of Hygiene and Public Health in 1992, and completed a residency in occupational and environmental medicine there. In 1996 he became Director of the Program on Health Effects of Global Environmental Change at Johns Hopkins and was appointed Assistant professor in the Bloomberg School of Public Health at Johns Hopkins in 1999. He moved to the University of Wisconsin in 2004. In addition to directing the university-wide Global Health Institute at University of Wisconsin, Professor Patz has faculty appointments in the Nelson Institute, Center for Sustainability & the Global Environment (SAGE) and the Department of Population Health Sciences. He also directs the NSF-sponsored Certificate on Humans and the Global Environment (CHANGE).

Dr. Patz has written over 90 peer-reviewed scientific papers, a textbook addressing the health effects of global environmental change, and most recently, a co-edited five-volume *Encyclopedia of Environmental Health* (2011). For the past 15 years, Dr. Patz served as a lead author for the United Nations Intergovernmental Panel on Climate Change (or IPCC) – the organization that shared the 2007 Nobel Peace Prize with Al Gore. He also Co-chaired the health expert panel of the *US National Assessment on Climate Change*, a report mandated by the US Congress. He has been invited to brief both houses of Congress and has served on several scientific committees of the National Academy of Sciences. Dr. Patz served as Founding President of the *International Association for Ecology and Health*.

Suggested Readings:

Patz, Jonathan Environmental Health, Chapter 10, Climate Change, Jonathan Patz

James Jarrett, James, J. Woodcock, Ulla K Griffiths, Zaid Chalabi, Phil Edwards, Ian Roberts and Andy Haines. Effect of increasing active travel in urban England and Wales on costs to the National Health Service. 2012. *Lancet* 2012; 379: 2198–205.



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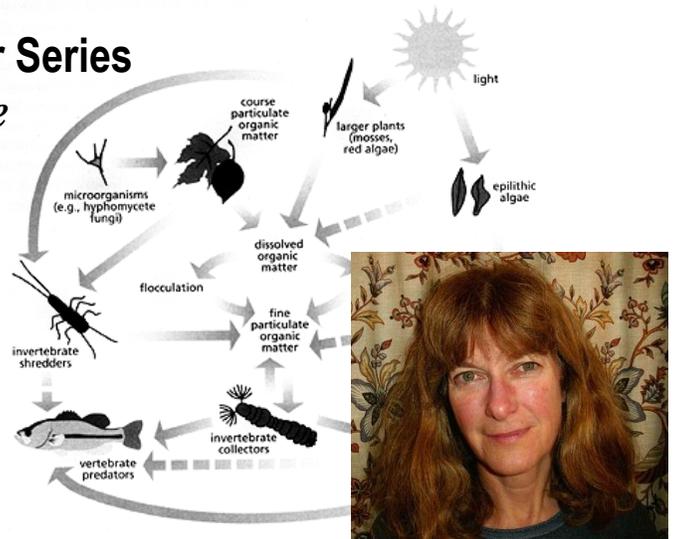
MBL ECOSYSTEMS, WOODS HOLE, MA

Mary E. Power

Professor of Integrative Biology
University of California, Berkeley

Food webs in warming rivers

September 20, 3:00 PM – Speck Auditorium



Mary Power has studied river food webs in the rainforest of Panama, the Ozarks and prairie margins of the Midwestern US, the floodplains of Papua New Guinea, and canyon-bound rivers along the California North Coast. Since 1988, she has been the Faculty Director of the Angelo Coast Range Reserve, a 3200 hectare field station along the Eel River on the California North Coast within the University of California Natural Reserve System, protected for university-level research, teaching, and public outreach.

Power, and her students and colleagues study food web interactions among bacteria, algae, aquatic invertebrates, fish, amphibians, and birds, lizards, spiders, and bats that feed on aquatic insect emergence in and around rivers. They seek to better understand how and why critical food web interactions change over space and time. Her research relies on a mix of field observations, manipulative experiments, and environmental mapping, sensing, and tracing technologies to investigate controls that mediate cross-ecosystem exchange of energy, organisms or materials linking rivers, uplands, and coastal oceans. Their goal is “predictive mapping” — using insights about local controls and ecosystem linkages to forecast how river-structured ecosystems will respond to changes in climate, land use, or biota. Power’s research has explored how species performances and interactions change along spatial gradients of productivity in river networks, and with year-to-year variation in river discharge during flood versus drought regimes.

Dr. Power received her B.A. from Brown University (magna cum laude, phi beta kappa), her M.S. from the Boston University Marine Program at Woods Hole, and her Ph.D. from the University of Washington. She has won numerous awards and honors, including a Guggenheim Fellowship (1994), the Kempe Award for Distinguished Ecologists from Umea University (2004), and the prestigious G. Evelyn Hutchinson Medal of the American Society of Limnology and Oceanography (2005) in recognition of the excellence and promise of her research. She has served as the President of the American Society of Naturalists (2005/6), and of the Ecological Society of America (2009/10). She was elected as a member of the California Academy of Sciences in 2005, the American Academy of Arts and Sciences in 2007, and the National Academy of Sciences in 2012.

Suggested Readings:

Power, M.E. 1990. Effects of fish in river food webs. *Science* 250: 411-415.

Wootton, J.T., M.S. Parker and M.E. Power. 1996. The effect of disturbance on river food webs. *Science* 273:1558-1560

Power, M.E., M.S. Parker, and W.E. Dietrich. 2008. Seasonal reassembly of river food webs under a Mediterranean hydrologic regime: Floods, droughts, and impacts of fish. *Ecological Monographs* 78:263-282.

Power, M.E. et al. 2009. Algal mats and insect emergence in rivers under Mediterranean climates: towards photogrammetric surveillance. *Freshwater Biology* doi:10.1111/j.1365-2427.2008.02163.x

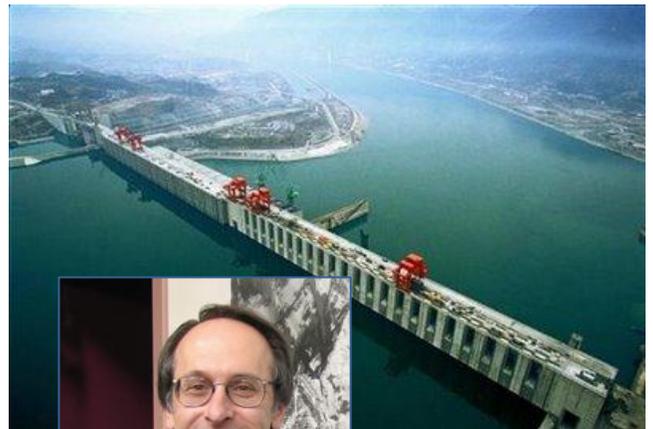
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Charles Vörösmarty

Professor of Civil Engineering,
The City College of New York
Distinguished Scientist,
NOAA-Cooperative Remote Sensing
Science and Technology Center

***Twenty-first Century Water
Systems and the Hippocratic Oath***

October 25, 3:00 PM – Speck Auditorium



What are the effects of deforestation on the hydrological cycle of the Amazon? How might changing trends in snowmelt and spring rainfall in Eurasia alter freshwater discharge to the Arctic Ocean? How does dam construction and retention of water in reservoirs affect the geology and ecology of river deltas? What are the impacts of large-scale water engineering projects worldwide on human water security and aquatic biodiversity? These are the types of questions addressed by Charles Vörösmarty's work. He develops and applies computer models and geospatial data sets to predict water balance, discharge, and constituent fluxes in river systems. He is spearheading efforts to develop global-scale indicators of water stress and develop and apply databases useful in evaluating the consequences of water management throughout the world.

Vörösmarty received his undergraduate degree in biology at Cornell University, then completed degrees in civil engineering (MS) and engineering systems design (Ph.D.) at the University of New Hampshire (UNH). He remained at UNH where he rose from research scientist to research full professor at the Institute for the Study of Earth, Oceans and Space. While at UNH, he founded and directed the Water Systems Analysis Group and was appointed director of the Complex Systems Research Center.

He has served on a broad array of national and international scientific advisory panels. These include the U.S. Arctic Research Commission (appointed by Presidents Bush and Obama), the NASA Earth Science Subcommittee, and the National Research Council Committee on Hydrologic Science, which he Chairs. He is a member of the National Research Council Review Committee on the U.S. Global Change Research Program, and the National Science Foundation's Arctic System Science Program Committee. He is a founding member and current co-Chair of the Global Water System Project that represents the input of several hundred international scientists under the International Council for Science's Global Environmental Change Programs, and is working with chief U.N. delegates who are negotiating the Rio+20 Sustainable Development Goals.

Suggested Readings:

Vörösmarty, C.J., P.B. McIntyre, M.O. Gessner, D. Dudgeon, A. Prusevich, P. Green, S. Glidden, S.E. Bunn, C.A. Sullivan, C. Reidy Liermann, and P.M. Davies (2010). Global threats to human water security and river biodiversity. *Nature* 467: 555-561.

Vörösmarty, C.J., J. Day, A. DeSherbinnen, J. Syvitski (2009). Battling to save the world's river deltas. *Bulletin of the Atomic Scientists* 65: 31-43. (By invitation).

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Ray Pierrehumbert

Louis Block Professor in Geophysical Sciences
The University of Chicago

***Much ado (much too much ado)
about methane and other short lived
climate forcing agents***

November 1, 3:00 PM – Lillie Auditorium

Dr. Pierrehumbert is interested in how climate works as a system and he develops idealized mathematical models that are used to address both fundamental and applied questions of climate science. He was trained as a physicist/applied mathematician at Massachusetts Institute of Technology where he received his doctorate in the Department of Aeronautics and Astronautics in 1980. He has studied problems such as how the earth kept from freezing over during its early evolution when solar output was ~30% lower than at present (“faint sun paradox”) and during the period of “snowball Earth” in the Proterozoic more than 650 million years ago. He is interested in climate more generally (e.g. on other planets and moons within the solar system, including Mars and Titan). Most recently he has begun studying the climate of extrasolar planets.

Pierrehumbert was a lead author of the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, and a co-author of the National Research Council report on abrupt climate change and of the report on Climate Stabilization Targets. He is currently serving on the NRC Panel on Geo-engineering. He has more than 100 publications in peer-reviewed journals, and has authored a definitive textbook, “Principles of Planetary Science,” as well as co-authoring with David Archer, “The Warming Papers”. He also writes opinion pieces on climate change and policy for the public (see for example, recent articles that appeared in *Slate Magazine* (http://www.slate.com/authors.raymond_t_pierrehumbert.html)).

From 1980-82 Pierrehumbert was Assistant Professor in meteorology at MIT, moving to Princeton where he remained until 1989 when he accepted a full professorship at the University of Chicago. He was awarded a Guggenheim Fellowship in 1996, which he used to launch work with colleagues in Paris on the climate of Early Mars. He returned to France from 2003/4 to accept a visiting position as Directeur de Recherche at the Ecole Polytechnique. He is a Fellow of the American Geophysical Union, and in recognition of his work on climate he has been named Chevalier de l'Ordre des Palmes Academiques by the Republic of France.

Suggested readings: (available at <http://geosci.uchicago.edu/~rtp1/papers/publist.html>)

Solomon S, Pierrehumbert RT, Matthews D and Daniel JS 2012: Atmospheric composition, irreversible climate change, and mitigation policy. in *Climate Science for Serving Society: Research, Modelling and Prediction Priorities*, Hurrell, J. and Asrar, G., eds., Springer

Pierrehumbert RT 2013: Short Lived Climate Pollution. (Draft of work in progress for Ann. Rev. Earth and Planetary Sciences, will be available late September).

