
MARK STEYVERS

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PROFESSIONAL POSITIONS

- 2005 - Associate Professor, Department of Cognitive Sciences, University of California, Irvine.
- 2002-2005 Assistant Professor, Department of Cognitive Sciences, University of California, Irvine.
- 2005- Joint faculty appointment with Computer Science Department, University of California, Irvine.
- 2005 -2007 Joint faculty appointment with Department of Psychology and Social Behavior, University of California, Irvine.

EDUCATION

- 2000-2002 Postdoctoral fellow. Stanford University
- 2000 PhD, Indiana University, Joint degree in Cognitive Psychology and Cognitive Science.
- 1994 BA, University of Amsterdam, Psychology (Cum Laude).

AWARDS AND HONORS

- 2005 Early Investigator Award from Society for Experimental Psychologists (SEP)
- 2004 New Investigator Award. American Psychological Association Division 3 – Journal of Experimental Psychology, Learning, Memory & Cognition.
- 2002 Research Achievement Award. Indiana University, Cognitive Science Program.
- 2000 J.R. Kantor Graduate Award for accomplished graduate careers.
- 1999-2000 Research Fellowship of Indiana University College of Arts and Sciences.

PROFESSIONAL AFFILIATIONS

- 2007- Program Leader in Cognitive Science, Center for Machine Learning and Intelligent Systems, University of California, Irvine.
- 2006- Society for Mathematical Psychology
- 2006- Society for Judgment and Decision Making
- 2005 - Elected Fellow for the Society of Experimental Psychologists (SEP)
- 2002 - IMBS, Institute of Mathematical Behavioral Sciences, University of California, Irvine (member).
- 2000 - Psychonomics Society
- 2000 - Cognitive Science Society

PROFESSIONAL ACTIVITIES

- 2007 Area Chair for NIPS 2007 (Neural Information Processing Systems)
- 2007 Conference Chair for Society of Mathematical Psychology (with Michael Lee)
- 2007 - Editorial Board Member for Psychonomic Bulletin & Review.
- 2006 Editorial Board Member for Journal of Experimental Psychology: Learning, Memory, and Cognition.
- 2006 AAAI-06 Program Committee Member (National Conference on Artificial Intelligence)
- 2003 Co-organizer of NIPS (Neural Information Processing Systems) workshop on “Syntax, Semantics, and Statistics” with Rich Shiffrin, David Blei and Tom Griffiths.
- 2003 Session Chair: Sackler colloquium “Mapping Knowledge Domains”.

Ad-hoc reviewing

Psychological Review
Cognitive Science
Memory & Cognition
NIPS (Neural Information Processing Systems)
Behavior Research Methods, Instruments, & Computers
Trends in Cognitive Sciences
Proceedings of the National Academy of Sciences
Journal of Experimental Psychology:
Learning, Memory, and Cognition

Cognition
Psychonomic Bulletin & Review
Journal of Memory and Language
Cognitive Science Society
BMC Bioinformatics
Air Force Office of Scientific Research
Journal of Mathematical Psychology
Journal of Learning and Memory
Journal of Artificial Intelligence Research

STUDENTS

Current PhD students

Miles Munro (advanced to candidacy), Mike Yi, and Pernille Hemmer

Masters Students supervised

Archana Raghunathan (2006)

PhD Thesis Committees (member)

Joetta Goebel (2003; CogSci), Michelle Miller (2005; CogSci), Colleen Nilson (2005; CogSci), Kayoko Okada (2005; CogSci)

PhD Candidacy Committees

Colleen Nilson (2003; CogSci), Michele Miller (2003; CogSci), Kayoko Okada (2004; CogSci), Bozhena Bidyuk (2005; ICS), Keita Fujii (2005; ICS), Miles Munro (2005; Cogsci; Chair) Jared Smith (2006; CogSci), Doug Grimes (2006; ICS), Chaitanya Chemudugunta (2006; ICS)

Undergraduate Students Supervised

Golnoosh Farzaneh (2003; independent study project), Angela Nelson (2003-2004; independent study project; summer undergraduate research program), Uyen Lee (2003; research project), Mercedes Lavoy (2004; independent study project; summer undergraduate research program; undergraduate research opportunities program), Pooja Reddy (2004; independent study project) Michelle Clark (2004; independent study project), Nick Punt (2004-2005; independent study project), Pernille Hemmer (2005; summer undergraduate research program); Steve Meissner (2006-2007; undergraduate research opportunities program). Amir Ali Habibi (2007; research project). Surina Ramirez (2007; research project). Hao-Ting Wu (2007; research project)

RESEARCH GRANTS

2008 – 2012 Australian Research Council Discovery Project DP0878858 "A new kind of dynamics for psychology." PI (Scott Brown). Amount: \$657,000. **Role: Co-PI**

2007 – 2009 AFRL/AFOSR, "Modeling Exploration and Exploitation in Structured Environments", 1/1/2007 – 11/30/2009. Amount: \$456,031. PI (Michael Lee). **Role: Co-PI.**

- 2006 – 2007 NSF-DARPA-NSA consortium, Knowledge Discovery and Dissemination Program, “*Entity-Topic Modeling, Querying, and Analysis*”. This research centers on a novel statistical modeling framework that relates entities, documents, and words via a set of latent topics. We demonstrate how statistical entity-topic modeling can provide a powerful set of new techniques for information retrieval on entities across multiple text sources and relational databases. Amount: \$300,000. PI (Smyth). **Role: Co-PI.**
- 2005 – 2006 NSF-ARMY consortium, “*Online Topic Extraction and Change Detection from Massive Multilingual Text Streams*”. 9/1/2005 – 8/31/2006. We develop a new generation of statistical topic modeling algorithms that are able to handle massive streaming text sources. We demonstrate the capabilities of these algorithms by developing a prototype system that monitors and extracts topics over time from online news sources in a variety of languages. Amount \$120,000. PI (Smyth). **Role: Co-PI**
- 2005 NSF-DARPA-NSA consortium, “*Knowledge Discovery and Dissemination (KDD) evaluation*”, 7/1/2005-8/1/2005. In this proposal we will use the topic model as a common component in our approach to three different prediction tasks of the KDD challenge. We will use the author-topic model for predicting edges in networks and the standard topic model for predicting changes in topics over time, and information retrieval. Amount: \$55,000. PI (Smyth). **Role: Co-I**
- 2004 – 2007 AFRL/AFOSR, “*Inference in dynamic environment*”, 7/1/2004 – 12/31/2007.. An empirical and theoretical investigation into dynamic decision making environments. We develop simple dynamic signal detection models to measure the trial-by-trial changes in decision processes in lexical decision, recognition memory, various perceptual tasks as well as simulated battle field environments. Amount: \$371,616. Co-PI: Brown. **Role: PI**
- 2003 – 2004 Council on Research, Computing and Library Resources (CORCLR), “*The Dynamics of Decision Making and Criterion Setting: Data and Theory*”, 7/1/2003 – 6/30/2004. This small seed grant served to purchase initial equipment to collect pilot data for the AFRL/AFOSR grant. Amount: \$11,950. PI (Brown). **Role: Co-PI**
- 2002 – 2007 NSF-DARPA-NSA consortium, Knowledge Discovery and Dissemination Program, “*Entity-Based Data Mining from Spatiotemporal and Text-Based Data Streams*”, 10/1/2002 – 5/1/2007. Amount: \$726,600. PI (Smyth). **Role: Co-I**

CONSULTING AND BUSINESS ACTIVITIES

- 2006 - Consultant for Yahoo!
- 2006 - Consultant for Netflix
- 2005 – Partner in TopicSeek, LLC, Irvine, CA.
- 2004 Consultant for Institute of Defense Analysis, Washington, D.C.

- 2004 Briefing on text mining techniques at the White House Office of Science and Technology Policy, Washington, D.C.
- 2004 - Scientific advisory board of Medical Care Corporation in Irvine (member).

PRESS COVERAGE

- June 22, 2007 Science (Vol 316, p. 1693). “*Congress Splits Over Plan to Consolidate Intelligence Research*”
- March 27, 2007 OC Register: “*Air Force gives UC Irvine \$456,000 to study how people make decisions*”
- July 26, 2006 UCI News release: “*UCI Researchers “Text Mine” The New York Times, Demonstrating Ease And Evolution Of Potent New Technology*”. Reported by OC Register, United Press International, ScienceDaily, Medical News Today, Daily India, Malaysian Sun, PhysOrg, Chronicle of Higher Education, Top Tech News, Supercomputing online.
- June 2004 APA Science Policy Insider News: “*Data Mining at the White House*”.
- April 6, 2004 NSF Press release: “*Here There Be Data: Mapping the Landscape of Science*”.

PUBLICATION LIST

Journal Articles

- (J1) Van Leeuwen, C., Steyvers, M., & Nooter, M. (1997). Stability and intermittency in large-scale coupled oscillator models for perceptual segmentation. *Journal of Mathematical Psychology*, 41, 319-344.
- (J2) Shiffrin, R.M. & Steyvers, M. (1997). A model for recognition memory: REM: Retrieving Effectively from Memory. *Psychonomic Bulletin & Review*, 4 (2), 145-166.
- (J3) Steyvers, M. (1999). Morphing techniques for generating and manipulating face images. *Behavior Research Methods, Instruments, & Computers*, 31, 359-369.
- (J4) Goldstone, R.L., & Steyvers, M. (2001). The sensitization and differentiation of dimensions during category learning. *Journal of Experimental Psychology, General*, 130. 116-139.
- (J5) Malmberg, K. J., Steyvers, M., Stephens, J. D., & Shiffrin, R.M. (2002). Feature-frequency effects in recognition memory. *Memory & Cognition*, 30(4), 607-613.
- (J6) Goldstone, R., Steyvers, M., & Rogosky, B.J. (2003). Conceptual Interrelatedness and Caricatures. *Memory and Cognition*, 31(2), 169-180.

- (J7) Steyvers, M., Tenenbaum, J., Wagenmakers, E.J., Blum, B. (2003). Inferring Causal Networks from Observations and Interventions. *Cognitive Science*, 27, 453-489.
- (J8) Steyvers, M., & Malmberg, K. (2003). The effect of normative context variability on recognition memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 29(5), 760-766.
- (J9) Wagenmakers, E.J.M., Steyvers, M., Raaijmakers, J.G.W., Shiffrin, R.M., van Rijn, H., & Zeelenberg, R. (2004). A Model for Evidence Accumulation in the Lexical Decision Task. *Cognitive Psychology*, 48, 332-367.
- (J10) Griffiths, T., & Steyvers, M. (2004). Finding Scientific Topics. *Proceedings of the National Academy of Sciences*, 101 (suppl. 1), 5228-5235.
- (J11) Wagenmakers, E.-J., Zeelenberg, R., Steyvers, M., Shiffrin, R. M., & Raaijmakers, J. G. W. (2004). Nonword repetition in lexical decision: Evidence for two opposing processes. *The Quarterly Journal of Experimental Psychology A*, 57(7), 1191-1210.
- (J12) Steyvers, M., & Tenenbaum, J.B. (2005). Graph Theoretic Analyses of Semantic Networks: Small Worlds in Semantic Networks. *Cognitive Science*, 29, 41-78.
- (J13) Brown, S.D., & Steyvers, M. (2005). The Dynamics of Experimentally Induced Criterion Shifts. *Journal of Experimental Psychology: Learning, Memory & Cognition*, 31(4), 587-599.
- (J14) Navarro, D.J., Griffiths, T.L., Steyvers, M., & Lee, M.D. (2006). Modeling individual differences using dirichlet processes. *Journal of Mathematical Psychology*, 50, 101-122.
- (J15) Wagenmakers, E.J., Grünwald, P., & Steyvers, M. (2006). Accumulative prediction error and the selection of time series models. *Journal of Mathematical Psychology*, 50, 149-166.
- (J16) Steyvers, M., Griffiths, T.L., & Dennis, S. (2006). Probabilistic inference in human semantic memory. *Trends in Cognitive Sciences*, 10(7), 327-334.
- (J18) Newman, D., Smyth, P., & Steyvers, M. (2006). Scalable Parallel Topic Models. *Journal of Intelligence Community Research and Development*.
- (J19) Brown, S.D., Steyvers, M., & Hemmer, P. (2007). Modeling Experimentally Induced Strategy Shifts. *Psychological Science*, 18(1), 40-45.
- (J20) Griffiths, T.L., Steyvers, M., & Tenenbaum, J.B.T. (2007). Topics in Semantic Representation. *Psychological Review*, 114(2), 211-244.
- (J21) Griffiths, T.L., Steyvers, M., & Firl, A. (in press). Google and the mind: Predicting fluency with PageRank. *Psychological Science*.

Book Chapters

- (B1) Shiffrin, R. M., & Steyvers, M. (1998). The effectiveness of retrieval from memory. In M. Oaksford & N. Chater (Eds.). *Rational models of cognition*. (pp. 73-95), Oxford, England: Oxford University Press.
- (B2) Steyvers, M., & Busey, T. (2000). Predicting Similarity Ratings to Faces using Physical Descriptions. In M. Wenger, & J. Townsend (Eds.), *Computational, geometric, and process perspectives on facial cognition: Contexts and challenges*. Lawrence Erlbaum Associates.
- (B3) Goldstone, R., Steyvers, M., Kersten, A., & Spencer-Smith, J. (2000). Interactions between perceptual and conceptual learning. In Dietrich, E., & A. Markman (eds.), *Cognitive Dynamics: conceptual and representational change in humans and machines*. Cambridge, MA: MIT Press.
- (B4) Steyvers, M. (2002). Multidimensional Scaling. In: *Encyclopedia of Cognitive Science*. Nature Publishing Group, London, UK.
- (B5) Steyvers, M., Shiffrin, R.M., & Nelson, D.L. (2004). Word Association Spaces for Predicting Semantic Similarity Effects in Episodic Memory. In A. Healy (Ed.), *Experimental cognitive psychology and its applications*, 237-249: American Psychological Association.
- (B6) Steyvers, M., Griffiths, T.L. (2007). Probabilistic Topic Models. In T. Landauer, D. McNamara, S. Dennis & W. Kintsch (Eds.) *Handbook of Latent Semantic Analysis*. Erlbaum.
- (B7) Steyvers, M. & Griffiths, T.L. (in press). Rational Analysis as a Link between Human Memory and Information Retrieval. In N. Chater and M Oaksford (Eds.) *The Probabilistic Mind: Prospects from Rational Models of Cognition*. Oxford University Press.

Papers in Refereed Conference Proceedings

- (C1) Steyvers, M. & Grünwald, P. (1996). A recurrent network that performs a context-sensitive task. In: *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society* (pp. 335-339). La Jolla, CA. Lawrence Erlbaum Associates.
- (C2) Goldstone, R.L., Steyvers, M. & Larimer, K. (1996). Categorical Perception of Novel Dimensions. In *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society* (pp. 243-248). La Jolla, CA. Lawrence Erlbaum Associates.
- (C3) Steyvers, M., Wagenmakers, E.J.M., Shiffrin, R.M., Zeelenberg, R., & Raaijmakers, J.G.W. (2001). A Bayesian model for the time-course of lexical processing. In: *Proceedings of the Fourth International Conference on Cognitive Modeling*. George Mason University, Fairfax, VA.

- (C4) Griffiths, T.L., & Steyvers, M. (2002). A probabilistic approach to semantic representation. In Gray W. and Schunn, C. (eds): *Proceedings of the Twenty-Fourth Annual Conference of Cognitive Science Society*, pp. 381-386. Erlbaum.
- (C5) Griffiths, T.L., & Steyvers, M. (2002). Prediction and semantic association. In: *Advances in Neural Information Processing Systems, 15*, pp. 11-18. MIT Press.
- (C6) Rosen-Zvi, M., Griffiths T., Steyvers, M., & Smyth, P. (2004). The Author-Topic Model for Authors and Documents. In *20th Conference on Uncertainty in Artificial Intelligence*, pp. 487-494. AUAI Press, Arlington, Virginia. (29% acceptance rate).
- (C7) Steyvers, M., Smyth, P., Rosen-Zvi, M., Griffiths T. (2004). Probabilistic Author-Topic Models for Information Discovery. In W. Kim, R. Kohavi, J. Gehrke, and W. DuMouchel(Eds.) *The Tenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, pp. 306-315, ACM (12% acceptance rate for full papers).
- (C8) Griffiths, T.L., & Steyvers, M., Blei, D.M., & Tenenbaum, J.B. (2005). Integrating Topics and Syntax. In: *Advances in Neural Information Processing Systems, 17* (Saul, L.K et al., eds), 537-544. MIT Press.
- (C9) Navarro, D. J., Griffiths, T. L., Steyvers, M. & Lee, M. D. (2005). Modeling individual differences with Dirichlet processes. In B. G. Bara, L. W. Barsalou & M. Bucciarelli (Eds.) *Proceedings of the 27th Annual Conference of the Cognitive Science Society* (pp. 1594-1599). Mahwah, NJ: Lawrence Erlbaum
- (C10) Steyvers, M., & Brown, S. (2006). Prediction and Change Detection. In Y. Weiss, B. Scholkopf, and J. Platt (Eds.) *Advances in Neural Information Processing Systems, 18*, pp. 1281-1288. MIT Press. (27% acceptance rate).
- (C11) Newman, D., Chemudugunta, C., Smyth, P., & Steyvers, M. (2006). Analyzing entities and topics in news articles using statistical topic models. In: Springer Lecture Notes in Computer Science (LNCS) series -- *IEEE International Conference on Intelligence and Security Informatics*. (31% acceptance rate).
- (C12) Newman, D., Chemudugunta, C., Smyth, P., & Steyvers, M. (2006). Statistical entity-topic models. *The Twelfth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*. Philadelphia (23% acceptance rate).
- (C13) Chemudugunta, C., Smyth, P., & Steyvers, M. (2007, in press). Modeling General and Specific Aspects of Documents with a Probabilistic Topic Model. In: *Advances in Neural Information Processing Systems, 19*. (24% acceptance rate)

INVITED TALKS

- 2007 *University of California, Los Angeles*. Graduate Summer School: “Probabilistic Models of Cognition: The Mathematics of Mind” held at IPAM (Institute for Pure and Applied Mathematics). Seminar.
- Artificial Intelligence and Machine Learning Group (AIML). University of California, Irvine*. Seminar
- 2006 *University of Rochester*. Department of Brain and Cognitive Sciences. Colloquium.
- Beijing Normal University, China*. State Key Laboratory of Cognitive Neuroscience and Learning. Seminar.
- Gatsby Computational Neuroscience Unit, London, UK*. Symposium on “The probabilistic mind: Prospects for rational models of cognition”
- Birkbeck college, London, UK*. Workshop on dynamics of information processing.
- University of California, San Diego*. Department of Psychology. Colloquium.
- Ohio State University*. Department of Psychology. Colloquium.
- Eastern Psychological Association*. Symposium on “Perception of Random Sequences”
- 2005 *University of South Florida*. Department of Psychology. Colloquium.
- Defense Science and Technology Organization*. Department of Defense, Adelaide, Australia. Adelaide Mental Life conference. Keynote speaker.
- University of California, Irvine*. Department of Psychology and Social Behavior. Colloquium.
- University of California, Los Angeles*. Workshop on “Probabilistic Models of Cognition: The Mathematics of Mind” at IPAM (Institute for Pure and Applied Mathematics).
- 2004 *University of Newcastle, Australia*. Departmental seminar.
- University of Leuven, Belgium*. Workshop on Formal Models in the Study of Natural Language concepts.
- University of Colorado, Boulder*. LSA workshop for LSA: A road to meaning.
- University of California, San Diego*. AI research seminar.
- 2003 *Iowa State University*. Department of Psychology. Colloquium.
- University of California, Riverside*. Psychology Department, Cognitive Lunch.
- 2002 *Annual Meeting of the Cognitive Science Society*. Rumelhart Symposium Honoring Richard Shiffrin
- Carnegie Mellon University*. Department of Psychology.

University of Maryland, College Park. Department of Psychology.

University of California, Irvine. Department of Cognitive Sciences.

Georgia Institute of Technology. Department of Psychology.

2001 *Barnard College. Department of Psychology.*

Stanford University. Department of Psychology.

University of Washington. Department of Psychology

PRESENTATIONS AT CONFERENCES & MEETINGS

2007 *Annual Summer Interdisciplinary Conference. Kalymnos, Greece.*

2006 *Annual Meeting of the Psychonomic Society, Houston.*

Annual meeting of the Society for Mathematical Psychology, Vancouver, BC.

Society of Experimental Psychologists (SEP), San Diego, CA.

2005 *Annual Meeting of the Psychonomic Society, Toronto.*

Annual meeting of the Society for Mathematical Psychology, Memphis, Tennessee.

Annual Summer Interdisciplinary Conference. Briancon, France.

Annual Episodic Memory Symposium. Philadelphia.

Annual Interdisciplinary Conference, Teton Village, Jackson Hole, Wyoming.

2004 *Annual Meeting of the Psychonomic Society, Minneapolis, MN*

Annual Meeting of the Society for Mathematical Psychology. Ann Arbor, Michigan.

Annual Summer Interdisciplinary Conference. Cavalese, Italy.

Annual Interdisciplinary Conference, Teton Village, Jackson Hole, Wyoming.

2003 *Neural Information Processing Systems (NIPS). Workshop on “Syntax, Semantics, and Statistics”*

Annual Episodic Memory Symposium. New Orleans.

Annual Meeting of the Psychonomic Society. Vancouver, BC (poster).

- Annual Summer Interdisciplinary Conference*. Squamish, British Columbia, Canada.
- Annual Interdisciplinary Conference*, Teton Village, Jackson Hole, Wyoming.
- 2002 *Annual Summer Interdisciplinary Conference*. Squamish, British Columbia, Canada.
- Annual Interdisciplinary Conference*, Teton Village, Jackson Hole, Wyoming.
- 2001 *Annual Interdisciplinary Conference*, Teton Village, Jackson Hole, Wyoming.
- 2000 *Rocky Mountain Psychological Association*, Tucson, Arizona.
- Hoosier Mental Life Conference*, Notre Dame, Indiana.
- Annual Interdisciplinary Conference*, Teton Village, Jackson Hole, Wyoming.
- 1999 *Annual Interdisciplinary Conference*, Teton Village, Jackson Hole, Wyoming.
- Annual meeting of the Society for Mathematical Psychology*, Santa Cruz, California.
- 1996 *Hoosier Mental Life*, Evanston, Illinois.
- 1994 *Conference on Oscillations in Neural Systems*, Arlington, Texas.
- Cognition Group*, University of Amsterdam, Amsterdam, The Netherlands.