2014 Distinguished Scientist Seminar Series

Semester in Environmental Science

MBL ECOSYSTEMS, WOODS HOLE, MA

Cathy Pfister

Professor, Dept. of Ecology & Evolution
University of Chicago

Productivity on rocky shores: from microbes to animals

September 12th, 3:00 PM
Speck Auditorium, Rowe Building

Rocky intertidal communities are characterized by high species diversity and dynamic physical-chemical conditions, making them ideal for revealing the dual importance of ocean events and local species interactions in structuring ecological communities. Tatoosh Island, in the Strait of Juan de Fuca off the west coast of Washington State is the site of some of the most remarkable and important early experiments in ecology. It is where Dr. Robert T. Paine, in 1967, conducted his seminal study along the rocky shore showing that a single "keystone" predator, the starfish, *Pisaster ochraceus*, could regulate the overall structure and composition of the ecological community by controlling the abundance of grazing snails and limpets. Cathy Pfister's work on Tatoosh Island has further advanced our understanding of how rocky intertidal communities, indeed ecological communities in general, are structured.

Dr. Pfister received her doctorate at the University of Washington where, as one of Dr. Paine's graduate students, she studied dynamics of fishes in tide pools of Tatoosh Island. In 1995 she joined the faculty of the University of Chicago, rising to full professor in 2013. She has continued to focus on the rocky intertidal habitats of Tatoosh, taking the research in new directions. Her interests can be broadly grouped into four areas: (1) the interplay between species and productivity in coastal marine ecosystems, (2) the implications of ocean acidification in coastal marine ecosystems, (3) identifying the causes and consequences of variability in marine populations and (4) understanding the relative impacts of genetic and demographic factors to extinction risk.

Dr. Pfister has published more than 50 papers on a broad spectrum of topics ranging from studies of Sculpin diversity in tide pools, to population modeling, to studies of the metagenomics of microbial assemblages associated with California mussels. She has studied how nutrients affect kelp productivity, evaluated the relative importance of oceanic and coastal currents and upwelling on intertidal ecosystems, and most recently begun to explore how climate change and ocean acidification might alter rocky shore communities.

Suggested readings:

Pfister, C. A., M. Altabet, D. Post. 2014. Animal Regeneration and microbial retention of nitrogen along coastal rocky shores. Ecology, in press. http://www.esajournals.org./doi/abs/10.1890/13-1825.1

Pather, S., C. A. Pfister, M. Altabet, D. M. Post. 2014. Ammonium cycling in the rocky intertidal: remineralization, removal and retention. Limnology and Oceanography 59:361-372. http://www.aslo.org/lo/toc/vol_59/issue_2/0361.html

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John Blair

University Distinguished Professor
Edwin G. and Lillian J. Brychta Professor of Biology

Assessing Multiple Controls of Primary Productivity in Tallgrass Prairie: The Konza Prairie LTER Program

September 19th, 3:00 PM – Speck Auditorium, Rowe Building

Human activities are directly altering grasslands through both controlled burning and wild fires, as well as by intensive management for grazing. Indirectly, humans are changing atmospheric chemistry and climate, which could have profound consequences for grassland ecosystems. John Blair is a terrestrial ecologist with broad interests in grassland ecosystems. He leads the Long-Term Ecological Research (LTER) program funded by the National Science Foundation at Kansas-State's Konza Prairie Biological Station. Konza Prairie's LTER program is focused on understanding how the drivers of fire, grazing, climate and elevated nutrient deposition affect grassland ecosystem function and diversity. Dr. Blair's research focuses primarily on studies of nutrient cycling and plant productivity in grasslands. He is also interested in rhizosphere processes and in developing strategies for restoring native grasslands.

A Kansas State biology faculty member since 1992, Dr. Blair was promoted to associate professor in 1997, and to full professor in 2001. He was named a university distinguished professor in spring 2006. In 2008, he was named Edwin G. and Lillian J. Brychta Professor of Biology and became an associate director of the Division of Biology at Kansas State. He earned his bachelor's and master's degrees in biology from Kent State University and a doctorate in entomology from the University of Georgia.

Dr. Blair is the author of more than 100 journal articles and book chapters. He has served on the editorial board of *Ecology*, the flagship journal of the Ecological Society of America, and other international journals. He is active in both graduate and undergraduate education. The College of Arts and Sciences at Kansas State recognized him in 1998 for outstanding teaching.

Suggested readings:

Blair, John M. (1997) Fire, N availability and plant response in grasslands:a test of the transient maxima hypothesis. *Ecology* 78 (Issue 8): 2359-2368.

Fay, P.A., J. M. Blair, M. D. Smith, J. B. Nippert, J. D. Carlisle, and A. K. Knapp. (2011) Relative effects of precipitation variability and warming on tallgrass prairie ecosystem function. *Biogeosciences* 8: 3053-3068.

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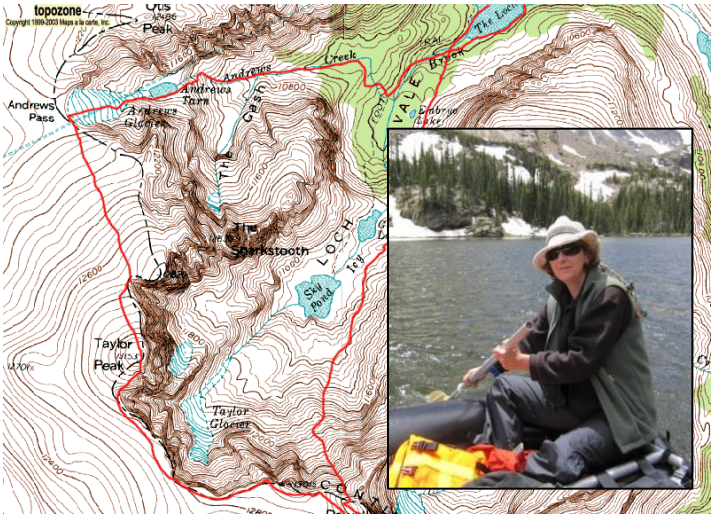
Jill Baron
US Geological Survey, Co-Director, John Wesley Powell Center for Earth System Science
Senior Scientist, Natural Resource Ecology Laboratory, Colorado State University

Double whammy: both reactive nitrogen in deposition and climate change influence in high elevation Rocky Mountain ecosystems



October 10th, 3:00 PM
Speck Auditorium, Rowe Building

Dr. Jill Baron is interested in the application of ecosystem concepts to management of human-dominated regions. Her work has included assessments of societal needs for freshwater, impacts of acid deposition in lakes and streams, and studies of how changing climate and nutrient cycles interact to alter ecosystem productivity and biodiversity.

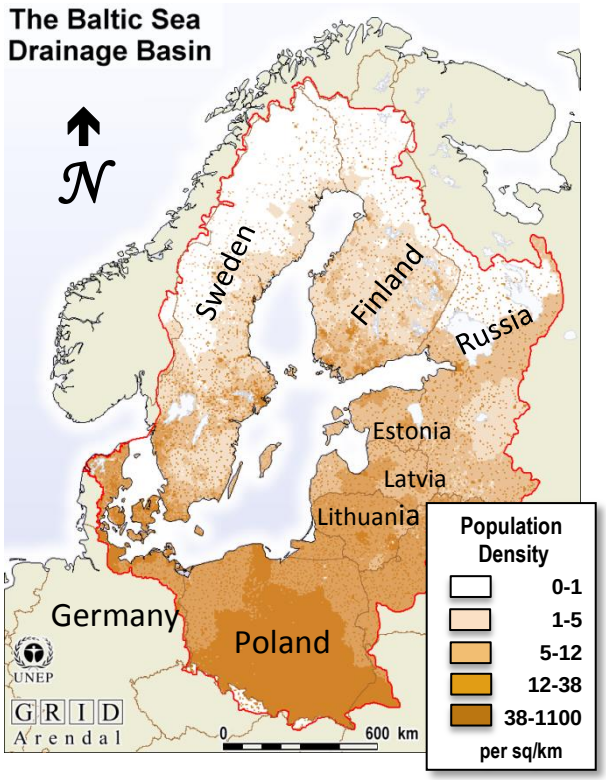
Dr. Baron received her Ph.D. from Colorado State University in 1991 in the department of rangeland ecology after completing a M.S. at the University of Wisconsin-Madison, and B.S. at Cornell in Plant Sciences. She is particularly interested in alpine and mountain ecosystem biogeochemistry, and is founder and principal investigator of the Loch Vale Watershed long-term monitoring and research program in Rocky Mountain National Park. Loch Vale is a fully instrumented catchment in which Baron, her colleagues and students have collected a continuous 32 year record of climate, water discharge and nutrient chemistry.

Baron is also founder and co-director of the John Wesley Powell Center for Earth System Science Analysis and Synthesis. Located in Fort Collins, CO, the Powell Center is supported jointly by the USGS and NSF, and provides a platform through which scientists collaborate to address complex questions with the goal of developing new insights and knowledge. Baron was also Lead Author of the US Climate Change Science Program report on Climate Change Adaptation Options for National Parks, has given testimony to Congress on western acid rain and climate change issues, and was Editor-in-Chief of *Issues in Ecology* from 2009-2012. She was President of the Ecological Society of America during 2012-14.

Suggested readings:

Baron, J.S., H. M. Rueth, A. M. Wolfe, K.R. Nydick, E. J. Allstott, J. T. Minear and B. Moraska. (2000) Ecosystem responses to nitrogen deposition in the Colorado front range. *Ecosystems* 3: 352–368.

Baron, J.S., T. M. Schmidt, and M.D. Hartman. (2009) Climate-induced changes in high elevation stream nitrate dynamics. *Global Change Biology* 15: 1777–1789.



Semester in Environmental Science
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MBL Ecosystems Center, Woods Hole, MA

Daniel Conley

Professor in Biogeochemistry
Department of Geology
Lund University, Sweden

Is "geo-engineering" an acceptable solution for Baltic Sea eutrophication?

October 24th , 3:00 PM – Lillie Auditorium

More than 80 million people from 14 separate countries - Belarus, Czech Republic, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, Slovakia, Sweden, and Ukraine live within the Baltic Sea drainage basin. Nearly 15 million people live within a 10 km distance from the Baltic coast. Numerous rivers carry nutrients from agricultural runoff and wastewater into the Baltic causing toxic algal blooms, as well as widespread hypoxia and anoxia. It is estimated more than 60,000 square km in the Baltic has experienced hypoxia during the last decade, creating - by some accounts - the world's biggest "dead zone." Several large-scale geo-engineering interventions have been proposed as solutions to this problem, including pumping oxygenated surface water to the bottom and adding chemicals to bind phosphorus. Such radical remediation measures promise impressive improvements in water quality on short timescales. They are popular in the media and politically attractive. But they could also be dangerous.

Daniel Conley's personal and professional goals are to provide managers with a sound scientific basis for developing policies and implementing practices to protect the marine environment. He is one of the leading scientists currently advising policy makers on the effectiveness, costs and ecosystem consequences associated with large-scale engineering projects intended to remediate eutrophic conditions in the Baltic. He is Professor in Biogeochemistry at the GeoBiosphere Science Centre Department of Geology at Lund University, Sweden. Dr. Conley has published more than 120 papers on Nitrogen, Phosphorus and Silica cycling in aquatic environments ranging from the Great Lakes to the Chesapeake to the North Atlantic.

A native of the U.S., Conley grew up on the shores of the Atlantic Ocean in Ft. Lauderdale, Florida, obtaining a B.S. at Tulane University, a M.Sc. at the University of Wisconsin–Green Bay, and a Ph.D. in chemical oceanography at The University of Michigan in 1987. After working on the Chesapeake Bay from 1988-1994 at the University of Maryland Center for Environmental Studies, Conley moved to Denmark taking a position at the National Environmental Research Institute, part of the Danish Ministry of the Environment. He accepted a three year appointment to the European Union Marie Curie chair in the Department of Geology at Lund University in 2007, and is now professor at Lund. In 2010 he was awarded a prestigious PEW Fellowship in Marine Conservation and in 2011 he was named a Wallenberg Scholar.

Suggested readings:

Conley, Daniel (2012). Save the Baltic Sea. *Nature* 486:464.

Conley, D., et al. (2009). Hypoxia-related processes in the Baltic Sea. *Environmental Science Technology*: 43 (10): 3412-3420.