David Radke

Cheriton School of Computer Science
University of Waterloo
dtradke@uwaterloo.ca
https://cs.uwaterloo.ca/~dtradke/

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)

-Thesis: *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)

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

Professional Experience

9/2022 – Current
Advisor, Hockey Research & Analytics
Chicago Blackhawks
(part-time)

9/2018 – Current
Research and Teaching Assistant
University of Waterloo

2022 (Fall)
Research Scientist Intern
Sony AI America

2018 (Summer)
Computation Research Intern
Lawrence Livermore National Laboratory (LLNL)

5/2017 – 5/2018 Undergraduate Research Assistant
University of California, Berkeley (UC Berkeley)
PI: Dr. Gregory Biging

Key Words and Skills

Key Words

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

Skills

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

Research and Scholarship

Areas of Interest

Multiagent systems (MAS) and reinforcement learning (RL) in the context of teams, groups, and heterogeneous population structures on game theoretical 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-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 models to evaluate passing, pressure, and marginal contributions in ice hockey. I also work part-time for the Chicago Blackhawks as a front office advisor for analytics.

Publications

Articles in Refereed Conference Proceedings

2023

- **D. Radke**, K. Larson, T. Brecht. The Importance of Credo in Multiagent Learning. *Autonomous Agents and Multiagent Systems (AAMAS 2023),* 2023
  - **Acceptance Rate:** 23.3%
  - **Link:** https://cs.uwaterloo.ca/~dtradke/credo_lp.html

- **D. Radke** and Alexi Orchard. Presenting Multiagent Challenges in Team Sports Analytics. *Autonomous Agents and Multiagent Systems (AAMAS 2023) BlueSky Track,* 2023
  - **BlueSky Acceptance Rate:** 19.5%
  - **Link:** https://cs.uwaterloo.ca/~dtradke/aamas23_bluesky.html

- Alexi Orchard and **David Radke**. An Analysis of Engineering Students' Responses to an AI Ethics Scienario, *Educational Advances in Artificial Intelligence (EAAI 2023)*, 2023
    - **Acceptance Rate:** Unknown
    - **Link:** https://cs.uwaterloo.ca/~dtradke/eaai_landing_page.html

2022

- **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**

2020

- **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

2019

- **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

2023

- **D. Radke*** and K. Tilbury*. Learning to Learn Group Alignment: A Self-Tuning Credo Framework with Multiagent Teams. *Adaptive and Learning Agents Workshop at AAMAS (ALA-AAMAS 2023)*, 2023
    - **Link:** Forthcoming

2022

- **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_lp.html

2021

- **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

Working Papers

- **D. Radke**, K. Larson, T. Brecht. Towards a Better Understanding of Learning with Multiagent Teams. **(Under Review)**

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

General
- Citizenship: USA and Canada
- Language: English and a little French (not fluent)

Hockey/Sports

- USports Ice Hockey at the University of Waterloo (Top Canadian University League)
    - Assistant Captain
- Division 1 Men's Ice Hockey at Colorado College (Top USA University League)
- 3 years of Jr. A hockey for the Soo Thunderbirds
    - Assistant Captain
    - NOJHL and Dudley Hewitt Cup Champion

Hobbies

- Under Construction: Directions towards general and ethical/responsible AI blog
    - In conjunction with Alexi Orchard, PhD Student (Ethics of Technology Curriculum)
- 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!