Curriculum Vitae
Aaron A. King
Nelson G. Hairston Collegiate Professor
Department of Ecology & Evolutionary Biology
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Education

Ph.D. (Applied Mathematics). University of Arizona, 1999.
M.A. (Mathematics). University of Hawai'i, 1992.
B.A. *summa cum laude* **(Mathematics).** Rice University, 1989.

Honors, Awards, and Recognitions

– Nelson G. Hairston Collegiate Professor of Ecology, Evolutionary Biology, and Complex Systems, University of Michigan, Ann Arbor, 2019–.
– Fellow of the American Association for the Advancement of Science, 2012–.
– Faculty of 1000 Biology, 2009–2011.
– Biological Sciences Scholar, University of Michigan, 2005–.
– National Science Foundation Mathematical Sciences Postdoctoral Fellowship, 2000–2003.
– National Science Foundation Biological Informatics Postdoctoral Fellowship, 2000 (refused).
– Flinn Foundation Postdoctoral Fellowship, 1999–2000.
– Flinn Foundation Graduate Fellowship, 1997–1998.
– National Science Foundation Graduate Research Fellowship, 1994–1997.
– Flinn Foundation Scholarship, 1995–1997.
– National Merit Scholarship, 1985–1989.
– Full Scholarship, Rice University, 1986–1989.
– Valedictorian, Andress High School, El Paso, Texas, 1985.

Appointments

28. Visiting Scholar, International Center for Theoretical Physics, Trieste, Italy, 2024.
27. External Professor, Santa Fe Institute, Santa Fe, New Mexico, 2020–.
26. Affiliate, Michigan Center for Applied and Interdisciplinary Mathematics, University of Michigan, Ann Arbor, 2020–.
25. Visiting Researcher, Santa Fe Institute, Santa Fe, New Mexico, 2020.
24. Visiting Scholar, Princeton University, 2019.

23. Nelson G. Hairston Professor of Ecology, Evolutionary Biology, and Complex Systems, University of Michigan, Ann Arbor, 2019–.
22. Affiliate, Michigan Institute for Data Science, University of Michigan, Ann Arbor, 2019–.
21. Professor of Complex Systems, University of Michigan, Ann Arbor, 2019–.
20. Professor of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, 2016–.
19. Professor of Mathematics, University of Michigan, Ann Arbor, 2016–.
18. Affiliate, Center for Computational Medicine and Bioinformatics, University of Michigan, Ann Arbor, 2012–.
17. Associate Professor of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, 2011–2016.
16. Associate Professor of Mathematics, University of Michigan, Ann Arbor, 2011–2016.
15. RAPIDD Research Fellow, Fogarty International Center for Advanced Study in the Health Sciences, National Institutes of Health, 2008–2015.
14. Primary Faculty Member, Center for the Study of Complex Systems, University of Michigan, Ann Arbor, 2005–2019.
13. Assistant Professor of Mathematics, University of Michigan, Ann Arbor, 2005–2011.
12. Assistant Professor of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, 2005–2011.
11. Research Assistant Professor of Mathematics, University of Tennessee, Knoxville, 2004–2005.
10. Assistant Professor of Ecology & Evolutionary Biology, University of Tennessee, Knoxville, 2002–2005.
 9. Visiting Research Assistant Professor of Mathematics. University of California, Davis, 2001–2002.
 8. National Science Foundation Postdoctoral Research Fellow. Department of Environmental Science & Policy, University of California, Davis, 2000–2002.
 7. Postdoctoral Research Associate. Program in Applied Mathematics, University of Arizona, 1999–2000.
 6. Graduate Research Associate. Department of Ecology & Evolutionary Biology, University of Arizona, 1998.
 5. Flinn Foundation Fellow. Program in Applied Mathematics, University of Arizona, 1997–1998.
 4. National Science Foundation Graduate Research Fellow. Program in Applied Mathematics, University of Arizona, 1994–1997.
 3. Adjunct Instructor of Mathematics, University of Arizona, 1993–1994.
 2. Adjunct Instructor of Mathematics, Pima County Community College, Tucson, Arizona, 1993.
 1. Graduate Teaching Assistant, Department of Mathematics, University of Hawai'i, Mānoa, 1991–1992.

Scientific Leadership

– Panelist, National Summit on the Science and Technology of Epidemiological Modeling and Prediction, Hosted by NSF, CDC, IARPA, & OSTP (12–13 November 2020).
– Organizing Committee Chair, Santa Fe Institute Working Group, "Re-emerging Infectious Diseases: The Challenge of Pertussis" (21–22 March 2016).
– Steering Committee, NSF Research Coordination Network on Infectious Disease Evolution Across Scales.
– Co-organizer, 2012 Ecology and Evolution of Infectious Disease Workshops and Conference (19–25 May 2012).
– Chair, Organizing Committee, 2011 University of Michigan Early Career Scientists Symposium, "Infectious Disease across Scales" (15–17 April 2011).
– Co-organizer, Research and Policy in Infectious Disease Dynamics (RAPIDD) Workshop on "Generation and Maintenance of Immune Memory", Fred Hutchinson Cancer Research Center, Seattle, 7–8 March 2011.
– Organizer, RAPIDD Workshop on "Statistical Inference for Disease Dynamics", Ann Arbor, 20–23 July 2009.
– Co-organizer, RAPIDD Workshop on "Scaling from Within- to Between-Host Dynamics and Evolution", Harvard School of Public Health, Boston (26–28 May 2009).
– Panelist, Review of Joint NSF/NIH Ecology of Infectious Disease Program, 20–21 April 2010.
– Co-organizer, National Center for Ecological Analysis and Synthesis (NCEAS) Working Group on "Unifying approaches to statistical inference in ecology" (2007–2010).
– Associate Editor, *Journal of Theoretical Biology*, 2006–2012.
– Associate Editor, *Theoretical Population Biology*, 2004–2014.

Preprints

82. A. A. King, Q.-Y. Lin, E. L. Ionides (2024) "Exact phylodynamic likelihood via structured Markov genealogy processes" *arXiv::*2405.17032.
81. A. A. King, Q.-Y. Lin, E. L. Ionides (2020) "The sampled Moran genealogy process" *arXiv:*2002.11184
80. O. N. Bjørnstad, B. T. Grenfell, C. Viboud, A. A. King (2019) "Comparison of alternative models of human movement and the spread of disease" *bioRxiv:*2019.12.19.882175.
79. M. Domenech de Cellès, P. Rohani, A. A. King (2018) "Rethinking the efficacy of acellular pertussis vaccines for primary immunization" *bioRxiv:*376947.

Peer-reviewed Articles

Abstracts and PDFs are available on my website.

78. K. Asfaw, J. Park, A. A. King, E. L. Ionides (2024) "spatPomp: An R package for spatiotemporal partially observed Markov process models" *J. Open Source Softw.* **9**(104): 7008.
77. M. Peters, A. A. King, N. Wale (2024) "Red blood cell dynamics during malaria infection challenge the assumptions of mathematical models of infection dynamics" *Front. Malaria* **2**.

76. J. Li, E. L. Ionides, A. A. King, M. Pascual, N. Ning (2024) "Inference on spatiotemporal dynamics for coupled biological populations" *J. R. Soc. Interface* **21**: 20240217.

75. Q.-Y. Lin, A. A. King, E. Romero-Severson (2024) "The number and pattern of viral genomic reassortments are not necessarily identifiable from segment trees" *Mol. Biol. Evol.* **41**: msae078.

74. E. L. Ionides, K. Asfaw, J. Park, A. A. King (2023) "Bagged filters for partially observed interacting systems" *J. Am. Stat. Assoc.* **118**: 1078–1089.

73. D. V. Gokhale, T. S. Brett, B. He, A. A. King, P. Rohani (2023) "Disentangling the causes of mumps reemergence in the United States" *Proc. Natl. Acad. Sci. U.S.A.* **120**: e2207595120.

72. A. A. King, Q.-Y. Lin, E. L. Ionides (2022) "Markov genealogy processes" *Theor. Popul. Biol.* **143**: 77–91.

71. V. Romeo-Aznar, L. P. Freitas, O. Cruz, A. A. King, M. Pascual (2022) "Fine-scale heterogeneity in population density predicts wave dynamics in dengue epidemics" *Nat. Commun.* **13**: 996.

70. A. Le, A. A. King, F. M. G. Magpantay, A. Mesbahi, P. Rohani (2021) "The impact of infection-derived immunity on disease dynamics" *J. Math. Biol.* **83**: 61.

69. M. Auger-Méthé, K. Newman, D. Cole, F. Empacher, R. Gryba, A. A. King, V. Leos-Barajas, J. Mills Flemming, A. Nielsen, G. Petris, L. Thomas (2021) "A guide to state-space modeling of ecological time series" *Ecol. Monogr.* e01470.

68. S. Funk and A. A. King (2020) "Choices and trade-offs in inference with infectious disease models" *Epidemics* **30**: 100383.

67. N. Wale, M. J. Jones, D. G. Sim, A. F. Read, A. A. King (2019) "The contribution of host cell-directed vs. parasite-directed immunity to the disease and dynamics of malaria infections" *Proc. Natl. Acad. Sci. U.S.A.* **116**: 22386–22392.

66. C. Bretó, E. L. Ionides, A. A. King (2019) "Panel data analysis via mechanistic models" *J. Am. Stat. Assoc.* **115**: 1178–1188.

65. M. Domenech de Cellès, P. Rohani, A. A. King (2019) "Duration of immunity and effectiveness of diphtheria-tetanus-acellular pertussis vaccines in children" *JAMA Pediatrics* **173**: 588–594.

64. F. M. G. Magpantay, A. A. King, P. Rohani (2019) "Age-structure and transient dynamics in epidemiological systems" *J. R. Soc. Interface* **16**: 20190151.

63. M. Domenech de Cellès, A. A. King, P. Rohani (2019) "Commentary: Resolving pertussis resurgence and vaccine immunity using mathematical transmission models" *Hum. Vaccines Immunother.* **15**: 683–686.

62. M. Domenech de Cellès, A. A. King, P. Rohani (2018) "Response to Comment on 'The impact of past vaccination coverage and immunity on pertussis resurgence'" *Sci. Trans. Med.* **10**: eaau9627.

61. M. Domenech de Cellès, F. M. G. Magpantay, A. A. King*, P. Rohani* (2018) "The impact of past vaccination coverage and immunity on pertussis resurgence" *Sci. Transl. Med.* **10**: eaaj1748. (*Equal author contribution.)

60. A. I. Bento, M. A. Riolo, Y. H. Choi, A. A. King, P. Rohani (2018) "Core pertussis transmission groups in England and Wales: a tale of two eras" *Vaccine* **36**: 1160–1166.

59. X. Du, A. A. King, R. J. Woods, M. Pascual (2017) "Evolution-informed forecasting of seasonal influenza A (H3N2)" *Sci. Transl. Med.* **9**: eaan5325.

58. R. A. Smith, E. L. Ionides, A. A. King (2017) "Infectious disease dynamics inferred from genetic data via sequential Monte Carlo" *Mol. Biol. Evol.* **34**: 2065–2084.

57. E. L. Ionides, C. Bretó, J. Park, R. A. Smith, A. A. King (2017) "Monte Carlo profile confidence intervals for dynamic systems" *J. R. Soc. Interface* **14**: 20170126.

56. A. I. Bento, A. A. King, P. Rohani (2017) "Maternal pertussis immunisation: clinical gains and epidemiological legacy" *Eurosurveill.* **22**(15): 3.

55. P. P. Martinez, R. C. Reiner Jr., M. Roy, B. A. Cash, Md. Yunus, A. S. G. Faruque, S. Huq, A. A. King, M. Pascual (2017) "Cholera forecast for Dhaka, Bangladesh, with the 2016 El Niño: lessons learned" *PLoS One* **12**(3): e0172355.

54. T. Baracchini, A. A. King, M. J. Bouma, X. Rodó, E. Bertuzzo, M. Pascual (2017) "Seasonality in cholera dynamics: A rainfall-driven model explains the wide range of patterns in endemic areas" *Adv. Water Resour.*, **108C**: 357–366.

53. J. Perez-Saez, A. A. King, A. Rinaldo, Md. Yunus, A. S. G. Faruque (2017) "Climate-driven endemic cholera is modulated by human mobility in a megacity" *Adv. Water Resour.*, **108C**: 367–376.

52. P. P. Martinez, A. A. King, Md. Yunus, A. S. G. Faruque, M. Pascual (2016) "Differential and enhanced response to climate forcing in diarrheal disease due to rotavirus across a megacity of the developing world" *Proc. Natl. Acad. Sci. U.S.A.*, **113**: 4092–4097.

51. A. A. King, D. Nguyen, E. L. Ionides (2016) "Statistical inference for partially observed Markov processes via the R package pomp" *J. Stat. Softw.*, **69**(12): 1–43.

50. M. Domenech de Cellès, F. M. G. Magpantay, A. A. King, P. Rohani (2016) "The pertussis enigma: reconciling epidemiology, immunology, and evolution" *Proc. R. Soc. Lond. B*, **283**: 20152309.

49. F. M. G. Magpantay, M. Domenech de Cellès, P. Rohani, A. A. King (2015) "Pertussis immunity and epidemiology: mode and duration of vaccine-induced immunity" *Parasitology*, **143**: 835–849.

48. C. E. Cressler, M. A. Butler, A. A. King (2015) "Detecting adaptive evolution in phylogenetic comparative analysis using the Ornstein-Uhlenbeck model" *Syst. Biol.*, **64**: 953-968.

47. M. Martinez-Bakker, A. A. King, P. Rohani (2015) "Unraveling the Transmission Ecology of Polio" *PLoS Biol.*, **13**: e1002172.

46. A. A. King, M. Domenech de Cellès, F. M. G. Magpantay, P. Rohani (2015) "Avoidable errors in the modeling of outbreaks of emerging pathogens, with special reference to Ebola" *Proc. R. Soc. Lond. B*, **282**: 20150347.

45. E. L. Ionides, D. Nguyen, Y. Atchadé, S. Stoev, A. A. King (2015) "Inference for dynamic and latent variable models via iterated, perturbed Bayes maps" *Proc. Natl. Acad. Sci. U.S.A.*, **112**: 719–724.

44. F. M. G. Magpantay, M. A. Riolo, M. Domenech de Cellès, A. A. King, P. Rohani (2014) "Epidemiological consequences of imperfect vaccines for immunizing infections" *SIAM J. Appl. Math.*, **74**: 1810–1830.

43. S. Shrestha, O. N. Bjørnstad, A. A. King (2014) "Evolution of acuteness in pathogen metapopulations: conflicts between 'classical' and invasion-persistence trade-offs" *Theor. Ecol.*, **7**: 299–311.

42. A. Massey, A. A. King, J. Foufopoulos (2014) "Fencing protected areas: a long-term assessment of the effects of reserve establishment and fencing on African mammalian diversity" *Biol. Conserv.*, **176**: 162–171.

41. R. C. Reiner, Jr., S. T. Stoddard, B. M. Forshey, A. A. King, A. M. Ellis, A. L. Lloyd, K. C. Long, C. Rocha, S. Vilcarromero, H. Astete, I. Bazan, A. Lenhart, G. M. Vazquez-Prokopec, V. A. Paz-Soldan, P. J. McCall, U. Kitron, J. Elder, E. Halsey, A. Morrison, T. J. Kochel, T. W. Scott (2014) "Time-varying, serotype-specific force of infection of dengue virus" *Proc. Natl. Acad. Sci. U.S.A.*, **111**: E2694–E2702.

40. M. Martinez-Bakker, K. Bakker, A. A. King, P. Rohani (2014) "Human birth seasonality: latitudinal gradient and interplay with childhood disease dynamics" *Proc. R. Soc. Lond. B*, **281**: 20132438.

39. M. Domenech de Cellès, M. A. Riolo, F. M. G. Magpantay, P. Rohani, A. A. King (2014) "Epidemiological evidence for herd immunity induced by acellular pertussis vaccines" *Proc. Natl. Acad. Sci. U.S.A.*, **111**: E716–E717.

38. M. A. Riolo, A. A. King, P. Rohani (2013), "Can vaccine legacy explain the British pertussis resurgence?" *Vaccine*, **31**: 5903–5908.

37. J. S. Lavine, A. A. King, V. Andreasen, O. N. Bjørnstad (2013), "Immune boosting explains regime-shifts in prevaccine-era pertussis dynamics" *PLoS ONE*, **8**: e72086.

36. N. G. Reich, S. Shrestha, A. A. King, P. Rohani, J. Lessler, S. Kalayanarooj, I-K. Yoon, R. V. Gibbons, D. S. Burke, D. A. T. Cummings (2013), "Interactions between serotypes of dengue highlight epidemiological impact of cross immunity" *J. R. Soc. Interface*, **10**: 20130414.

35. R. C. Reiner, Jr., A. A. King, M. Emch, Md. Yunus, A. S. G. Faruque, M. Pascual (2012), "Highly localized sensitivity to climate forcing drives endemic cholera in a megacity", *Proc. Natl. Acad. Sci. U.S.A.*, **109**: 2033–2036.

34. S. Shreshta, P. Rohani, A. A. King (2011), "Statistical inference for multi-pathogen systems" *PLOS Comput. Biol.*, **7**:e1002135.

33. E. L. Ionides, A. Bhadra, Y. Atchadé, A. A. King (2011), "Iterated filtering" *Ann. Stat.*, **39**:1776–1802.

32. J. Lavine, A. A. King, O. N. Bjørnstad (2011), "Natural immune boosting in pertussis dynamics and the potential for long-term vaccine failure" *Proc. Natl. Acad. Sci. U.S.A.*, **108**:7259–7264.

31. P. Rohani, X. Zhong, A A. King (2010), "Contact network structure explains the changing epidemiology of pertussis" *Science*, **330**:982–985.

30. P. Rohani and A. A. King (2010), "Never mind the length, feel the quality: The impact of long-term epidemiological data sets on theory, application, and policy" *Trends Ecol. Evol.*, **25**:611–618.

29. C. E. Cressler, A. A. King, E. E. Werner (2010), "Interactions between behavioral and life history tradeoffs in the evolution of integrated predator-defense plasticity" *Am. Nat.*, **176**:276–288.

28. J. L. Zelner, A. A. King, C. L. Moe, J. N. S. Eisenberg (2010) "How infections propagate after point source outbreaks: An analysis of secondary norovirus transmission" *Epidemiology*, **21**:711–718.

27. J. Vandermeer and A. A. King (2010), "Consequential classes of resources: Subtle global bifurcation with dramatic ecological consequences in a simple population model" *J. Theor. Biol.*, **263**:237–241.

26. E. C. Farrer, D. E. Goldberg, A. A. King (2010), "Time lags and the balance of positive and negative interactions in driving grassland community dynamics" *Am. Nat.*, **175**:160–173.

25. D. He, E. L. Ionides, A. A. King (2010), "Plug-and-play inference for disease dynamics: Measles in large and small towns as a case study" *J. R. Soc. Interface*, **7**: 271–283.

24. A. A. King, S. Shrestha, E. T. Harvill, O. N. Bjørnstad (2009), "Evolution of acute infections and the invasion-persistence trade-off" *Am. Nat.*, **173**: 446–455.

23. J. A. Scales, A. A. King, M. A. Butler (2009), "Running for your life or running for your dinner: What drives fiber-type evolution in lizard locomotor muscles?" *Am. Nat.*, **173**:543–553.

22. C. Bretó, D. He, E. L. Ionides, A. A. King (2009), "Time series analysis via mechanistic models" *Ann. Appl. Stat.*, **3**:319–348.

21. H. D. G. Maschner, M. W. Betts, J. Cornell, J. A. Dunne, B. Finney, N. Huntly, J. W. Jordan, A. A. King, N. Misarti, K. L. Reedy-Maschner, R. Russell, A. Tews, S. A. Wood, B. Benson (2009) "An Introduction to the Biocomplexity of Sanak Island, Western Gulf of Alaska" *Pacific Sci.*, **63**:673–709.

20. A. A. King, E. L. Ionides, M. Pascual, M. J. Bouma (2008), "Inapparent infections and cholera dynamics", *Nature* **454**:877–880.

19. D. Dimitrov, A. A. King, T. G. Hallam (2008), "Modeling evolution and persistence of neurological viral diseases in wild populations". *Math. Biosci. Eng.* **5**:729–741.

18. E. L. Ionides, C. Bretó, A. A. King (2006), "Inference for nonlinear dynamical systems" *Proc. Natl. Acad. Sci. U.S.A.* **103**:18438–18443.

17. R. A. Desharnais, R. F. Costantino, J. M. Cushing, S. M. Henson, B. Dennis, A. A. King (2006), "Experimental support of the scaling rule for demographic stochasticity" *Ecol. Lett.* **9**:537–547.

16. R. F. Costantino, R. A. Desharnais, J. M. Cushing, B. Dennis, S. M. Henson, A. A. King (2005), "Nonlinear population dynamics: The flour beetle *Tribolium* as an effective tool of discovery" *Advances in Ecological Research* **37**:101–141.

15. M. A. Butler and A. A. King (2004), "Phylogenetic comparative analysis: a modeling approach for adaptive evolution", *Am. Nat.* **164**:683–695.

14. A. A. King, R. F. Costantino, J. M. Cushing, S. M. Henson, R. A. Desharnais, B. Dennis (2004), "Anatomy of a chaotic attractor: subtle model-predicted patterns revealed in population data" *Proc. Natl. Acad. Sci. U.S.A.* **101**:408–413.

13. A. A. King and A. Hastings (2003), "Spatial mechanisms for coexistence of species with a shared natural enemy", *Theor. Popul. Biol.* **64**: 431–438.

12. S. M. Henson, A. A. King, R. F. Costantino, J. M. Cushing, B. Dennis, R. A. Desharnais (2003), "Explaining and predicting patterns in stochastic population systems", *Proc. R. Soc. Lond. B* **270**: 1549–1553.

11. A. A. King, R. A. Desharnais, S. M. Henson, R. F. Costantino, J. M. Cushing (2002), "Random Perturbations and Lattice Effects in Chaotic Population Dynamics", *Science* **297**:2163.

10. S. M. Henson, R. F. Costantino, J. M. Cushing, R. A. Desharnais, B. Dennis, A. A. King (2001), "Lattice Effects Observed in Chaotic Dynamics of Experimental Populations", *Science* **294**:602-605.

9. A. A. King and W. M. Schaffer (2001), "The Geometry of a Population Cycle: A Mechanistic Model of Snowshoe Hare Demography", *Ecology* **82**:814–830.

8. W. M. Schaffer, B. S. Pederson, K. Moore, O. Skarpaas, A. A. King, T. V. Bronnikova (2001), "Subharmonic resonance and multi-annual oscillations in northern mammals: a nonlinear dynamical systems perspective", *Chaos, Solitons, Fractals* **12**:251–264.

7. J. M. Cushing, S. M. Henson, R. A. Desharnais, B. Dennis, R. F. Costantino, A. King (2001), "A Chaotic Attractor in Ecology: Theory and Experimental Data", *Chaos, Solitons, Fractals* **12**:219–234.

6. A. A. King and W. M. Schaffer (1999), "The Rainbow Bridge: Hamiltonian Limits and Resonance in Predator Prey Dynamics", *J. Math. Biol.* **39**:439–469.

5. A. A. King, W. M. Schaffer, J. Treat, C. Gordon, M. Kot (1996), "Weakly Dissipative Predator-Prey Systems", *Bull. Math. Biol.* **58**:835–860.

Book Chapters

4. A. A. King, M. Domenech de Cellès, F. M. G. Magpantay, P. Rohani (2018), "Pertussis Immunity and the Epidemiological Impact of Adult Transmission: Statistical Evidence From Sweden and Massachusetts" in P. Rohani and S. Scarpino (eds.) *Pertussis: Epidemiology, Immunology, and Evolution*, Oxford University Press, Oxford.

3. E. L. Ionides, C. Bretó, A. A. King (2008), "Modeling disease dynamics: Cholera as a case study", Chapter 8 in A. Biswas, S. Datta, J. Fine, M. Segal (eds.) *Statistical Advances in Biomedical Sciences*. John Wiley & Sons, Hoboken, N.J.

2. A. A. King (2005), "Phase plane", in Alwyn Scott (ed.), *Encyclopedia of Nonlinear Science*, pp. 712–714. Routledge, New York.

1. A. A. King and A. C. Scott (1998), "The Dimensions of Creativity", in S. R. Hameroff, A. W. Kaszniak, & A. C. Scott (eds.) *Toward a Science of Consciousness 2*, MIT Press, Cambridge, Mass.

Technical Reports

2. A. Becker and A. A. King (2014), "Biases in statistical inference: measles as a case study", University of Michigan, Applied & Interdisciplinary Mathematics Program.

1. E. L. Ionides, C. Bretó, A. A. King (2006), "Parameter estimation for nonlinear state space models", Statistics Department Technical Report #438. University of Michigan, Department of Statistics.

Publication Databases

– ORCID: 0000-0001-6159-3207
– ResearcherID: B-8092-2012

– NCBI Bibliography
– Google Scholar profile

Software Development

Developer and maintainer of the following software packages:

– `pomp`, an R package for statistical inference using partially-observed Markov processes
– `phylopomp`, an R package for phylodynamic inference
– `panelPomp`, an R package for statistical inference on panel data using partially observed Markov process models
– `spatPomp`, an R package for statistical inference on spatiotemporal dynamics
– `PartiallyObservedMarkovProcesses.jl`, a Julia port of the `pomp` package
– `subplex`, an R package for nonlinear optimization
– `ouch`, an R package for model-based phylogenetic comparative analysis of quantitative traits
– `tao`, a very important software package,
– `BifCurve`, a Mathematica package for numerical continuation and bifurcation analysis
– `NormalForm`, a Mathematica package for symbolic normal-form analysis of vectorfields

These packages are linked from my website.

Completed Grants

11. National Institutes of Health, NIAID Grant #1R01AI143852: "Dynamical modeling of hospital transmission and antibiotic resistance evolution in a multidrug resistant nosocomial pathogen" 2019–2025. Co-PI. $2.9M.
10. Joint NSF DMS/NIH NIGMS Interface Grant #1761603: "Collaborative research: Urban vector-borne disease transmission demands advances in spatiotemporal statistical inference" 2018–2023. Co-PI. $1.3M.
9. National Institutes of Health, NIGMS Grant #1U54GM111274: "X-raying high-dimensional infectious disease data using statistical inference", Part of Center for Inference & Dynamics of Infectious Disease, a Center of Excellence of the Models of Infectious Disease Agents (MIDAS) Network 2014–2019. UM PI. $3.0M.
8. National Institutes of Health, NIAID Grant #1R01AI101155: "Integrating immunology, epidemiology, and evolution to understand and control pertussis transmission", 2012–2019. PI. $1.7M.
7. Research and Policy for Infectious Disease Dynamics (RAPIDD) Program Interagency Personnel Agreement, 2008–2012. National Institutes of Health, Fogarty International Center and Department of Homeland Security, Science & Technology Directorate.
6. National Oceanic and Atmospheric Administration Grant #NA08NOS4730321: "Cholera prediction: the role of the oceans and nonlinear disease dynamics", 2008–2013. Oceans and Human Health Program. Co-PI. $943k.
5. National Science Foundation, Division of Environmental Biology Grant #0542360: "Collaborative Research: A direct modeling approach for phylogenetic comparative analysis", 2005–2010. Systematics Program. PI. $361k.

4. National Science Foundation, Directorate for Biological Sciences Grant #0545276: "EID: Collaborative Research: The interplay of extrinsic and intrinsic factors in epidemiological dynamics: cholera as a case study", 2004–2008. Ecology of Infectious Diseases Program. Co-PI. $942k.
3. National Science Foundation, Division of Biological Sciences Grant #0430418: "EID: Ecological Influences on Rabies Infections in Bats", 2004–2006. Ecology of Infectious Diseases Program. Co-PI. $1.5M.
2. National Science Foundation Mathematical Science Postdoctoral Research Fellowship #0071584, 2000–2003. $90k.
1. National Science Foundation Graduate Research Fellowship, 1994–1997.

Working Groups

6. Isaac Newton Institute for Mathematical Sciences, Cambridge, "Modelling and Inference for Pandemic Preparedness" (2024).
5. Mathematisches Forschungsinstitut Oberwolfach, "Design and Analysis of Infectious Disease Studies" (2018, 2023).
4. National Evolutionary Synthesis Center (NESCent) Catalysis Meeting "Evolution of Infectious Diseases: Integrating Empirical Data and Modeling Approaches" (2011).
3. National Center for Ecological Analysis and Sythesis (NCEAS) Working Group on "Unifying approaches to statistical inference in ecology" (2007–2010).
2. National Evolutionary Synthesis Center (NESCent) "Hackathon on Comparative Methods in R" (2007–2008).
1. National Center for Ecological Analysis and Sythesis (NCEAS) Working Group on "Seasonality and the population dynamics of infectious diseases" (2003–2005).

Invited Lectures

118. Plenary Lecture, Workshop on Mathematical Ecology: Phylodynamics, Queen's University, Kingston, Ontario (25 July 2025).
117. Annual Meeting of the Society for Modeling and Theory in Population Biology, National Institute for Theory and Mathematics in Biology, Chicago (3 June 2025).
116. Phyloseminar.org (11 February 2025).
115. Phyloseminar.org (14 January 2025).
114. Theoretical Ecology Seminar, International Initiative for Theoretical Ecology (12 November 2024).
113. Modelling and Inference for Pandemic Preparedness—A Focussed Workshop. Isaac Newton Institute for Mathematical Sciences, University of Cambridge (9 August 2024).
112. Determinants and Dynamics of Viral Emergence and Establishment in Human Populations. Princeton University (10 April 2024).
111. Plenary Lecture, 15th International Conference on Dynamical Systems Applied to Biology and the Natural Sciences (DSABNS). Universidade Nova de Lisboa, Lisbon, Portugal (6 February 2024).

110. Invited Lecture, Workshop on Design and Analysis of Infectious Disease Studies. Mathematisches Forschungsinstitut Oberwolfach. Baden-Württemberg, Germany (21 February 2023).
109. Public Lecture, 14th International Conference on Dynamical Systems Applied to Biology and the Natural Sciences (DSABNS). Bilbao, PV, Spain (6 February 2023).
108. Workshop on Mathematics and Statistics of Genomic Epidemiology. Casa Matemática Oaxaca, Oaxaca, Mexico (8 November 2022).
107. Plenary Lecture, Workshop on Mathematical Ecology: Modeling Epidemics, Queen's University, Kingston, Ontario (10 August 2022).
106. Plenary Lecture, 13th Conference on Dynamical Systems Applied to Biology and Natural Sciences (DSABNS) (remote, 11 February 2022).
105. Keynote Address, International Forum on Advanced Environmental Sciences and Technology (iFAST) Symposium in Honor of Simon Levin's 80th Birthday (remote, 26 July 2021).
104. Workshop on Mathematics and Statistics of Genomic Epidemiology. Banff International Research Station, Banff, Alberta and Casa Matemática Oaxaca, Oaxaca, Mexico (remote, 9 November 2020).
103. Workshop on Construction and Maintenance of Immune Memory, Center for Infectious Disease Dynamics, Pennsylvania State University (24–26 April 2019)
102. Keynote Address, International Workshop on Mathematical Biology, Bohol Bee Farm, Panglao Island, Bohol, Philippines (9 January 2019)
101. Workshop on Mathematical and Statistical Challenges in Bridging Model Development, Parameter Identification and Model Selection in the Biological Sciences. Banff International Research Station, Banff, Alberta (14 November 2018).
100. Western North American Region Meeting of the International Biometric Society, Edmonton, Alberta (26 June 2018).
 99. Workshop on Disease Ecology & Eco-epidemiology, Mathematical Biosciences Institute, Columbus, Ohio (28 March 2018).
 98. Plenary Address, Workshop on Distributed Data for Dynamics and Manifolds, Casa Matemática Oaxaca, Oaxaca, Mexico (4 September 2017).
 97. Workshop on New Perspectives on State Space Models, Casa Matemática Oaxaca, Oaxaca, Mexico (30 August 2017).
 96. Conference on Mathematical Modeling and Control of Communicable Diseases, Fundação Getulio Vargas, Rio de Janeiro, Brazil (12 January 2016).
 95. RAPIDD Workshop on Gravity Models, Disease Spread, and Spatial Scales, Queens' College, Cambridge, England (8 September 2015).
 94. Workshop on Statistics and Nonlinear Dynamics in Biology and Medicine, Banff International Research Station, Banff, Alberta (29 July 2014).
 93. Statistical and Mathematical Modeling in Biological Applications (SaMMBA) Seminar, Institut Pasteur, Paris (6 May 2014).
 92. Course on Modeling of Infectious Diseases, Institut Pasteur, Paris (5 May 2014).
 91. Program in Applied Mathematics 35th Anniversary Meeting, University of Arizona, Tucson, Arizona (26 April 2014).
 90. Chi Epsilon Civil Engineering Honors Society, University of Michigan (26 March 2014).

89. Statistical Society of Canada Annual Meeting, Guelph, Ontario (4 June 2012).

88. Global Environmental Changes and Health, Ecole des Hautes Études en Santé Publique, Paris, (4 November 2011).

87. National Evolutionary Synthesis Center (NESCent) Catalysis Meeting on Evolution of Infectious Diseases: Integrating Empirical Data and Modeling Approaches, Durham, North Carolina (23 March 2011).

86. University of Michigan Society of Biology Students, Ann Arbor (19 January 2011).

85. Plenary Address, Opening Workshop for the Statistical and Applied Mathematical Sciences Institute (SAMSI) Program on Analysis of Object Data, Research Triangle Park, North Carolina (13 September 2010).

84. Keynote Address, Symposium on Advances in Modelling Ecological Data, British Ecological Society Annual Meeting, University of Leeds (8 September 2010).

83. Symposium on Stochastic Dynamics in Population Biology, Society for Industrial and Applied Mathematics (SIAM) Conference on the Life Sciences, Pittsburgh (15 July 2010).

82. Workshop on Statistical Methods for Dynamic System Models, Vancouver, British Columbia (6 June 2009).

81. Plenary Address, Ecology & Evolution of Infectious Disease Conference, University of Georgia (22 May 2009).

80. Mathematical Modeling and Analysis of Populations in Biological Systems Conference, Tucson, Arizona (5 October 2007).

79. Bridging the Scales of Disease Dynamics 2006, Pacific Institute of Mathematical Sciences, University of British Columbia, Vancouver (29 September 2006).

78. Keynote Address, TIMBER 2005, A Conference on Quantitative Biology, Appalachian State University, Boone, North Carolina (4 November 2005).

77. Symposium, Ecological Society of America Annual Meeting, Montréal, Québec, (12 August 2005).

76. Symposium, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah (26 May 2005).

75. Joint Mathematics Meetings, Atlanta, Georgia (8 January 2005).

74. Joint Mathematics Meetings, Phoenix, Arizona (7 January 2004).

73. University of Tennessee Chapter of the Society for Industrial and Applied Mathematics, University of Tennessee, Knoxville (5 November 2003).

72. Ecological Society of America Annual Meeting, Savannah, Georgia, (7 August 2003).

71. Rocky Mountain Mathematics Consortium Summer Conference, University of Wyoming, Laramie, Wyoming, (7–18 July 2003).

70. Ecological Society of America Annual Meeting, Tucson (4 August 2002).

69. Mathematical Methods in Population Biology, University of California, Davis (2000–2001).

Seminars

68. Department of Ecology & Evolution, University of Chicago (17 February 2025).

67. Texas Biomedical Research Institute, San Antonio (4 February 2025).

66. Department of Infectious Disease Epidemiology, Imperial College, London
    (21 August 2024).
65. Applied & Interdisciplinary Mathematics Seminar, University of Michigan, Ann Arbor
    (22 March 2024).
64. Center for Statistics and Quantitative Infectious Disease, University of Florida (hybrid,
    19 April 2023).
63. Santa Fe Institute (hybrid, 8 March 2022).
62. Center for the Ecology of Infectious Diseases, University of Georgia (remote,
    23 February 2022).
61. Centre d'Estudis Avançats de Blanes (CEAB), Blanes (remote, 22 February 2022).
60. Center for the Study of Complex Systems, University of Michigan (in person!,
    15 February 2022).
59. Biomedical Mathematics Group, Institute for Basic Science, Daejeon, Korea (remote,
    16 September 2021).
58. Mathematical and Theoretical Biology Seminar, Basque Center for Applied Mathematics,
    Bilbao (remote, 21 May 2021).
57. Quantitative Biology Colloquium, University of Arizona (joint with Mathematical
    Biology Seminar, Arizona State University) (remote, 5 March 2021).
56. Applied & Interdisciplinary Mathematics Seminar, University of Michigan, Ann Arbor
    (remote, 6 November 2020).
55. Mathematics Department, University of Kansas (remote, 28 October 2020).
54. Santa Fe Institute (remote, 1 April 2020).
53. Santa Fe Institute (3 February 2020).
52. Infectious Disease Seminar, Department of Ecology & Evolutionary Biology, Princeton
    University (20 November 2019).
51. Department of Public Health Sciences, University of Chicago (8 May 2019).
50. Center for Modeling Complex Interactions, University of Idaho (24 January 2019).
49. Department of Ecology & Evolutionary Biology, University of California, Los Angeles
    (22 May 2018).
48. Centre for Comparative Genomics and Evolutionary Bioinformatics, Dalhousie
    University, Halifax (19 April 2018).
47. Department of Epidemiology & Biostatistics, Indiana University, Bloomington
    (2 April 2018).
46. Laboratory for Pediatric Infectious Disease, Radboud University Medical Center,
    Nijmegen, Netherlands (7 October 2016).
45. Theoretical Biology, Institut für Integrative Biologie, Eidgenössische Technische
    Hochschule (ETH), Zürich (3 October 2016)
44. Center for Infectious Disease Dynamics, Pennsylvania State University
    (10 December 2015).
43. Quantitative Biology, Program in Applied Mathematics, University of Arizona, Tucson
    (22 April 2014).
42. Department of Epidemiology of Microbial Diseases, Yale School of Public Health, New
    Haven, Connecticut (3 April 2014).
41. Department of Ecology and Evolutionary Biology, Princeton University (4 April 2013).

40. Department of Ecology and Evolutionary Biology, Queen's University, Kingston, Ontario (6 December 2012).
39. Centre National de la Recherche Scientifique & Institut de Recherche pour le Développement, Montpellier, France (14 October 2011).
38. Harvard School of Public Health, Boston (25 April 2011).
37. Center for Infectious Disease Dynamics, Pennsylvania State University (21 April 2011).
36. Biological Physics and Complex Systems Series, University of Michigan (22 February 2010).
35. Department of Physics, Oakland University (17 September 2009).
34. Department of Ecology & Evolution, University of Chicago (9 February 2009).
33. Mathematical and Computational Biology Series, Department of Mathematics, University of California, Berkeley (17 September 2008).
32. National Center for Ecological Analysis and Synthesis, Santa Barbara, California (6 December 2007).
31. Department of Biology, Case Western Reserve University, Cleveland, Ohio (17 October 2007).
30. Applied and Interdisciplinary Mathematics Program, University of Michigan (23 February 2007).
29. Department of Epidemiology, University of Michigan (24 January 2007).
28. W. K. Kellogg Biological Station (13 January 2006).
27. Program in Applied and Interdisciplinary Mathematics, University of Michigan (28 October 2005).
26. Differential Equations Seminar, Department of Mathematics, University of Tennessee, Knoxville (28 October 2002).
25. Institute for Theoretical Dynamics, University of California, Davis (9 May 2001).
24. Department of Ecology & Evolutionary Biology, University of Arizona (19 January 1999).

Contributed Presentations

23. "The filter equation for exact phylodynamic likelihood", Poster, Dynamical Systems Applied to Biology and the Natural Sciences, Naples (20–24 January 2025).
22. "Unified and exact approach to phylodynamics via a new class of Markov genealogy processes", Poster, Ecology & Evolution of Infectious Disease, Atlanta (6–9 June 2022).
21. "Unified and exact approach to phylodynamics via a new class of Markov genealogy processes", Poster, 8th International Conference on Infectious Disease Dynamics, Bologna (remote, 30 November–3 December 2021).
20. "Unified approach to phylodynamic inference", Poster, 18th Meeting on Ecology and Evolution of Infectious Disease, Montpellier (remote, 13–17 June 2021).
19. "Toward exact phylodynamic inference", Faculty Science Lunch, Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor (16 November 2020)).
18. "Breaking down defenses: quantitative analysis of malaria infection dynamics reveals distinct immune defense strategies", Poster, 17th Annual Meeting on Ecology and Evolution of Infectious Disease, Princeton (10–13 June 2019).

17. "The end of the honeymoon: cumulative impact of vaccination coverage on pertussis incidence", Poster, 12th Annual Symposium on Bordetella, Brussels (9–12 April 2019).

16. "An epidemiological perspective on the generation and maintenance of immune memory", Lecture, RAPIDD Workshop on Generation and Maintenance of Immune Memory, Fred Hutchinson Cancer Research Center, Seattle, Washington (7 March 2011).

15. "Boosting of acquired immunity through re-exposure: Dynamical consequences", Lecture, Ecology Society of America Annual Meeting, Albuquerque, New Mexico (6 August 2009).

14. "Statistical inference using mechanistic models in continuous time: Measles as a case study", Lecture, Ecology Society of America Annual Meeting, Milwaukee, Wisconsin (7 August 2008).

13. "New insights into cholera dynamics: Rapid loss of immunity, transmission mode, and climate drivers", Lecture, Ecology Society of America Annual Meeting, San Jose, California (9 August 2007).

12. "A new view of cholera endemicity: routes of transmission and rapid loss of immunity", Lecture, Ecology of Infectious Diseases and American Society of Tropical Medicine & Hygiene, Atlanta, Georgia (21 November 2006).

11. "Multiple skeletons and lattice effects in stochastic population models", Lecture, Alcalá Second International Conference on Mathematical Ecology, Alcalá de Henares, Spain (5–9 September 2003).

10. "Spatial mechanisms for coexistence of species sharing a common natural enemy", Lecture, Ecological Society of America Annual Meeting, Tucson, Arizona (4–9 August 2002).

9. "Subtle temporal patterns in *Tribolium* population dynamics", Lecture, International Conference on Mathematical and Theoretical Biology, Hilo, Hawai'i (16–19 July 2001).

8. "Genesis of spatio-temporal pattern: a codimension-three bifurcation in a spatial predator-prey model", Poster, International Conference on Mathematical and Theoretical Biology, Hilo, Hawai'i (16–19 July 2001).

7. "Hamiltonian limits and subharmonic resonance in ecological models: From the pendulum to the lynx and the hare", Symposium Lecture, AMS Western Sectional Meeting, Tucson, Arizona (14 November 1998).

6. "Subharmonic resonance and population cycles", Seminar, Department of Mathematics, University of Arizona (1 & 8 April 1998).

5. "Elucidating the microcircuitry underlying polyphasic response to olfactory stimulation", Lecture and Poster, Flinn Foundation Biomedical Initiative Symposium, Tucson, Arizona (9–10 May 1997).

4. "Using mathematics to sniff out the brain's olfactory code", Lecture, Quantitative Modeling in Biology Seminar Series, University of Arizona, (26 February 1997).

3. "Persistent remnants of Hamiltonian topology in predator-prey dynamics", Lecture, Dynamics Days Arizona Conference (8–11 January 1997).

2. "Mathematical modeling as a tool in neurophysiology", Lecture, Foundation Biomedical Initiative Symposium, Scottsdale, Arizona (3–4 May 1996).

1. "The dimensions of creativity", Lecture, Toward A Science of Consciousness II Conference (8–13 April 1996).

University Courses

47. Mathematical Ecology, Departments of Ecology & Evolutionary Biology and Mathematics, Center for the Study of Complex Systems, University of Michigan, Ann Arbor, Winter 2025.
46. Introduction to Adaptive Systems. Center for the Study of Complex Systems and Department of Mathematics, University of Michigan, Ann Arbor, Fall 2023.
45. Model-based Statistical Inference in Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2023.
44. Population and Community Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2023.
43. Introduction to Adaptive Systems. Center for the Study of Complex Systems and Department of Mathematics, University of Michigan, Ann Arbor, Fall 2022.
42. Foundations of Mathematical Ecology, Departments of Ecology & Evolutionary Biology and Mathematics, Center for the Study of Complex Systems, University of Michigan, Ann Arbor, Fall 2022.
41. Introduction to Adaptive Systems. Center for the Study of Complex Systems and Department of Mathematics, University of Michigan, Ann Arbor, Winter 2022.
40. Foundations of Mathematical Ecology, Departments of Ecology & Evolutionary Biology and Mathematics, Center for the Study of Complex Systems, University of Michigan, Ann Arbor, Fall 2021.
39. Introduction to Adaptive Systems. Center for the Study of Complex Systems and Department of Mathematics, University of Michigan, Ann Arbor, Winter 2021.
38. Foundations of Mathematical Ecology. Departments of Ecology & Evolutionary Biology and Mathematics, Center for the Study of Complex Systems, University of Michigan, Ann Arbor, Fall 2020.
37. Model-based Statistical Inference in Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2018.
36. Mathematics of Life: An Introduction to Quantitative Biology. Program in Biology, University of Michigan, Ann Arbor, Winter 2018.
35. Mathematics of Life: An Introduction to Quantitative Biology. Program in Biology, University of Michigan, Ann Arbor, Winter 2017.
34. Model-based Statistical Inference in Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2016.
33. Mathematics of Life: An Introduction to Quantitative Biology. Program in Biology, University of Michigan, Ann Arbor, Winter 2016.
32. Mathematical Ecology. Departments of Ecology & Evolutionary Biology and Mathematics, University of Michigan, Ann Arbor, Fall 2015.
31. Model-based Statistical Inference in Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2014.
30. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2014.
29. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2013.
28. Population and Community Ecology. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Fall 2012.

27. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2012.
26. Model-based Statistical Inference for Ecological and Epidemiological Dynamics. Department of Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Winter term 2012.
25. Mathematical Ecology. Departments of Ecology & Evolutionary Biology and Mathematics, University of Michigan, Ann Arbor, Winter 2011.
24. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2010.
23. Interrogating Data with Models, Graduate Course, Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Winter 2010.
22. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2009.
21. Mathematical Ecology. Departments of Ecology & Evolutionary Biology and Mathematics, University of Michigan, Ann Arbor, Winter 2009.
20. Interrogating Data with Models, Graduate Course, Ecology & Evolutionary Biology, University of Michigan, Ann Arbor, Winter 2008.
19. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2007.
18. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Winter 2007.
17. Mathematical Ecology. Departments of Ecology & Evolutionary Biology and Mathematics, University of Michigan, Ann Arbor, Fall 2006.
16. General Ecology. Program in Biology, University of Michigan, Ann Arbor, Fall 2005.
15. Mathematical Ecology II. Departments of Ecology & Evolutionary Biology and Mathematics, University of Tennessee, Knoxville, Spring 2005.
14. Mathematical Ecology I. Departments of Ecology & Evolutionary Biology and Mathematics, University of Tennessee, Knoxville, Fall 2004.
13. Mathematical Ecology II. Departments of Ecology & Evolutionary Biology and Mathematics, University of Tennessee, Knoxville, Spring 2004.
12. Mathematical Ecology I. Departments of Ecology & Evolutionary Biology and Mathematics, University of Tennessee, Knoxville, Fall 2003.
11. Introduction to Modeling in Ecology, Evolution, and Behavior. Department of Ecology & Evolutionary Biology, University of Tennessee, Knoxville, Spring 2003.
10. Integral Calculus. Department of Mathematics, University of California, Davis, 2002.
9. Ordinary Differential Equations. Department of Mathematics, University of California, Davis, 2002.
8. Calculus. Department of Mathematics, University of Arizona, 1996.
7. Calculus (with Laboratory). Department of Mathematics, University of Arizona, 1994.
6. Calculus (with Laboratory). Department of Mathematics, University of Arizona, 1993.
5. College Algebra. Pima County Community College, Tucson, Arizona, 1993.
4. Elementary Mathematics. Pima County Community College, Tucson, Arizona, 1993.
3. Trigonometry. Department of Mathematics, University of Hawai'i, Mānoa, 1992.
2. Trigonometry. Department of Mathematics, University of Hawai'i, Mānoa, 1991.
1. Calculus. Department of Mathematics, University of Hawai'i, Mānoa, 1991.

Short Courses

21. Inference for Disease Dynamics. Instituto Serrapilheira Training Program in Quantitative Ecology, Araras, Rio de Janeiro, Brazil, 1–4 March 2024.
20. Simulation-based Inference for Epidemiological Dynamics. 15th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, 24–26 July 2023.
19. Simulation-based Inference for Epidemiological Dynamics. 14th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, (remote) 25–27 July 2022.
18. Simulation-based Inference for Epidemiological Dynamics. 13th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, (remote) 12–14 July 2021.
17. Simulation-based Inference for Epidemiological Dynamics. 12th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, (remote) 15–17 July 2020.
16. Simulation-based Inference for Epidemiological Dynamics. 11th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, 17–19 July 2019.
15. Summer School on Data Science and Epidemic Models University of Trento, Italy, 8–12 July 2019.
14. CMCI Modeler's Workshop. Center for Modeling Complex Interactions, University of Idaho, Moscow, 25 January 2019.
13. Simulation-based Inference for Epidemiological Dynamics. 10th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, 16–18 July 2018.
12. Simulation-based Inference for Epidemiological Dynamics. 9th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, 12–14 July 2017.
11. Workshop on Mathematical Models of Climate Variability, Environmental Change and Infectious Diseases. International Centre for Theoretical Physics, Trieste, Italy 8–19 May 2017.
10. Simulation-based Inference for Epidemiological Dynamics. 8th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, 18–20 July 2016.
9. Model-based Inference in Ecology and Epidemiology. Spring College on the Physics of Complex Systems, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, 9–20 May 2016.
8. Simulation-based Inference for Epidemiological Dynamics. 7th Summer Institute in Statistics and Modeling in Infectious Diseases, University of Washington, Seattle, 15–17 July 2015.
7. School on Pathogen Dynamics, Climate, and Global Change. International Centre for Theoretical Physics/South American Institute for Fundamental Research (ICTP-SAIFR), São Paulo, Brazil, 12–23 January 2015.

6. Workshop on Mathematical Models of Climate Variability, Environmental Change, & Infectious Diseases, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, 29 April–3 May 2013.
5. Ecology and Evolution of Infectious Diseases Workshop, University of Michigan, Ann Arbor, 19–22 May 2012.
4. Abdus Salam ICTP Workshop on Infectious Diseases, Nelson Mandela African Institute of Science & Technology, Arusha, Tanzania, 23–30 January 2012.
3. Ecology and Evolution of Infectious Diseases Workshop, University of California, Santa Barbara, 22–25 June 2011.
2. Ecology and Evolution of Infectious Diseases Workshop, University of Georgia, Athens, 16–19 May 2009.
1. Ecology and Evolution of Infectious Diseases Workshop, Colorado State University, Ft. Collins, 1–4 June, 2008.

Secondary School Courses

3. General Biology. Tucson Unified School District, Tucson, Arizona, 1993.
2. Art History. Varsity International School, Honolulu, Hawai'i, 1992.
1. English. Varsity International School, Honolulu, Hawai'i, 1991–1992.

Postdoctoral Researchers Supervised

13. Madeline Peters (2023–)
12. Maryam Hayati (2021–2024)
11. Qianying Lin (2019–2022)
10. Kenetta Nunn (2019-2021)
9. Nina Wale (2017–2020)
8. Carles Bretó (2015–2018)
7. Masoud Mirmomeni (2015–2016)
6. Matthieu Domenech de Cellès (2013–2015)
5. Felicia G. Magpantay (2013–2015)
4. Jennie S. Lavine (2011–2013)
3. Robert C. Reiner (2010–2011)
2. Sourya Shrestha (2009–2012)
1. Daihai He (2006–2008)

Visiting Scholars Hosted

6. Qianying Lin, Hong Kong Polytechnic University, September 2018–February 2019.
5. Prof. Birgitte Friesleben de Blasio, Oslo Centre for Biostatistics and Epidemiology, University of Oslo and Director, Department of Infectious Disease Epidemiology and Modelling, Norwegian Institute of Public Health, October 2016
4. Prof. Viggo Andreasen, Institut for Naturvidenskab og Miljø, Roskilde Universitet, October 2015
3. Theo Baracchini, École polytechnique Fédérale de Lausanne, March–July 2014
2. Leo Evequoz, École Polytechnique Fédérale de Lausanne, March–July 2013

   1. Javier Perez-Saez, École Polytechnique Fédérale de Lausanne, March–July 2013

Graduate Students Supervised

11. Avinash Subramanian (Ecology & Evolutionary Biology, University of Michigan, 2021–).
10. Kidus Asfaw (Ph.D., Statistics, University of Michigan, 2021). Currently at Microsoft Research.
9. Richard (Alex) Smith (Ph.D., Bioinformatics, University of Michigan, 2018).
8. Micaela E. Martinez (Ph.D., Ecology & Evolutionary Biology, University of Michigan, 2015)
7. Daniel Jonas (M.S. Applied Mathematics, University of Michigan, 2013) Currently a Ph.D. student at Colorado State University.
6. Laura Helmkamp (M.S., Biostatistics, University of Michigan, 2012) Currently a data analyst at the University of Colorado, Denver.
5. Clayton Cressler (Ph.D., Ecology & Evolutionary Biology, University of Michigan, 2010) Currently an associate professor at the University of Nebraska.
4. Melissa Brady (M.S., Ecology & Evolutionary Biology, University of Michigan, 2010) Currently a research scientist at Texas A&M university.
3. Yancy Lo (M.S., Ecology & Evolutionary Biology, University of Michigan, 2009) Currently a data scientist at the Institute for Biomedical Informatics, University of Pennsylvania.
2. Sourya Shrestha (Ph.D., Applied Interdisciplinary Mathematics, University of Michigan, 2009) Currently a research scientist at Bloomberg School of Public Health, Johns Hopkins University.
1. Frank Wright, (M.A., Mathematics, University of Tennessee, 2005)

Graduate Student Advisory Committee Service

37. Aaron Abkemeier (Statistics, University of Michigan, 2025–)
36. Sean Richards (EEB, University of Michigan, 2024–)
35. William Weaver (Ph.D., EEB, University of Michigan, 2025)
34. Jesse Wheeler (Ph.D., Statistics, University of Michigan, 2025)
33. Kevin Tracy (Ph.D., Bioinformatics, University of Michigan, 2024)
32. Kayla Hale (Ph.D., EEB, University of Michigan, 2023)
31. Deven V. Gokhale (Ph.D., Ecology, University of Georgia, 2022)
30. Jess Millar (Ph.D., Bioinformatics, University of Michigan, 2022)
29. Steph Wraith (Ph.D., Epidemiology, University of Michigan, 2022)
28. Katherine McLean (Ph.D., EEB, University of Michigan, 2022)
27. Camden Gowler (Ph.D., EEB, University of Michigan, 2020)
26. Clara Shaw (Ph.D., EEB, University of Michigan, 2019)
25. Byron Smith (Ph.D., EEB, University of Michigan, 2018)
24. Joonha Park (Ph.D., Statistics, University of Michigan, 2018)
23. Imani Russell (M.S., EEB, University of Michigan, 2018)
22. Paul Glaum (Ph.D., EEB, University of Michigan, 2018)
21. J. T. McCrone (Ph.D., Microbiology & Immunology, University of Michigan, 2018)

20. Pamela Martinez (Ph.D., Ecology & Evolution, University of Chicago, 2017)
19. Kevin Bakker (Ph.D., EEB, University of Michigan, 2017)
18. Nina Wale (Ph.D., Biology, Pennsylvania State University, 2016)
17. Dao Nguyen (Ph.D., Statistics, University of Michigan, 2016)
16. Daniel Zinder (Ph.D., Bioinformatics, University of Michigan, 2015)
15. Maria Riolo (Ph.D., Applied & Interdisciplinary Mathematics, University of Michigan, 2014)
14. Andres Baeza (Ph.D., EEB, University of Michigan, 2013)
13. Edward Baskerville (Ph.D., EEB, University of Michigan, 2013)
12. David Allen (Ph.D., EEB, University of Michigan, 2012)
11. Susanna Messinger (Ph.D., EEB, University of Michigan, 2012)
10. Jennie Lavine (Ph.D., Biology, Pennsylvania State University, 2011)
 9. Joseph Brown (Ph.D., EEB, University of Michigan, 2010)
 8. Anindya Bhadra, (Ph.D., Statistics, University of Michigan, 2010)
 7. Sarah Cobey (Ph.D., EEB, University of Michigan, 2009)
 6. Diego Ruiz-Moreno (Ph.D., EEB, University of Michigan, 2009)
 5. Carles Bretó, (Ph.D., Statistics, University of Michigan, 2007)
 4. Mimi Lin (EEB, Duke University)
 3. Sean McMahon (Ph.D., EEB, University of Tennessee, 2006)
 2. Tadashi Fukami (Ph.D., EEB, University of Tennessee, 2003)
 1. Paula Federico (Ph.D., EEB, University of Tennessee, 2007)
 0. Marc Cadotte (Ph.D., EEB, University of Tennessee, 2006)
-1. Wandi Ding (Ph.D., Mathematics, University of Tennessee, 2006)

Undergraduate Research Experiences Supervised

8. Tianyong Yao (Mathematics, Complex Systems, Interdisciplinary Physics, University of Michigan, 2025–)
7. Peter Yang (Mathematics, Statistics, Computer Science, University of Michigan, 2024–2025)
6. Bo Yang (Mathematics, Statistics, Data Science, University of Michigan, 2022–2023)
5. Joshua Pickard (Computer Science, University of Michigan, 2021–2022)
4. Diane Wang (Honors Thesis, Biology, University of Michigan, 2013–2014)
3. Alexander Becker (Mathematics, New York University, Summer REU, 2014)
2. Samuel Bouma (Physics, Trinity College, Dublin, Summer REU, 2012)
1. Busola Ruth Alabi (Biology, South Carolina State University, Summer REU, 2011)

Professional Society Memberships

– Society for Modeling and Theory in Population Biology
– Society for Industrial and Applied Mathematics
– Society for Mathematical Biology
– American Society of Naturalists
– Ecological Society of America
– American Association for the Advancement of Science

Department Service

17. Facilities & Space Committee, 2018–.
16. Faculty Mentor for five assistant professors.
15. Retreat Committee, 2022–2023
14. Faculty Search Committee, Ecology & Evolutionary Biology and Michigan Center for Infectious Disease Threats, University of Michigan, 2022.
13. Promotions and Merit Committee, Ecology & Evolutionary Biology, University of Michigan, 2017–2018.
12. Faculty Search Committee, Ecology & Evolutionary Biology, University of Michigan, 2016.
11. Biological Sciences Building Habitation Committee, Ecology & Evolutionary Biology, University of Michigan, 2015–2018.
10. Graduate Evaluations Committee, Ecology & Evolutionary Biology, University of Michigan, 2012–2015. Chair, 2013–2015.
 9. Undergraduate Affairs Committee, Ecology & Evolutionary Biology, University of Michigan, 2013–2015.
 8. Executive Committee, Ecology & Evolutionary Biology, University of Michigan, 2010–2012.
 7. Seminar Committee, Ecology & Evolutionary Biology, University of Michigan, 2008–2010. Chair, 2009–2010
 6. Graduate Admissions Committee, Ecology & Evolutionary Biology, University of Michigan, 2006–2008.
 5. Undergraduate Affairs Committee, Ecology & Evolutionary Biology, University of Tennessee, 2003–2004.
 4. Graduate Admissions Committee, Ecology & Evolutionary Biology, University of Tennessee, 2002–2005.
 3. Library Representative, Ecology & Evolutionary Biology, University of Tennessee, 2002–2005.
 2. Website Committee, Ecology & Evolutionary Biology, University of Tennessee, 2004–2005.
 1. Admissions Committee, Nonlinear Dynamics in Biology Research and Training Group, University of California, Davis, 2001.

College Service

2. Divisional Evaluation Committee, Natural Sciences Division, College of Literature, Science, and the Arts, University of Michigan, 2016–2019.
1. Faculty Information Technology Advisory Committee, College of Literature, Science, and the Arts, University of Michigan, 2013–2015.

University service

– Program Committee, Michigan Center for Data and AI in Society, 2024–.
– Member, Research Review Committee, Office of the Vice President for Research, University of Michigan, 2020–2022.

– Member, Executive Board, Michigan Center for Infectious Disease Threats, 2021–.
– Organizer, Teach-In on "Reclaiming Our Campus", University of Michigan, Ann Arbor, 15 March 2018.

Extramural Service

– Grant Proposal Review Panel, U.S. National Science Foundation, 2024.
– Grant Proposal Review Panel, U.S. National Institutes of Health, 2020.
– Scientific Consultant, Ann Arbor Civic Theater production of Tom Stoppard's *Arcadia*, 2018.
– Grant Proposal Review Panel, U.S. National Science Foundation, 2017.
– Grant Proposal Reviewer, Netherlands Organisation for Scientific Research, 2017.
– Grant Proposal Review Panel, U.S. National Science Foundation, 2012.
– Scientific Program Committee for "Experimental Chaos & Complexity Conference", Ann Arbor, 2012.
– Scientific Program Committee for "UseR! 2010, The R User Conference", National Institute of Standards and Technology (NIST), Gaithersburg, Maryland (July 20–23, 2010).
– Board of Directors, Tucson Waldorf Education Association, 1999–2000.
– Reviewer for: (1) *Advances in Ecological Research*, (2) *Annals of Applied Statistics*, (3) *American Naturalist*, (4) *Ecological Monographs*, (5) *Ecology*, (6) *Ecology Letters*, (7) *eLife*, (8) *Epidemics*, (9) *Epidemiology*, (10) *Geophysical Review Letters*, (11) *Journal of Biological Dynamics*, (12) *Journal of Health, Population and Nutrition*, (13) *Journal of Mathematical Biology*, (14) *Journal of Statistical Software*, (15) *Journal of Theoretical Biology*, (16) *Journal of the Royal Society Interface*, (17) *Mathematical Biosciences*, (18) *Methods in Ecology & Evolution*, (19) *Molecular Biology & Evolution*, (20) *Nature*, (21) *Nature Communications*, (22) *Nature Physics*, (23) *Oikos*, (24) *Parasitology*, (25) *Physica D*, (26) *Physical Review Letters*, (27) *Physics Letters A*, (28) *PLOS Biology*, (29) *PLOS Computational Biology*, (30) *PLOS Medicine*, (31) *PLOS Neglected Tropical Diseases*, (32) *PLOS One*, (33) *PLOS Pathogens*, (34) *Proceedings of the National Academy of Sciences, U.S.A*, (35) *Proceedings of the Royal Society A*, (36) *Proceedings of the Royal Society B*, (37) *Science*, (38) *Science Advances*, (39) *Science Translational Medicine*, (40) *Scientific Reports*, (41) *SIAM Journal on Applied Mathematics*, (42) *Statistics in Medicine*, (43) *Statistical Methods in Medical Research*, (44) *Theoretical Ecology*, (45) *Theoretical Population Biology*, (46) *Trends in Ecology & Evolution*.