

Curriculum Vitae

R. MATTHEW KRETCHMAR

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POSITIONS

- 1999 - **Associate Professor of Computer Science**
Department of Mathematics and Computer Science, Denison University
- 2007 - **Dean of First-Year Students**
2012 Office of First-Year Programs, Denison University
- 1992 - **Software Engineer**
1995 International Business Machines. Fishkill, NY.

EDUCATION

- Ph.D. **Colorado State University**, 2000, Computer Science. (Charles Anderson, advisor)
Dissertation title: *Synthesis of Reinforcement Learning and Robust Control*.
- M.S. **Rensselaer Polytechnic Institute**, 1995, Computer Science.
Thesis title: *Using Neural Networks for Pattern Recognition in Graphs*.
- B.S. **Penn State University**, 1992. Computer Engineering, Minor Philosophy.
Thesis title: *A Small Operating System for use with a Multi-User Custom Computer*.

JOURNAL PUBLICATIONS (peer reviewed)

- Kell, N., Kretchmar, R. M. Suspense at the Ballot Box. *College Mathematics Journal*, vol. 44, no. 1, pp. 9-16. 2013.
- Feil, T., Hutson, K., Kretchmar, R. M. Tree traversals and permutations. *Congressus Numerantium*, vol. 172. pp. 201-221. 2005.
- Kretchmar, R. M., Feil, T., Bansal, R. (2003) Improved Automatic Discovery of Subgoals for Options in Hierarchical Reinforcement Learning. *Journal of Computer Science and Technology*, October, 2003.
- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C., Anderson, M. L., Delnero, C. C. (2001) Robust Reinforcement Learning Control with Static and Dynamic Stability. *International Journal of Robust and Nonlinear Control*, no. 11, pp. 1469-1500, 2001.
- Anderson, C.W., Hittle, D.C., Katz, A.D., Kretchmar, R.M. Synthesis of Reinforcement Learning, Neural Networks, and PI Control Applied to a Simulated Heating Coil. *Journal of Artificial Intelligence in Engineering*, vol. 11, no. 4, pp. 423-431, 1997
- Kretchmar, R. Matthew. Uncontrolling Technology: A Review of Kevin Kelly's Book Out of Control. In *Research in Philosophy and Technology*. ed by Carl Mitcham, vol 16, 1997.

CONFERENCE PUBLICATIONS (peer reviewed)

- Kretchmar, R. M. A Model Advising Seminar. *The 30th Annual Conference on the First Year Experience*. Atlanta, GA. February 2011.
- Bucantanschi, D., B. Hoffman, K. Hutson, and R. M. Kretchmar. A Neighborhood Search Technique for the Freeze Tag Problem. *Extending the Gap: Advances in Computing, Optimization, and Decision Technologies*, E. Baker, A. Joseph, A. Mehrotra, and M. Trick (eds.), Springer, 2007, pp. 97-113.
- Bucantanschi, D., Hoffman, B. Hutson, K. Kretchmar, R.M. A Neighborhood Search Technique for the Freeze-Tag Problem. Submitted to: *INFORMS ICS 2007*. Miami, FL, December 2006.
- Kretchmar, R.M. Multi-agent Reinforcement Learning. *ACM WASP03. Workshop on Agent and Swarm Programming*. John Carroll University, Cleveland, OH, October 2003.
- Kretchmar, R.M. Parallel Reinforcement Learning. *SCI2002. The 6th World Conference on Systemics, Cybernetics, and Informatics*. Orlando, FL, July 2002.
- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C. Robust Reinforcement Learning Control. *2001 American Control Conference*. Washington D.C. June 2001.
- Kretchmar, R.M., and Anderson, C.W. Using temporal neighborhoods to adapt function approximators in reinforcement learning. In *IWANN99: International Work Conference and Artificial and Natural Neural Networks*. Alicante, Spain. June 1999.
- Kretchmar, R.M., and Anderson, C.W. Comparison of CMACs and Radial Basis Functions for Local Function Approximators in Reinforcement Learning. In *Proceedings of the International Conference on Neural Networks, ICNN'97*, Houston, TX. June, 1997
- Anderson, C.W., Hittle, D.C., Katz, A.D., Kretchmar, R.M. Reinforcement Learning, Neural Networks and PI Control Applied to a Heating Coil. *Solving Engineering Problems with Neural Networks: Proceedings of the International Conference on Engineering Applications of Neural Networks (EANN'96)*, ed. by Bulsari, A.B., Kallio, S., and Tsaptsinos, D., Systems Engineering Association, PL 34, FIN-20111 Turku 11, Finland, pp. 135–142. Also see <http://www.abo.fi/~abulsari/EANN96.html>

OTHER PUBLICATIONS AND PRESENTATIONS

- Kretchmar, R.M., Young, P.M., Anderson, C.W., Hittle, D.C. Chapter in book: *Handbook of Learning and Approximate Dynamic Programming*. Wiley-IEEE Press. July, 2004.
- Kretchmar, R.M. (Invited Speaker). Complex Systems: Searching for the Empirical in CS. *The MITC Symposium on Innovative Science Teaching: Enhancing Learning with Technology*. Greencastle, IN. May, 2003.
- Kretchmar, R.M., Antonova, D. Machine Learning in a Distributed Agent Environment. *The GLCA Conference on Complex Systems*. Kalamazoo, MI. February, 2003.
- Kretchmar, R. M. Presentation: “Using Robotics as a Pedagogical Tool”. *AAAI Symposium on Robotics in Education*. American Association for Artificial Intelligence. Stanford University, Palo Alto, CA. March 2001.
- Kretchmar, R. M. TM: A text-based, object-oriented, Turing machine simulator. *Technical Report and Web Publication: Denison University*. October 2000.
- Kretchmar, R.M. Dissertation: *Synthesis of Reinforcement Learning and Robust Control*. Ph.D. Colorado State University. August 2000.
- Bontempo, Charles, Zagelow, George. The IBM Data Warehouse Architecture. *Communications of the ACM*. v41. n 9. September 1998. pages 38-48.

RESEARCH SUPERVISED

- 2010 N. Kell *Survivor: Suspense at the Ballot Box.* An investigation into the ballot reading order of final tribal council elections in the Survivor television program.
- 2006 D. Bucatanschi *Kernel Method for Image Processing: A Denison University Honors Thesis.* The use of various kernel techniques to identify photographs of people and learn common distinguishing features.
- 2005 D. Bucatanschi *Dimensionality Reduction Via Alternative Basis in Reinforcement Learning.* An application of principal component analysis to the learned value function landscape of reinforcement learning.
- 2004 B. Hoffman, and D. Bucatanschi *Solutions to the freeze tag problem.* Application of genetic algorithms and ant-algorithm heuristics to finding optimal awakening schedules for the freeze tag problem.
- 2003 D. Antonova *Parallel Reinforcement Learning.* An investigation of information sharing for multi-agent Q-learning.
- 2002 N. Hristov *Stellar model searching.* Application of simulated annealing to parameter fitting for a stellar density model.
- 2001 R. Bansal *Q-Learning for a mobile robot.* A continuation of D. Michael's work on Q-learning and map formation.
- 2000 D. Michael *Using Q-Learning for environment mapping.* Equipped a small mobile robot with a crude sonar sensor to construct internal mappings the robot's environment.

EMPLOYMENT

- 8/05 present **Associate Professor**, Department of Mathematics and Computer Science, Denison University.
- 7/07 6/12 **Dean of First Year Students**, Denison University.
- 8/99 8/05 **Assistant Professor**, Department of Mathematics and Computer Science, Denison University.
- 7/95 8/99 **Graduate Research Assistant**, Department of Computer Science, Colorado State University.
Research involving function approximation and reinforcement learning. Application to HVAC systems.
- 8/97 8/98 **Instructor** Department of Computer Science, Colorado State University.
- 10/97 8/99 **Research Assistant**, Department of Cognitive Psychology, Colorado State University.
- 6/92 6/95 **Software Engineer**, IBM, Data Warehouse Development Project.

PROFESSIONAL ACTIVITIES

Conference Committees

- 2004 MCURCSM. Midwest Conference on Undergraduate Research in Computer Science and Mathematics. Program chair (for October 2004).
- 2003 MCURCSM. Midwest Conference on Undergraduate Research in Computer Science and Mathematics. General program committee member.
- 1999 GECCO. Genetic and Evolutionary Computation Conference: invited general program committee member.
- 1998 NIPS. Neural Information Processing Systems: volunteer staff.

Professional Organizations

- IEEE. (Institute for Electric and Electronic Engineers).
- ISAB. (International Society of Adaptive Behavior).
- MAA. (Mathematical Association of America).

Other Notes and Activities

My two children (Dylan and Eli), Competitive distance running (9th place 2002 Cleveland Revco Intl Marathon, 16th place 2002 Columbus Marathon), competitive mountain biking, games, chess, game theory, recreational mathematics.