Dylan P. Losey

Contact

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Research Interests

Human-Robot Interaction, Machine Learning, Control Theory, and Cognitive Science. I apply my research to Personal, Assistive, and Rehabilitation Robots.

Current Position

Virginia Tech
Assistant Professor — Starting August 2020
Department of Mechanical Engineering

Experience

Stanford University
Postdoctoral Scholar in Computer Science — 2019 – Present
Advisor: Dorsa Sadigh

Rice University
NSF Research Fellow — 2014 – 2018
Advisor: Marcia K. O'Malley

University of California, Berkeley
Visiting Scholar in Computer Science — 2017
Advisor: Anca D. Dragan

Vanderbilt University
Undergraduate Researcher — 2013
Advisor: Robert J. Webster III

Education

Rice University
Ph.D. in Mechanical Engineering — 2018
M.S. in Mechanical Engineering — 2016
Research focus: Physical human-robot interaction
Advisor: Marcia K. O'Malley

Vanderbilt University
B.E. in Mechanical Engineering — 2014

Honors & Awards

ACM/IEEE International Conference on Human-Robot Interaction
Best Paper Award, Honorable Mention — 2020

Rice University, Department of Mechanical Engineering
Outstanding Ph.D. Thesis Award — 2019

IEEE/ASME Transactions on Mechatronics
Best Paper Award — 2017

IEEE Conference on Biomedical Robotics and Biomechatronics
Best Student Paper Award, Finalist 2016

National Science Foundation Graduate Research Fellowship 2014

Rice University Graduate Research Fellowship 2014

Vanderbilt University Dynamics & Controls Award 2014

Vanderbilt University Cornelius Vanderbilt Scholarship 2010

Teaching

COMP/ELEC/MECH 498: Introduction to Robotics Spring 2018
Guest Lecturer, Rice University

MECH 488: Design of Mechatronic Systems Spring 2017
TA for Prof. Marcia K. O'Malley, Rice University

MECH 311: Instrumentation Laboratory Spring 2016
Head TA, Rice University

MECH 343: Modeling of Dynamic Systems Fall 2014 & 2016
Guest Lecturer & TA for Prof. Marcia K. O'Malley, Rice University

MECH/ELEC 420: Fundamentals of Control Systems Spring 2015
TA for Prof. Fathi Ghorbel, Rice University

Advising & Mentoring

Graduate Research Mentor

- *Annie Xie:* Learning and influencing the latent dynamics of human teammates in multi-agent tasks.
- *Hong Jun Jeon:* Teleoperating assistive robots to perform precise manipulation tasks by combining shared autonomy with intuitive embeddings.
- *Minae Kwon:* Developing robots which recognize that humans are not purely rational in scenarios with risk and uncertainty.
- *Krishnan Srinivasan:* Leveraging self-supervised models to learn embeddings that humans can use to control high-dimensional robot arms.
- *Mengxi Li:* Introducing algorithms for decentralized multi-robot teams that enable the teammates to communicate via actions.
- *Erdem Biyik, Malayandi Palan, Nicholas C. Landolfi:* Formalizing active learning so that robots ask informative questions that humans can easily answer.

Undergraduate Research Mentor

- *Daniel and Jing:* Learning latent embeddings to control bimanual robots and high-dimensional autonomous systems.
- *Shoko:* Designing and controlling a torsional haptic rocker that provides tactile feedback to the human wearer.

High School Research Mentor

- *Aditi and Karan:* Creating games for human-robot interaction that provide insight into how robots should model human decision making.

Outreach

Stanford AI Mentor 2019 – 2020
I mentor in this SAIL program, where we connect underrepresented minorities and female undergraduate students interested in AI with Ph.D. students at Stanford to meet monthly and discuss research and career choices.

AI4ALL Summer Program Speaker 2019
I shared our lab's research in human-robot interaction with female high-schools students participating in AI4ALL, and lectured on how we write code to control robots at Stanford University.

TOMODACHI-STEM Mentor 2018
I mentored a female undergraduate student from Japan throughout a mechantronics research project as a part of this Rice University program meant to provide an introduction to higher education and opportunities for cultural engagement.

Professional Activities

Workshop Organizer
RSS: *Emergent Behaviors in Human-Robot Systems* 2020

Program Committee Member
AAAI Conference on Artificial Intelligence 2019

Editorial Board
Stanford Artificial Intelligence Lab (SAIL) Blog 2019 – Present

Invited Paper Reviews

- International Journal of Robotics Research
- IEEE Transactions on Robotics
- IEEE Robotics and Automation Letters
- IEEE/ASME Transactions on Mechatronics
- ACM Transactions on Human-Robot Interaction
- Mechatronics
- Conferences including ICRA, RSS, CoRL, IROS, HRI, and ICORR

Invited Talks

ICRA Workshop on Interactive Robot Learning 2020
Personalizing Robots through Learned Latent Actions

University of North Carolina, Department of Computer Science 2020
Personalizing Robots with Mechanics and Learning

University of Washington, Department of Mechanical Engineering 2020

Boston University, Department of Mechanical Engineering 2020

Notre Dame, Department of Aerospace and Mechanical Engineering 2020

Virginia Tech, Department of Mechanical Engineering 2020

Stanford University, Robotics Seminar 2020

Amazon Research Awards 2019
Controlling Assistive Robots with Learned Latent Actions

MIT, Computer Science & Artificial Intelligence Lab 2019
Personalizing Robots with Physics and Intelligence

Harvard University, Materials Science and Mechanical Engineering 2019

Boston University, Center for Information & Systems Engineering 2019

UIUC, Departments of Mechanical Engineering & Computer Science 2019
Responding to Physical Human-Robot Interaction

Stanford University, Robotics Seminar 2019

Journal Papers

8. **Dylan P. Losey**, Andrea Bajcsy, Marcia K. O'Malley, and Anca D. Dragan, "Physical interaction as communication: Learning robot objectives online from human corrections," *The International Journal of Robotics Research*, 2020 (in review).
7. **Dylan P. Losey** and Marcia K. O'Malley, "Learning the correct robot trajectory in real-time from physical human interactions," *ACM Transactions on Human-Robot Interaction*, vol. 9, no. 1, pp. 1-19, 2019.
6. **Dylan P. Losey**, Laura Blumenschein, Janelle Clark, and Marcia K. O'Malley, "Improving short-term retention after robotic training by leveraging fixed-gain controllers," *Journal of Rehabilitation and Assistive Technologies Engineering*, vol. 6, pp. 1-13, 2019.
5. **Dylan P. Losey** and Marcia K. O'Malley, "Enabling robots to infer how end-users teach and learn through human-robot interaction," *IEEE Robotics and Automation Letters*, vol. 4, no. 2, pp. 1956-1963, 2019.
4. **Dylan P. Losey** and Marcia K. O'Malley, "Trajectory deformations from physical human-robot interaction," *IEEE Transactions on Robotics*, vol. 34, no. 1, pp. 126-138, 2018.
3. **Dylan P. Losey**, Craig G. McDonald, Edoardo Battaglia, and Marcia K. O'Malley, "A review of intent detection, arbitration, and communication aspects of shared control for physical human-robot interaction," *Applied Mechanics Reviews*, vol. 70, no. 1, 2018.
2. **Dylan P. Losey**, Andrew Erwin, Craig G. McDonald, Fabrizio Sergi, and Marcia K. O'Malley, "A time domain approach to control of series elastic actuators: Adaptive torque and passivity-based impedance control," *IEEE/ASME Transactions on Mechatronics*, vol. 21, no. 4, pp. 2085-2096, 2016. **Best Paper Award**.
1. Ali Utku Pehlivan*, **Dylan P. Losey***, and Marcia K. O'Malley, "Minimal assist-as-needed controller for upper limb robotic rehabilitation," *IEEE Transactions on Robotics*, vol. 32, no. 1, pp. 113-124, 2016.

Refereed Conference Proceedings

16. Mengxi Li, **Dylan P. Losey**, Jeannette Bohg, and Dorsa Sadigh, "Learning user-preferred mappings for intuitive robot control," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020 (in review).
15. Hong Jun Jeon, **Dylan P. Losey**, and Dorsa Sadigh, "Shared autonomy with learned latent actions," *Robotics: Science and Systems (RSS)*, 2020.

14. **Dylan P. Losey**, Krishnan Srinivasan, Ajay Mandlekar, Animesh Garg, and Dorsa Sadigh, "Controlling assistive robots with learned latent actions," *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.
13. Minae Kwon, Erdem Biyik, Aditi Talati, Karan Bhasin, **Dylan P. Losey**, and Dorsa Sadigh, "When humans aren't optimal: Robots that collaborate with risk-aware humans," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, pp. 43-52, 2020. **Best Paper Honorable Mention.**
12. **Dylan P. Losey***, Mengxi Li*, Jeannette Bohg, and Dorsa Sadigh, "Learning from my partner's actions: Roles in decentralized robot teams," *Conference on Robot Learning (CoRL)*, 2019. **Oral Presentation**.
11. Erdem Biyik, Malayandi Palan, Nicholas C. Landolfi, **Dylan P. Losey**, and Dorsa Sadigh, "Asking easy questions: A user-friendly approach to active reward learning," *Conference on Robot Learning (CoRL)*, 2019.
10. **Dylan P. Losey** and Dorsa Sadigh, "Robots that take advantage of human trust," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019.
9. **Dylan P. Losey** and Marcia K. O'Malley, "Including uncertainty when learning from human corrections," *Conference on Robot Learning (CoRL)*, pp. 123-132, 2018.
8. Andrea Bajcsy, **Dylan P. Losey**, Marcia K. O'Malley, and Anca D. Dragan, "Learning from physical human corrections, one feature at a time," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2018.
7. Andrea Bajcsy*, **Dylan P. Losey***, Marcia K. O'Malley, and Anca D. Dragan, "Learning robot objectives from physical human interaction," *Conference on Robot Learning (CoRL)*, pp. 217-226, 2017. **Oral Presentation**.
6. **Dylan P. Losey** and Marcia K. O'Malley, "Effects of discretization on the K-width of series elastic actuators, *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 421-426, 2017.
5. Ali Utku Pehlivan, **Dylan P. Losey**, Chad G. Rose, and Marcia K. O'Malley, "Maintaining subject engagement during robotic rehabilitation with a minimal assist-as-needed (mAAN) controller," *IEEE International Conference on Rehabilitation Robotics (ICORR)*, pp. 62-67, 2017.
4. **Dylan P. Losey**, Laura H. Blumenschein, and Marcia K. O'Malley, "Improving the retention of motor skills after reward-based reinforcement by incorporating haptic guidance and error augmentation, *IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob)*, pp. 865-871, 2016.
3. **Dylan P. Losey**, Craig G. McDonald, and Marcia K. O'Malley, "A bio-inspired algorithm for identifying unknown kinematics from a discrete set of candidate models by using collision detection, *IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob)*, pp. 418-423, 2016. **Best Student Paper Award Finalist**.
2. Ben D. Kramer, **Dylan P. Losey**, and Marcia K. O'Malley, "SOM and LVQ classification of endovascular surgeons using motion-based metrics, *Workshop on Self-Organizing Maps (WSOM)*, pp. 227-237, 2016.
1. **Dylan P. Losey***, Peter A. York*, Philip J. Swaney, Jessica Burgner, and Robert J. Webster III, "A flexure-based wrist for needle-sized surgical robots, *SPIE Medical Imaging*, pp. 86711G, 2013.