Curriculum Vitae

Cosma Rohilla Shalizi

Contact

ADDRESS	Department of Statistics, Carnegie Mellon University 5000 Forbes Avenue, Pittsburgh, PA 15213-3890
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SEX	Male NATIONALITY USA

Education

1993–2001: University of Wisconsin at Madison, Physics Department, Ph.D. *Causal Architecture, Complexity and Self-Organization for Time Series and Cellular Automata*. Advisers: James P. Crutchfield (physics) and David Griffeath (mathematics).
1990–1993: University of California at Berkeley, Physics Department, A.B.

Research

Positions

2005–: Statistics Department, Carnegie Mellon University. Associate professor with tenure since 2014
(With affiliations with the Machine Learning Department; the Center for the Neural Basis of Cognition; the Heinz School of Public Policy; and the Institute for Complex Social Dynamics)
2007–: External faculty, Santa Fe Institute
2002–2005: Postdoctoral Research Fellow, Center for the Study of Complex Systems, University of Michigan
1998–2002: Graduate and then Postdoctoral Fellow, Santa Fe Institute
1997: Research assistant, Mathematics Department, UW-Madison

Research Interests

Statistical analysis of complex systems models
Inference for stochastic processes: learning theory, nonparametric prediction
Networks: causal inference, exponential families, nonparametrics, historical networks
Simulation-based inference
Inference and prediction with mis-specified models
Collective cognition and problem-solving
Stochastic models of social evolution and institutional change
Large deviations and ergodic theory in statistical learning

Functional connectivity in neural systems
Inference for heavy-tailed distributions
Quantitative measures of self-organization and complexity
Cellular automaton models of pattern formation
Hidden Markov models and hidden Markov random fields
Philosophy of science (causation; induction; reduction and emergence)

Grant Support

As PI

- "Nonparametric Prediction and Structure Discovery for Spatial Dynamics", NSF (grant DMS1207759), 2012–2015
- "Model Complexity and Prediction Error in Macroeconomic Forecasting", Institute for New Economic Thinking (grant IN01100005), 2011–2013
- "High-Dimensional Statistics for Macroeconomic Forecasting", INET (INO1400020), 2014–2016
- "Nonparametric Network Comparison", NSF (DMS1418124), 2014–2017
- "Simulation-based Inference through Random Features", NSF (DMS2310834, 2023–2026)

As co-PI

- "New Statistical Methods for fMRI Applied to Visual Reference Frames in Humans", NIH (grant # 2 R01 NS047493), 2009–2013 (PI: Christopher Genovese)
- "Six Degrees of Francis Bacon", Google, 2012–2013 (PI: Christopher Warren)

Publications

In Peer-Reviewed Journals and Conferences

1. Henry Farrell, Alison Gopnik, CRS and James Evans, "Large AI models are cultural and social technologies", *Science* **387** (2025): 1153–1156
2. (*) CRS and Cristopher Moore, "What Is a Macrostate? Subjective Observations and Objective Dynamics", *Foundations of Physics* **55** (2025): 2, arxiv:cond-mat/0303625
3. Henry Farrell and CRS, "Bias, Skew and Search Engines Are Sufficient to Explain Online Toxicity", *Communications of the ACM* **67:4** (2024): 25–28
4. CRS and Dena Asta, "Consistency of Maximum Likelihood for Continuous-Space Network Models, Part I", *Electronic Journal of Statistics* **18** (2024): 335–354, arxiv:1711.02123

5. Neil A. Spencer and CRS, "Projective, Sparse, Learnable Latent Space Network Models", *Annals of Statistics* **51** (2023): 2506–2525, arxiv:1709.09702

6. Edward McFowland III and CRS, "Estimating Causal Peer Influence in Homophilous Social Networks by Inferring Latent Locations", *Journal of the American Statistical Association* **118** (2023): 707–718, arxiv:1607.06565

7. William A. Fahy, CRS, and Ryan C. Sullivan, "A universally applicable method of calculating confidence bands for ice nucleation spectra derived from droplet freezing experiments", *Atmospheric Measurement Techniques* **15** (2022): 6819–6836

8. Alden Green and CRS, "Bootstrapping Exchangeable Random Graphs", *Electronic Journal of Statistics* **16** (2022): 1058–1095, arxiv:1711.00813

9. Octavio César Mesner and CRS, "Conditional Mutual Information Estimation for Mixed Discrete and Continuous Variables with Nearest Neighbors", *IEEE Transactions on Information Theory* **67** (2021): 464–484, arxiv:1912.03387

10. Octavio César Mesner, Alex Davis, Elizabeth Casman, Hyagriv Simhan, CRS, Lauren Keenan-Devlin, Ann Borders and Tamar Krishnamurti, "Using graph learning to understand adverse pregnancy outcomes and stress pathways", *PLoS One* **14** (2019): e0223319

11. George D. Montañez and CRS, "The LICORS Cabinet: Nonparametric Light Cone Methods for Spatio-temporal Modeling", *International Joint Conference on Neural Networks 2017* [IJCNN 2017], pp. 2811–2819, arxiv:1506.02686 (winner of INNS/Intel Best Student Paper and Best Poster awards)

12. Daniel J. McDonald, CRS and Mark Schervish, "Nonparametric Risk Bounds for Time-Series Forecasting", *Journal of Machine Learning Research* **18:32** (2017): 1–40, arxiv:1212.0463

13. Christopher N. Warren, Daniel Shore, Jessica Otis, Lawrence Wang, Mike Finegold and CRS, "Six Degrees of Francis Bacon: A Statistical Method for Reconstructing Large Historical Social Networks", *Digital Humanities Quarterly* **10:3** (2016)

14. Daniel J. McDonald, CRS and Mark Schervish, "Estimating Beta-Mixing Coefficients via Histograms", *Electronic Journal of Statistics* **9** (2015): 2855–2883, arxiv:1109.5998

15. Leila Wehbe, Aaditya Ramdas, Rebecca C. Steorts and CRS, "Regularized Brain Reading with Shrinkage and Smoothing", *Annals of Applied Statistics* **9** (2015): 1997–2022, arxiv:1401.6595

16. Dena Asta and CRS, "Geometric Network Comparison", pp. 102–110 in Marina Meila and Tom Heskes (eds.), *31st Conference on Uncertainty in Artificial Intelligence* [UAI 2015], arxiv:1411.1350,

17. (*) Xiaoran Yan, CRS, Jacob E. Jensen, Florent Krzakala, Cristopher Moore, Lenka Zdeborova, Pan Zhang and Yaojia Zhu, "Model Selection for Degree-corrected Block Models", *Journal of Statistical Mechanics: Theory and Experiment* (2014): P05007, arxiv:1207.3994

18. CRS and Aryeh (Leonid) Kontorovich, "Predictive PAC Learning and Process Decompositions", pp. 1619–1627 in *Advances in Neural Information Processing Systems 26* [NIPS 2013], arxiv:1309.4859

19. Georg M. Goerg and CRS, "Mixed LICORS: A Nonparametric Algorithm for Predictive State Reconstruction", pp. 289–297 in *Proceedings of the 16th Conference on Artificial Intelligence and Statistics* [AIStats 2013], arxiv:1211.3760

20. (*) CRS and Alessandro Rinaldo, "Consistency under Sampling of Exponential Random Graph Models", *Annals of Statistics* **41** (2013): 508–535, arxiv:1111.3054

21. (**) Andrew Gelman and CRS, "Philosophy and the Practice of Bayesian Statistics", *British Journal of Mathematical and Statistical Psychology* **66** (2013): 8–38, arxiv:1006.3868 (with discussion)

22. Daniel J. McDonald, CRS and Mark Schervish, "Estimating beta-mixing Coefficients", in *Proceedings of the 14th Conference on Artificial Intelligence and Statistics* [AIStats 2011], arxiv:1103.0941

23. (**) CRS and Andrew C. Thomas, "Homophily and Contagion Are Generically Confounded in Observational Social Network Studies", *Sociological Methods and Research* **40** (2011): 211–239, arxiv:1004.4704

24. Shinsuke Koyama, Lucia Castellanos Pérez-Bolde, CRS and Robert E. Kass, "Approximate Methods for State-Space Models", *Journal of the American Statistical Association* **105** (2010): 170–180, arxiv:1004.3476

25. Robert Haslinger, Kristina Lisa Klinkner and CRS, "The Computational Structure of Spike Trains", *Neural Computation* **22** (2010): 121–157, arxiv:1001.0036

26. (*) CRS, "Dynamics of Bayesian Updating with Dependent Data and Misspecified Models", *Electronic Journal of Statistics* **3** (2009): 1039–1074, arxiv:0901.1342

27. (***) Aaron Clauset, CRS and M. E. J. Newman, "Power-law distributions in empirical data", *SIAM Review* **51** (2009): 661–703, arxiv:0706.1062

28. CRS, "Social Media as Windows on the Social Life of the Mind", forthcoming in the proceedings of the AAAI 2008 spring symposium on social information processing, arxiv:0710.4911

29. CRS, Marcelo F. Camperi and Kristina Lisa Klinkner, "Discovering Functional Communities in Dynamical Networks", pp. 140–157 in Anna Goldenberg *et al.* (eds.), *Statistical Network Analysis: Models, Issues, and New Directions* (New York: Springer-Verlag, 2007) [proceedings of a workshop at ICML 2006], arxiv:q-bio.NC/0609008

30. (*) CRS, Robert Haslinger, Jean-Baptiste Rouquier, Kristina Lisa Klinkner and Cristopher Moore, "Automatic Filters for the Detection of Coherent Structure in Spatiotemporal Systems", *Physical Review E* **73** (2006): 036104, arxiv:nlin/0508001

31. Kristina Lisa Klinkner, CRS and Marcelo F. Camperi, "Measuring Shared Information and Coordinated Activity in Neuronal Networks", pp. 667–674 in Yair Weiss, Bernhard Schölkopf and John C. Platt (eds.), *Advances in Neural Information Processing Systems 18* [NIPS 2005] (Cambridge, Massachusetts: MIT Press, 2006), arxiv:q-bio.NC/0506009

32. Michael T. Gaster, CRS and M. E. J. Newman, "Maps and Cartograms of the 2004 US Presidential Election Results", *Advances in Complex Systems* **8** (2005): 117–123

33. Matthew J. Berryman, Scott W. Coussens, CRS, Yvonne Pamula, David Parsons, Kurt Lushington, David Saint, Andrew Allison, A. James Martin, Declan Kennedy and Derek Abbott, "Nonlinear Aspects of EEG Signals from Sleep Patients", pp. 40–48 in Nigel G. Stocks, Derek Abbott and Robert P. Morse (eds.), *Fluctuations and Noise in Biological, Biophysical, and Biomedical Systems III* (Bellingham, Washington: SPIE, 2005), arxiv:q-bio.NC/0506015

34. (*) CRS, Kristina Lisa Klinkner and Robert Haslinger, "Quantifying Self-Organization with Optimal Predictors", *Physical Review Letters* **93** (2004): 118701, arxiv:nlin/0409024

35. (*) CRS and Kristina Lisa Klinkner, "Blind Construction of Optimal Nonlinear Recursive Predictors for Discrete Sequences", pp. 504–511 in Max Chickering and Joseph Halpern (eds.), *Uncertainty in Artificial Intelligence: Proceedings of the Twentieth Conference* [UAI 2004] (Arlington, Virginia: AUAI Press, 2004), arxiv:cs.LG/0406011

36. CRS, "Functionalism, Emergence and Collective Coordinates", *Behavioral and Brain Sciences* **27** (2004): 635–636

37. CRS, "Optimal Nonlinear Prediction of Random Fields on Networks", *Discrete Mathematics and Theoretical Computer Science*, **AB(DMCS)** (2003): 11–30; arxiv:math.PR/0305160 (proceedings of the conference "Discrete Models for Complex Systems 2003")

38. CRS and James P. Crutchfield, "Information Bottlenecks, Causal States, and Statistical Relevance Bases: How to Represent Relevant Information in Memoryless Transduction", *Advances in Complex Systems*, **5** (2002): 91–95, arxiv:nlin/0006025

39. Wim Hordijk, CRS and James P. Crutchfield, "An Upper Bound on the Products of Particle Interactions in Cellular Automata", *Physica D* **154** (2001): 240–258, arxiv:nlin/0008038

40. (*) CRS and James P. Crutchfield, "Computational Mechanics: Pattern and Prediction, Structure and Simplicity", *Journal of Statistical Physics* **104** (2001): 817–879, arxiv:cond-mat/9907176

41. James P. Crutchfield, David P. Feldman and CRS, "Comment on 'Simple Measure for Complexity"', *Physical Review E* **62** (2000): 2996-2997, arxiv:nlin/9907001

42. Cristopher Moore, Mats G. Nordahl, Nelson Minar and CRS, "Vortex Dynamics and Entropic Forces in Antiferromagnets and Antiferromagnetic Potts Models", *Physical Review E* **60** (1999): 5344–5351, arxiv:cond-mat/9902200

43. (*) James P. Crutchfield and CRS, "Thermodynamic Depth of Causal States: Objective Complexity via Minimal Representation", *Physical Review E* **59** (1999): 275–283; arxiv:cond-mat/9808147

Invited and Contributed Papers

1. CRS, "Opening a Closed Box: Introduction to A. Rosenblueth and N. Wiener, 'The Role of Models in Science' (1945)", pp. 149–169 in David Krakauer (ed.), *Foundational Papers in Complexity Science*, volume I (Santa Fe, New Mexico: Santa Fe Institute Press, 2024)

2. Henry Farrell and CRS, "Pursuing Cognitive Democracy", pp. 211–231 in Danielle Allen and Jennifer S. Light (eds.), *From Voice to Influence: Understanding Citizenship in a Digital Age* (Chicago: University of Chicago Press, 2015), `http://bactra.org/weblog/917.html`

3. Justin H. Gross, CRS and Andrew Gelman, "Does the US Media Have a Liberal Bias? A Discussion of Tim Groseclose's *Left Turn: How Liberal Media Bias Distorts the American Mind*", *Perspectives on Politics* **10** (2012): 775–779, `http://www.stat.cmu.edu/~cshalizi/leftturn/`

4. CRS, "Comment on 'Why and When "Flawed" Social Network Analyses Still Yield Valid Tests of No Contagion", *Statistics, Politics, and Policy* **3** (2012): 5

5. Andrew Gelman and CRS, "Philosophy and the practice of Bayesian statistics in the social sciences", in Harold Kincaid (ed.), *Oxford Handbook of the Philosophy of the Social Sciences* (New York: Oxford University Press, 2012)

6. CRS, "Graphs, Trees, Materialism, Fishing: Reflections on Moretti", pp. 115–139 in Jonathan Goodwin and John Holbo (eds.), *Reading* Graphs, Maps, Trees (Anderson, SC: Parlor Press, 2011); `http://www.thevalve.org/go/valve/article/graphs_trees_materialism_fishing/`

7. (*) CRS, "Methods and Techniques in Complex Systems Science: An Overview", pp. 33–114 in Thomas S. Deisboeck and J. Yasha Kresh (eds.), *Complex Systems Science in Biomedicine* (New York: Springer-Verlag, 2006); arxiv:nlin/0307015

8. CRS and Kristina Lisa Klinkner, "Quantifying Self-Organization in Cyclic Cellular Automata", pp. 108–117 in Lutz Schimansky-Geier, Derek Abbott, Alexander Neiman and Christian Van den Broeck (eds.), *Noise in Complex Systems and Stochastic Dynamics* (Bellingham, Washington: SPIE, 2003), arxiv:nlin/0507067

9. Derek Abbott, Paul C. W. Davies and CRS, "Order from Disorder: The Role of Noise in Creative Processes. A Special Issue on Game Theory and Evolutionary Processes — Overview", *Fluctuation and Noise Letters*, vol. 2, no. 4 (December 2002)

Submitted Papers

- Robert Lunde and CRS, "Bootstrapping Generalization Error Bounds for Time Series", arxiv:1711.02834
- CRS, "Simulation-Based Inference by Matching Random Features", arxiv:2111.09220
- CRS, "Evaluating Posterior Distributions by Selectively Breeding Prior Samples", arxiv:2203.09077
- CRS, "A Simple Non-Stationary Mean Ergodic Theorem, with Bonus Weak Law of Large Numbers", arxiv:2203.09085
- Sabina J. Sloman, Daniel M. Oppenheimer, Stephen B. Broomell and CRS, "Characterizing the robustness of Bayesian adaptive experimental designs to active learning bias", arxiv:2205.13698

Online Book Manuscripts

- (*) CRS, *Advanced Data Analysis from an Elementary Point of View* (Cambridge University Press, forthcoming), `http://www.stat.cmu.edu/~cshalizi/ADAfaEPoV`
- CRS, *The Truth About Linear Regression*, `http://www.stat.cmu.edu/~cshalizi/TALR`
- CRS with Aryeh (Leonid) Kontorovich, *Almost None of the Theory of Stochastic Processes*, `http://www.stat.cmu.edu/~cshalizi/almost-none`

Miscellaneous Manuscripts

- CRS, Abigail Z. Jacobs, Kristina Lisa Klinkner and Aaron Clauset, "Adapting to Non-Stationarity with Growing Expert Ensembles", arxiv:1103.0949
- Georg M. Goerg and CRS, "LICORS: Light Cone Reconstruction of States for Non-parametric Forecasting of Spatio-Temporal Systems", arxiv:1206.2398
- Daniel J. McDonald and CRS, "Rademacher Complexity of Stationary Sequences", arxiv:1106.0730
- Daniel J. McDonald, CRS and Mark Schervish, "Stationarity regularizes autoregressive models", arxiv:1103.0942
- Daniel J. McDonald, CRS and Mark Schervish, "Estimating VC Dimension for Risk Bounds", arxiv:1111.3404
- CRS, "Scaling and Hierarchy in Urban Economies", arxiv:1102.4101

- (*) CRS, Kristina Lisa Klinkner and James P. Crutchfield, "An Algorithm for Pattern Discovery in Time Series" Technical Report, Santa Fe Institute, 2002-10-60, arxiv:cs.LG/0210025
- (*) CRS, *Causal Architecture, Complexity and Self-Organization in Time Series and Cellular Automata*, Ph.D. Thesis, UW-Madison (2001), `http://bactra.org/thesis/`
- CRS, "Lecture Notes on Probability, Statistics and Stochastic Processes" (2000), `http://bactra.org/prob-notes/`.
- CRS, "Maximum Likelihood Estimation and Testing for q-Exponential Distributions", arxiv:math.ST/0701854
- CRS, "The Backwards Arrow of Time of the Coherently Bayesian Statistical Mechanic", arxiv:cond-mat/0410063
- CRS and David J. Albers, "Symbolic Dynamics for Discrete Adaptive Games", arxiv:cond-mat/0207407
- CRS and James P. Crutchfield, "Pattern Discovery and Computational Mechanics" (2000), cs.LG/0001027.
- CRS and William A. Tozier, "A Simple Model of the Evolution of Simple Models of Evolution" (1999), arxiv:nlin/9910002
- CRS, "Lecture Notes on Computational Mechanics" (1998), `http://bactra.org/comp-mech-lectures/`.

Manuscripts in Preparation

- Danielle S. Allen, Henry Farrell and CRS, "Evolutionary Theory and Endogenous Institutional Change"
- CRS, "An Apology for Causal Discovery"
- CRS, "Bayesian Learning, Evolutionary Search, and Information Theory"
- CRS, "Do Not Adjust Your Receiver: Ego- and Alter- Centered Designs for Experimenting with Social Influence"
- CRS, "The Formation of the Statistical Learning Paradigm and the Field of Machine Learning, *circa* 1985–2000"
- CRS, "Fractal Network Asymptotics"
- CRS, "General Factors in Correlational Psychology: Artifacts and Myths"
- CRS, "Large Deviations for Compartment Models, with Application to Epidemic Models and to Social Learning"
- CRS, "Large Deviations in Exponential Families of Stochastic Automata"

- CRS, "Large Language Models in Statistical Perspective: You Can Do *That* with Kernel Smoothing and a Markov Chain?"
- CRS, "Predictive Markovian Representations of Stochastic Processes"
- CRS, "Risk Minimization in Heterogeneous Populations Implies Either Disparate Impact or Disparate Treatment"
- CRS, "The Scale-Free Networks Controversy in the Rise of Network Science"
- CRS, *Statistical Analysis of Complex Systems* (Cambridge University Press), `http://www.stat.cmu.edu/~cshalizi/stacs`
- CRS and Dena Asta, "Consistency of Maximum Likelihood for Continuous-Space Network Models, Part II"
- CRS, Lawrence Wang and Brian Karrer, "Nonparametric Graph Smoothing"
- Lawrence Wang and CRS, "Network Comparison by Sample Splitting"
- Michael Wieck-Sosa and CRS, "Simulation-Based Inference for Non-stationary Models Using Random Features"

Teaching

Classes

2005–: Statistics Department, CMU. Courses taught (courses designed in bold):

- engineering statistics and quality control (36-220)
- **statistics of inequality and discrimination** (36-313)
- **statistical computing** (36-350)
- modern regression (36-401)
- **undergraduate advanced data analysis** (36-402)
- **chaos, complexity, and inference** (old 36-462)
- **data mining** (old 36-350, new 36-462)
- **conceptual foundations of statistical learning** (36-465)
- **data over space and time** (36-467)
- undergraduate research (36-490)
- **introductory statistical network modeling** (36-720)
- **advanced theory of stochastic processes** (36-754)
- graduate advanced data analysis (36-757)

- **advanced network modeling** (36-781)
- foundations of statistical modeling (36-835)
- financial time series analysis (46-929)

Adviser to half of the undergraduates in the joint Economics-Statistics major (2010–2014)
2017: Lecturer, University of Pennsylvania, Statistics Dept., "Contemporary Themes in Statistical Research" (Stat 991); short course on non-parametric network modeling
2012: Lecturer, University of Warwick complexity science summer school.
2000–2, 2005–6, 2010–11, 2013–17: Lecturer, SFI Complex Systems Summer School
1996: Teaching assistant at UW-Madison for Psychology-Anthropology-Zoology-Neuroscience 619, "Biology of Mind", a writing-intensive interdisciplinary course on the biological foundations of behavior, cognition, and consciousness, and their evolution.
1994–1997: TA, Physics Department, UW-Madison. Taught discussion and lab sections for a range of introductory physics courses.

Research Students (chronological)
UNDERGRADUATES: Jacob Usinowicz; Jean-Baptiste Rouquier; Akiko Takeda; Shawn Mankad; Francis Keith; Edward McFowland; Abigail Jacobs; Luis Marquina; Jaclyn Wolf; Hannah Worrall; Max Kaplan
GRADUTE STUDENTS: Matthew Berryman; Susan Buchman; Stacey Ackermann-Alexeeff; Nathaniel Anozie; Raja Ahmad; Francesca Matano; Lee Richardson; Jessica Chemali; Alexander Loewi; Zachary Kurtz; Alden Green; Michael Wieck-Sosa THESIS SUPERVISOR: Linqiao Zhao (with Mark Schervish; defended, 2010); Justin Gross (with Stephen Fienberg and David Krackhardt; 2009); Daniel McDonald (with Mark Schervish; 2012); Georg Goerg (with Larry Wasserman; 2012); Dena Asta (2015); George David Montañez (2017); Lawrence Wang (2016); Robert Lunde (2018); Michael Spece Ibanez (2018); Octavio César Mesner(2020); Neil Spencer (2020)

Professional Activities

Associate editor: *Annals of Applied Statistics* (2008–2016).
Editorial board: *Structure and Dynamics: e-Journal of Anthropological and Related Sciences* (2005–).

Reviewer for *ACM Transactions on Intelligent Systems and Technology*; *Advances in Complex Systems*; *American Sociological Review*; *Annals of Applied Statistics*; *Annals of Statistics*; *Artificial Life*; *Behavioral & Brain Sciences*; *Biometrika*; *Biosystems*; *British Journal for the Philosophy of Science*; *British Journal of Mathematical and Statistical Psychology*; Cambridge University Press; *Canadian Journal of Statistics*; *Chaos*; *Complexity*; *The Computer Journal*; CRC Press; *Econometrica*; *Electronic Journal of Statistics*; *Empirical Economics*; *Entropy*; *European Physical Journal B*; *Europhysics Letters*; *Fluctuations and Noise Letters*; *Foundations of Physics*; *IEEE International Symposium on Information Theory*; *IEEE Transactions on Information Theory*; *IEEE Transactions on Neural Networks*; *IEEE Transactions on Signal Processing*; *IEEE Transactions on*

Systems, Man, and Cybernetics A; *Inverse Problems*; International Colloquium on Automata, Languages and Programming; International Conference on Machine Learning (ICML); International Joint Conference on Neural Networks; *International Journal of Theoretical and Applied Finance*; International Parallel and Distributed Processing Symposium; *Journal of the American Statistical Association*; *Journal of the Association for Computing Machinery*; *Journal of Cellular Automata*; *Journal of Computational Neuroscience*; *Journal of Forecasting*; *Journal of Physics A*; *Journal of Statistical Mechanics: Theory and Experiment*; *Journal of Statistical Physics*; *Journal of Statistical Planning and Inference*; *Journal of Theoretical Biology*; *Journal of the Royal Statistical Society B*; *Journal of the Royal Society: Interface*; *Machine Learning*; *Mathematical Reviews*; *Medical Care*; MIT Press; *Nature*; *Network Science*; *Neural Computation*; Neural Information Processing (NIPS); Oxford University Press; Perseus Books, Advanced Books Program; *Philosophical Transactions* A; *Philosophy of Science*; *Physica A*; *Physica D*; *Physical Review A*; *Physical Review E*; *Physical Review Letters*; *Physics Letters A*; *PLoS Computational Biology*; *PLoS ONE*; Princeton University Press; *Proceedings of the National Academy of Sciences* (USA); *Proceedings of the Royal Society* (London) *A*; *Psychological Review*; *Scandinavian Journal of Statistics*; *Science*; *Science Advances*; *Social Networks*; *Sociological Methods and Research*; *Statistical Science*; *Statistics and Computing*; *Statistics in Medicine*; *Statistics, Politics, and Policy*; University of Chicago Press; John Wiley and Sons; World Scientific Publishing; Yale University Press.

Outstanding Referee, American Physical Society, 2011

Conference/workshop program committees: Noise in Complex Systems and Stochastic Dynamics (2003–2005); Alife X (2006) main conference and workshop on Evolution of Complexity; European Conference on Complex Systems 2006; workshop on Statistical Network Analysis at 23rd International Conference on Machine Learning (ICML 2006); European Conference on Artificial Life (2007, 2011); AAAI Spring Symposium on Social Information Processing (2008); Statistical Methods for the Analysis of Network Data in Practice (2009); AAAI International Conference on Weblogs and Social Media (2010, 2011); AIStats (2011–); European Conference on Artificial Life (2011); WWW (2011–); International Conference on Social Informatics (SocInfo 2011–); AAAI Symposium 2012 on Social Networks and Social Contagion (SNSC 2012); Advances in Neural Information Processing (NIPS 2012–); Uncertainty in Artificial Intelligence (UAI 2013); Causal Learning and Reasoning (CLeaR) 2022–

Grant review: Expert evaluator for the "Future and Emerging Technologies" program of the European Commission's research directorate, 2001–. Referee for the Technology Foundation STW (Dutch national technology research agency), 2003; for the National Environment Research Council (UK), 2004; for the Civilian Research and Development Foundation (US), 2004; for the National Science Foundation (US), 2007–; for the Institute for New Economic Thinking, 2010–2013; for the Department of Energy, 2017–.

University service: Statistics department senator, Carnegie Mellon University faculty organization, 2011–2013.

Union activities: Member of the Teaching Assistants Association at UW-Madison, 1994–2001; Natural Sciences area representative, 1995–1996; Physics Department steward, 1996–1997.

Other professional service: Science advisory board, Institute for Computational

and Experimental Research in Mathematics, Brown University, 2014–2018; advisory board, Aydelotte Foundation for the Advancement of the Liberal Arts, Swarthmore College, 2018–.

Workshops and Journal Special Issues Organized

- *The Calculated Economy in the Era of Machine Learning* workshop co-chaired with Henry Farrell. Santa Fe Institute, 8–9 April 2024.
- *Collective Problem Solving*, workshop co-chaired with Henry Farrell, SFI, 10–11 November 2016.
- *Theory and Applications of Complex Networks*, IMS panel at the 2006 Joint Statistical Meeting. Seattle, 7 August 2006.
- *Order out of disorder: the role of noise in creative processes*, special issue of *Fluctuation and Noise Letters* (vol. 2, no. 4, December 2002), editor with Derek Abbott and P. C. W. Davies.
- *Collective Cognition: Mathematical Foundations of Distributed Intelligence*, co-chair with James P. Crutchfield, Kagan Tumer and David H. Wolpert. SFI, 22–26 January 2002.
  Website: `http://www.santafe.edu/~dynlearn/colcog`.

Invited Seminars, Conference Talks, etc.

Available on request.

Magazine Articles

- (with Henry Farrell), "Artificial intelligence is a familiar-looking monster", *The Economist* 21 June 2023
- "Turning Scientific Perplexity into Ordinary Statistical Uncertainty", *American Scientist* **100** (2012): 260 (review of D. R. Cox and C. A. Donnelly, *Principles of Applied Statistics*)
- (with H. Farrell), "Nudge No More", *New Scientist* **2837** (9 November 2011)
- "Connecting the Dots", *American Scientist* **99** (2011): 335 (review of D. Easley and J. Kleinberg, *Networks, Crowds, and Markets*)
- "Honor Among Thieves", *American Scientist* **99** (2011): 87 (review of K. Sigmund, *The Calculus of Selfishness*)
- "The Bootstrap", *American Scientist* **98** (2010): 186–190
- "Ready or Not", *American Scientist* **98** (2010): 160 (review of S. Hough, *Predicting the Unpredictable: The Tumultuous Science of Earthquake Prediction*)

- "Twilight of the Efficient Markets", *American Scientist* **97** (2009): 504 (review of J. Fox, *The Myth of the Rational Market*)
- "The Domestication of the Savage Mind", *American Scientist* **97** (2009): 244 (review of J. R. Flynn, *What Is Intelligence?*)
- "Obstacles and Tricks", *American Scientist* **97** (2009): 160 (review of T. Tao, *Structure and Randomness*)
- "The Logic of Diversity: The Complexity of a Controversial Concept", *Santa Fe Institute Bulletin*, **20:1** (2005): 34–38
- "The world is our laboratory: Myron Scholes and the history of finance", *Quantitative Finance*, **3:2** (2003): C20–C21.
- "Growth, Form, Function, and Crashes", *SFI Bulletin* **15:2** (2000): 6–11.
- "Modeling Markets", *SFI Bulletin*, **15:1** (2000): 10–15.
- "*Homo reciprocans*: Political Economy and Cultural Evolution", *SFI Bulletin*, **14:2** (1999): 16-20.
- "What Can Emergence Tell Us About Today's Eastern Europe?" *SFI Bulletin*, **14:1** (1999): 8–10.
- "Scientific Models: Claiming and Validating", *SFI Bulletin*, **13:2** (1998): 8–12.

Book Reviews

I have written over 170 book reviews, reviewing works on physics, complexity, mathematics, economics, cognition, statistics, philosophy of science, machine learning, evolutionary biology and literary theory. A complete list of my reviews, and their full text, are online at `http://bactra.org/reviews/`. Some of them have appeared in *American Scientist*, the *Bulletin of the London Mathematical Society*, the *Journal of the American Statistical Association*, *Physics Today*, and *Quantitative Finance*.

Weblog

THREE-TOED SLOTH since 2003, `http://bactra.org/weblog/`, ranked one of the top fifty science weblogs by *Nature* (**442** [2006]: 9); and NOTEBOOKS, `http://bactra.org/notebooks/`, since 1994.