Anna Nickelson, Ph.D.

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Education

Oregon State University — Corvallis, OR

Doctor of Philosophy, Robotics — Defended: June 2024

- Dissertation title: ”Optimal is not Always Best: Multi-Objective Decision Making for Adaptive Artificial Intelligence”
- Relevant coursework: Autonomous Agents (AI), Science Communication, Science and Technology Studies (STS)

Masters of Science, Robotics — Defended: Dec 2021

- Masters title: ”Contextual Multi-Objective Path Planning”

California Polytechnic State University — San Luis Obispo, CA

Bachelors of Science, Mathematics — Graduated: June 2012

- Focus in Applied Mathematics with courses in Statistics, Mathematical Modeling, Nonlinear Dynamical Systems

Work Experience

Oregon State University — Corvallis, OR

Graduate Research Assistant — Sep 2018 - June 2024

- Defined, scoped, and executed new research directions focused on assistive artificial intelligence (AI) systems
- Researched the impact of multi-objective optimization on AI systems, privacy in healthcare, and ethical AI
- Collaborated on interdisciplinary research in Ethical AI with the Director of the Center of Ethics and Policy at Carnegie Mellon University as part of the AI-CARING NSF Institute
- Developed AI decision-making algorithms leveraging Python and the Robot Operating System (ROS1)
- Mentored junior graduate and undergraduate students in research, presentation skills, and communication

Graduate Teaching Assistant — Sep 2021 - Mar 2022

- Supported students’ developing skills in the Robot Operating System (ROS1), Amazon Robomaker, and Python

Naval Research Laboratory — Washington, DC

Naval Research Enterprise Graduate Intern — Jun - Aug 2022

- Researched multi-objective cooperative co-evolutionary machine learning (ML) systems
- Mentored undergraduate interns on research, leadership, presentation skills, and communication

Brookings Institution — Washington, DC (remote)

Graduate Research Intern — Jun - Aug 2020

- Researched and composed policy brief on the nuances of enforcing privacy rules on a robot in a healthcare setting
- Advised interdisciplinary team on challenges and implications of artificial intelligence and technology

Dolby Laboratories — San Francisco, CA

Associate Project Manager — Oct 2013 - Oct 2018

- Engaged cross-functional teams in strategic planning to anticipate customer, training, and operational needs
- Managed technical training programs for internal worldwide support engineers enabling smooth product release
- Coordinated and maintained excellent relationships with teams across cultures, countries, and organization levels, including C-suite, to deliver high-value initiatives
- Project managed and delivered domestic and international technical summits with budgets from $500 to $300k
- Contributed as core team member managing local and international technical events ranging from $300k to $3.2M
- 30+ hours of presentation skills training from professional presentation coaches, Butterfield Speaks
- Other titles held with similar responsibilities: Field Training Specialist and Field Training Support Specialist

Field Training & Technical Community Intern — Sep 2012 - Oct 2013

Service and Outreach

Skype A Scientist - Friendly Scientist — Sep 2019 - Current

- Connect with 10+ K-12 classrooms around the country to engage students with AI, robotics, and careers in STEM
- Distill and communicate complex technical concepts, such as artificial intelligence and math, to students of all ages

Presentation Skills Seminar — Mar 2019 - Current

- Develop and present seminars on delivering an impactful technical presentation to any audience
- Link to recorded talk (not anonymized): https://oregonstate.box.com/s/pgrvr8mzuz6gaqclyb6rs7ctyr3hk92i

Student Leadership Council, AI-CARING NSF Institute — Aug 2022 - Jun 2024

- Coordinated and collaborated with students and faculty across five universities to host semi-annual symposia
- Built curriculum to drive interdisciplinary collaborations and development of research into real-world applications

Coalition of Graduate Employees - Contract Compliance Workshops — Jan 2022 - May 2022

- Led contract compliance initiative to advocate for graduate student rights and reducing overwork
- Developed and presented materials to educate graduate students on worker exploitation and their union contracts

Skills

Research Topics Multi-Objective Artificial Intelligence, Ethical AI, Evolutionary Learning, Quality Diversity
Technical Skills Python (Pandas, PyTorch, NumPy, Matplotlib), ROS1 (navstack), LaTeX, Git, Excel, Linux
Professional Skills Engaging Presentations, Science Communication, Project Management, Strategic Planning

Research Projects

A Multi-Objective Perspective on Privacy in Healthcare Robotics — Jun 2020 - Current

- Research and develop policy brief to explain nuances of enforcing privacy rules on a robot in a healthcare setting
- Propose design recommendations to resolve trade-offs between functionality and privacy

Multi-Objective Learning Framework for Beneficent AI [1] — Apr 2023 - April 2024

- Developed framework for multi-objective AI system that balances conflicting values of multiple stakeholders
- Collaborated with interdisciplinary team including Center of Ethics and Philosophy at Carnegie Mellon University

Redefining the Behavior Space for Multi-Objective Map Elites [2, 4] — Jun 2023 - Feb 2024

- Researched multi-objective evolutionary policy search for adaptive and robust artificial intelligence systems

Contextual Multi-Objective Path Planning [3] — Mar 2020 - Sep 2022

- Incorporated context and multi-objective decision-making into traditional robotic path planning framework

First Author Publications

[1] Multi-Objective Reinforcement Learning Framework for Beneficent Artificial Intelligence. **Anna Nickelson**, Russell Perkins, Alex John London, Paul Robinette, Kagan Tumer. *Neural Computing and Applications*, under review

[2] Redefining the Behavior Space for Multi-Objective Map Elites. **Anna Nickelson**, Kagan Tumer. *Proceedings of Genetic and Evolutionary Computation Conference (GECCO)*, 2024

[3] Contextual Multi-Objective Path Planning. **Anna Nickelson**, Kagan Tumer, William D. Smart. *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023

[4] Shaping the Behavior Space with Counterfactual Agents in Multi-Objective Map Elites. **Anna Nickelson**, Nicholas Zerbel, Guarav Dixit, Kagan Tumer. *15th International Conference on Evolutionary Computation Theory and Applications (ECTA); nomiated for Best Student Paper*, 2023