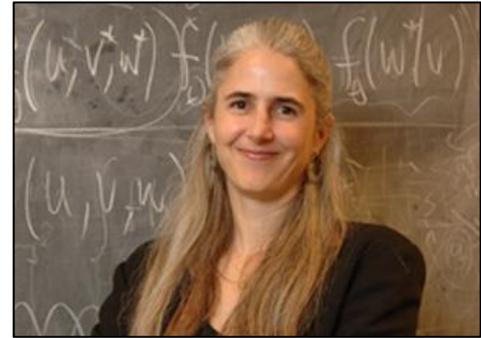


2015 Distinguished Scientist Seminar
Semester in Environmental Science
MBL ECOSYSTEMS CENTER, WOODS HOLE, MA

Mercedes Pascual

Professor, Dept. of Ecology and Evolution
University of Chicago



Infectious Disease Dynamics under a Changing Climate

September 18th — 2:30 PM

Lillie Auditorium, MBL

Mercedes Pascual is a mathematical ecologist interested in predicting the behavior of dynamic biological systems. She has published on a wide range of topics including chaotic behavior in predator-prey populations, controls on phytoplankton growth, and the structure and dynamics of food web networks. In recent years, she has focused her research on the question of how a warmer climate, together with an increasingly mobile, urbanized and growing human population will affect the geographic distribution, transmission and incidence of diseases such as cholera, malaria and leishmaniasis, a parasitic disease that is found in parts of the tropics, subtropics and Europe.

Dr. Pascual is currently a professor in the Department of Ecology and Evolution at the University of Chicago. Prior to coming to Chicago, she was a Rosemary Grant Collegiate Professor at the University of Michigan, holding appointments in both Ecology and Evolutionary Biology, and at the Center for Computational Biology and Bioinformatics. She earned a M.Sc., Mathematics from New Mexico State University and a doctorate in Biological Oceanography from the joint program of the Woods Hole Oceanographic Institution and the Massachusetts Institute of Technology.

She has received a number of awards and honors. She was elected a fellow of the American Association for the Advancement of Science in 2003 and was named one of the top 50 Women in Science by *Discover Magazine* that same year. She was a Distinguished Lecturer in The Rosenstiel School of Marine and Atmospheric Science at the University of Miami in 2011. In 2013 she was named Astor Visiting Lecturer at the University of Oxford.

For more information on Mercedes: <http://www-personal.umich.edu/~pascual/Index.html>

Suggested readings:

Reiner, R. C., King, A. A., Emch, M., Yunus, M., Faruque, A. S. G., & Pascual, M. (2012). Highly localized sensitivity to climate forcing drives endemic cholera in a megacity. *Proceedings of the National Academy of Sciences*, 109(6), 2033-2036.

Altizer, S., Ostfeld, R. S., Johnson, P. T., Kutz, S., & Harvell, C. D. (2013). Climate change and infectious diseases: from evidence to a predictive framework. *Science*, 341(6145), 514-519.

Siraj, A. S., Santos-Vega, M., Bouma, M. J., Yadeta, D., Carrascal, D. R., & Pascual, M. (2014). Altitudinal changes in malaria incidence in highlands of Ethiopia and Colombia. *Science*, 343(6175), 1154-1158.

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Nancy Grimm

Professor, School of Life Sciences
Arizona State University



The Future of Cities: Addressing Challenges from the Collision of Urbanization and Climate Change

October 23th — 3:00 PM
Lillie Auditorium, MBL

A century ago, just 10% of the world's population lived in cities. Today, more than 3.5 billion people, over half of humanity, live in urban environments. Urbanization is expected to continue intensifying over the next decades and megacities with populations exceeding 10 million are increasingly common. Understanding the interplay between the sociology of cities, land use and the functioning of the landscape, including impacts on water cycling, biogeochemical processes and biodiversity is necessary if we hope to develop wise policies to create sustainable and livable cities. Nancy Grimm has been a leader in discovering how human activities affect the ecology of cities.

Nancy Grimm's research focuses on how disturbances (such as flooding or drying) alter the structure and processes of desert streams and how chemical elements move through and cycle within both desert streams and cities. She has studied how storm water infrastructure affects water and material movement across an urban landscape. She is particularly interested in nitrogen cycling and retention and understanding how landscape heterogeneity affect nitrate transport and storage in urban, agricultural and natural streams.

Dr. Grimm is the Director of the National Science Foundation (NSF) funded Central Arizona–Phoenix Long Term Ecological Research Program — an interdisciplinary study by ecologists, engineers, physical and social scientists of the Phoenix urban ecosystem. She received a prestigious NSF director's award for collaborative integration in 2012. Grimm has chaired or served on numerous national and international advisory and editorial boards, is an editor for *Earth's Future*, is a past program director for the National Science Foundation and senior scientist for the U.S. Global Change Research Program. She has authored or co-authored nearly 170 scientific publications, and was a lead author for two chapters of the U.S. National Climate Assessment, released in 2014. She served as president of the Ecological Society of America (2005-6) and was named a fellow of the Ecological Society in 2012 and a Fellow of the American Society for the Advancement of Science in 2008. She is a graduate of Hampshire College and earned her doctorate at Arizona State University

Suggested readings:

Hale, R. L., Turnbull, L., Earl, S. R., Childers, D. L., & Grimm, N. B. 2015. Stormwater infrastructure controls runoff and dissolved material export from arid urban watersheds. *Ecosystems*, 18(1), 62-75.

Grimm, N. B., et. Al. 2008. Global change and the ecology of cities. *Science*, 319(5864), 756-760.

Grimm, N.B. et al. 2013. Viewing the urban socio-ecological system through a sustainability lens: lessons and prospects from the central Arizona–Phoenix LTER Programme. Ch. 10. S.J. Singh et al. (eds.), *Long Term Socio-Ecological Research, Human-Environment Interactions 2*, DOI 10.1007/978-94-007-1177-8_10.

2015 Distinguished Scientist Seminar
Semester in Environmental Science
MBL ECOSYSTEMS, WOODS HOLE, MA

Cheryl Palm

Director of Research & Senior Research Scientist
Agriculture and Food Security Center
Earth Institute, Columbia University

***Agricultural Intensification in Africa:
Implications for the Environment and
Livelihoods***

October 30th — 3:00 PM
Lillie Auditorium



Cheryl Palm is a tropical ecologist and biogeochemist. Her research focuses on land use change and the degradation and rehabilitation of tropical agricultural landscapes. She has led a major effort quantifying carbon stocks, losses and net greenhouse gas emissions following slash and burn and alternative land use systems in the humid tropics in the Brazilian and Peruvian Amazon, Indonesia and the Congo Basin.

For much of the past 15 years Dr. Palm has been investigating soil nutrient dynamics in farming systems of Africa. She has conducted research at sites in Kenya and Tanzania that are part of the Millennium Villages Project (<http://millenniumvillages.org/millenniumpromise/>). Sub-Saharan Africa is one of the poorest regions on Earth — 65% of the population is rural and nearly two-thirds of the rural population relies on agriculture for their livelihood. Cereal yields are low and stagnant and 41% the population lives on less than \$1 per day. To maintain crop production, small farmers in this region have traditionally abandoned old fields as fertility declined and cleared forest to develop new fields that, for a few years, produced higher crop yields. The goals of Dr. Palm's work are to explore how improved management of agro-ecosystems can result in sustained higher productivity in the hope of curbing this deforestation, and to understand how different farming practices affect greenhouse gas emissions and carbon sequestration across the landscape.

Dr. Palm received her Ph.D. in soil science from North Carolina State University after completing her bachelor's and master's degrees in Zoology at the University of California, Davis. She served as Principal Research Scientist of the Tropical Soil Biology and Fertility Program in Nairobi, Kenya from 1991-2001. She has served on the faculties of North Carolina State University and Colorado State University. She is a fellow of the American Society of Agronomists and served as chair of the International Nitrogen Initiative (INI) from 2008 to 2011. She is currently Deputy Director of *Vital Signs Africa*, a new project developing and implementing integrated monitoring systems in agricultural landscapes.

Suggested readings:

Palm, C.A., S.M. Smukler, C.C. Sullivan, P.K. Mutuo, G.I. Nyadzi, and M.G. Walsh. 2010. Climate mitigation and agricultural productivity in tropical landscapes special feature: Identifying potential synergies and trade-offs for meeting food security and climate change objectives in sub-Saharan Africa. *Proceedings of the National Academy of Science*. doi:10.1073/pnas.0912248107

Palm CA, Blanco-Canqui H, DeClerck F, Gatere L, Grace P. 2014. Conservation agriculture and ecosystem services: An overview. *Agriculture Ecosystems & Environment*. 187:187-105.

2015 Distinguished Scientist Seminar

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James Famiglietti

Senior Water Cycle Scientist, Leader, NASA
Jet Propulsion Laboratory Water Initiative

Professor Earth System Science
University of California, Irvine

Water Cycle Change and Global Groundwater Depletion as Viewed from Space

November 13th — 3:00 PM

Lillie Auditorium



Climate change is expected to alter precipitation patterns across the globe creating drought conditions in some areas that have traditionally supported agriculture. Over two billion people on Earth rely on groundwater as their primary water source. Half or more of the irrigation water used to grow the world's food is supplied from underground sources, and groundwater provides strategic water reserves in times of droughts. Advances in satellite technology such as NASA's Gravity Recovery and Climate Experiment (GRACE) mission launched in 2002 have made it possible, for the first time, to obtain a comprehensive picture of global groundwater inventories. Jay Famiglietti is a hydrologist and is one of the leaders of NASA's effort to interpret data from the GRACE mission. His work has revealed extreme depletion of groundwater reserves in many regions of the globe.

He and his team have been researching and communicating about water and climate change — in academics, in business, in government and to the general public — for over 25 years. He has appeared as a featured expert in the water documentary *Last Call at the Oasis* and in CBS News *60 Minutes*. He is a frequent speaker, an avid writer and a regular contributor to *National Geographic Water Currents* and to the *Huffington Post*. His research is often featured in the international news media, including the *New York Times*, *Los Angeles Times*, *The Economist*, *CNN/Fareed Zakaria GPS* and network television news. He is a regular guest on *National Public Radio*, *BBC Radio* and other public radio shows.

Dr. Famiglietti is the Founding Director of the University of California Center for Hydrologic Modeling (UCCHM) at UC Irvine and was recently appointed by California Governor Jerry Brown to the Santa Ana Regional Water Quality Control Board. Before joining University of California in 2001, he was on the faculty of the Geological Sciences Department at the University of Texas at Austin, where he helped launch the program in climate and the University of Texas Environmental Science Institute. He received a M.S. in Hydrology from the University of Arizona in 1986, and earned both a M.A. and Ph.D. in Civil Engineering at Princeton University.

Suggested readings:

Famiglietti, J. S. 2014. The global groundwater crisis. *Nature Climate Change*, 4(11), 945-948.

Up a Dry Creek, *LA Times Op-Ed*: <http://www.latimes.com/opinion/op-ed/la-oe-famiglietti-drought-california-20150313-story.html>

60 Minutes, *Depleting the Water*, <http://www.cbsnews.com/news/depleting-the-water/>