Anca Dragan

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Current Position

Assistant Professor, UC Berkeley, EECS Department. **2015-present**

Education

PhD, Robotics, Carnegie Mellon University, USA. **2009-2015**
Advisor: Siddhartha Srinivasa. *"Legible Robot Motion Planning".*

B.Sc., Computer Science, Jacobs University Bremen, Germany. **2006-2009**
Advisors: Michael Kohlhase and Herbert Jaeger.

Awards

TR 35. **2017**
MIT Tech Review 35 Innovators under 35

Okawa Foundation Award. **2017**
Awarded to 9 faculty in the United States

NSF CAREER Award. **2017**
"Towards Autonomously Generating Robot Behavior for Coordination with Humans – Accounting for Effects on Human Actions "

Best Cognitive Robotics Paper Finalist, IROS. **2016**
"Active Information Gathering over Human Internal State"

Best HRI Paper Finalist, ICRA. **2016**
"Reducing Supervisor Burden in Online Learning from Demonstration"

SCS Disseration Award Honorable Mention. **2015**
For "Legible Robot Motion Planning"

Best Paper and Best Student Paper Finalist, ICRA. **2015**
"Motion Primitives via Optimization"

Rising Stars in EECS. **2014**
Awarded to 40 EECS graduate and postdoctoral women.

Siebel Scholar. **2014**
For academic excellence and demonstrated leadership.

Best Reviewer Award Finalist. **2014**
Robotics: Science and Systems

Dan David Scholarship. **2014**

For the Future Direction of Artificial Intelligence, 2014.

CITEC Award for Excellence in Doctoral HRI Research. 2014
At the International Conference on Human-Robot Interaction in 2014.

Intel PhD Fellow. 2013
I was one of the 14 students who were awarded the Intel PhD Fellowship.

Best Paper Award Finalist, Robotics: Science and Systems. 2013
"Generating Legible Motion"

Best Paper Award Finalist, Robotics: Science and Systems. 2012
"Formalizing Assistive Teleoperation"

Best Paper Award Nomination, International Symposium on Human-Robot Communication. 2012
"Online Customization of Teleoperation Interfaces"

Google Anita Borg Scholar. 2012
I was one of the 25 students in the U.S. who were awarded the Google Anita Borg Memorial Scholarship.

HRI Pioneer. 2011
I was selected to participate in the Human-Robot Interaction Pioneers Workshop, a highly selective workshop seeking to foster creativity, communication, and collaboration across HRI.

Teaching

Algorithmic Human-Robot Interaction (CS294-115), UC Berkeley. 2015, 2016
Instructor. Ratings: 6.4/7 6.3/7.

Human-Compatible AI (CS294-125), UC Berkeley. 2016
Co-instructor. Rating: 6.8/7.

Introduction to Artificial Intelligence (CS188), UC Berkeley. 2016, 2017
Co-instructor 2016, Instructor 2017. Rating: 6.5/7, 6.23/7.

Manipulation Algorithms, Carnegie Mellon University. 2014
Co-instructor.

Mathematical Fundamentals for Robotics, Carnegie Mellon University. 2011
TA for Prof. Michael Erdmann.

Computability and Complexity, Jacobs University Bremen. 2009
TA for Prof. Herbert Jaeger.

General Computer Science I and II, Jacobs University Bremen. 2007-2009
TA for Prof. Michael Kohlhase.

General Electrical Engineering I and II, Jacobs University Bremen. 2007-2008
TA for Prof. Werner Bergholz.

Mentoring

Current PhD Students, Smitha Milli, Ellis Ratner, Sid Reddy, Andreea Bobu, Andrea Bajcsy, Kush Bhatia, Dylan Hadfield-Menell, Sandy Huang, Jaime Fisac, Aaron Bestick.

Former PhD Students, Dorsa Sadigh (Faculty at Stanford).

Masters Students, Chang Liu.

Current Undergraduate Students, Allan Zhou, Nick Landolfi, Jason Zhang, Hong Jeon, Minae Kwon.

Former Undergraduate Students, Glen Chao (PhD at U. Michigan), Rachel Holladay (PhD at MIT), Kenton Lee (PhD at UW).

Outreach

BAIR AI4ALL Camp, Founded and ran a summer camp for high school students from low-income families on human-centered AI.

InterACT Summer Internship, Founded a lab internship program offered yearly to one Bay Area high-school girl.

High School Curriculum Development, Working with 5 local teachers on incorporating robotics and AI into science and math education in their schools..

Lectures on Robotics, CS, and Math, Carlmont High, SAILORS, Ellis School for Girls, Hawken School, Leap@CMU, Carnegie Science Center, Wilkinsburg Gifted Class.

Talks at Women in STEM events and panels, SWE, Fem Tech, Women in Tech SF Summit, WICSE.

Research Team Leader, OurCS: Opportunities for undergraduate research in Computer Science..

Talks to Berkeley Undergraduates on Integrating Interaction into Robotics, EECS Honors, HKN General Meeting, Transfer Students Breakfast with Faculty, etc..

Lab Tours, Tours and demos to the general public, particularly to children aged 2-18.

Professional Activities

Co-PI for the Center on Human-Compatible AI.: Our mission is AI that is (provably) beneficial to humanity; `http://humancompatible.ai`

BAIR Steering Committee.: I helped found and am on the steering committee of the Berkeley AI Research Lab (BAIR); `http://bair.berkeley.edu`.

Chair: *Bay Area Robotics Symposium*, 2016 and 2017.

Associate Editor (or equivalent): ACM Transactions on HRI (Computational HRI track), AURO (special issue), ICRA 2017, HRI 2016, WAFR 2016, IROS 2016, ARSO 2014.

Workshops Chair: *Robotics: Science and Systems*, 2017.

Workshop Organizer: *Algorithms for Human-Robot Interaction*, Paris 2016.

Workshop Organizer: *Algorithms for Human-Robot Interaction*, UC Berkeley 2015.

Workshop Organizer: *Planning for Human-Robot Interaction*, RSS 2016.

Workshop Organizer: *Human-Robot Collaboration*, RSS 2013.

Workshop Organizer: *Robot Learning*, ICML 2013.

Workshop Organizer: *Collaborative Manipulation*, HRI 2013.

AI Prelim Examiner: UC Berkeley EECS, 2016, 2017.

Robotics Roadmap Contributor: Contributed to the Robotics Roadmap, 2016.

Grant Panels: NSF, NASA.

Invited Talks

Learning to Coordinate with and Help People, Conference on Robot Learning (CoRL) Keynote. 2017

How will algorithmic HRI shape autonomous driving?, Workshop on Mathematical Models, Algorithms, and HRI (RSS). 2017

Getting around misspecified objectives, Reinforcement Learning and Decision Making (RLDM) Keynote. 2017

Learning Human Values, Huawei AI Workshop, Orange Institute. 2017

Cars that Coordinate with People, O'Reily AI Keynote, Workshop on Machine Learning for Intelligent Transportation Workshop (NIPS), Machine Intelligence and Self Driving Vehicles Meetup Series (Mercedes-Benz), Ford Research Seminar, Workshop on Robotics and Vehicular Technologies for Self-driving cars (ICRA). 2016-2017

Interactively Learning Robot Objectives, Workshop on Reliable Machine Learning (NIPS), Simons Workshop on Interactive Learning. 2016

Estimating and Adapting to Human Internal State, Shared Autonomy Workshop (IROS). 2016

How Robots Influence our Actions, Trust Workshop (RSS), Safety Workshop (Microsoft Research), Human-Robot Collaboration Workshop (IROS). 2016

Robot Planning for Interaction with Humans, BEARS Symposium, Fem Tech, Intercampus Open House, HKN Honors Society, SWARM Lab, Cognitive Science Seminar, UC Berkeley. 2016

Challenges and Opportunities for Deep Learning in HRI, CITRIS Day, UC Berkeley. 2015

Interaction as Manipulation, Caltech, UCSD, Stanford, UC Berkeley, MIT, UW, GaTech, Cornell, Harvard, Princeton, U Toronto, McGill, USC, CMU, UT Austin. 2015

A Mathematical Formalism for Legible Robot Motion, University of Southern California. 2014

Robot Motion for Seamless Human-Robot Collaboration, Cornell University. 2014

A Personal Robot for a Better Quality of Life, Carnegie Science Center. 2013

Learning to Collaborate with People, The Machine Learning Lunch, Carnegie Mellon. 2013

Robot Motion for Seamless Human-Robot Collaboration, Stanford University. 2013

Enabling Physical Systems to Seamlessly Collaborate with Their Users, Intel. 2013

Optimal Robot Motion for Human-Robot Collaboration, DLR Germany. 2013

Robot Motion for Seamless Human-Robot Collaboration, Georgia Tech. 2013

The Practical Side of Optimization, Guest Lecture, Carnegie Mellon University. 2012

Assistive Teleoperation, CFR, Carnegie Mellon University. 2012

Optimal Planning for Robotic Manipulation, Intel Science and Technology Center. 2012

Learning from Experience and Demonstration for Manipulation Planning, Google. 2012

Optimization in the Real World, Guest Lecture, Carnegie Mellon University. 2011

Manipulation Planning: How do we learn from experience?, SELECT Laboratory. 2011

Trajectory Optimization with Goal Sets, CFR, Carnegie Mellon University. 2011

Solving Constraint Satisfaction Problems, ETH Zurich. 2009

Publications (Conferences and Journals)

[1] D. Hadfield-Menell, S. Milli, P. Abbeel, S. Russell, and A.D. Dragan. Inverse reward design. In *Neural Information Processing Systems (NIPS)*, 2017. **(oral, acceptance rate 1.2%)**.

[2] J. Fisac, M. Gates, J. Hammrick, C. Liu, D. Hadfield-Menell, S. Sastry, T. Griffiths, and A.D. Dragan. Pragmatic-pedagogic value alignment. In *International Symposium on Robotics Research (ISRR)*, 2017.

[3] M. Laskey, J. Mahler, A.D. Dragan, and K. Goldberg. Dart:optimizing noise injection in imitation learning. In *Conference on Robot Learning (CoRL)*, 2017.

[4] A. Bajcsy, D. Losey, M. O'Malley, and A.D. Dragan. Learning robot objectives from physical human interaction. In *Conference on Robot Learning (CoRL)*, 2017. **(full length talk, acceptance rate 10%)**.

[5] S. Huang, P. Abbeel, and A.D. Dragan. Enabling robots to communicate their objectives. In *Robotics: Science and Systems (RSS)*, 2017.

[6] D. Sadigh, A.D. Dragan, S. Sastry, and S. Seshia. Active preference-based learning of reward functions. In *Robotics: Science and Systems (RSS)*, 2017.

[7] S. Milli, D. Hadfield-Menell, A.D. Dragan, P. Abbeel, and S. Russell. Should robots be obedient? In *International Joint Confernece on Artificial Intelligence (IJCAI)*, 2017.

[8] D. Hadfield-Menell, A.D. Dragan, P. Abbeel, and S. Russell. The off-switch game. In *International Joint Confernece on Artificial Intelligence (IJCAI)*, 2017.

[9] J. Andreas, A.D. Dragan, and D. Klein. Translating neuralese. In *Association for Computational Linguistics (ACL)*, 2017.

[10] M. Laskey, S. Krishnan, J. Mahler, K. Jamieson, A.D. Dragan, and K. Goldberg. Comparing human-centric and robot-centric sampling for robot learning from demonstration. In *International Conference on Robotics and Automation (ICRA)*, 2017.

[11] C. Basu, Q. Yang andD. Hungerman, Singhal M, and A.D. Dragan. Do you want your autonomous car to drive like you? In *International Conference on Human-Robot Interaction (HRI)*, 2017.

[12] A. Zhou, D. Hadfield-Menell andA. Nagabaudi, and A.D. Dragan. Expressive robot motion timing. In *International Conference on Human-Robot Interaction (HRI)*, 2017.

[13] J. Fisac, C. Liu, J. Harick, K. Hedrick, S. Sastry, T. Griffiths, and A.D. Dragan. Generating plans that predict themselves. In *Workshop on the Algorithmic Foundations of Robotics (WAFR)*, 2016.

[14] D. Hadfield-Menell, A.D. Dragan, P. Abbeel, and S. Russell. Collaborative inverse reinforcement learning. In *Neural Information Processing Systems (NIPS)*, 2016.

[15] N. Mehr, R. Horowitz, and A.D. Dragan. Inferring and assisting with constraints in shared autonomy. In *Conference on Decision and Control (CDC)*, 2016.

[16] D. Sadigh, S. Sastry, S. Seshia, and A.D. Dragan. Information gathering actions over human internal state. In *International Conference on Intelligent Robots and Systems (IROS)*, 2016. **(best cognitive robotics paper award finalist)**.

[17] A. Bestick, R. Bajcsy, and A.D. Dragan. Implicitly assisting humans to choose good grasps in robot to human handovers. In *International Symposium on Experimental Robotics (ISER)*, 2016.

[18] M. Laskey, J. Lee, C. Chuck, D.V. Gealy, W. Hsieh, F.T. Pokorny, A.D. Dragan, and K. Goldberg. Using a hierarchy of supervisors in learning from demonstration. In *International Conference on Automation Science and Engineering (CASE)*, 2016.

[19] Z. Marinho, B. Boots, A.D. Dragan, A. Byravan, G.J. Gordon, and S.S. Srinivasa. Functional gradient motion planning in reproducing kernel hilbert spaces. In *Robotics: Science and Systems (R:SS)*, 2016.

[20] D. Sadigh, S. Sastry, S. Seshia, and A.D. Dragan. Planning for autonomous cars that leverages effects on human drivers. In *Robotics: Science and Systems (R:SS)*, 2016.

[21] C. Liu, J. Harick, J. Fisac, A.D. Dragan, K. Hedrick, S. Sastry, and T. Griffiths. Goal inference improves objective and perceived performance in human-robot collaboration. In *Autonomous Agents and Multiagent Systems (AAMAS)*, 2016.

[22] S. Nikolaidis, A.D. Dragan, and S.S. Srinivasa. Viewpoint-based legibility optimization. In *International Conference on Human-Robot Interaction (HRI)*, 2016.

[23] M. Laskey, S. Staszak, W. Y. Hsieh, F.T. Pokorny J. Mahler, A.D. Dragan, and K. Goldberg. Shiv: Reducing supervisor burden in dagger using support vectors for efficient learning from demonstrations in high dimensional state spaces. In *International Conference on Robotics and Automation (ICRA)*, 2016. **(best HRI paper award finalist)**.

[24] A.D. Dragan, K. Muellin, J.A. Bagnell, and S.S. Srinivasa. Movement primitives via optimization. In *International Conference on Robotics and Automation (ICRA)*, 2015. **(best paper and best student paper award finalist)**.

[25] A.D. Dragan, S. Bauman, J. Forlizzi, and S.S. Srinivasa. Effects of robot motion on human-robot collaboration. In *International Conference on Human-Robot Interaction (HRI)*, 2015.

[26] A.D. Dragan, R. Holladay, and S.S. Srinivasa. From legibility to deception. In *Autonomous Robots (AURO)*, 2015.

[27] R. Holladay, A.D. Dragan, and S.S. Srinivasa. Legible robot pointing. In *International Symposium on Human and Robot Communication (Ro-Man)*, 2014.

[28] A.D. Dragan, R. Holladay, and S.S. Srinivasa. An analysis of deceptive robot motion. In *Robotics: Science and Systems (R:SS)*, 2014.

[29] A.D. Dragan and S.S. Srinivasa. Integrating human observer inferences into robot motion planning. *Autonomous Robots (AURO)*, 2014.

[30] E. Cha, A.D. Dragan, and S.S. Srinivasa. Pre-school children's first encounter with a robot. In *International Conference on Human-Robot Interaction (HRI)*, 2014. (late-breaking report).

[31] E. Cha, A.D. Dragan, and S.S. Srinivasa. Effects of speech on perceived capability. In *International Conference on Human-Robot Interaction (HRI)*, 2014. (late-breaking report).

[32] A.D. Dragan and S.S. Srinivasa. Familiarization to robot motion. In *International Conference on Human-Robot Interaction (HRI)*, 2014.

[33] H. Admoni, A.D. Dragan, B. Scassellati, and S.S. Srinivasa. Deliberate delays during robot-to-human handovers improve compliance with gaze communication. In *International Conference on Human-Robot Interaction (HRI)*, 2014.

[34] A.D. Dragan and S.S. Srinivasa. A policy blending formalism for shared control. *International Journal of Robotics Research (IJRR)*, 2013.

[35] M. Zucker, N. Ratliff, A.D. Dragan, M. Pivtoraiko, M. Klingensmith, C. Dellin, J. Bagnell, and S.S. Srinivasa. CHOMP: Covariant Hamiltonian Optimization for Motion Planning. *International Journal of Robotics Research (IJRR)*, 2013.

[36] A.D. Dragan, K.T. Lee, and S.S. Srinivasa. Teleoperation with intelligent and customizable interfaces. *Journal of Human-Robot Interaction (JHRI)*, 2013.

[37] A.D. Dragan and S.S. Srinivasa. Generating legible motion. In *Robotics: Science and Systems (R:SS)*, 2013. **(best paper award finalist)**.

[38] E. Cha, A.D. Dragan, and S.S. Srinivasa. Effects of robot capability on user acceptance. In *International Conference on Human-Robot Interaction (HRI)*, 2013. (late-breaking report).

[39] K.T. Lee, A.D. Dragan, and S.S. Srinivasa. Legible user input for intent prediction. In *International Conference on Human-Robot Interaction (HRI)*, 2013. (late-breaking report).

[40] A.D. Dragan, K.T. Lee, and S.S. Srinivasa. Legibility and predictability of robot motion. In *International Conference on Human-Robot Interaction (HRI)*, 2013.

[41] K. Strabala, M.K. Lee, A.D. Dragan, J. Forlizzi, S.S. Srinivasa, M. Cakmak, and V. Micelli. Towards seamless human-robot handovers. *Journal of Human-Robot Interaction (JHRI)*, 2013.

[42] A.D. Dragan and S.S. Srinivasa. Formalizing assistive teleoperation. In *Robotics: Science and Systems (R:SS)*, 2012. **(best paper award finalist)**.

[43] A.D. Dragan and S.S. Srinivasa. Online customization of teleoperation interfaces. In *International Symposium on Human and Robot Communication (Ro-Man)*, 2012. **(best paper award finalist)**.

[44] K. Strabala, M.K. Lee, A.D. Dragan, J. Forlizzi, and S.S. Srinivasa. Learning the communication of intent prior to physical collaboration. In *International Symposium on Robot and Human Interactive Communication (Ro-Man)*, 2012.

[45] A.D. Dragan and S.S. Srinivasa. Assistive teleoperation for manipulation tasks. In *International Conference on Human-Robot Interaction (HRI)*, 2012. (late-breaking report).

[46] S.S. Srinivasa, D. Berenson, M. Cakmak, A. Collet, M.R. Dogar, A.D. Dragan, R.A. Knepper, T. Niemueller, K. Strabala, M. Vande Weghe, and J. Ziegler. HERB 2.0: Lessons learned from developing a mobile manipulator for the home. *Proc. of the IEEE, Special Issue on Quality of Life Technology*, 2012.

[47] A.D. Dragan, G. Gordon, and S.S. Srinivasa. Learning from experience in manipulation planning: Setting the right goals. In *International Symposium on Robotics Research (ISRR)*, 2011.

[48] A.D. Dragan, N. Ratliff, and S.S. Srinivasa. Manipulation planning with goal sets using constrained trajectory optimization. In *International Conference on Robotics and Automation (ICRA)*, 2011.