Curriculum Vitae

MATT KRETCHMAR

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POSITIONS

1999 - **Faculty Member**
Department of Mathematics and Computer Science, Denison University

2019 - **Department Chair**
2022 Department of Mathematics and Computer Science, Denison University

2016 - **Department Co-Chair**
2019 Department of Mathematics and Computer Science, Denison University

2014 - **Chair of Denison Writing Program**
2016 Denison Writing Program, 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**, Computer Science. 2000.
Dissertation title: *Synthesis of Reinforcement Learning and Robust Control.*

M.S. **Rensselaer Polytechnic Institute**, Computer Science. 1995.
Thesis title: *Using Neural Networks for Pattern Recognition in Graphs.*

B.S. **Penn State University**, Computer Engineering, Minor Philosophy. 1992.
Thesis title: *A Small Operating System for use with a Multi-User Custom Computer.*

CONFERENCE AND JOURNAL PUBLICATIONS

Tran, Son, Matt Kretchmar. Single-Sentence Reader: A Novel Approach for Addressing Answer Position Bias. *In Preparation.*

Tran, Son, Matt Kretchmar. Intersectional Analysis on Gender and Nationality in Question Answering. *In Preparation.*

Tran, Son, Gia-Huy Do, Nguyen-Thuan Do, Matt Kretchmar, and Xinya Du. AGent: A Novel Pipeline for Automatically Creating Unanswerable Questions. *Submitted to: EACL, 2024.*

Tran, Son, Gia-Huy Do, Nguyen-Thuan Do, Matt Kretchmar, and Xinya Du. AGent: A Novel Pipeline for Automatically Creating Unanswerable Questions. *Submitted to: SoCal NLP Colloquim, 2023.*

Tran, Son, and Matt Kretchmar. The Impacts of Unanswerable Questions on the Robustness of Machine Reading Comprehension Models. *Submitted to: SoCal NLP Colloquim, 2023.*

Goodwin, David, David Gillikin, Alan Wanamaker Jr, Ashwin Lall, May Mei, and Matt Kretchmar. Reconstructing Seasonality Using Oxygen Isotopes from Bivalve Mollusk Shells. *Geological Society of America Connects*. Pittsburgh, PA. October 2023.

Tran, Son, Nguyen Thuan Do, P., Uyen Le, and Matt Kretchmar. The Impacts of Unanswerable Questions on the Robustness of Machine Reading Comprehension Models. *EACL: European Association of Computational Linguistics*. Dubrovnic, Croatia. 2023.

Kretchmar, Matt, Zhe Wang, and John Platt. Statistical Equity in Ohio Cross Country Competition. *Ohio State University Sports Analytics Conference*. Columbus, OH. April 2023.

Kretchmar, M, and Olivia Strasburg. Exploring Equity in the Golf Skins Game. *Midwest Sports Analytics Meeting*. Central College, Pella, IA. November 21, 2020.

Kretchmar, M. Analyzing Equity in High School Cross Country Competition. *Midwest Sports Analytics Meeting*. Central College, Pella, IA. November 23, 2019.

Kretchmar, M. Measuring Equity in High School Cross Country Running. *Great Lakes Data Analytics Conference*. University of Wisconsin Stevens Point. October 2019.

DeVeaux, Richard, Mahesh Agarwal, Maia Averett, Benjamin S. Baumer, Andrew Bray, Thomas C. Bressoud, Lance Bryant, Lei Z. Cheng, Amanda Francis, Robert Gould, Albert Y. Kim, Matt Kretchmar, Qin Lu, Ann Moskol, Deborah Nolan, Roberto Pelayo, Sean Raleigh, Ricky J. Sethi, Mutiara Sondjaja, Neelesh Tiruviluamala, Paul X. Uhlig, Talitha M. Washington, Curtis L. Wesley, David White, and Ping Ye. *Curriculum Guidelines for Undergraduate Programs in Data Science*. Annual Review of Statistics and Its Application. v4. pg 15-30. March 2017.

Kretchmar, R.M. *A Portfolio Based Pedagogy for CS Courses*. AACU's Ohio Project Kaleidoscope: STEM Conference for Learning Pedagogies and Underprepared students. June 2016.

Kretchmar, R.M. *Integrating Writing into STEM Courses*. AACU's Ohio Project Kaleidoscope: STEM Conference for Learning Pedagogies and Underprepared students. June 2016.

Kretchmar, R. M., Zhao, Y. Text Message Authorship Classification Using Kernel Support Vector Machines. *Computational Science and Computational Intelligence, CSCI '14*. Las Vegas, NV. March 2014.

Kell, N., Kretchmar, R. M. Suspense at the Ballot Box. *College Mathematics Journal*, vol. 44, no. 1, pp. 9-16. 2013.

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.

Bucatanschi, D., Hoffman, B. Hutson, K. Kretchmar, R.M. A Neighborhood Search Technique for the Freeze-Tag Problem. *INFORMS ICS 2007*. Miami, FL, December 2006.

Feil, T., Hutson, K., Kretchmar, R. M. Tree traversals and permutations. *Congressus Numerantium*, vol. 172. pp. 201-221. 2005.

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. Multi-agent Reinforcement Learning. *ACM WASP03. Workshop on Agent and Swarm Programming*. John Carroll University, Cleveland, OH, October 2003.

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. (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. 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., 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.

Kretchmar, R. M. Presentation: "Using Robotics as a Pedogogical 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.

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.

Bontempo, Charles, Zagelow, George. The IBM Data Warehouse Architecture. *Communications of the ACM*. v41. n 9. September 1998. pages 38-48.

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.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

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.

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

RECENT PRESENTATIONS

Kretchmar, M. *The Ethics of AI*. Professional Engagement: Invited speaker. Washington DC. 2023.

Kretchmar, M. *Training Large Language Models*. Invited speaker at Kenyon College. 2023.

Kretchmar, M. *Algorithms That Matter*. Denison University. 2023.

Kretchmar, M. *Using Portfolios in Science Classes*. Otterbein University. 2016.

Kretchmar, M. *Text Message Classification with Machine Learning.* Invited talk at Oberlin College, 2013.

PROFESSIONAL ACTIVITIES

Conference Committees

2016 PCMI. Park City Mathematics Institute: Undergraduate workshop/thinktank for various topics in mathematics. This workshop is on Data Analytics. June/July 2016.

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 Review Activities

2022-present: Reviewer for COMPJ (The Computer Journal).

2019-present: Reviewer for *Foundations in Undergraduate Research in Mathematics*, an annual book series.

2019-present: Review for *Nazarbayev University Research Review*.

2019-present: Serve on the editorial board of the IJMLC, *International Journal of Machine Learning and Computing*.

2015-present: Reviewer for Mathematical Association of America (MMA) *College Mathematics Journal*.

2015: External reviewer for John Carroll's Department of Mathematics and Computer Science.

2009: External reviewer for DePauw University's First Year Programs.

Professional Organizations

IEEE. (Institute for Electric and Electronic Engineers).

ACM. Association of Computing Machinery.

MAA. (Mathematical Association of America).

STUDENT RESEARCH SUPERVISED

2023	Son Tran	*Measuring Coherence in Long Form Question Answering Deep Learning Models.* LFQA machines provide a long paragraph of response. We seek to assess the paragraph level coherence of the ideas in the machine's response. This metric will be useful for later training better LFQA machines.
2023	Son Tran, Gia-Huy Do	*Intersectional Analysis on Gender and Nationality in Question Answering.*. We examine inherent biases present in machine learning models, concentrating on the unique intersection of gender and ethnic bias.
2023	Phinneas Pham	*Machine Learning Based Visualization to Capture the Dynamics of Human Traffic in Buildings.*. We explore a project that crosses non-traditional boundaries of art, visualization, machine learning, electronics, and architecture.
2023	Luka Bagashvili	*Constraint Based Scheduling Algorithms on Client/Server Architectures.*. We develop a mobile app to allow students to schedule coursework to complete a major. A back-end server records student schedules and predicts course registration demand.
2022	Son Tran, Uyen Le, Khoi Le	*Machine Reading Comprehension in Deep Learning NLP.*. We explored the use of training NLP models with unanswerable questions in an attempt to improve their comprehension performance against adversarial attacks.
2022	John Platt	*Data Analytics Applied to Ohio Cross Country Competition*. We compiled a database of five years of OH XC results combined with 2020 US Census Data. We examined the data for correlations between school performance and various demographic factors.
2020	Yubo Wang	*Equity in High School Cross Country Running*. An application of Order Statistics to verify disparities created by school enrollments in cross country competition.
2020	Junye Li	*Optimal Policies in the White Elephant Gift Exchange*. Exploring the properties of the combinatorial White Elephant Gift Exchange game in an attempt to find optimal play.
2020	Olivia Strasburg	*Exploring Equity in the Golf Skins Game*. Building a statistical model of golfing ability and using Monte Carlo simulation to explore issues of fairness in golf handicaps.
2017	Lauren Robbins	*Using Decision Trees to Classify Text Message Authorship*. Studying the "hardness" of the text message authorship problem.

2016	Alivia Tacheny	*Resource Allocation in Learning*. Techniques for distributing function approximator resources in reinforcement learning problems.
2015/16	Taylor Kessler Faulkner	*The Restaurant Hostess Problem*. Senior research: application of reinforcement learning to seating guests at a busy restaurant.
2013	Yifu Zhou	*Text Message Authorship Classification*. An application of Kernel based Support Vector Machines to authorship classification of text messages.
2013	Taylor Kessler Faulkner	*RL Robotics Controller*. An application of Reinforcement Learning for a robotic arm controller.
2010	Nat 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	Dan 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	Dan 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	Blaine Hoffman, and Dan 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	Daria 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	Rohit Bansal	*Q-Learning for a mobile robot*. A continuation of D. Michael's work on Q-learning and map formation.
2000	David 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, Fishkill, NY. Data Warehouse Development Project.

Personal Notes

I enjoy spending time with my two children (Dylan and Eli). I am a competitive distance runner and ultra endurance cyclist. I enjoy games, chess, game theory, and recreational mathematics.