

# JACOB GATES FOSTER

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## EMPLOYMENT

- 2013— Assistant Professor, Department of Sociology, UCLA  
Affiliate, California Center for Population Research  
Core Faculty, Center for Behavior, Evolution, and Culture  
Member, Center for Engineering Economics, Learning, and Networks
- 2013 Research Associate (Assistant Professor), Department of Sociology,  
University of Chicago
- 2010-2012 Postdoctoral Scholar, Department of Sociology, University of Chicago  
supervised by James A. Evans

## EDUCATION

- 2006-2010 PhD, Physics, University of Calgary  
Thesis: "On the Methodology of Complex Network Analysis,"  
supervised by Profs. Maya Paczuski and Peter Grassberger
- 2003-2006 DPhil Candidate, Mathematics, University of Oxford  
Transfer Thesis: "Conformal Invariance, Renormalization, and the Eternal  
Universe," supervised by Prof. Sir Roger Penrose
- 1999-2003 B.S. with distinction, magna cum laude, Physics, Duke University  
Honors Thesis: "Physics with Two Time Dimensions,"  
supervised by Prof. Berndt Mueller

## RESEARCH INTERESTS

Science and technology, social theory, computational social science, networks, complex systems, cultural evolution, game theory

## FUNDING

- 2013-2014 PI, "Selection and Cognitive Transformation in the Population Dynamics of Culture," California Center for Population Research (seed grant)
- 2012-2015 Co-PI, "Metaknowledge Research Network," John Templeton Foundation

## SCHOLARSHIPS AND FELLOWSHIPS

2008	iCORE Scholarship (transferred from 2007 Alberta Ingenuity Scholarship)
2007, 2008	Graduate Research Scholarship, University of Calgary
2006	Dean's Entrance and Graduate Recruitment Scholarships, University of Calgary
2003	Rhodes Scholar
2003	Fellowship to attend Vienna International Summer University
2002	Faculty Scholar, Duke University (2-3 awarded per year for academic promise)
2002	Dean's Summer Fellowship, Duke University
1999	Angier B. Duke Scholar, Duke University (full-tuition, 4 year merit scholarship)

## PUBLICATIONS AND WORK UNDER REVIEW

**Foster JG**, Rzhetsky A, Evans JA (*forthcoming*, October 2015) Tradition and innovation in scientists' research strategies. *American Sociological Review*.

**Foster JG** (*forthcoming*) The eye of the swarm: collective intelligence and the public intellectual. In Keren M, Hawkins R (eds.), *Speaking Power to Truth: Knowledge and the Public Intellectual in a Changing World*, Edmonton: Athabasca University Press.

Shi F, **Foster JG**, Evans JA (2015) Weaving the fabric of science: Dynamic network models of science's unfolding structure. *Social Networks* 43: 73-85.

Vilhena DA, **Foster JG**, Rosvall M, West JD, Evans JA, Bergstrom CT (2014) Finding cultural holes: How structure and culture diverge in networks of scholarly communication. *Sociological Science* 1: 221-238.

Foster DV, Rorick M, Gesell T, Feeney L, **Foster JG** (2013) Dynamic landscapes: A model of context and contingency in evolution. *J. Theor. Biol.* 334: 162-172.

Foster DV, **Foster JG**, Grassberger P, Paczuski M (2011) Clustering drives assortativity and community structure in ensembles of networks. *Phys. Rev. E.* 84: 066117.

Evans JA, **Foster JG** (2011) Metaknowledge. *Science* 331(6018): 721-725.

Foster DV, **Foster JG**, Paczuski M, Grassberger P (2010) Communities, clustering phase transitions, and hysteresis: pitfalls in constructing network ensembles. *Phys. Rev. E* 81: 046115.

**Foster JG**, Foster DV, Grassberger P, Paczuski M (2010) Edge direction and the structure of networks. *Proc. Natl. Acad. Sci. USA* 107(24): 10815-10820.

Foster DV, **Foster JG**, Huang S, Kauffman SA (2009) A model of sequential branching in hierarchical cell fate determination. *J. Theor. Biol.* 260: 589-597.

**Foster JG**, Grassberger P, Paczuski M (2009) Reinforced walks in two and three dimensions. *New J. Phys.* 11: 023009 (selected as one of the best papers in NJP for 2009).

**Foster JG**, Foster DV, Grassberger P, Paczuski M (2007) Link and subgraph likelihoods in random undirected networks with fixed and partially fixed degree sequences. *Phys. Rev. E* 76: 046112.

*Under Review/Revision (manuscripts available upon request):*

Rzhetsky A, **Foster JG**, Foster IT, Evans JA (under review, *Proc. Natl. Acad. Sci. USA*) Choosing the next experiment: gains and losses for scientists and society.

### **PEER REVIEWED ABSTRACTS AND CONFERENCE PROCEEDINGS**

**Foster JG**, (2012) Me to We: Cooperation, conflict, and the evolution of language. In Scott-Phillips TC, Tamariz M, Cartmill EA, Hurford JR (eds.), *The Evolution of Language: Proceedings of the 9th International Conference (EVLANG9)*, Singapore: World Scientific.

**Foster JG**, Slayton M (2010) Deception, tells, and the evolution of combinatorial communication. In Smith ADM, Schouwstra M, de Boer B, Smith K (eds.), *The Evolution of Language: Proceedings of the 8th International Conference (EVLANG8)*, Singapore: World Scientific.

### **BOOK REVIEWS**

**Foster JG** (2014) Review of “Climbing the Charts” by Gabriel Rossman. *American Journal of Sociology* 119, 4: 1205-1208.

**Foster JG** (2012) Review of “A Cooperative Species” by Samuel Bowles and Herbert Gintis. *American Journal of Sociology* 118, 2: 501-504.

### **WORK IN PROGRESS**

**Foster JG**, Rzhetsky A, Evans JA (in prep) Measuring novelty: Models of discovery and invention.

**Foster JG**, Evans JA (in prep) Promiscuous inventions: Modeling cultural evolution with multiple inheritance.

Song Y, Bergstrom CT, **Foster JG** (in prep) Why scientists chase big problems: Individual strategy and social optimality.

Xu J, **Foster JG**, van der Schaar M (in prep) Making the cut: The design and dynamics of up-or-out evaluation.

### **PREPRINTS**

**Foster JG**, Müller B (2010) Physics with two time dimensions.

Online at: <http://arxiv.org/abs/1001.2485>

## INVITED TALKS

- June 2015 “On the Shoulders of Giants? Science and Collective Intelligence,” Collective Intelligence 2015 (Santa Clara, USA)
- May 2015 “On the Shoulders of Giants? Science, Social Learning, and Collective Intelligence,” The Jacob Marschak Interdisciplinary Colloquium on Mathematics in the Behavioral Sciences (UCLA, USA)
- May 2015 “The Unknown Known: Science, Social Learning, and Cultural Evolution,” Behavior, Evolution, and Culture Speaker Series (UCLA, USA)
- Oct 2014 “Promiscuous Inventions,” with James Evans, Beyond the Meme: Articulating Dynamic Structures in Cultural Evolution (University of Minnesota, USA)
- May 2014 “Finding Cultural Holes,” Data as Critique: New Computational Approaches to the Study of Culture (University of Chicago, USA)
- April 2014 “How Science Thinks,” Innovation and Creativity Workshop (UCLA, USA)
- Feb 2014 “Science as Social Learning,” CCPR Seminar (UCLA, USA)
- Jan 2014 “Toward an Ecology of Scientific Knowledge: Science, Social Learning, and Cultural Evolution,” Workshop on Mathematics of Social Learning (IPAM, UCLA, USA)
- Oct 2013 “Cultural Enrichment,” Workshop on Social Network Data: Collection and Analysis (Statistical and Applied Mathematical Sciences Institute, NC, USA)
- July 2013 “Clusters,” NSF Conference on Innovation (Wharton, UPENN, USA)
- Apr 2012 “Stability and Conformity in Scientists’ Research Strategies,” School of Information (University of Michigan, USA)
- Nov 2011 “Novelty, Metaknowledge and Models of Discovery,” Center for Nonlinear and Complex Systems & Center for Theoretical and Mathematical Sciences (Duke University, USA)
- Oct 2011 “The Eye of the Swarm: Collective Intelligence and the Public Intellectual,” Workshop on the Transformation of Public Intellectuals and Canadian Democracy (University of Calgary, Canada)
- Aug 2010 “Knowledge and Metaknowledge,” inaugural Institute for Computing in Science Workshop: Integrating, Representing, and Reasoning over Human Knowledge (Snowbird, Utah, USA)
- Mar 2009 “Complex Equality & Complex Systems,” invited class (University of Alberta, Canada)
- Oct 2007 “Simulation, Reality, and the Social: a Virtual Provocation,” Computational Philosophies (Niels Bohr Institute, Denmark)

## TALKS

- Aug 2014 "Finding Cultural Holes," with Daril Vilhena, Martin Rosvall, Jevin West, James Evans, and Carl Bergstrom, contributed talk, American Sociological Association Annual Meeting (San Francisco, USA)
- Oct 2013 "The Numbers Speak: Big Data, Utopia, and Reflexivity," contributed talk, Society for the Social Studies of Science (San Diego, USA)
- Aug 2013 "Blackboxing, Conceptual Distance, and the Routines of Invention," with James Evans, contributed talk, American Sociological Association Annual Meeting (New York, USA)
- Aug 2012 "Stability and Conformity in Scientists' Research Strategies," with James Evans and Andrey Rzhetsky, contributed talk, American Sociological Association Annual Meeting (Denver, USA)
- Aug 2012 "Evolutionary and Ecological Approaches to Measuring Influence and Impact," with James Evans and Andrey Rzhetsky, contributed talk, American Sociological Association Annual Meeting (Denver, USA)
- June 2012 "Stability and Conformity in Scientists' Research Strategies," NetSci 2012 Symposium, Networks: The Science of Science & Innovation (Northwestern University, USA)
- May 2012 "The Art and Science of Community Detection," Computational Social Sciences Workshop (University of Chicago, USA)
- Nov 2011 "Novelty, Metaknowledge and Models of Discovery," Organizations and Markets Workshop, Booth School of Business (University of Chicago, USA)
- Aug 2011 "Measuring Novelty: Models of Discovery and Invention," with James Evans and Andrey Rzhetsky, contributed talk, American Sociological Association Annual Meeting (Las Vegas, USA)
- Jan 2010 "A Network Analysis Smörgåsbord," Complexity Seminar (University of Calgary, Canada)
- Apr 2009 "The Meme Factor," InnoLab Seminar (University of Calgary, Canada)
- Mar 2009 "What is the Future of Economics?" Complexity Seminar (University of Calgary, Canada)
- Sep 2008 "On Unification in the Behavioral Sciences," InnoLab Seminar (University of Calgary, Canada)
- Aug 2008 "Taking the Avatar Approximation: The Promise and Peril of High-throughput Social Science in Virtual Worlds," contributed talk, Challenges and Visions in the Social Sciences (ETH Zurich, Switzerland)

- Jun 2008      “Dynamic Landscapes: A Model of Context and Contingency in Evolution,”  
Santa Fe Institute Complex Systems Summer School (Santa Fe, USA)
- Mar 2008      “Torture, Terror, and the Undead,” contributed talk, Graduate Sociology  
Conference (University of Calgary, Canada)
- May 2007      “Modeling Adaptive Radiation in Pseudomonads,” with Amer Shreim,  
contributed talk, Fields Institute Workshop: The Mathematics of Evolution  
(University of Ottawa, Canada)

**AWARDS**

- 2006            Finalist, Oxford Leadership Prize
- 2005            Finalist, Oxford Leadership Prize
- 2005            International Academy of Achievement
- 2003            Spot Award, Los Alamos National Laboratory, Group P-21
- 2003            Barbara Herrnstein-Smith Award for Outstanding Work in Literary Theory or  
Criticism, Duke University
- 2002            Phi Beta Kappa
- 2002            Sigma Pi Sigma (physics honor society)
- 1998            Recognized by Educational Testing Service and Virginia General Assembly for the  
most 5's on Advanced Placement exams of any junior in the world

**RESEARCH EXPERIENCE**

- 2010-2012      Postdoctoral Scholar, Department of Sociology, University of Chicago
- 2006-2010      Graduate Research Assistant, Department of Physics, University of Calgary
- 2003            Researcher, Quantum Cryptography Group, Los Alamos National Laboratory
- 2001-2002      Undergraduate Researcher, Quantum Optics Group, Duke University

**TEACHING EXPERIENCE**

- 2014—            Instructor, SOCIOL 111 (Social Networks), SOCIOL 191V (Science as X), SOCIOL  
204 (Topics in Sociological Theorizing), SOCIOL 208A (Social Network Methods)  
UCLA, Department of Sociology
- 2013—            Member, PhD Committee (Brooks Ambrose, 2013; Seth Erickson, 2015; Kevin  
Shih, 2015), UCLA
- 2013            Co-instructor, SOCI 40183 (Do Ideas Evolve?), University of Chicago, Center for  
Disciplinary Innovation/CHSS/Department of Sociology
- 2009            Mentor for Undergrad Research Project, University of Calgary/Duke University
- 2005-2006      Tutor, Applied Mathematics, University of Oxford, Balliol College

- 2004-2006 Teaching Assistant, Further Quantum Theory, Quantum Field Theory, University of Oxford, Mathematical Institute
- 2000, 2002 Teaching Assistant, Mathematics & Chemistry, Woodberry Forest School

### **SUMMER SCHOOLS AND WORKSHOPS**

- 2014 University of Chicago: Data as Critique: New Computational Approaches to the Study of Culture (invited)
- 2014 Institute for Pure and Applied Mathematics, UCLA: Mathematics of Social Learning (invited)
- 2013 Statistical and Applied Mathematical Sciences Institute: Workshop on Social Network Data: Collection and Analysis (invited)
- 2013 Wharton, UPENN: NSF Workshop on Innovation (invited)
- 2013 Oxford Internet Institute: Workshop on Big Data and the Social Sciences (invited)
- 2012 Institute for Computing in Science Workshop: Big Data and Long Tails (invited)
- 2011 Institute for Computing in Science Workshop: Accelerating Discovery, Human Computer Symbiosis 50 Years On (invited)
- 2010 Institute for Computing in Science Workshop: Integrating, Representing, and Reasoning over Human Knowledge (invited)
- 2008 Complex Systems Summer School, Santa Fe Institute
- 2005 String Theory Summer School, Perimeter Institute
- 2003 Vienna International Summer University: Cosmological and Biological Evolution

### **ACADEMIC SERVICE AND CITIZENSHIP**

Ad hoc reviewer: American Journal of Sociology, American Sociological Review, Proceedings of the National Academy of Sciences (USA), Sociological Science, Topics in Cognitive Science, EPJ Data Science, Social Science and Medicine, Evolang, Computer Supported Cooperative Work, Academy of Management, PLoS ONE, PLoS Computational Biology, Journal of Physics A: Mathematical and Theoretical, New Journal of Physics, Physical Review E

- 2015 Member, Mathematical Sociology Outstanding Article Award Committee (ASA)
- 2014-2015 Graduate Admissions Committee, Department of Sociology, UCLA
- 2014 Expert reviewer for grant submitted to John Templeton Foundation
- 2014 Organized Arthur Frank's visit to UCLA as 2014 Canadian Scholar in Residence
- 2014 Co-organizer and panelist, Mathematics of Politics, Institute for Pure and Applied Mathematics, UCLA

- 2014 Public lecture, "The Ecology of Ideas: How is Knowledge Made?"  
UCLA Department of Sociology Development event, Calabasas, CA
- 2013— Executive Committee, Institute for Digital Research and Education, UCLA
- 2013 Presenter, SOCIOL 201 & SOCIOL 202, Department of Sociology, UCLA
- 2013-2014 Graduate Committee, Department of Sociology, UCLA
- 2013— Editorial Board, Computational Social Sciences Series, Springer
- 2012 Co-organizer, Networks: The Science of Science and Innovation,  
NetSci 2012 Symposium
- 2012-2013 Founding co-organizer, Computational Social Sciences Workshop,  
University of Chicago
- 2011— Member, American Sociological Association  
(Science, Knowledge & Technology; Theory; Mathematical Sociology; Sociology  
of Culture; Comparative/Historical Soc; Communication and Information)
- 2008-2009 President, Physics Graduate Liaison Committee, University of Calgary
- 2008 Graduate Student Representative, Visioning Retreat, Department of Physics &  
Astronomy, University of Calgary
- 2007 Interdepartmental working group on "The Physics of Life," University of Calgary
- 2006-2009 Physics Graduate Liaison Committee, University of Calgary
- 2006-2008 Colloquium committee, Department of Physics & Astronomy,  
University of Calgary
- 2003-2004 Research, supervision of final editing for Prof. Sir Roger Penrose's The Road to  
Reality: A Complete Guide to the Laws of the Universe (Random House, 2004).

## COMMUNICATION SKILLS

Completed course in January 2005 on public communication of science, University of Oxford,  
Departments of Neuroscience, Zoology, Mathematics

Writer for Oxonian Review of Books, [www.oxonianreview.org](http://www.oxonianreview.org)

"Everybody Loves Einstein," a review of Einstein's Miraculous Year, ed. John Stachel

"Brave Old World," a review of World as Laboratory by Rebecca Lemov

"Warming Up to Al Gore," a review of An Inconvenient Truth by Al Gore

"Love Among the Ruins," a review of In the Shadow of the Bomb by S.S. Schweber

Writer for The American, [www.american.com](http://www.american.com)

"The Man Who Made Our World," a review of Einstein: His Life and Universe by Walter  
Isaacson



## REFERENCES

Carl T. Bergstrom  
Professor, Department of Biology, University of Washington  
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Seattle, WA 98195-1800, USA  
1-206-685-3487  
[cbergst@u.washington.edu](mailto:cbergst@u.washington.edu)

Ronald S. Burt  
Hobart W. Williams Professor of Sociology and Strategy  
University of Chicago Booth School of Business  
5807 South Woodlawn Avenue  
Chicago, IL 60637  
1-773-702-0848  
[ronald.burt@chicagobooth.edu](mailto:ronald.burt@chicagobooth.edu)

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Associate Professor, Department of Sociology, University of Chicago  
1126 East 59<sup>th</sup> Street  
Chicago, IL 60637  
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[jevans@uchicago.edu](mailto:jevans@uchicago.edu)

Peter Grassberger (co-supervisor, PhD)  
Professor Emeritus, John von Neumann Institute for Computing, Forschungszentrum Jülich  
52425 Jülich, Germany  
[p.grassberger@fz-juelich.de](mailto:p.grassberger@fz-juelich.de)

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Professor, Department of Communication and Culture, University of Calgary  
2500 University Drive NW  
Calgary, Alberta T2N 1N4, Canada  
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