# Dylan P. Losey

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**Contact**

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**Research Interests**

Human-robot interaction, machine learning, control theory, and cognitive science, with applications in personal, assistive, and rehabilitation robots.

**Current Position**

**Virginia Tech**
Assistant Professor                                                    August 2020 – Present
Department of Mechanical Engineering

**Experience**

**Stanford University**
Postdoctoral Scholar in Computer Science                               2019 – 2020
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**

Robotics: Science and Systems
Best Student Paper Award, Finalist                                    2020

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 | |
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| | Best Paper Award | 2017 |
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| | IEEE Conference on Biomedical Robotics and Biomechatronics | |
| | Best Student Paper Award, Finalist | 2016 |
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| | National Science Foundation Graduate Research Fellowship | 2014 |
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| | Rice University Graduate Research Fellowship | 2014 |
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| | Vanderbilt University Dynamics & Controls Award | 2014 |
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| | 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 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 Marcia K. O'Malley, Rice University

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

**Advising & Mentoring**

**Graduate Research Mentor**
- *Annie Xie:* Learning and influencing the latent dynamics of other non-stationary agents in multi-agent systems.
- *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.

**Outreach**

**Stanford AI Mentor**        2019 – 2020
I mentored in this SAIL program, where we connected 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 – 2020
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**
Conference on Robot Learning                                         2019, 2020
AAAI Conference on Artificial Intelligence                           2019, 2020

**Editorial Board**
Stanford Artificial Intelligence Lab (SAIL) Blog                     2019 – 2020

**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**

9. Erdem Biyik, **Dylan P. Losey**, Malayandi Palan, Nicholas C. Landolfi, and Dorsa Sadigh, "Learning reward functions from diverse sources of human feedback: Optimally integrating demonstrations and preferences," *The International Journal of Robotics Research*, 2020 (in review).

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.

15. Hong Jun Jeon, **Dylan P. Losey**, and Dorsa Sadigh, "Shared autonomy with learned latent actions," *Robotics: Science and Systems (RSS)*, 2020. **Best Student Paper Finalist.**

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.