Ellen R. Novoseller (formerly Ellen R. Feldman)

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ACADEMIC EMPLOYMENT

Postdoctoral Scholar Jan. 2021 – Present
University of California, Berkeley
Mentor: Ken Goldberg

EDUCATION

California Institute of Technology Aug. 2014 – Dec. 2020
PhD in Control and Dynamical Systems; GPA: 3.9
Dissertation: *Online Learning from Human Feedback with Applications to Exoskeleton Gait Optimization*
Advisors: Joel W. Burdick and Yisong Yue

University of Southern California (USC) Aug. 2010 – May 2014
B. S. in Electrical Engineering, *Summa cum laude*; GPA: 3.99
Concentration in signal processing, minor in mathematics

SELECTED RESEARCH EXPERIENCE

Postdoctoral Researcher University of California, Berkeley, Jan. 2021 – present
Mentor: Ken Goldberg AUTOLAB

- Researching human-in-the-loop learning, multi-fidelity robot learning, and deformable object manipulation, with applications to assistive robotics and automated polyculture farming

Research Assistant California Institute of Technology, Aug. 2014 – Dec. 2020
Advisors: Joel W. Burdick and Yisong Yue

- Conducted projects on preference-based bandit and reinforcement learning, including developing theory and learning personalized walking gaits for a robotic exoskeleton
- Modeled electrical stimulation of the spinal cord, a therapy for spinal cord injury, to identify critical features of the stimulation for patient standing

Summer NSF CSMR REU program Johns Hopkins University, May 2013 – Aug. 2013
Supervisors: Russell Taylor and Berk Gonenc

- Project: *Development and Evaluation of MICRON: A Robotic System for Retinal Microsurgery*
- Evaluated design options for a microforceps tool for a retinal microsurgical robotic system, wrote C++ code to control the microforceps system, and developed methodology to evaluate robot performance based on statistics and signal processing

PUBLICATIONS

Preprints

- Ryan Hoque, Ashwin Balakrishna, Carl Putterman, Michael Luo, Daniel S. Brown, Daniel Seita, Brijen Thananjeyan, Ellen Novoseller, Ken Goldberg. "LazyDAgger: Reducing Context Switching in Interactive Imitation Learning," Preprint, 2021.

Refereed Conference Proceedings

- Jennifer Grannen*, Priya Sundaresan*, Brijen Thananjeyan, Ashwin Balakrishna, Jeff Ichnowski, Ellen Novoseller, Minho Hwang, Michael Laskey, Joseph E. Gonzalez, Ken Goldberg. "Untangling Dense Non-Planar Knots by Learning Manipulation Features and Recovery Policies," *Robotics: Science and Systems (RSS)*, 2021.
- Kejun Li, Maegan Tucker, Erdem Bıyık, Ellen Novoseller, Joel W. Burdick, Yanan Sui, Dorsa Sadigh, Yisong Yue, Aaron D. Ames, "ROIAL: Region of Interest Active Learning for Characterizing Exoskeleton Gait Preference Landscapes," *IEEE International Conference on Robotics and Automation (ICRA)*, 2021.
- Maegan Tucker, Myra Cheng, Ellen Novoseller, Richard Cheng, Yisong Yue, Joel W. Burdick, Aaron D. Ames, "Human Preference-Based Learning for High-Dimensional Optimization of Exoskeleton Walking Gaits," *IEEE International Conference on Intelligent Robots and Systems (IROS)*, 2020.
- Ellen Novoseller, Yibing Wei, Yanan Sui, Yisong Yue, Joel W. Burdick, "Dueling Posterior Sampling for Preference-Based Reinforcement Learning," *Conference on Uncertainty in Artificial Intelligence (UAI)*, 2020.
- Maegan Tucker*, Ellen Novoseller*, Claudia Kann, Yanan Sui, Yisong Yue, Joel W. Burdick, Aaron D. Ames, "Preference-Based Learning for Exoskeleton Gait Optimization," *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

  Received the **Best Paper Award** and **Best Paper in Human-Robot Interaction Award**.
- Ellen Feldman Joel W. Burdick, "Modeling Motor Responses of Paraplegics under Epidural Spinal Cord Stimulation," *IEEE International Conference on Neural Engineering (NER)*, 2017.
- Berk Gonenc, Ellen Feldman, Peter Gehlbach, James Handa, Russell H. Taylor, Iulian Iordachita, "Towards Robot-Assisted Vitreoretinal Surgery: Force-Sensing Micro-Forceps Integrated with a Handheld Micromanipulator," *IEEE International Conference on Robotics and Automation (ICRA)*, 2014.

Workshop Proceedings

- Myra Cheng, Ellen Novoseller, Maegan Tucker, Richard Cheng, Joel W. Burdick, Yisong Yue, "Preference-Based Bayesian Optimization in High Dimensions with Human Feedback," *Workshop on Real World Experiment Design and Active Learning at the International Conference on Machine Learning (ICML)*, 2020.
- Ellen Novoseller, Yanan Sui, Yisong Yue, Joel W. Burdick, "Dueling Posterior Sampling for Preference-Based Reinforcement Learning," *Workshop on Real-world Sequential Decision Making: Reinforcement Learning and Beyond at the International Conference on Machine Learning (ICML)*, 2019.

DEVELOPED SOFTWARE

- Dueling Posterior Sampling for Preference-Based Reinforcement Learning
- CoSpar: Online Learning from Human Preference and Coactive Feedback

AWARDS AND PROFESSIONAL SOCIETIES

- Computing Innovation Fellow, 2020
- Received the Best Paper Award and Best Paper in Human-Robot Interaction Award at the 2020 IEEE International Conference on Robotics and Automation (ICRA), for the paper "Preference-Based Learning for Exoskeleton Gait Optimization," 5/2020
- Microsoft Graduate Teaching in CMS Award (Caltech CMS departmental award), 5/2018
- Excellent TA award, winter 2018 (award from the Caltech Registrar's Office)
- 2017 Amazon Graduate Fellowship
- National Science Foundation Graduate Research Fellowship, 2014 – 2017
- USC graduation awards, 4/2014: Emma Josephine Bradley Bovard Graduation Award; Philip S. Biegler Memorial Award for Outstanding Achievement in Electrical Engineering
- Professional and Honor Societies: Institute of Electrical and Electronics Engineers (IEEE), Society of Women in Engineering (SWE), Women in Robotics, Tau Beta Pi (Engineering Honor Society); Eta Kappa Nu (Electrical and Computer Engineering Honor Society); Alpha Lambda Delta

TEACHING EXPERIENCE

- Head Teaching Assistant for Machine Learning and Data Mining (CS 155), Winter 2018, Caltech
- Teaching Assistant for Introduction to Robotics (ME 133a), Fall 2017, Caltech
- Completed a quarter-long course on "University Teaching and Learning in STEM," Fall 2017

ACADEMIC SERVICE

- Reviewer: IROS 2021; ICRA 2021; Women in Machine Learning Workshop, 2017 and 2019
- Member of the Computing and Mathematical Sciences graduate student council, Caltech, 10/2018 – 10/2020
- PhD Admissions Reader for the Caltech CMS Department, 12/2018, 12/2019
- Volunteer at Caltech's AI for Science initiative office hours, 10/2019 – 3/2020
- Served on Computing and Mathematical Sciences Colloquium student seminar committee, Caltech, 5/2016 – 5/2017; responsibilities include proposing, inviting, and hosting speakers
- Mentored 15+ PhD, Master's, undergraduate, and high school students on projects in machine learning and robotics, e.g. reinforcement learning and human-in-the-loop learning

K-12 AND UNDERGADUATE OUTREACH

- Presented on "Treating Spinal Cord Injury via Electrical Spinal Cord Stimulation" to: "Introduce a Girl to Engineering Day," Caltech Society of Women in Engineering Event, 2/21/20; USC Biomedical Device Design Team, 3/19/18; Caltech undergraduate computer science seminar class (CS 9), 10/4/2017; W.V.T. Rusch Undergraduate Engineering Honors Colloquium, USC, invited talk, 9/8/2017
- Helped to develop lecture notes for an introductory machine learning course that was piloted at Pasadena City College in winter 2019; delivered a guest lecture on decision trees
- Presented on "Artificial Intelligence for Spinal Cord Therapy," Leadership Pasadena workshop, 3/1/19
- Presented on "Reinforcement Learning for Treating Spinal Cord Injury," DataTalk series at UC Santa Barbara, organized by the UCSB Data Science Club, 5/2/19
- Delivered keynote talk, "My Journey Toward Spinal Cord Therapy and Machine Learning," Pasadena Girl Scout Robotics Expo, 4/6/19
- Presented in the TEDx Pasadena Salon "Her Path to Engineering," aimed at inspiring women to choose STEM disciplines, 7/14/18
- Volunteered at Tech Savvy (a STEM program for 6^{th}-9^{th} grade girls), co-running a workshop entitled "Coding Virtual Reality Environments," 4/14/18
- Volunteered at science nights, engaging students in origami and math puzzles: Alverno Heights Academy (12/4/18), the Pasadena Public Library (3/9/18), Washington Elementary School (9/28/17)
- Volunteered at the Science Olympiad Los Angeles Regionals, 3/3/18