

Jeff Schneider

The Robotics Institute
Carnegie Mellon University
5000 Forbes Ave
Pittsburgh, PA 15213-3890

phone: (412) 268-2339
<http://www.cs.cmu.edu/~schneide>
Email: Jeff.Schneider@cs.cmu.edu
U.S. Citizen

Research Interests

My research is in machine learning, optimization, data mining, robotics, and intelligent control. I am also interested in related areas including navigation, manipulation, vision, and other types of sensing. My efforts are focused on the use of these methods in science and real-world commercial applications.

Education

Ph.D. (Computer Science), **University of Rochester**, December 1994.

Thesis title: "Intelligent Experimentation for Robot Skill Learning"

Thesis advisor: Christopher M. Brown.

M.S. (Computer Science, EE minor), **Michigan State University**, June 1990.

B.S. (Computer Science, EE minor), **Michigan State University**, June 1988.

Employment

7/04-present Associate Research Professor, **Carnegie Mellon, Robotics Institute**, Pittsburgh, PA

8/04-7/06 Chief Informatics Officer, **Psychogenics, Inc.**, Tarrytown, NY
PGI focuses on in vivo CNS drug discovery. Responsibilities included assembling the informatics group and leading the development new machine learning based drug discovery methods.

7/98-7/04 Research Scientist, **Carnegie Mellon, Robotics Institute**, Pittsburgh, PA

8/95-4/04 Co-founder, CEO, **Schenley Park Research, Inc.**, Pittsburgh, PA
SPR's mission is to bring machine learning technology to the commercial world by integrating it into software that is usable by non-experts. Activities include development of a general machine learning software product, development of a factory production scheduling system used by a major US food manufacturer, consulting for large and small clients, management of company finances, and employees. SPR had over two dozen clients in six countries including four Fortune 500 companies.

1/95-6/98 Post-Doc, **Carnegie Mellon, Robotics Institute**, Pittsburgh, PA
Supervisor: Andrew W. Moore

1/91-12/94 Research Assistant, **U. of Rochester Comp. Sci. Dept.**, Rochester, NY
Supervisor: Christopher M. Brown

- 5/93-7/93 Visiting Graduate Student, **MIT AI Lab**, Cambridge, MA
Supervisor: Christopher G. Atkeson
Studied complex strategy learning in game playing domains.
- 6/91-9/91, Research Assistant, **General Motors Research Labs**, Warren, MI
6/90-9/90, Supervisors: Yong Lee, Paul Besl
6/89-9/89 Created a system to generate high-precision range images of wear on tools.
Developed algorithms for manipulating B-spline surface patches, solid triangulations, and contour data in a CAD modeling system.
- 6/88-9/88, Research Assistant, **Texas Instruments AI Lab**, Plano, TX
6/87-9/87, Supervisors: Tom Barrett, Pam Fales

Publications

Refereed Publications

- B. Bryan, B. McMahan, C. Schafer, J. Schneider, “Efficiently Computing Minimax Expected-Size Confidence Regions”, *International Conference on Machine Learning (ICML)*, 2007.
- B. Bryan, J. Schneider, C. Miller, R. Nichol, C. Genovese, L. Wasserman, “Mapping the Cosmological Confidence Ball Surface”, *Astrophysical Journal*, 2007.
- K. Das, J. Schneider, “Detecting Anomalous Records in Categorical Data Sets”, *ACM International Conference on Knowledge Discovery and Data Mining (KDD)*, 2007.
- J. Roure, A. Dubrawski, J. Schneider, “A Study into Detection of Bio-Events in Multiple Streams of Surveillance Data”, *Intelligence and Security Informatics: Biosurveillance*, pp 124-133, 2007.
- B. Bryan, L. Wasserman, J. Schneider, R. Nichol, C. Miller, C. Genovese, “Active Learning for Identifying Function Threshold Boundaries,” *Neural Information Processing Systems (NIPS)*, 2005.
- R. Emery-Montemerlo, G. Gordon, J. Schneider, S. Thrun, “Game Theoretic Control for Robot Teams” *International Conference on Robotics and Automation*, 2005.
- J. Schneider, D. Apfelbaum, D. Bagnell, R. Simmons, “Learning Opportunity Costs in Multi-Robot Market Based Planners,” *International Conference on Robotics and Automation*, 2005.
- P. Hsiung, A. Moore, D. Neill, J. Schneider, “Alias Detection in Link Data Sets”, *International Conference on Intelligence Analysis*, 2005.
- S. Baker, I. Matthews, J. Schneider, “Automatic Construction of Active Appearance Models as an Image Coding Problem”, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, v. 26, no. 10, 2004.
- K. Das, A. Moore, J. Schneider, “Belief state approaches to signaling alarms in surveillance systems”, *ACM International Conference on Knowledge Discovery and Data Mining (KDD)*, 2004.

- R. Emery-Montemerlo, G. Gordon, J. Schneider, S. Thrun, "Approximate Solutions for Partially Observable Stochastic Games with Common Payoffs", *Autonomous Agents and Multi-Agent Systems (AAMAS)*, 2004.
- J. Bagnell, S. Kakade, A. Ng, J. Schneider, "Policy Search by Dynamic Programming", *Proceedings of Neural Information Processing Systems*, 2003.
- A. Goldenberg, J. Kubica, P. Komarek, A. Moore, J. Schneider, "A Comparison of Statistical and Machine Learning Algorithms on the Task of Link Completion", *KDD Workshop on Link Analysis for Detecting Complex Behavior*, 2003.
- J. Kubica, A. Moore, D. Cohn, J. Schneider, "Finding Underlying Connections: A Fast Method for Link Analysis and Collaboration Queries", *International Conference on Machine Learning (ICML)*, 2003.
- J. Bagnell, J. Schneider, "Covariant Policy Search", *International Joint Conference on Artificial Intelligence*, 2003.
- J. Kubica, A. Moore, J. Schneider, "Tractable Group Detection on Large Link Data Sets", *The Third IEEE International Conference on Data Mining*, 2003.
- J. Schneider, A. Moore, "Active Learning in Discrete Input Spaces", *The 34th Interface Symposium*, Montreal, Quebec, Apr 17-20, 2002.
- A. Moore, J. Schneider, "Real-valued All-Dimensions search: Low-overhead rapid searching over subsets of attributes", *Conference of Uncertainty in Artificial Intelligence (UAI)*, 2002.
- J. Kubica, A. Moore, J. Schneider, Y. Yang, "Stochastic Link and Group Detection", *Eighth National Conference on Artificial Intelligence (AAAI)*, 2002.
- C. Miller, C. Genovese, R. Nichol, L. Wasserman, A. Connolly, D. Reichart, A. Hopkins, J. Schneider, A. Moore, "Controlling the False Discovery Rate in Astrophysical Data Analysis", *Astronomical Journal*, 122, 6, 3492-3505, 2001.
- Y. Liu, F. Dellaert, W.E. Rothfus, A. Moore, J. Schneider, T. Kanade, "Classification-Driven Pathological Neuroimage Retrieval Using Statistical Asymmetry Measures", *Proceedings of the International Conference of Medical Image Computing and Computer Assisted Intervention (MICCAI 2001)*, October 14-17, 2001.
- M. Riedmiller, A. Moore, J. Schneider, "Reinforcement Learning for Cooperating and Communicating Reactive Agents in Electrical Power Grids", *Balancing Reactivity and Social Deliberation in Multi-agent Systems*, edited by M. Hannebauer, Jan Wendler, E. Pagello, Springer, 2001.
- J. A. Bagnell, J. Schneider, "Autonomous Helicopter Control using Reinforcement Learning Policy Search Methods", *International Conference on Robotics and Automation*, 2001.
- J. G. Schneider, W. K. Wong, A. W. Moore, M. Riedmiller, "Distributed Value Functions", *International Conference on Machine Learning*, 1999.
- M. Chen, T. Kanade, D. Pomerleau, J. Schneider, "3-Deformable Registration of Medical Images Using a Statistical Atlas", *Second International Conference on Medical Image Computing and Computer-Assisted Intervention*, 1999.

- J. Schneider, J. Boyan, and A. Moore, "Stochastic Production Scheduling to meet Demand Forecasts", *IEEE Conference on Decision and Control*, 1998.
- J. G. Schneider, J. A. Boyan, A. W. Moore, "Value Function Based Production Scheduling," *International Conference on Machine Learning*, 1998.
- A. W. Moore, J. G. Schneider, J. A. Boyan, M. S. Lee, "Q2: Memory-based active learning for optimizing noisy continuous functions," *International Conference on Machine Learning*, 1998.
- A. W. Moore, J. G. Schneider, K. Deng, "Efficient Locally Weighted Polynomial Regression Predictions," *International Conference on Machine Learning*, 1997.
- J. G. Schneider, "Exploiting Model Uncertainty Estimates for Safe Dynamic Control Learning," *Neural Information Processing Systems*, 1996.
- A. W. Moore, J. G. Schneider, "Memory-based Stochastic Optimization," *Neural Information Processing Systems*, 1995.
- J. G. Schneider, C. M. Brown, "Cooperative Coaching in Robot Skill Learning," *Int. Conference on Intelligent Robots and Systems*, 1995.
- J. G. Schneider, R. F. Gans, "Efficient Search for Robot Skill Learning: Simulation and Reality," *IEEE Int. Conference on Intelligent Robots and Systems*, 1994.
- J. G. Schneider, C. M. Brown, "Task Level Training Signals for Learning Controllers," *IEEE International Symposium on Intelligent Control*, 1994.
- J. G. Schneider, "High Dimension Action Spaces in Robot Skill Learning," *Twelfth National Conference on Artificial Intelligence (AAAI-94)*, 1994.
- J. G. Schneider, C. M. Brown, "Cooperation and Coaching for Motor Skill Learning," *Int. Dedicated Conference on Robotics, Motion and Machine Vision*, 1994.
- J. G. Schneider, C. M. Brown, "Robot Skill Learning, Basis Functions, and Control Regimes," *Proceedings: IEEE Int. Conference on Robotics and Automation*, 1993.

Other Publications

- Y. Liu, N. Lazar, W. Rothfus, F. Dellaert, A. Moore, J. Schneider, T. Kanade, "Semantic based Biomedical Image Indexing and Retrieval", in *Trends and Advances in Content-Based Image and Video Retrieval*, 2004.
- J. Kubica, A. Moore, D. Cohn, J. Schneider, "cGraph: A Fast Graph-Based Method for Link Analysis and Queries", *Proceedings of the 2003 IJCAI Text-Mining and Link-Analysis Workshop*, 2003.
- A. Goldenberg, J. Kubica, P. Komarek, A. Moore, J. Schneider, "A Comparison of Statistical and Machine Learning Algorithms on the Task of Link Completion", *KDD Workshop on Link Analysis for Detecting Complex Behavior*, 2003.
- A. Arora, V. Choudhary, K. Kannan, R. Krishnan, R. Padman and J. Schneider, "Value of Information in a Software Agent Marketplace", *Infonomics/Merit Workshop on Digitalisation of Commerce: e-Intermediation*, Maastricht, November 23-24, 2001.
- J. G. Schneider, "Open Loop Motor Skill Learning," In *Working notes, AAAI Fall Symposium: Machine Learning in Computer Vision*, K. Bowyer, L. Hall editors, 1993.

Invited Talks, Tutorials, and Panels

- “Machine Learning in in vivo Drug Discovery”, *Institute for Operations Research and the Management Sciences (INFORMS)*, Pittsburgh, PA, Nov 6, 2006.
- “Machine Learning in in vivo Drug Discovery”, *University of Pittsburgh Department of Biomedical Informatics Colloquium*, Pittsburgh, PA, September 22, 2006.
- “Machine Learning in in vivo Drug Discovery”, *IBM T.J. Watson Research Center*, Yorktown, NY, June 14, 2006.
- “Data Mining in Anti-Terrorism Applications”, *SAMSI Kickoff Workshop for the program on Data Mining and Machine Learning*, Research Triangle, NC, Sep 7-9, 2003.
- “Link Detection and Searching for Terrorist Threat Activity”, *IJCAI Text Mining and Link Analysis Workshop*, Acapulco, Mexico, August 9, 2003.
- “Statistical Data Mining Methods for Detecting Terrorist Attacks”, *DARPA Workshop on Smart Systems for Recognizing Radiation Threats*, Arlington, VA, May 28-29, 2003.
- “Algorithms in Data Mining with Remote Sensing Applications”, *ASPRS 2003 Annual Conference*, Anchorage, Alaska, May 5-9, 2003.
- Invited member of panel on “Homeland Security Technologies: What are they and why do states need them?”, National Association of State Chief Information Officers (NASCIO) Midyear Conference, Pittsburgh, April 6-8, 2003.
- “Safe Learning Control for Nonlinear Dynamic Systems”, *NTU-CMU joint symposium on Advances in Robotics*, Nanyang Technological University, Singapore, Aug 24, 2001.
- “Data Mining Tutorial”, National Security Agency, Columbia, MD, May 21, 2001.
- “Tree Codes and Clustering Algorithms”, *National Virtual Observatory Conference*, Caltech, Pasadena, CA, June 13–16, 2000.
- “Reinforcement Learning for the Real World”, Polish Academy of Sciences, Warsaw, Poland, January 5, 2000.
- J. Schneider, A. Dubrawski, “Tutorial: Data Mining for Industrial Applications”, Masterfoods, Warsaw, Poland, January 5-7, 2000.
- “Exploiting Model Uncertainty Estimates for Safe Dynamic Control Learning”, *ICML-97 Workshop on Reinforcement Learning*, Nashville, Tennessee, July 9–12, 1997.
- A. Moore, J. Schneider, “Tutorial: Data Mining Algorithms and Applications”, FirstUSA, Wilmington, DE, September, 1996.
- A. W. Moore, S. Schaal, J. G. Schneider, “Locally Weighted Learning: Algorithms and Applications for Robot and Process Control”, *AAAI-96 Tutorial*, Portland, Oregon, August 4–8, 1996.
- “Active Learning on Non-Stationary Functions,” *AAAI Fall Symposium on Active Learning*, Boston, MA, November 10–12, 1995.

“An Architecture Based on Intelligent Experimentation,” *Workshop on Architectures for Intelligent Control Systems* at the IEEE International Symposium on Intelligent Control, Columbus, OH, August 16-18, 1994.

“Using Cooperating Learning Controllers for Complex Tasks,” *ZiF Conference on Integration of Elementary Functions into Complex Behavior*, Bielefeld, Germany, July 12–15, 1994.

“A PUMA goes to Spring Training: Learning through Trial and Error,” presented at a meeting of the *Rochester chapter of the American Society of Mechanical Engineers*, Rochester, NY, March 24, 1994.

“Learning Closed Loop Motor Skills,” *NIPS Workshop on Robot Learning in Continuous Domains*, Vail, CO, December 3, 1993.

Professional Activities

Grant review panels:

NSF CAREER Graph Data Panel	Oct 2007.
NSF Review Panel for the Large Synoptic Survey Telescope (LSST) project	Sep 2007.
NASA Applied Information Systems Research Program	May 2003.
Research Grants Council of Hong Kong	Mar 2003.
National Science Foundation SBIR in Artificial Intelligence	Aug 2002.

Editorial Boards:

Machine Learning Journal

Reviewed papers for:

Int. Conf. on Computer Vision	IEEE Conf. on Computer Vision and Pattern Recognition
IEEE Conf. on Advanced Robotics	IEEE Conf. on Robotics and Automation
Journal of AI Research	Conf. on Neural Information Processing Systems
Artificial Intelligence Journal	IEEE Trans. on Robotics and Automation
Int. Journal of Systems Science	IEEE Trans. on Sys. Man, and Cybernetics
Journal of Process Control	IEEE American Control Conference
AAAI National Conference	Int. Conference on Machine Learning
Int. Joint Conf. on Artificial Intelligence	Int. Journal of Robotics Research

Past and current PhD students:

Drew Bagnell	CMU RI	Graduated 2005
Rosemary Emery	CMU RI	Graduated 2005
Brent Bryan	CMU MLD	
Kaustav Das	CMU MLD	
Robin Sabhnani	CMU MLD	
Yi Zhang	CMU MLD	

Participated on the PhD thesis committees of:

Jian Cheng	University of Pittsburgh	Graduated 2001
Karthik Kannan	CMU Heinz School	Graduated 2003
Larry Zitnick	CMU RI	Graduated 2003
Weng-Keen Wong	CMU CS	Graduated 2004
Bernardine Dias	CMU RI	Graduated 2004
Paul Tompkins	CMU RI	Graduated 2005
Hakan Younes	CMU CS	Graduated 2005
Carl Wellington	CMU RI	Graduated 2005
Cristian Dima	CMU RI	Graduated 2005
Dan Wilson	CMU RI	Graduated 2005
Brendan McMahan	CMU CS	Graduated 2006
Sarjoun Skaff	CMU RI	Graduated 2006
Ting Liu	CMU CS	Graduated 2006
Daniel Neill	CMU CS	Graduated 2006
Dan Bohus	CMU CS	Graduated 2007
David Conner	CMU RI	
Maayan Roth	CMU RI	Graduated 2007
David Thompson	CMU RI	
Sounil Biswas	CMU ECE	
David Duke	CMU RI	

Carnegie Mellon Service Activities:

Robotics Institute seminar committee	1999-2000
Robotics Institute graduate admissions committee	2001-2004
Physics department faculty search committee	2007-2008