

Lee Worden

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Education

Ph.D., Applied and Computational Mathematics, Princeton University, 2003.

BA, Mathematics; BS, Computer Science, San Francisco State University, 1994.

Areas of specialization

Applied mathematics; stochastic and deterministic dynamical systems; infectious disease dynamics; ecology and evolution; software development.

Professional Appointments

- 2015– **Epidemiologist**, Francis I. Proctor Foundation, UC San Francisco, San Francisco, Calif.
- 2011–2015 **Visiting professor**, San Francisco Art Institute.
- 2012–2015 **Postdoctoral researcher** UC Berkeley, Berkeley, Calif. Advisors: Wayne Getz, Jonathan Dushoff.
- 2010–2011 **Postdoctoral researcher**, McMaster University Department of Biology, Hamilton, Ontario, Canada. Advisor: Jonathan Dushoff.
- 2008–2010 Software development consultant to McMaster University Department of Biology, Hamilton, Ontario, Canada.
- 2005–2007 **S.V. Ciriacy-Wantrup Postdoctoral Fellow**, UC Berkeley. Advisors: Richard M. Norgaard, Ignacio Chapela.
- 2003–2005 **Postdoctoral Researcher**, Pacific salmon population dynamics, UC Davis. Advisors: Alan M. Hastings, Louis W. Botsford.

Publications

Peer-reviewed

- 2016 Enanoria, W., Liu, F., Zipprich, J., Harriman, K., Ackley, S. A., Blumberg, S., Worden, L. and Porco, T. C., “The Effect of Contact Investigations and Public Health Interventions in the Control and Prevention of Measles Transmission: A Simulation Study.” to appear in *PLoS One*.
- 2015 Brook, C., Beauclair, R., Ngwenya, O., Worden, L., Ndeffo-Mbah, M., Lietman, T. M., Sathpathy, S. K., Galvani, A. C., and Porco, T. C., “Spatial heterogeneity in projected leprosy

- trends in India.” *Parasites & Vectors* 8:42.
- 2015 Enanoria, W., Worden, L., Liu, F., Gao, D., Ackley, S. A., Scott, J., Deiner, M., Mwebaze, E., Ip, W., Lietman, T. M., and Porco, T. C., “Evaluating Subcriticality during the Ebola Epidemic in West Africa.” *PLoS ONE* 10(10):e0140651.
- 2015 Blumberg, S., Worden, L., Enanoria, W., Ackley, S. A., Deiner, M., Liu, F., Gao, D., Lietman, T. M., and Porco, T. C., “Assessing Measles Transmission in the United States Following a Large Outbreak in California.” *PLoS Currents: Outbreaks*, 2015 May 7, Edition 1.
- 2013 Akhmetzhanov, A. R., L. Worden, and J. Dushoff, “Effects of Mixing in Threshold Models of Social Behavior.” *Phys. Rev. E* 88:012816.
- 2010 Worden, L. “Notes from the Greenhouse World: A Study in Coevolution, Planetary Sustainability, and Community Structure.” *Ecological Economics* 69:762–769.
- 2010 Worden, L., L. W. Botsford, A. Hastings, and M. D. Holland. 2010. “Frequency responses of age-structured populations: Pacific salmon as an example.” *Theoretical Population Biology* 78:4, 239–249.
- 2007 Worden, L. and S. A. Levin. 2007. “Evolutionary escape from the prisoner’s dilemma.” *Journal of Theoretical Biology* 245(3):411–422.
- 2006 Ma, J., L. Worden, and S. A. Levin. 2006. “Evolutionary branching of single traits.” Chapter 10 of *From Energetics to Ecosystems: The Dynamics and Structure of Ecological Systems*, N. Rooney, K. S. McCann, and D. L. G. Oakes, eds. Springer Netherlands.
- 2002 Dushoff, J., L. Worden, J. Keymer, and S. A. Levin. 2002. “Metapopulations, community assembly and scale invariance in aspect space.” *Theoretical Population Biology* 62:329–338.
- 2000 Hartvigsen, G., L. Worden, and S. A. Levin. 2000. “Global cooperation achieved through small behavioral changes among strangers.” *Complexity* 5(3):14–19.

Other

- 2012 Worden, L. “Counterculture, cyberculture, and the Third Culture: Reinventing Civilization, Then and Now.” Chapter 13, *West of Eden: Communes and Utopia in Northern California*, I. Boal, C. Winslow, M. Watts, and J. Stone, eds. PM Press.
- 2011 Worden, L. “WorkingWiki: a MediaWiki-based platform for collaborative research.” Proceedings of ITP 2011 Workshop on Mathematical Wikis. <http://ceur-ws.org/Vol-767/paper-11.pdf>.
- 2011 Worden, L. *WorkingWiki*. Software package freely available from <http://lalashan.mcmaster.ca/theobio/projects/index.php/WorkingWiki>.
- 2011 Worden, L. *Lee Worden Research Wiki: An experiment in open, reproducible research*. <http://lalashan.mcmaster.ca/theobio/worden>.
- 2003 Worden, L. 2003. *Evolution, Constraint, Cooperation, and Community Structure in Simple Models*. PhD Dissertation.
- Subject matter includes modeling self-organization processes in ecological communities; evolution in the context of ecological communities; transformations between competitive and cooperative interactions in ecological (Lotka-Volterra and related) and game theory models; and ways scientific models function as rhetorical tools in social contexts and how alternative models can be used to intervene in accepted economic and social discourses.

Fellowships and Awards

- 2008 Heinz von Foerster prize for best paper by a young scholar, American Society for Cybernetics annual meeting.
- 2005–2007 S.V. Ciriacy-Wantrup Postdoctoral Fellowship, UC Berkeley.
- 1998–2002 Department of Energy Computational Science Graduate Fellowship.

Invited Talks

- 2012 “Preliminary mathematics of direct democracy.” Google TechTalks, Google, Mountain View, Calif.
- 2011 “Studies in cooperation and collaboration.” Part of a public evening sponsored by FundScience.org and QB3, San Francisco, Calif.
- 2008 “How selection acts on interactions, and why it favors mutual benefit.” Symposium on Evolution of Social Behavior, Ecological Society of America, Milwaukee, Wisc.
- 2006 “The rise and fall of the Whole Earth Catalog.” West of Eden: Communes and Utopia in Northern California, Berkeley, Calif.
- 2004 “Thoughts about model making and power.” Energy and Resources Group weekly speaker series, UC Berkeley.

Conferences and Other Participation

- 2015 Epidemics, Clearwater, Florida.
- 2015 Models of Infectious Disease Agent Study (MIDAS), Atlanta, Georgia.
Clinic on Dynamical Approaches to Infectious Disease Data (DAIDD), Gainesville, Florida.
- 2008– New England Workshop of Science and Social Change (focusing on teaching, group processes, and collaborative learning), Woods Hole, Mass., organized by Peter Taylor, U. Mass.
- 2011 “WorkingWiki: a MediaWiki-based environment for collaborative research”, Interactive Theorem Proving 2011 Workshop on Mathematical Wikis, Nijmegen, Netherlands.
- 2008 “Structural power in hub-spoke networks.”
- 2009–2011 Working group, Integrating functional and evolutionary dynamics at multiple scales, NIM-BioS, University of Tennessee, organized by Joan Roughgarden and colleagues, Stanford University.
- 2008 “Structural power in hub-spoke networks.” Networked Politics Seminar, Berkeley, Calif.
- 2008 “Evolutionary graph theory and structural power” (poster presentation). Networks in Political Science, Cambridge, Mass.
- 2008 Cornell Probability Summer School, Ithaca, N.Y.
- 2008 “A simple dynamic argument for biospherical self-regulation.” American Society for Cybernetics, Urbana, Ill.
- 2005–2009 Principal organizer, Nonlinear Dynamics and Social Change study group, Berkeley, Calif.
- 2004 “Modeling early returns, fluctuation, and cohort resonance in Pacific salmon.” Society for Mathematical Biology, Ann Arbor, Mich.
- 2004 “Transformation, cooperation, and community structure.” International Society for Ecological Economics, Montreal, Québec.
- 2004 “Adaptive dynamics of mutual aid.” Ecological Society of America, Tucson, Ariz.

- 2000 Practicum visitor, Santa Fe Institute, Los Alamos National Laboratory. Advisor: Alan Perelson.
Co-organizer, SFI evolutionary ecology study group, with Ricard Solé, J. Doyne Farmer and colleagues.
- 1998 Santa Fe Institute Complex Systems Summer School, Santa Fe, N.M.

Undergraduate Teaching, San Francisco Art Institute

- 2014 “Drones, Workers, and Queens.” Introductory science and technology course.
2014 “Conceptual Physics.” Introductory science course.
2013 “Numbers in Music.” Introductory mathematics course.
2012 “Boundaries and Coexistence in Biology and Human Life.” Introductory science course.
2011, 2012, 2015 “Systems, Networks, and Strategy.” Introductory mathematics course.