

Curriculum Vitae

Mercedes Pascual

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Academic Training

Postdoctoral, Ecology and Evolutionary Biology, Princeton University, Princeton, NJ (1995-97)
Ph.D, Biological Oceanography, Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program, Woods Hole, MA (1989-95)
M.Sc., Mathematics, New Mexico State University, Las Cruces NM (1987-89)
Second Autumn Course on Mathematical Ecology, International Center for Theoretical Physics, Trieste, Italy (1986)
Visiting Student, Section of Ecology and Systematics, Cornell University, Ithaca, NY (1985-86)
Licenciatura Degree, Biology, Universidad de Ciencias Exactas y Naturales, Buenos Aires, Argentina (1985)
Undergraduate Student, Mathematics, P.U.C. University, Rio de Janeiro, Brazil (1980) and Marine Biology, U.S.U. University, Rio de Janeiro, Brazil (1978-79)

Professional Experience

Professor, Department of Ecology and Evolution, University of Chicago (February 2015 - present)
Rosemary Grant Collegiate Professor, Department of Ecology and Evolutionary Biology, and Center for Computational Biology and Bioinformatics, University of Michigan, Ann Arbor, MI (September 2008 - December 2014)
Investigator, Howard Hughes Medical Institute (September 2008 - November 2015)
Associate Professor, Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI (June 2004 - August 2008)
Assistant Professor, Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI (January 2001- May 2004)
External faculty, Santa Fe Institute, Santa Fe, NM (April 2003 - present)
Invited Professor, Ecole Normale Supérieure, Paris (June 2006 and June 2007)
Adjunct Scientist, Biology Department, WHOI, Woods Hole, MA (1999-2001)
Research Assistant Professor, Center of Marine Biotechnology, University of Maryland Biotechnology Institute, Baltimore, MD (1997-2000)
Affiliated Faculty, Program on Health Effects of Global Environmental Change, Johns Hopkins University, MD (1997-2000)

Affiliate Research Assistant Professor, Department of Zoology, University of Maryland, College Park, MD (1997-1998)

Visiting Scholar, Center of Environmental and Applied Fluid Mechanics, Johns Hopkins University, MD (1997)

Awards and Recognition

Louis Block Professorship, University of Chicago (2020)

Member, American Academy of Arts and Sciences (2019)

Board of Directors, the American Association for the Advancement of Science (2015-2019)

Fellow of the Ecological Society of America (2015)

Robert H. MacArthur Award of the Ecological Society of America (2014)

Astor Visiting Lectureship, University of Oxford (Oxford) (2013)

Distinguished Lecturer, University of Miami, The Rosenstiel School of Marine and Atmospheric Science (Miami, FL) (2011)

Howard Hughes Medical Institute, Investigator (2008)

Collegiate Professor, University of Michigan (2008)

Faculty Recognition Award, University of Michigan (2004)

Fellow of the American Association for the Advancement of Science (2003)

Discover Magazine: Top 50 Women in Science (2003)

James S. McDonnell Centennial Fellowship in Global and Complex Systems (1999-2008)

U.S. Department of Energy Alexander Hollaender Distinguished Postdoctoral Fellowship (1995-97)

Ocean Ventures Fund Award, MIT/WHOI Joint Graduate Program (1991-95)

Publications

Romeo-Aznar V., L. Picinini Freitas, O. Goncalves Cruz, A.A. King, and **M. Pascual**. 2022. Fine-scale heterogeneity in population density predicts wave dynamics in dengue epidemics. *Nature Communications* 13:996.

Santos-Vega M., P. Martinez, M.J. Bouma, V.J. Vaishnav, V. Kohli, V. Desai, **M. Pascual**. 2022. The neglected role of relative humidity in the interannual variability of urban malaria in Indian cities. *Nature Communications* 13:533.

Fontal, A., M.J. Bouma, A. San José, **M. Pascual**, and X. Rodó. 2021. COVID19 is a seasonal climate-driven disease across both hemispheres. *Nature Computational Science* 1: 655665.

He Q., S. Pulosof, K.E. Tiedje, K.P. Day, and **M. Pascual**. 2021. Frequency-dependent competition between strains imparts persistence in a model of *Plasmodium falciparum* malaria transmission. *Frontiers in Ecology and Evolution* 9:319.

M. Pascual and A. Baeza. 2021. Malaria: what happens when forests fall? *eLife* 10:e67863.

Subramanian, R., Q. He and **M. Pascual**. 2021. Quantifying asymptomatic infection and transmission of COVID-19 in New York City using observed Cases, serology and testing capacity. *Proceedings of the National Academy of Sciences* 118 (9) e2019716118.

- He, Q. and **M. Pascual**. 2021. An antigenic diversification threshold for falciparum malaria and its control at high endemicity. *PloS Computational Biology* 17(2): e1008729.
- Rodó, X., P. Martinez, A. Siraj, **M. Pascual**. 2021. Malaria trends in Ethiopian highlands track the early 21st Century global warming slowdown. *Nature Communications* 12, 1555.
- Gillespie, T.R., K.E. Jones, A.P. Dobson, J.A. Clennon, and **M. Pascual**. 2021. COVID-clarity demands unification of health and environmental policy. *Global Change Biology* 27(7):1319-1321.
- Lowe, R., S. Lee, R. Martins Lana, C. Torres Codeo, M.C. Castro, **M. Pascual**. 2020. Emerging arboviruses in the urbanized Amazon rainforest. *BMJ, Special Issue on Climate Change and Infectious Diseases* 371:m4385.
- Pilosof, S., S.A. Alcalá-Corona, T. Wang, T. Kim, S. Maslov, R. Whitaker, **M. Pascual**. 2020. The network structure and eco-evolutionary dynamics of CRISPR-induced immune diversification. *Nature Ecology and Evolution*, doi.org/10.1038/s41559-020-01312-z
- Subramanian, R., V. Romeo-Aznar, E. Ionides, C.T. Codeco, **M. Pascual**. 2020. Predicting re-emergence times of dengue epidemics at low reproductive numbers: DENV1 in Rio de Janeiro. *Royal Society Interface*.1720200273, doi.org/10.1098/rsif.2020.0273.
- Alonso, D., A. Dobson and **M. Pascual**. 2019. Critical transitions in malaria transmission are consistently generated by superinfection. *Philosophical Transactions of the Royal Society of London B* 374, 1775.
- Pilosof, S., Q. He, K.E. Tiedje, S. Ruybal-Pesntez, K.P. Day and **M. Pascual**. 2019. Competition for hosts modulates vast antigenic diversity to generate persistent strain structure in *Plasmodium falciparum*. *PLOS Biology* 17(6): e3000336.
- Martinez, P., A.S. Mahmudi, Md. Yunus, A.S.G. Faruque, T. Ahmed, **M. Pascual** and C.O. Buckee. 2019. Tubewell use protects against rotavirus infection during the monsoons in an urban setting. *The Journal of Infectious Diseases* 200(50): 1-9.
- Castro, M.C., A. Baeza, C.T. Codeco, Z.M. Cucunuba, A.P. DalAsta, *et al.*. 2019. Development, environmental degradation, and disease spread in the Brazilian Amazon. *PLOS Biology* 17(11): e3000526.
- Romeo-Aznar, V., R. Paul, O. Telle and **M. Pascual**. 2018 Mosquito-borne transmission in urban landscapes: the missing link between vector abundance and human density. *Proceedings of the Royal Society of London B* 285, 1884.
- He, Q., S. Pilosof, K.E. Tiedje, S. Ruibal-Pesantez, Y. Artzy-Randrup, E. Baskerville, K. Day and **M. Pascual**. 2018. Networks of genetic similarity reveal non-neutral processes shape strain structure in *Plasmodium falciparum*. *Nature Communications* 9, 1817.
- Rorick, M.M., Y. Artzy-Randrup, S. Ruibal-Pesantez, K.E. Tiedje, T.S. Rask, A. Oduro, A. Ghan-shah, K. Koram, K. Day and **M. Pascual**. 2018. Signatures of competition and strain structure within blood-stage antigen of *P. falciparum* in a local community in Ghana. *Ecology and Evolution* 00:0-15.
- Du, X. and **M. Pascual**. 2018. Incidence Prediction for the 2017-2018 Influenza Season in the United States with an Evolution-informed Model. *PLOS Currents Outbreaks* 1.
- Du, X., A.A. King, R. Woods and **M. Pascual**. 2017. Evolution-informed incidence forecasting of seasonal influenza A (H3N2). *Science Translational Medicine* 9(413).

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- Day, K., Y. Artzy, K. Tiedje, V. Rougeron, D. Chen, T. Rask and **M. Pascual**. 2017. Evidence of strain structure in *Plasmodium falciparum* Var repertoires in children from Gabon, West Africa. *Proceedings of the National Academy of Sciences* 114 (20) E4103-E4111.
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- Pilosof S., M. Porter, **M. Pascual** and S. Kefi. 2017. The multilayer nature of ecological networks. *Nature Ecology and Evolution* 1: 0101.
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- Baracchini, T., A.A. King, M.J. Bouma, X. Rodó, E. Bertuzzo and **M. Pascual**. 2017. Seasonality in cholera dynamics: A rainfall-driven model explains the wide range of patterns in endemic areas. *Advances in Water Resources* 108: 357-366.
- Tiedje K., S. Ruibal-Pesantez, A. Oduro, A. Ghanshah, K. Koram, **M. Pascual** and K. Day. 2017. Spatio-temporal variation in the epidemiology of asymptomatic *Plasmodium falciparum* infections in Bongo District, Ghana. *American Journal of Tropical Medicine and Hygiene* 91 (1): 199-212.
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- Santos-Vega M., M.J. Bouma, V. Kohli and **M. Pascual**. 2016. Population density, climate variables, and poverty synergistically structure spatial risk in urban malaria. *PLoS Neglected Tropical Diseases* 10(12): e0005155.
- Santos-Vega M., P.P. Martinez and **M. Pascual**. 2016. Climate forcing and infectious disease transmission in urban landscapes: integrating demographic and socio-economic heterogeneity. *Ann. NY Acad. Sci.* 1382(1):44-55.
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- Bedford, T., S. Cobey and **M. Pascual**. 2011. Strength and tempo of selection revealed in viral gene genealogies. *BMC Evolutionary Biology* 11: 220.
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- Bhadra, A., E.L. Ionides, K. Laneri, **M. Pascual**, M. Bouma, and R.C. Dhiman. 2011. Malaria in Northwest India: Data analysis via partially observed stochastic differential equation models driven by Levy noise. *Journal of the American Statistical Association* 106: 440-451.
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- Alonso, D., M. Bouma and **M. Pascual**. 2011. Epidemic malaria and warmer temperatures in recent decades in an East African highland. *Proceedings of the Royal Society B* 278(1712): 1661-9.
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- Bedford, T., S. Cobey, P. Beerli and **M. Pascual**. 2010. Global migration dynamics underlie

- evolution and persistence of human influenza A (H3N2). *PLoS Pathogens* 6(5): 1-9.
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- Palmer, M. (and 20 other members of the ESA Visions Committee). 2004. Ecology for a crowded planet. *Science* 304: 1251-1252.
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- Roy M., **M. Pascual** and A. Franc. 2003. Broad scaling region in a spatial ecological system. *Complexity* 8(5): 19-27.
- Pascual, M.** and P. Mazzega. 2003. Quasicycles revisited: apparent sensitivity to initial conditions. *Theoretical Population Biology* 64(3): 385-395.
- Rodó, X., **M. Pascual**, G. Fuchs, and S. Faruque. 2002. ENSO and cholera: a nonstationary link related to climate change? *Proceedings of the National Academy of Sciences* 99(20): 12901-12906.
- Pascual, M.**, M. Roy, and A. Franc. 2002a. Simple models for ecological systems with complex spatial patterns. *Ecology Letters* 5: 412-419.
- Pascual, M.**, M.J. Bouma, and A. Dobson. 2002. Cholera and climate: revisiting the quantitative evidence. *Microbes and Infection* 4: 237-245.
- Pascual, M.**, M. Roy, F. Guichard, and G. Flierl. 2002b. Cluster size distributions: signatures of self-organization in spatial ecologies. *Philosophical Transactions of the Royal Society of London B* 357: 657-666.
- J.S. Clark, S.R. Carpenter, M. Barber, S. Collins, A. Dobson, J.A. Foley, D.M. Lodge, **M. Pascual**, P. Pielke Jr., W. Pizer, C. Pringle, W.V. Reid, K.A. Rose, O. Sala, W.A. Schlesinger, D.H. Wall, D. Wear. 2001. Ecological forecasts: an emerging imperative. *Science* 293: 657-660.
- Bouma, M.J., and **M. Pascual**. 2001. Contributions of climate and geography to seasonal and interannual cycles of endemic cholera in Bengal 1891-1940. *Hydrobiologia* (Special Edition on ‘Diseases in the Ocean’) *Hydrobiologia* 460: 147-156.
- Pascual, M.**, P. Mazzega, and S. Levin. 2001. Oscillatory dynamics and spatial scale in ecological systems: the role of noise and unresolved pattern. *Ecology* 82(8): 2357-2369.

- Pascual, M.** and S.P. Ellner. 2000. Linking ecological patterns to environmental forcing via non-linear time series models. *Ecology* 81(10): 2767-2780.
- * **Pascual, M.**, X. Rodó, S.P. Ellner, R. Colwell and M.J. Bouma. 2000. Cholera dynamics and the El Niño Southern Oscillation. *Science* 289(5485): 1766.
- Pascual, M.** and S.A. Levin. 1999. From individuals to population densities: searching for the intermediate scale of nontrivial determinism. *Ecology* 80(7): 2225-2236.
- Pascual, M.** and S.A. Levin. 1999. Spatial scaling in a benthic population model with density-dependent disturbance. *Theoretical Population Biology* 56: 106-122.
- Pascual, M.** and H. Caswell. 1997. From the cell cycle to population cycles in phytoplankton-nutrient interactions. *Ecology* 78(3): 897-912.
- Pascual, M.** and H. Caswell. 1997. Environmental heterogeneity and biological pattern in a chaotic predator-prey system. *Journal of Theoretical Biology* 185: 1-13.
- Little, S.A., S. Ellner, **M. Pascual**, M. Neubert, D.T. Kaplan, T. Sauer, A. Solow, and H. Caswell. 1996. Detecting nonlinear dynamics in spatio-temporal systems: examples from ecological models. *Physica D* 96: 321-333.
- Pascual, M.**, F.A. Asciti, and H. Caswell. 1995. Intermittency in the plankton: a multifractal analysis of zooplankton biomass variability. *Journal of Plankton Research* 17: 1209-1232.
- Pascual, M.** 1994. Periodic response to periodic forcing of the Droop equations for phytoplankton growth. *Journal of Mathematical Biology* 37: 743-759.
- Pascual, M.** 1993. Diffusion-induced chaos in a spatial predator-prey system. *Proceedings of the Royal Society of London B* 25: 1-7.
- Pascual, M.** and H. Caswell. 1991. The dynamics of a size-classified benthic population with reproductive subsidy. *Theoretical Population Biology* 39: 129-147.

Chapters

- Pascual, M.**. 2020. Two sides of the same coin: High Non-Neutral Diversity and High-Dimensional Trait Space in Pathogen Populations and Ecological Communities *In B. Holt, A. Dobson, and D. Tilman, Eds.* Unsolved problems in Ecology. Princeton University Press. Princeton, NJ.
- Bouma, M.J., and **M. Pascual**. 2014. Global warming and malaria in tropical highlands – An estimation of Ethiopias ‘unmitigated’ annual malaria burden in the 21st century *In C. Butler, Ed.* Climate Change and Global Health, CABI.
- Pascual, M.** and J. Dunne. 2005. From small to large networks in a dynamic world. *In M. Pascual and J. Dunne (eds.)*. Ecological networks: linking structure to dynamics in food webs. SFI and Oxford University Press.
- Pascual, M.**, J. Dunne, and S.A. Levin. 2005. Challenges for the future *In M. Pascual and J. Dunne (eds.)*. Ecological networks: linking structure to dynamics in food webs. SFI and Oxford University Press.
- Ruiz-Moreno D., **M. Pascual**, and R. Riolo. 2005. Exploring network space with genetic algorithms: modularity, resilience, and reactivity. *In M. Pascual and J. Dunne (eds.)*. Ecological networks: linking structure to dynamics in food webs. SFI and Oxford University Press.

- Peacor S., R.L. Riolo, and **M. Pascual**. 2005. Phenotypic plasticity and species coexistence: modeling food webs as complex adaptive systems. *In* M. Pascual and J. Dunne (eds.). Ecological networks: linking structure to dynamics in food webs. SFI and Oxford University Press.
- Dobson A., S. Kutz, **M. Pascual**, and R. Winfree. 2003. Pathogens and parasites in a changing climate. *In* L. Hannah and T. Lovejoy (eds.), Climate Change and Biodiversity: Synergistic Impacts. Advances in Applied Biodiversity Science 4. Conservation International, Washington DC.
- Pascual, M.** 2001. Scales that matter: untangling complexity in ecological systems. *In* Carving Our Destiny: Scientific Research Faces a New Millennium. Commemorative volume, James S. McDonnell Centennial Fellowships, NAS and Joseph Henry Press.
- Deutschman, D., G.A. Bradshaw, W.M. Childress, K. Daly, D. Grunbaüm, **M. Pascual**, and J. Wu. 1993. Mechanisms of patch formation, pp. 184-209. *In* Levin, S.A., T. Powell, and J.H. Steele (eds.), Patch Dynamics, Lecture Notes in Biomathematics, Springer-Verlag, New York.

Membership in Professional Societies

The Ecological Society of America
 The American Association for the Advancement of Science
 Society for Industrial and Applied Mathematics

Invited Seminars

2022

Institute for Mathematical and Statistical Innovation (IMSI), University of Chicago, Chicago, IL
 Northwestern Institute of Complex Systems (NICO), Northwestern, Chicago, IL (online)

2021

Econet21, V Symposium on Ecological Networks 2021. Palma de Mallorca, Spain (plenary)
 SIAM Conference on Mathematical and Computational Issues in the Geosciences, Milano, Italy (online)
 University of Chicago, MACCS (Masters in Computational Social Sciences), Chicago, IL (online)
 Harvard School of Public Health, Boston, MA (online)
 University of Utah, Salt Lake City, UT (online)
 Purdue University, West Lafayette, IN (online)
 q-evo2021, Eology and co-evolution: from models to data and back, Paris, France (online)

2020

Network Science Society Conference 2020 (Plenary), Rome, Italy (online)
 International Center for Theoretical Physics (ICTP), Quantitative Systems Biology: Quantitative Approaches in Ecosystem Ecology (Winter School), Trieste, Italy (online).
 Santa Fe Institute, Ecological complexity and the sixth extinction (workshop), Santa Fe, NM (online).
 Gordon Conference, Unifying Ecology Across Scales, NH (cancelled)

2019

Columbia University, New York, NY

MIT, Physical Concepts and Computational Models in Immunology, Cambridge, MA
Santa Fe Institute/National Science Foundation, Meeting on Complex Systems, Arlington, MD
IMERA, Institute for Advanced Studies , Aix-Marseille University, France

2018

Conference on Theory in Biology (Plenary), Boston University, Boston, MA.
Health Meeting of The Inter-Sectoral Impact Model Intercomparison Project (ISIMIP) on climate change, Barcelona, Spain.
Conference on Physics and Ecology (Plenary), Menorca, Spain
IMERA, Institute for Advanced Studies , Aix-Marseille University, France.

2017

Harvard University, Global Health Institute, Boston, MA.
Arizona State University, 6th International meeting on Mathematical Modelling and Analysis of Populations in Biological Systems (ICMA-6th), Tempe, AZ.
J.S. McDonnell Foundation Workshop on Complex Systems, Cambridge, UK.
Workshop on Multidisciplinary Complex Systems, NSF, Washington DC.
University of Illinois, Urbana-Champaign, IL.

2016

UC Santa Cruz, Climate and Science Policy Conference 2016, Earth's Climate Future: Uncharted Territory, Santa Cruz, CA.
Columbia University, New York, NY.
Harvard University, Boston, MA.
Conference on Mathematical Modeling and Control of Communicable Diseases, Rio de Janeiro, Brasil. (Plenary).

2015

Epidemics⁵, Fifth International Conference on Infectious Disease Dynamics, FL (Plenary).
MacArthur Lecture, Annual meeting of the Ecological Society of America, Baltimore, MD. (Plenary).
Human Health in the Face of Climate Change, The New York Academy of Sciences, Barcelona, Spain. (Plenary).
Impact of environmental changes on infectious diseases (IECID), Sitges, Spain. (Plenary).
Impacts of climate change on ecosystem services. Politecnico di Milano, Italy. (Plenary).

2014

Santa Fe Institute, Santa Fe, NM.
University of Chicago, Chicago, IL.
University of California Davis (Major Issues in Modern Biology), Davis, CA.

2013

Oxford University, Astor Lectureship Seminar, Oxford, UK.
Institut Pasteur, Statistical and Mathematical Modeling in Biological Applications, Paris.
Indian Institute of Technology, Gandhinagar, Gujarat.
Cornell University, Ithaca, NY.
Yale University (Forum on the Integration of Climate Science and Infectious Disease), New Haven, CT.

Penn State University, University Park, PA.

2012

EEID 10th Annual Conference at University of Michigan, Ann Arbor, MI.

Fall Meeting of the American Geophysical Union, San Francisco, CA.

Institut Pasteur and Fondation Prince Albert II de Monaco, Environmental changes and impacts on human health, Monaco.

University of Tennessee (Baker Center Interdisciplinary Forum on Environmental Policy), Knoxville, TN.

Mathematical Biosciences Institute, Columbus, OH.

Fiocruz - Fundao Instituto Oswaldo Cruz, Observatory on Climate and Health, Rio, Brazil.

The Great Lakes Bioinformatics Conference, Ann Arbor, MI.

The 12th Conference on experimental chaos and complexity, Ann Arbor, MI.

2011

Denver University, Denver, CO.

Universidad de los Andes (Latin American Congress of Parasitology), Bogota, Colombia.

University of California Santa Barbara, EEID (Ecology and Evolution of Infectious Diseases) Meeting, Santa Barbara, CA.

ASLO (American Society of Limnology and Oceanography), Ecology of Marine Infectious Diseases (EMID) Workshop, San Juan, Puerto Rico.

2010

University of Miami, The Rosenstiel School of Marine and Atmospheric Science (2010-2011 Distinguished Lecturer), Miami, FL.

Cornell University, EEID (Ecology and Evolution of Infectious Diseases) Meeting, Ithaca, NY.

ASM (American Society for Microbiology) Annual Meeting, Division R (Evolutionary and Genomic Microbiology) Lecturer, San Diego, CA.

Harvard University, Boston MA.

2009

Institut Catala de Ciencies del Clima Scientific Advisory Board (IC3R), Barcelona, Spain.

Duke University, NC.

University of Amsterdam, Amsterdam, The Netherlands.

Centennial Fellows 10 Year Reunion Conference, J.S. McDonnell Foundation, St. Louis, MO.

2008

EcoHealth, Biennial meeting, Merida, Mexico (plenary).

National Institute of Malaria Research, Delhi, India.

University of California, Santa Barbara, CA.

Oxford University, Oxford, UK.

Princeton University, Princeton, NJ.

2007

University of Chicago, Chicago, IL.

Princeton University, Princeton, NJ.

Brown University, Providence, RI.

The Santa Fe Institute, Santa Fe, NM.

Graham Environmental Sustainability Institute, University of Michigan, Ann Arbor, MI.

Harvard University, Cambridge, MA.

Yale University, New Haven, CT.

2006

Science Museum, Barcelona, Spain.

Ecole Normale Supérieure, Paris, France.

2005

Columbia University, New York, NY.

Kellogg Biological Station, Michigan State University, MI.

Massachusetts Institute of Technology, Department of Civil and Environmental Engineering, Boston, MA.

Scripps Institution of Oceanography, Conference on The Future of Biodiversity (plenary speaker), San Diego, CA.

University of California San Diego, Section of Ecology, Behavior and Evolution, San Diego, CA.

2004

National Institute of Health, 5th Annual NIH Hispanic Scientist Day, Bethesda, MD.

Santa Fe Institute, 2004 Public Lecture Series, Santa Fe, NM.

Princeton Environmental Institute, Princeton, NJ.

2003

University of Chicago, Department of Ecology and Evolution, Chicago, IL.

Cornell University, Center for Applied Mathematics, Ithaca, NY.

Pennsylvania State University, Biology Department, University Park, PA.

2002

UCLA, Department of Biomathematics, Los Angeles, CA.

Gordon Conference in Mathematical Biology, NH.

21st Century Initiative Meeting, McDonnell Foundation, Tarrytown, NY.

2001

Isaac Newton Institute, Cambridge, England.

2000

Scripps Institution of Oceanography, University of California, San Diego, CA.

Massachusetts Institute of Technology, Department of Civil and Environmental Engineering, Boston, MA.

Florida State University, Department of Biological Sciences, Tallahassee, FL.

Emory University, Department of Environmental Studies, Atlanta, GA.

University of Michigan, Department of Biology, Ann Arbor, MI.

University of Washington, Department of Zoology, Seattle, WA.

University of Oxford, Department of Zoology, Oxford, England.

Yale University, Department of Ecology and Evolutionary Biology, New Haven, CT.

University of North Carolina, Department of Marine Sciences, Chapel Hill, NC.

Boston University, Department of Biology, Boston, MA.

1999

Institute of Global Environment and Society, Center for Ocean-Land-Atmosphere Studies, Calverton, MD.

Massachusetts Institute of Technology, Department of Earth, Atmospheric, and Planetary Sciences, Boston, MA.

University of Utah, Department of Biology and Dept. of Mathematics, Salt Lake City, UT.

National Academy of Sciences, James S. McDonnell Foundation Centennial Fellowship Symposium, Washington D.C.

Laboratoire d'Etudes en Géophysique et en Océanographie Spatiales, Toulouse, France.

University of Minnesota, Institute for Mathematics and its Applications, Minneapolis, MN.

University of California, Department of Ocean Sciences, Santa Cruz, CA.

University of Florida, Department of Zoology, Gainesville, FL.

1998-1997

Center for Coastal Physical Oceanography, Norfolk, VA.

Johns Hopkins University, Center for Environmental Fluid Dynamics, Baltimore, MD.

University of Maryland, Department of Biology, College Park, MD.

Woods Hole Oceanographic Institution, Sloan Foundation lecture series on Limits to Knowledge in Oceanography, Woods Hole, MA.

1996-1995

University of Maryland Biotechnology Institute, Center of Marine Biotechnology, Baltimore, MD.

University of Rhode Island, Graduate School of Oceanography, Narragansett, RI.

Princeton University, Department of Ecology and Evolutionary Biology, Princeton, NJ.

1994-1993

Oregon State University, Zoology Department, Corvallis, OR.

Summer Institute for Geophysical Fluid Dynamics, Bio-Physical Models of Oceanic Population Dynamics, Woods Hole, MA.

Yale University, Seminar Series on Nonlinear Dynamics and Computational Ecology, New Haven, CT.

Professional Service

Organizing Committee, AGU Chapman Conference on African Climate and Health, (on-going).

Faculty Working group on Diversity, Biological Sciences Division, University of Chicago (2021).

Chair, Search Committee, faculty position in Evolutionary Biology, Dept. of Ecology and Evolution, University of Chicago (2021).

Science Council Member, International Center for Theoretical Physics (ICTP), Trieste, Italy (2020-2024).

Organizing Committee, International meeting on Impact of Environmental Changes on Infectious Diseases, Singapore (2020, postponed).

External advisory board for ISGLOBAL (Instituto de Salud Global de Barcelona), Barcelona, Spain. (2018-present).

Advisory Board, Complex Systems, James S. McDonnell Foundation (2005-2021).

Member, Provost Committee on Environmental Initiative, UC (2019).

Chair, Science Board (2016-2019) and member, Science Steering Committee (2012-2019), The Santa Fe Institute (SFI), NM.

Member, Board of Directors, American Association for the Advancement of Science (AAAS), (2015-2019).

Co-chair, International meeting on Impact of Environmental Changes on Infectious Diseases, Trieste, Italy (2017).

Member, Provost Committee on Data Science Initiative, UC (fall 2017).

Member, Strategic Advisory Committee, Biological Sciences Division, UC (2016-2018).

Faculty working group on Shared Administrative Services, UC (2017).

Participant, Burroughs Wellcome Fund, meeting on interdisciplinary training (2016).

Chair, Committee for the review of graduate courses in quantitative biology, UC (2015).

Science advisory board, Institut Catala de Ciencies del Clima (IC3), Barcelona, Spain (2008-2014).

Panel Member, NSF Ecology of Infectious Diseases (2006, 2014).

Participant, Consultation on Multisectoral Action Framework for Malaria, World Health Organization, WHO, Geneva (2013).

Participant, external review, The International Research Institute for Climate and Society (IRI), Columbia University (2013).

Chair, Cluster Faculty Search on 'Networks and Diversity' (UM 2011).

Chair, Faculty Search committee for joint position (Ecology and Evolutionary Biology and Center for the Study of Complex Systems) (2009).

Advisory Panel, OHHI (Oceans and Human Health Initiative), NOAA (2006-2012).

Co-organizer of NSF Workshop on Theoretical Biology. (2006).

Chair, Faculty Search committee for Ecology position (2004).

Chair of the Theoretical Section of the Ecological Society of America (2003-04).

Vice Chair of the Theoretical Section of the Ecological Society of America (2002-03)

Member of the Visions Committee of the Ecological Society of America (2003-04).

Co-chair of special sessions/symposia at scientific meetings: 'Climate and Disease: Quantitative Insights and Interdisciplinary Challenges' (AAAS 2007); 'The assembly and disassembly of ecological networks' (ESA 2007) ; 'The rising tide of ocean plagues' (AAAS 2006); 'Death of determinism? Noise in a nonlinear world' (ESA 2003); 'New developments in marine and freshwater epidemiology' (ASLO 1999); 'Long term time series in ecology: novel approaches for a new synthesis' (INTECOL 1998).

Scientific Committee, Second International Conference on Mathematical Ecology, Alcala de Henares, Spain (2003).

Executive committee member: Department of Ecology and Evolutionary Biology, University of Michigan (fall 2001-2003).

Executive committee member: Center for the Study of Complex Systems, University of Michigan (spring 2001-present).

Editorial board (academic editor): PLoS Computational Biology (current); Theoretical Ecology, Ecohealth, Ecological Letters (previously).

Member of the National Academy of Sciences/National Research Council Committee on Strengthening the Linkages between the Sciences and the Mathematical Sciences (1998).

Journal Article Reviews (within last five years): PLoS Medicine; PLoS Neglected Tropical Diseases; Proceedings of the Royal Society B; Proceedings of the Royal Society Interface; American Naturalist; Frontiers in Ecology and the Environment; Ecology; Theoretical Population Biology; Geophysical Research Letters; Journal of Mathematical Biology; Proceedings of the National Academy of Sciences; Nature; Nature Climate Change; Nature Communications; Nature Ecology and Evolution; Science.

Book Reviews: Bulletin of Mathematical Biology; Princeton University Press; Oxford University Press.

Proposal Reviews (within the last five years): NIH IRAP: Infectious Disease Epidemiology; NIH COVID 19-pandemic: Epidemiology and Analytics; NSF-NIH Panel on the Ecology of Infectious Diseases (EEID); Climate Change and Health (CCH) Special Emphasis Panel (SEP), NIH.

Workshops/Working Groups

Limits to Diversity Assembly, Workshop (co-organizer), International Center for Theoretical Physics, Trieste, Italy, 2021 (online).

Aging and Adaptation in Infectious Diseases, The Santa Fe Institute (co-organizer), Santa Fe Institute, Santa Fe, NM, 2019.

Synergistic effects of environmental, economic, and social factors on vector-borne disease transmission in the Amazon (co-organizer), National Socio-Environmental Synthesis Center (SESYNC), Annapolis, MD, 2018-2019.

Cities, Climate Forcing and Infectious Disease Dynamics (organizer). The University of Chicago Center in Delhi, Delhi, India, 2016.

Land Use Change and Infectious Disease Dynamics (working group). The National Socio-Environmental Synthesis Center (SESYNC). Annapolis, MD. 2014.

Land Use Change and Infectious Disease Dynamics (working group). National Center for Ecological Analysis and Synthesis (NCEAS). Santa Barbara, CA. 2013.

Challenges in Modeling the Spatial and Temporal Dimensions of the Ecology of Infectious Diseases. Mathematical Biosciences Institute, Columbus, OH. 2012.

Spatial Models of Micro and Macro Systems. Mathematical Biosciences Institute, Columbus, OH. 2012.

Theory and models for infectious disease dynamics: from the land to the sea. Ecology of Marine Infectious Diseases (EMID) Workshop. San Juan, Puerto Rico. 2011.

Climate and Disease (co-organizer). Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers, NJ. 2008.

Parasites and Food Webs (co-director of working group). National Center for Ecological Analysis and Synthesis. Santa Barbara, CA. 2007-2010.

Models of Emergent Behavior in Complex Adaptive Systems. Santa Fe Institute (SFI) and ICAM. Santa Fe, NM. 2007.

Linking Structure and Dynamics in Complex Ecological Networks (co-director). Santa Fe Institute.

Santa Fe, NM. 2004.

Seasonality and the Population Dynamics of Infectious Diseases (co-director of working group). National Center for Ecological Analysis and Synthesis. Santa Barbara, CA. 2003-2004.

Global Change and Infectious Disease. National Center for Ecological Analysis and Synthesis (working group). Santa Barbara, CA. January 2004.

The Spatial Dynamics of Diseases. National Center for Ecological Analysis and Synthesis (working group). Santa Barbara, CA. 2000-2001.

Ecological Forecasting. National Center for Ecological Analysis and Synthesis (working group). Santa Barbara, CA. 2001.

Macroscopic Organisation from Microscopic Behavior in Immunology, Ecology, and Epidemiology. Newton Institute, Cambridge, England. 2001.

Robustness in Ecological and Biological Systems (co-organizer) Center for the Study of Complex Systems, UM, Ann Arbor, MI. 2001.

Ocean Carbon Transport, Exchanges and Transformations (OCTET). Washington DC. 2000.

Health, Climate, and Infectious Disease: a Global Perspective. American Academy of Microbiology, Tucson, AZ. 1999.

Mixing and Reactive Turbulence. National Center for Atmospheric Research, Boulder, CO. 1999.

Climate and Health Diagnostic Workshop. NOAA, North Falmouth, MA. 1999.

From Individual to Aggregation: Modelling Animal Grouping. Institute for Mathematics and its Applications, Minneapolis, MN. 1999.

The Ecology and Evolution of Biodiversity. Princeton University, Princeton, NJ. 1997.

Climate Variability and Human Health: An Interdisciplinary Perspective. American Academy of Microbiology, Montego Bay, Jamaica. 1997.

Exploring Nonlinearities in Simple Plankton Models. ONR University Research Initiative Program. University of California, Berkeley. 1996.

Ecomachines and Spatial Modeling in Ecology and Biology. Santa Fe Institute. Santa Fe, NM. 1996.

Nonlinear Data Analysis in Marine Ecology. ONR University Research Initiative Program. Woods Hole, MA. 1994.

Biological/Physical Modelling of Upper Ocean Processes. ONR University Research Initiative Program. Woods Hole, MA. 1993.

Teaching

(beyond regular courses)

Lecturer (and co-organizer), Workshop on Mathematical Models of Climate Variability, Environmental Change and Infectious Diseases. The International Center for Theoretical Physics (ICTP), Trieste, Italy (May 2017).

Lecturer (and co-organizer), School on Pathogen Dynamics, Climate and Global Change. International Center for Theoretical Physics- South American Institute for Fundamental Research (ICTP-SAIFR), Sao Paulo, Brazil.(January 2015)

Lecturer (and co-organizer), Workshop on Mathematical models of Climate Variability, Environmental Change and Infectious Diseases, sponsored by the International Center for Theoretical Physics

(ICTP), Trieste, Italy (May 2013).
Lecturer (and co-organizer), School on Mathematical Models of Infectious Diseases sponsored by the International Center for Theoretical Physics (ICTP, Trieste), Arusha, Tanzania (January 2012).
Lecturer (and co-organizer), Theoretical Ecology course, International Center for Theoretical Physics, Trieste, Italy (March 2009).
Lecturer, Complex Systems Summer School, sponsored by the Santa Fe Institute, Bariloche, Argentina (December 2008).
Graduate Teaching Assistant, Mathematics Learning Center, New Mexico State University (1988-1989).
Graduate Teaching Assistant (Field Ecology, Introductory Biology Laboratory), Department of Biology, New Mexico State University (1987-88).
Course Assistant, Marine Ecology Course, Marine Biological Laboratory, Woods Hole, MA (Summer 1986).

Funding

NIH R01. Redefining thermal suitability for urban malaria transmission in the context of humidity. (co-PIs, Murdock, Cornell University; Wimberly, South Dakota State University) (2020-2024).
NSF Biological Integration Institute, Genomics and Eco-Evolution of Multi-Scale Symbiosis (GEMS). (co-PI; Participating Institutions: University of Illinois at Urbana-Champaign, Indiana University and University of Chicago) (2020-2024).
NIH R01. Temporal strain structure and responses to interventions in a high endemicity region of *Plasmodium falciparum*. (co-PI, Day, University of Melbourne Australia) (2019-2024).
NSF DMS-NIMGS. Urban vector-borne disease transmission demands advances in spatiotemporal statistical inference. (co-PIs Ionides and King, University of Michigan, Ann Arbor, MI) (2018-22).
Subcontract to UIUC (University of Illinois-Urbana Champaign). The Moore Foundation (Whitaker, PI). 2020-2024).
Subcontract to UIUC (University of Illinois-Urbana Champaign). The Paul G. Allen Foundation (Whitaker, PI). Microbial evolution through viral gene flow in natural populations. (2019-2020).
FACCTS: France and Chicago Collaborating in The Sciences (2017-2018).
University of Chicago Delhi Center, Cities, Climate Forcing and Infectious Disease Dynamics (2016).
NSF/NIH EEID (Ecology and Evolution of Infectious Diseases). The impact of seasonality and vector control on the population structure and dynamics of *Plasmodium falciparum*. (co-PI with Karen Day, University of Melbourne, Australia) (2013-2018).
National Science Foundation. Anticipating Bifurcations for Identifying Dynamic Characteristics of Nonlinear Systems. (co-PI with Bogdan Epurneau, Dept. of Mechanical Engineering, UM) (2013-16).
Howard Hughes Medical Institute (2008-2015).
National Science Foundation, Advancing Theory in Biology. The spider and the web: inference in ecological networks. (With Stefano Allesina, National Center for Ecological Analysis and Synthesis). (2008- 2014).

National Oceanic and Atmospheric Administration, Oceans and Human Health Program. Cholera prediction: the role of the oceans and nonlinear disease dynamics. (With the Center for Land-Atmosphere-Ocean Studies, Princeton University and the University of North Carolina). (2008-2013).

ESMRT awards, Graham Environmental Sustainability Institute, University of Michigan. Vector-transmitted diseases in a changing world. (With I. Perfecto, School of Natural Resources and the Environment, and Edward Ionides, Statistics, at UM), (2007-2013).

NSF/NIH Program on Ecology of Infectious Diseases. The interplay of environmental forcing and intrinsic disease dynamics: cholera as a case study. Collaborative proposal with the Center for Land-Atmosphere-Ocean Studies (COLA), Princeton University, and University of Tennessee (2004-2008).

NOAA, Oceans and Human Health Initiative. Cholera across scales: oceanic links to climate and local estuarine influences. Subcontracts to COLA, Princeton University, and Portland State University. (2004-2007).

NOAA-EPRI-NSF-EPA-NASA. Joint Program on Climate Variability and Human Health. Cholera dynamics and climate variability: towards prediction of disease incidence (2001-2005).

James S. McDonnell Foundation. Centennial Fellowship in the area of Global and Complex Systems. Scales that matter: untangling complexity in ecological systems (1999-2008).

NSF Biocomplexity: Phase I. Collaborative research (with D. Capone, E. Carpenter, PIs). Factors affecting, and impact of, diazotrophic microorganisms in the Western Equatorial Atlantic Ocean. (1999-2004).

Wallenberg Foundation. Participant in the VIRTUE Program (Virtual University Education Program) of the University of Maryland (1997-2001).

NOAA/NIH. A historical analysis of cholera dynamics in Bengal 1870-1940 in relation to ENSO and rainfall. (M.J. Bouma, co-PI, 1998-99; pilot project).

Student and Postdoctoral Mentoring

Shuanger Li (graduate student, EE, fall 2021-);

Qi Zhan (graduate student, Committee on Genetics, Genomics & Systems Biology, fall 2020-present);

Armun Liaghat (graduate student, EE, fall 2019-present);

Rahul Subramanian (graduate student, EE, fall 2017-present);

Frederic Labbe (postdoc, EE, summer 2020-present);

Victoria Romeo Aznar (postdoc, EE, fall 2016-summer 2021; Assistant Professor, Universidad de Buenos Aires, Argentina);

Qixin He (postdoc, EE, spring 2015-2019; Staff Scientist, spring 2020-winter2021), Assistant Professor, Purdue University);

Sergio Alcalá-Corona (postdoc, EE, spring 2019-2020, at present: postdoc, UNAM, Mexico);

Oscar Mauricio Santos Vega (graduate student, EE, fall 2013-2019; at present: Research Assistant Professor, Universidad de los Andes, Colombia);

Shai Pilosof (postdoc, EE, fall 2015-2019; at present: Assistant professor position, Ben Gurion University, Israel);

Pamela Martinez (graduate student, EE, fall 2012-2017; at present: Assistant Professor, University of Illinois, Urbana-Champaign);

Xiangjun Du (postdoc, EE, fall 2014-2017; at present: Assistant Professor, Sun Yat-Sen University, China);

Mary (Molly) Rorick (postdoc, HHMI, fall 2011-spring 2015; at present: postdoc, University of Utah);

Daniel Zinder (graduate student, Bioinformatics, fall 2010-fall 2015; at present: private sector);

Robert Woods (postdoc, UM Medical School, spring 2012-fall 2014; at present: faculty member, UM Medical School);

Robert Reiner (postdoc, EEB, spring 2010-summer 2011; at present: Assistant Professor, University of Washington);

Richard Zinck (postdoc, EEB, winter 2010-spring 2011; at present: private sector);

Trevor Bedford (postdoc, HHMI, fall 2008-summer 2011; at present: Assistant Professor, Fred Hutchinson Cancer Center, University of Washington, Seattle, WA);

Andres Baeza (graduate student, EEB, fall 2008-2013; at present: Research Assistant Professor, ASU);

Ed Baskerville (graduate student, EEB, fall 2008-2013; at present: data/software engineer);

Karina Laneri (postdoc, EEB, winter 2008-2010; at present: Investigator, Statistics Group, Balseiro Institute, Argentina);

Yael Artzy (postdoc, HHMI, winter 2008-2013; at present: Assistant Professor, University of Amsterdam, Amsterdam, The Netherlands);

Sarah Cobey (graduate student, EEB, fall 2004-2009; at present: Associate Professor, University of Chicago);

Diego Ruiz-Moreno (graduate student, EEB, fall 2004-2009; at present: private sector);

Luis Fernando Chaves (graduate student, EEB, fall 2004-winter 2008; at present: Investigator, Inciensa, Costa Rica);

Katia Koelle (graduate student, EEB, fall 2002-fall 2005; at present: Associate Professor, Emory University);

David Alonso (postdoc, EEB, winter 2003-summer 2007; at present: Investigator, CSIC, Spain);

Stefano Allesina (postdoc, EEB, 2005-summer 2007; at present: Professor, University of Chicago);

Christopher Warren (postdoc, EEB, Fall 2003-December 2004; at present: Research Fellow at Mayo Clinic);

Khalid Boushaba (postdoc, EEB, September 2001 - August 2003; at present: Research Scientist, Johns Hopkins University);

Manojit Roy (postdoc, EEB, 2000-December 2003; at present: Consultant).

Selected Outreach / Press Coverage

2021: Public Lecture in Spanish on "Ecosistemas complejos y transiciones criticas en nuestros mares cambiantes" (Complex ecosystems and critical transitions in our changing oceans) at Caixa Forum Auditorium (Palma de Mallorca, Spain); Interviews in Palma de Mallorca Newspaper and Public

Radio; News and blogs on our Nature Communications paper on highland malaria and the 'slow-down' of climate change (e.g. AgenciaSINC, EurekaAlert!, Phys.org, UPI.com, Skeptical Science, and my own writing for Nature Microbiology Communications: "The rise and fall of malaria with changing climate in highlands of East Africa"). **2020:** Lecture on Environmental Change and Marine Ecosystems (Fragata Libertad, Recife, Brasil). **2016:** Interview in newspaper O Globo (Rio de Janeiro, Brasil). **2014:** Malaria climbs mountains as the climate warms: Time; Malaria cases could rise with temperatures, study says: Newsweek; Malaria spreading to new altitude': BBC; Climate change could mean more malaria in Africa, South America: Reuters, Chicago Tribune; As temperatures rise, Malaria will invade higher elevations: Smithsonian; Millions potentially at risk for this: The Weather Channel; Malaria on the move as temperatures warm: study: The Times of India; Global warming amplifying malaria risk: Channel NewsAsia; Climate change may increase the risk of malaria: Business Standard; Global warming increases the spread of malaria in mountainous regions: Noticias Mundo Los Angeles, Fox TV Spanish; Climate change multiplied cases of malaria in Africa and South America: La Vanguardia; Climate change spreads malaria to higher ground: El Tiempo; **2013: (1):** Malaria dogs newly irrigated areas for a decade: scidev.net; Irrigating arid regions in Gujarat increased malaria risk for a decade: ANI (Asian News International); Business Standard; Think India Foundation; News Medical; Med India; Yahoo News India; Global Malaria News (Malaria World); **(2):** India should look to Atlantic for increased malaria risk: research: The China Post; Topix; I4U News; Ocean temperatures give early warning of Indian malaria: Reuters; South Atlantic Ocean temperatures can predict India malaria epidemics: Livemint; The Wall Street Journal; Hindustan Times; The Telegraph; South Atlantic's low temperature enhances malaria risk in India: TopNews New Zealand; Cooler South Atlantic causes malaria rise in India: The Times of India; Atlantic warming points to malaria risk in India: The Economic Times; Channel News Asia; NY Daily News; The Hindu; Yahoo! News UK; **2012:** BBC News (report on influenza) **2011:** Understanding Shifts in Wildfire Regimes as Emergent Threshold Phenomena: German Public Radio; **2010:** Flu doesn't die out, it hides out: U.S. News & World Report; U.S. Department of Health and Human Services; Science Daily; Reuters; Post Chronicle; MSNBC; India Times; Health Care Weekly Review; Centre For Infectious Disease Research and Policy. **2009:** The New York Times Magazine (The 9th Annual Year in Ideas); BBC; Discovery News; Australian Broadcasting Corporation (ABC News); ABC Radio National, The Health Report; Inter Press Service (IPS); La Jornada (Mexico City); SciDvNet; Scientific American; **2007:** La Nación (Argentinian newspaper); cholera research featured in exhibit on Climate Change at The Museum of Zoology (UM); Spanish TV; **2006:** Time Magazine (Special issue on global climate change); BBC News; BBC Spanish; United Press International, Daily India, Madrid Newspaper ABC, Folha de Sao Paulo, La Vanguardia (Barcelona). **2005:** BBC Word Series; Radio 10 (Argentina); LA Times. **2003:** Detroit Free Press; Discover Magazine; Earthwatch Radio. **2002:** The Todd Mundt Show (NPR, MI); Ann Arbor News; Folha de Sao Paulo. **2000:** Baltimore Sun.