David Radke

Cheriton School of Computer Science
University of Waterloo
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Education

2018 – Current

PhD – Computer Science
University of Waterloo, Waterloo, ON, Canada
Artificial Intelligence
Average: 94.6%
Advisors:

- Kate Larson (kate.larson@uwaterloo.ca)
- Tim Brecht (brecht@uwaterloo.ca)

-*The Impact of Teams in Multiagent Systems*

2015 – 2018

Bachelor of Arts – Computer Science and Discrete Math
Colorado College, Colorado Springs, CO, USA
GPA: 3.55
Advisor:

- Dan Ellsworth (dellsworth@coloradocollege.edu)

-*Using Artificial Neural Networks to Predict Wildfire Growth*
(Top 60 Undergraduate Project – Posters on the Hill, Presented in Washington D.C.)

Professional Experience

2018 – Current

Research and Teaching Assistant
University of Waterloo

2018

Computation Research Intern
Lawrence Livermore National Laboratory (LLNL)

2017 – 2018

Undergraduate Research Assistant
University of California, Berkeley (UC Berkeley)
PI: Dr. Gregory Biging

Key Words and Skills

Key Words

Artificial Intelligence (AI), Multiagent Systems (MAS), Reinforcement Learning (RL), Deep Learning, Game Theory, Hockey Performance Analytics

Skills

Languages: Python, C++, Java
Libraries & Software: Tensorflow, PyTorch, NumPy, Pandas, SciKit-Learn, ArcGIS

Research and Scholarship

Areas of Interest

Artificial intelligence (AI) and Multiagent Systems (MAS) with a focus on the impacts of teams, groups, and heterogeneous population structures on game theoretic models, agent preferences, and learning processes. This involves understanding how we can best support Cooperative AI, the process of developing agents with cooperative tendencies or incentivizing cooperation in human-human, hybrid human-AI, or AI agent teams.

I am involved in various projects related to ice hockey analytics using puck and player tracking data from the National Hockey League (NHL). This includes developing mathematical models to evaluate passing and pressure in ice hockey.

Publications

Articles in Refereed Conference Proceedings

- **D. Radke**, K. Larson, T. Brecht. Exploring the Benefits of Teams in Multiagent Learning, *31st International Joint Conference on Artificial Intelligence (IJCAI 2022)*, 2022
  - **Acceptance Rate:** 15%
  - **Long Talk Acceptance Rate:** 3%
  - **Link:** https://cs.uwaterloo.ca/~dtradke/teams_ijcai22.html

- **D. T. Radke**, T. Brecht, D. L. Radke. Identifying Completed Pass Types and Improving Passing Lane Models. *Linköping Hockey Analytics Conference (LINHAC 2022)*, 2022
  - **Link:** https://cs.uwaterloo.ca/~dtradke/linhac22_lp.html
  - **BEST PAPER AWARD**

- **D. Radke**, O. Abari, T. Brecht, K. Larson. Can Future Wireless Networks Detect Fires?. *International Conference on Systems for Energy-Efficient Built Environments (BuildSys 2020)*, 2020
  - **Acceptance Rate:** 35.2%
  - **Link:** https://dl.acm.org/doi/10.1145/3408308.3427978

- **D. Radke**, A. Hessler, D. Ellsworth. FireCast: Leveraging Deep Learning to Predict Wildfire Spread. *28th International Joint Conference on Artificial Intelligence (IJCAI 2019)*, 2019
    - **Acceptance Rate:** 17.9%
    - **Link:** https://www.ijcai.org/proceedings/2019/0636.pdf

Articles in Peer Reviewed Workshops

- **D. Radke**, K. Larson, T. Brecht. The Importance of Credo in Multiagent Learning. *Adaptive and Learning Agents Workshop at AAMAS (ALA-AAMAS 2022)*, 2022
    - **Link:** https://cs.uwaterloo.ca/~dtradke/credo_ala_landing_page.html

- **D. T. Radke**, D. L. Radke, T. Brecht, A. Pawelczyk. Passing and Pressure Metrics in Ice Hockey. *Artificial Intelligence for Sports Analytics Workshop at IJCAI (AISA-IJCAI 2021)*, 2021
    - **Link:** https://cs.uwaterloo.ca/~dtradke/aisa-hockey-paper.html

Journal Articles

- **D. T. Radke**, D. L. Radke, J. D. Radke. Beyond Measurement: Extracting Vegetation Height from High Resolution Imagery with Deep Learning. *Remote Sensing*, 2020, 12(22), 3797
    - **Impact Factor:** 4.509
    - **5-Year Impact Factor:** 5.001
    - **DOI:** https://doi.org/10.3390/rs12223797
    - **Link:** https://www.mdpi.com/2072-4292/12/22/3797

Other Publications

- Radke, J. D., G. S. Biging, K. Roberts, M. Schmidt-Poolman, H. Foster, E. Roe, Y. Ju, S. Lindbergh, T. Beach, L. Maier, Y. He, M. Ashenfarb, P. Norton, M. Wray, A. Alruheil, S. Yi, R. Rau, J. Collins, **D. Radke**, M. Coufal, S. Marx, D. Moanga, V. Ulyashin, A. Dalal. Assessing Extreme Weather-Related Vulnerability and Identifying Resilience Options for California's Interdependent Transportation Fuel Sector. *California's Fourth Climate Change Assessment, California Energy Commission (CEC).* 2018
    - **Publication Number:** CCCA4-CEC2018012
    - **Link:** https://www.energy.ca.gov/sites/default/files/2019-11/Energy_CCCA4-CEC-2018-012_ADA.pdf

Research Talks

- *Exploring the Benefits of Teams in Multiagent Learning*, IJCAI, Vienna, Austria, 2022
- *The Importance of Credo in Multiagent Learning*, ALA-AAMAS, Virtual, 2022
- *Identifying Completed Pass Types and Improving Passing Lane Models*, LINHAC, Virual, 2022

- *Passing and Pressure Metrics in Ice Hockey*, AISA-IJCAI, Virtual, 2021
- *Can Future Wireless Networks Detect Fires?*, BuildSys, Virtual, 2020
- *FireCast: Leveraging Deep Learning to Predict WildFire Spread*, IJCAI, Macao, Macao, 2019
- *Using Artificial Neural Networks to Predict Wildfire Spread*, Posters on the Hill, Washington DC, 2018

Research Posters

- *Exploring the Benefits of Teams in Multiagent Learning*, IJCAI, Vienna, Austria, 2022
- *The Importance of Credo in Multiagent Learning*, ALA-AAMAS, Virtual, 2022
- *Can Future Wireless Networks Detect Fires?*, BuildSys and University of Guelph Research Group Visitor, 2020
- *FireCast: Leveraging Deep Learning to Predict WildFire Spread*, IJCAI, Macao, Macao, 2019 and Vector Institute Evolution of Deep Learning Symposium, Toronto, ON, 2019
- *Using Artificial Neural Networks to Predict Wildfire Spread*, Posters on the Hill, Washington DC, 2018

Awards and Honors

2022	Natural Sciences and Engineering Research Council (NSERC) PGS-D Ontario Graduate Scholarship – Declined President's Graduate Scholarship USports Academic All-Canadian
2021	Ontario Graduate Scholarship President's Graduate Scholarship Waterloo AI Institute Scholarship Ron & Lydia Glover Award USports Academic All-Canadian
2020	1st Place: Sportsnet Hockey Hackathon: Powered by Rogers 5G Type 1 Cheriton Scholarship University of Waterloo Community Service Award USports Academic All-Canadian
2019	Math Domestic Graduate Award USports Academic All-Canadian

Courses Taken

Graduate Courses

- CS886: Theory of Deep Learning
- CS885: Reinforcement Learning
- CS848: Machine Learning for Data Cleaning

- CS886: Trust Modeling and Social Networks
- CS854: Experimental Performance Evaluation
- CS854: Intelligent Connectivity – Internet of Things (IoT)
- CS846: Software Engineering for Large Repositories
- CS889: Information Visualization

Undergraduate Courses

Computer Science

- CSD102: Programming in C++
- CSD105: Programming in Python
- CP122: Computer Science 1
- CP222: Computer Science 2
- CP275: Computer Organization
- CP274: Software Design
- CP334: Database Systems
- CP341: Topics in Computer Science: Machine Learning
- CP405: Theory of Computation
- CP407: Analysis of Algorithms
- ESPM: Directed Group Study Environmental Analysis
- PS403: Computer Science and Politics

Mathematics

- MA126: Calculus 1
- MA129: Calculus 2
- MA204: Calculus 3
- MA251: Number Theory
- MA201: Foundations of Discrete Mathematics
- MA220: Linear Algebra
- MA325: Graph Theory
- MA321: Abstract Algebra

Outside of Major/Minor

- EV260: Topics in Environmental Social Sciences: Going Green: American Environmental Policy in Theory & Practice
- HY105: Civilization in the West: Atlantic World
- EV127: Introduction to Geographical Information Systems (GIS)
- FR101 & FR102: Elementary French I & II
- HY205: US History to 1860
- HY228: The American Colonies, 1492-1763
- GS222: Special Topics: Innovations in Social Work

Personal Details

- Citizenship: USA and Canada
- Language: English and a little French (not fluent)
- USports Ice Hockey at the University of Waterloo
    - Assistant Captain
- Division 1 Men's Ice Hockey at Colorado College
- 3 years of Jr. A hockey for the Soo Thunderbirds
    - Assistant Captain
    - NOJHL and Dudley Hewitt Cup Champion
- Sail on Lake Superior in the summer
- Hike the Rockies when I can
- Picked up cycling during the COVID-19 pandemic. Find me on Strava!