

McCormick School of Engineering, Northwestern University, 2145 Sheridan Road, Tech Inst. Rm L359, Evanston, IL 60208 USA  
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Associate Professor of Electrical Engineering and Computer Science, *Northwestern University*

Associate Professor of Mechanical Engineering, *Northwestern University*

Associate Professor of Physical Medicine & Rehabilitation, *Northwestern University*

Faculty Research Scientist, *Rehabilitation Institute of Chicago* (now the *Shirley Ryan AbilityLab*)

Member, Center for Engineering & Health, Institute for Public Health & Medicine, *Northwestern University*

Director, assistive & rehabilitation robotics **laboratory** (**argallab**)

<http://argallab.northwestern.edu>

***Our mission is to advance human ability through robotics autonomy.***

It is an irony that often the *more* severe a person's motor impairment, often the *less* able they are to operate the very assistive machines created to assist them. My lab addresses this confound by endowing assistive machines with customized robotics autonomy and intelligence. By offloading control burden, we aim to increase access and independence—to advance human ability and autonomy.

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**POSITIONS and EMPLOYMENT**

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**Associate Professor***Sep. 2017 – present*

Department of Electrical Engineering & Computer Science (EECS), McCormick School of Engineering

Department of Mechanical Engineering (ME), McCormick School of Engineering

Department of Physical Medicine & Rehabilitation (PMR), Feinberg School of Medicine

*Northwestern University, Evanston IL, USA*

**Assistant Professor***Sep. 2011 – Aug. 2017*

Departments of EECS, ME and PMR

*Northwestern University, Evanston IL, USA*

**Faculty Research Scientist***Sep. 2011 – present*

*Rehabilitation Institute of Chicago, Chicago IL, USA*

Founder and director, assistive & rehabilitation robotics **laboratory** (**argallab**).

**Postdoctoral Fellow***May 2009 – Jul. 2011*

Learning Algorithms & Systems Laboratory, *École Polytechnique Fédérale de Lausanne (EPFL)*, Lausanne, Switzerland

**Research Intern***Summer 2008*

Autonomous Systems Laboratory, ICT Centre, CSIRO, Brisbane, Australia

**Computational Biologist***Sep. 2003 – Jul. 2004*

Laboratory of Brain and Cognition, NIMH, *National Institutes of Health*, Bethesda MD, USA

**Post-Baccalaureate IRTA Fellow***Aug. 2002 – Sep. 2003*

Laboratory of Brain and Cognition, NIMH, *National Institutes of Health*, Bethesda MD, USA

## EDUCATION

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**Ph.D. in Robotics**, Robotics Institute, *Carnegie Mellon University*, Pittsburgh PA, USA, *Mar. 2009*

Advisors : Brett Browning, Ph.D. and Manuela Veloso, Ph.D.

Thesis : Learning Mobile Robot Motion Control from Demonstration and Corrective Feedback

**Visiting Graduate Student**, *Carnegie Mellon University Qatar Campus*, Doha, Qatar, *Spring 2007*

**M.S. in Robotics**, Robotics Institute, *Carnegie Mellon University*, Pittsburgh PA, USA, *Dec. 2006*

**B.S. in Mathematical Sciences**, College of Science, *Carnegie Mellon University*, Pittsburgh PA, USA, *May 2002*

Concentration : Computational & Applied Mathematics

Minors : Biological Sciences, Music

**Visiting Undergraduate Student**, *National University of Ireland Galway*, Galway, Ireland, *Fall 2000*

## SELECTED AWARDS and HONORS

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**Chicago Ideas Brain Trust**, experts who help shape the Chicago Ideas Week program. Invited member. (Chicago IL, USA, *2017*)

**40 under 40**, Crain's Chicago Business. Named one of the 2016 40 under 40 class. (Chicago IL, USA, *Dec. 2016*)

**CAREER Award**, National Science Foundation. Faculty Early CAREER Award recipient. (*Feb. 2016*)

**Robotics Encyclopedia Article**, World Book Encyclopedia. Invited Author. (*forthcoming*)

**U.S. National Robotics Roadmap**, CCC-supported workshops to update the U.S. National Robotics Roadmap, published and provided to Congress in 2009. Invited participant and text contributor. (San Francisco CA, USA, *Mar. 2016*, and Atlanta GA, USA, *Sep. 2016*)

**The Robot Revolution**, Chicago Council on Foreign Affairs and Museum of Science and Industry. Invited panelist. (Chicago IL, USA, *Nov. 2015*)

**Searle Fellows Program**, Searle Center for Advancing Learning and Teaching, Northwestern University. Teaching Fellow. (Evanston IL, USA, *2014–2015*)

**Quantum Sensing and Nanophotonic Devices Keynote**, SPIE Photonics West Conference. Keynote speaker. (San Francisco CA, USA, *Feb. 2015*)

**June and Donald Brewer Junior Professor Chair**, Northwestern University. (Evanston IL, USA, *Sep. 2011*)

## TEACHING

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**Machine Learning & Artificial Intelligence for Robotics** (Northwestern University, *Fall 2016, Fall 2014, Spring 2012–2013*). Instructor. Course design and development. (New addition to the curriculum, EECS 469.)

**Introductory Robotics Laboratory** (Northwestern University, *Fall 2014–2016, Winter 2013–2014*). Instructor. Course design and development. (New addition to the curriculum, EECS 301.)

## SELECTED PUBLICATIONS

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### BOOK CHAPTERS

[B1] B. D. Argall, B. Browning and M. M. Veloso. Mobile Robot Motion Control from Demonstration and Corrective Feedback. In *From Motor to Interaction Learning in Robots*. J. Peters and O. Sigaud, editors. Springer, New York, NY, 2009.

### JOURNAL ARTICLES

[J18] B. D. Argall. Autonomy in Rehabilitation Robotics: An Intersection. *Annual Review of Control, Robotics, and Autonomous Systems*. In press.

[J17] A. Erdogan and B. Argall. The Effect Robotic Wheelchair Control Paradigm and Interface on User Performance, Effort and Preference: An Experimental Assessment. *Robotics and Autonomous Systems*, 94, 282-297, 2017.

[J16] A. Broad, J. Arkin, N. Ratliff, T. Howard and B. Argall. Real-Time Natural Language Corrections for Assistive Manipulation Tasks. *International Journal of Robotics Research*, 36(5-7), 684-698, 2017.

[J15] P. Beckerle, G. Salvietti, R. Ünal, D. Prattichizzo, S. Rossi, C. Castellini, S. Hirche, S. Endo, H. Ben Amor, M. Ciocarlie, F. Mastrogiovanni, B. D. Argall and M. Bianchi. A Human-Robot Interaction Perspective on Assistive and Rehabilitation Robotics. *Frontiers in Neurorobotics*, 2017.

[J14] S. Mohammed, H. W. Park, C. H. Park, Y. Amirat and B. Argall. Special Issue on Assistive and Rehabilitation Robotics. *Autonomous Robots*. 41(3), 513-517, 2017.

[J13] A. Broad, J. Schultz, M. Derry, T. Murphey and B. Argall. Trust Adaptation Leads to Lower Control Effort in Shared Control of Crane Automation. *IEEE Robotics and Automation Letters*, 2(1), 239-246, 2017.

(Also presented at *IEEE Conference on Automation Science and Engineering (CASE)*, Fort Worth, Texas, USA, Aug, 2016.)

[J12] D. Gopinath, S. Jain and B. Argall. Human-in-the-Loop Customization of Shared Autonomy in Assistive Robotics. *IEEE Robotics and Automation Letters*, 2(1), 247-254, 2017.

(Also presented at *IEEE Conference on Automation Science and Engineering (CASE)*, Fort Worth, Texas, USA, Aug. 2016.)

[J11] A. L. Pais, B. D. Argall and A. G. Billard. Assessing Interaction Dynamics in the Context of Robot Programming by Demonstration. *International Journal of Social Robotics*, 5(4): 3477-490, 2013.

[J10] B. D. Argall, B. Browning and M. Veloso. Policy Feedback for the Refinement of Learned Motion Control on a Mobile Robot. *International Journal of Social Robotics*, 4(4): 383-395, 2012.

[J9] E. L. Sauser, B. D. Argall, G. Metta and A. G. Billard. Iterative Grasp Adaptation Learning with Tactile Corrections. *Robotics and Autonomous Systems*, 60(1): 55-71, 2012.

[J8] B. D. Argall, B. Browning and M. Veloso. Teacher Feedback to Scaffold and Refine Demonstrated Motion Primitives on a Mobile Robot. *Robotics and Autonomous Systems*, 59(3-4): 243-255, 2011.

[J7] B. D. Argall, Eric L. Sauser and A. G. Billard. Tactile Guidance for Policy Adaptation. *Foundation and Trends in Robotics*, 1(2): 79-133, 2010.

[J6] B. D. Argall and A. G. Billard. A Survey of Tactile Human-Robot Interactions. *Robotics and Autonomous Systems*. 58(10): 1159-1176, 2010.

[J5] B. D. Argall, S. Chernova, M. Veloso, and B. Browning. A Survey of Robot Learning from Demonstration. *Robotics and Autonomous Systems*, 57(5): 469-483, 2009.

- [J4] B. D. Argall, Z. S. Saad, and M. S. Beauchamp. Simplified Intersubject Averaging on the Cortical Surface Using SUMA. *Human Brain Mapping*, 27(1):14-27, 2006.
- [J3] M. S. Beauchamp, B. D. Argall, J. Bodurka, J. H. Duyn, and A. Martin. Unraveling multisensory integration: Patchy organization within human STS multisensory cortex. *Nature Neuroscience*, 7(11): 1190-1192, 2004.
- [J2] M. S. Beauchamp, K. E. Lee, B. D. Argall, and A. Martin. Integration of Auditory and Visual Information about Objects in Superior Temporal Sulcus. *Neuron*, 41:809-823, 2003.
- [J1] B. D. Argall, E. Cheleshkin, J. M. Greenberg, C. Hinde, and P.J. Lin. A rigorous Treatment of a Follow-the-Leader Traffic Model with Traffic Lights Present. *SIAM Journal on Applied Mathematics*, 63(1):149-168, 2002.

## **Ph.D. DISSERTATION**

B. D. Argall. *Learning Mobile Robot Motion Control from Demonstration and Corrective Feedback*. Ph.D. Thesis, Robotics Institute, Carnegie Mellon University, Mar. 2009. Technical report CMU-RI-TR-09-13.

## **REFEREED CONFERENCE PUBLICATIONS**

- [C26] M. Young, M. Nejati, A. Erdogan and B. Argall. An Analysis of Degraded Communication Channels in Human-Robot Teaming and Implications for Dynamic Autonomy Allocation. In *Proceedings of the Conference on Field and Service Robotics*, Zurich, Switzerland, Sep. 2017.
- [C25] A. Broad, T. Murphey and B. Argall. Learning Models for Shared Control of Human-Machine Systems with Unknown Dynamics. In *Proceedings of Robotics: Science and Systems (R:SS)*, Boston, Massachusetts, USA, Jul. 2017.
- [C24] D. Gopinath and B. Argall. Mode Switch Assistance To Maximize Human Intent Disambiguation. In *Proceedings of Robotics: Science and Systems (R:SS)*, Boston, Massachusetts, USA, Jul. 2017.
- [C23] A. Erdogan and B. Argall. Prediction of User Preference over Shared-Control Paradigms for a Robotic Wheelchair. In *Proceedings of the IEEE International Conference on Rehabilitation Robotics (ICORR)*, London, United Kingdom, Jul. 2017.
- [C22] M. Nejati and B. Argall. Automated Incline and Drop-off Detection for Assistive Powered Wheelchairs. In *Proceedings of the IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, New York, New York, USA, Aug. 2016.
- [C21] A. Broad and B. Argall. Path Planning under Kinematic Constraints for Assistive Robotics. In *Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS)*, London, United Kingdom, Jun. 2016.
- [C20] S. Jain and B. Argall. Grasp Detection for Assistive Robotic Manipulation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016.
- [C19] S. Jain, K. Barsness and B. Argall. Automated and Objective Assessment of Surgical Training: Detection of Procedural Steps on Videotaped Performances. In *Proceedings of the International Conference on Digital Image Computing: Techniques and Applications (DICTA)*, Adelaide, Australia, Nov. 2015.
- [C18] S. Jain, A. Farshchiansadegh, A. Broad, F. Abdollahi, F. Mussa-Ivaldi and B. Argall. Assistive Robotic Manipulation through Shared Autonomy and a Body-Machine Interface. In *Proceedings of the IEEE International Conference on Rehabilitation Robotics (ICORR)*, Singapore, Aug. 2015.
- [C17] B. Argall. Turning Assistive Machines into Assistive Robots. In *Proceedings of SPIE 9370, Quantum Sensing and Nanophotonic Devices XII*, San Francisco, California, USA, Feb. 2015. (Keynote paper)

- [C16] S. Jain and B. Argall. Automated Perception of Safe Docking Locations with Alignment Information for Assistive Wheelchairs. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Chicago, Illinois, USA, Sep. 2014.
- [C15] B. D. Argall. Modular and Adaptive Wheelchair Automation. In *Proceedings of the International Symposium on Experimental Robotics (ISER)*, Marrakech, Morocco, Jun. 2014.
- [C14] M. Derry and B. D. Argall. Extending Myoelectric Prosthesis Control with Shapable Automation: A First Assessment. In *Proceedings of the International Conference on Human-Robot Interactions (HRI)*, Bielefeld, Germany, Mar. 2014.
- [C13] A. Goil, M. Derry and B. Argall. Using Machine Learning to Blend User and Robot Controls for Assisted Wheelchair Doorway Navigation. In *Proceedings of the IEEE International Conference on Rehabilitation Robotics (ICORR)*, Seattle, Washington, USA, Jun. 2013.
- [C12] M. Derry and B. D. Argall. Automated Doorway Detection for Assistive Shared-Control Wheelchairs. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Karlsruhe, Germany, May 2013.
- [C11] B. D. Argall and A. G. Billard. Learning from Demonstration and Correction via Multiple Modalities for a Humanoid Robot. In *Proceedings of the International Conference SKILLS*, Montpellier, France, Dec. 2011.
- [C10] B. D. Argall. Continuing Robot Skill Learning after Demonstration with Human Feedback. In *Proceedings of the International Conference SKILLS*, Montpellier, France, Dec. 2011.
- [C9] B. D. Argall, E. L. Sauser and A. G. Billard. Tactile Guidance for Policy Refinement and Reuse. In *Proceedings of the IEEE International Conference on Development and Learning (ICDL)*, Ann Arbor, Michigan, USA, Aug. 2010.
- [C8] B. D. Argall, E. L. Sauser and A. G. Billard. Policy Adaptation through Tactile Correction. In *Proceedings of the Annual Convention of the Society for the Study of Artificial Intelligence and Simulation of Behaviour*, Leicester, UK, Mar. 2010.
- [C7] B. D. Argall, B. Browning, and M. Veloso. Learning Mobile Robot Motion Control from Demonstrated Primitives and Human Feedback. In *Proceedings of the International Symposium on Robotics Research (ISRR)*, Luzern, Switzerland, Aug. 2009.
- [C6] B. D. Argall, B. Browning, and M. Veloso. Automatic Weight Learning for Multiple Data Sources when Learning from Demonstration. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Kobe, Japan, May 2009.
- [C5] B. D. Argall, B. Browning, and M. Veloso. Learning Robot Motion Control with Demonstration and Advice-Operators. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Nice, France, Sep. 2008.
- [C4] B. D. Argall, B. Browning, and M. Veloso. Learning to Select State Machines using Expert Advice on an Autonomous Robot. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Rome, Italy, Apr. 2007.
- [C3] B. D. Argall, B. Browning, and M. Veloso. Learning by Demonstration with Critique from a Human Teacher. In *Proceedings of the International Conference on Human-Robot Interactions (HRI)*, Washington D.C., USA, Mar. 2007.
- [C2] B. D. Argall, Y. Gu, B. Browning, and M. Veloso. The First Segway Soccer Experience: Towards Peer-to-Peer Human-Robot Teams. In *Proceedings of the International Conference on Human-Robot Interactions (HRI)*, Salt Lake City, Utah, USA, Mar. 2006. (Also Carnegie Mellon University Technical Report, CMU-CS-05-161, 2005.)
- [C1] Z. S. Saad, R. C. Reynolds, B. Argall, S. Japee and R. W. Cox. SUMA: An Interface for Surface-based Intra- and Inter-Subject Analysis with AFNI. In *Proceedings of the IEEE International Symposium on Biomedical Imaging: Nano to Macro*, Washington D.C., USA, Apr. 2004.

## **REFEREED WORKSHOP and SYMPOSIUM PUBLICATIONS** (selected: not published elsewhere)

- [W9] D. Gopinath, P. Egli and B. Argall. A Call for Convergence of Research Directions in Assistive Robotics. In *RSS Workshop on Socially and Physically Assistive Robotics for Humanity*, Ann Arbor, Michigan, USA, Jun. 2016.
- [W8] S. Jain and B. Argall. Robot Learning to Switch Control Modes for Assistive Teleoperation. In *RSS Workshop on Planning for Human-Robot Interaction: Shared Autonomy and Collaborative Robotics*, Ann Arbor, Michigan, USA, Jun. 2016.
- [W7] B. D. Argall. Information Extraction under Communication Constraints within Assistive Robot Domains. In *RSS Workshop on Model Learning for Human-Robot Communication*, Rome, Italy, Jul. 2015.
- [W6] B. D. Argall and T. D. Murphey. Computable Trust in Human Instruction. In *Proceedings of the AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction*, Arlington, Virginia, USA, Nov. 2014.
- [W5] M. Derry and B. Argall. A Probabilistic Representation of User Intent for Assistive Robots. In *IROS Workshop on Rehabilitation and Assistive Robotics*, Chicago, Illinois, USA, Sep. 2014.
- [W4] T. D. Murphey and B. D. Argall. Towards Software-Enabled Rehabilitation. In *IROS Workshop on Rehabilitation and Assistive Robotics*, Chicago, Illinois, USA, Sep. 2014.
- [W3] B. D. Argall. Machine Learning for Shared Control with Assistive Machines. In *ICRA Workshop on Autonomous Learning: From Machine Learning to Learning in Real-world Autonomous Systems*, Karlsruhe, Germany, May 2013.
- [W2] T. D. Murphey and B. D. Argall. Making Robotic Marionettes Perform. In *ICRA Workshop on Robotics and Performance Arts: Reciprocal Influences*, Minneapolis, Minnesota, USA, May 2012.
- [W1] B. D. Argall, E. L. Sauser and A. G. Billard. Demonstration, Tactile Correction and Multiple Training Data Sources for Robot Motion Control. In *NIPS Workshop on Learning from Multiple Sources with Application to Robotics*, Whistler, British Columbia, Canada, Dec. 2009.

## **ADVISING and MENTORING**

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### **Postdoctoral Fellows:**

Ahmetcan Erdogan (PMR, 2015-2017)

### **PhD Students (Advisor):**

Alexander Broad (CS, *current*)  
Deepak Gopinath (ME, *current*)  
Siddarth Jain (CS, *current*)  
Christopher Miller (ME, *current*)  
Mahdiah Nejati (ME, *current*)  
Michael Young (ME, *current*)

### **Graduate Student Research:**

Nate Kaiser (Masters of Science in Robotics, *Spring – Fall 2017*)  
Abishek Patel (Masters of Science in Robotics, *Spring – Fall 2016*, Honda Research Institute)  
Mahdiah Nejati (Masters of Science in Robotics, *Spring 2015, Fall 2015*, PhD student at Northwestern University)  
Matthew Derry (CS, *Winter 2012 – Spring 2015*, Toyota)  
Zhu Chen (CS, *Fall 2011, Winter – Fall 2012, Winter – Spring 2013*, Compuware)  
Aditya Goil (CS, *Fall 2011, Winter – Fall (including Summer) 2012, Winter 2013*, Amazon)

**Masters Students (Advisor):**

An Yudi (CS, *current*), Bo Guan (EE, *current*), Shailav Tanega (CS, *current*), Shibo Zhang (CS, *current*), Yishu Gu (CS, *Winter 2015*), Hao Sun (EE, *Spring 2015*), Weihang Yan (EE, *Spring 2015*), Harleen Billing Kaur (CS, *Spring 2014*), Zhu Chen (CS, *Spring 2013*), Luting Wang (CS, *Spring 2013*), Aditya Goil (CS, *Winter 2013*)

**Visiting Students:**

Pascal Egli (Masters student in Robotics, Swiss Federal Institute of Technology Zurich (ETH), *Feb. – Aug. 2016*)

Lou-Ann Raymond (Masters student in Mechatronics, Université Libre de Bruxelles, *Jul. – Nov. 2014*)

**Undergraduate Research, Honors or Murphy Scholars Advisor:**

Katherine Lin (CS, *2016*)

Bryanna Yeh (CE, *2016*)

**Undergraduate Research, Multi-quarter and Summer Internships:**

Marc Gyongyosi (CS, *Spring 2017, Fall 2016, Winter – Spring 2015, Fall 2014*)

Christian Ingham (ME, University of Maryland, Baltimore County, *Summer 2016*)

Brian Zhan (CS, *Winter – Summer 2016*)

Katherine Lin (CS, *Winter – Spring 2016, Winter – Spring 2015*)

Bryanna Yeh (CE, *Spring 2016, Winter 2016, Winter – Fall (including Summer) 2015*)

Haley De Boom (CS, *Winter 2016, Spring 2015*)

Samuel Schlesinger (ME, *Summer 2015, Spring 2015*)

Colin Barnwell (CS, *Winter – Spring 2015*)

Seth McCammon (CS, *Spring 2015, Summer 2014, Spring 2014, Fall 2013*)

David McDonald (ECE, Carnegie Mellon University, *Summer 2014*)

Luke Olney (U, *Summer 2014*)

Taiwon Chung (CS, *Spring 2014, Fall 2013, Summer 2013*)

Anika Dutta (EE, *Summer 2012*)

Paul Lam (BME, Chinese University of Hong Kong, *Summer 2012*)

**Undergraduate Research, Single Quarter:**

Peter Haddad (ME, *Fall 2014*), Neil Ehardt (CS, *Spring 2013*), Henry Spindell (CS, *Spring 2013*), Yin Chen (Applied Math, *Summer 2012*), Daniel Weiss (CE, *Spring 2012*)

**Highschool Research:**

Paul Rosa (*Fall 2014*), Sean Ye (*Summer 2014*), Marion Lewis (*Summer 2013*)

**Events:** (where served as a mentor)

NSF Smart and Connected Health Aspiring Investigator's Meeting (Arlington VA, USA, *Jun. 2015*)

FIRST Design Review Panel, Northwestern University (Evanston IL, USA, *Jan. 2014*)

Women in Computing (student group) Panel, Northwestern University (Evanston IL, USA, *Apr. 2013*)

**ACTIVE FUNDING**

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Brenna Argall (PI). National Science Foundation (Robust Intelligence): *CAREER: Robot Learning from Motor-Impaired Instructors and Task Partners*. 2/1/2016 – 1/31/2021, \$525,000.

Brenna Argall (PI). Office of Naval Research: *Dynamic Allocation of Autonomy for Limited-Bandwidth Human-Robot Teams Based on Measures of Trust in the Human*. 2/1/2016 – 1/31/2020, \$954,398.

John Condon (PI) and Brenna Argall (co-I). National Institutes of Health (NICHD): *SBIR: Semi-autonomous Robotic Powered Wheelchair Functionality*. 1/1/2016 – 12/31/2017, (RIC/Northwestern portion) \$70,500.

Brenna Argall (PI) and Siddhartha Srinivasa (PI, lead). National Science Foundation: *CPS: Synergy: Collaborative Research: Learning Control Sharing Strategies for Assistive Cyber-Physical Systems*. 10/1/2015 – 9/30/2018, (RIC/Northwestern portion) \$363,937.

Brenna Argall (PI, lead) and Siddhartha Srinivasa (PI). National Institutes of Health (NIBIB/NICHD): *R01: SCH: A Formalism for Customizing and Training Intelligent Assistive Devices*. 9/1/2014 – 8/31/2018, \$546,989.

Todd D. Murphey (PI, lead), Brenna Argall (co-PI) and Magnus Egerstedt (PI). National Science Foundation: *CPS: Synergy: Collaborative Research: Mutually Stabilized Correction in Physical Demonstration*. 10/1/2013 – 9/31/2018, (Northwestern portion) \$700,000.

## COMPLETED FUNDING

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Kevin Lynch (PI), Brenna Argall, J. Edward Colgate, Todd D. Murphey, and Ying Wu (co-PIs). National Science Foundation: *MRI: Equipment Development: Bimanual Robotic Manipulation and Sensory Workspace*. 9/1/2012 – 3/31/2016, \$400,000.

Brenna Argall (PI). BMW. *The Identified Flying Object Project*. 10/2014, \$15,000. (Gift for student project.)

Brenna Argall (PI). Murphy Society: *Hardware for the Laboratory Component of a New Undergraduate Robotics Course*. 10/2012, \$15,000.

Brenna Argall (PI). Center for Engineering and Health, Northwestern University: *Meta-Control Shaping for the Partial Automation of Upper Limb Prostheses*. 6/15/2012 – 9/15/2012, \$10,192.

## PUBLIC ENGAGEMENT

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### Publicity (external):

- 2017: OZY, “[Self-driving Wheelchairs: Coming to a Nursing Home near You?](#)”, (Sep. 15)  
Fast Company, “[The Next Frontier in Automation: Self-Driving Wheelchairs](#)”, (Mar. 8)
- 2016: Crain's Chicago Business, “[Why Brenna Argall is on Our 40 under 40 in Chicago List](#)”, (Dec. 2)  
Carnegie Mellon Today, “[Autonomous Wheelchair Improves Patient Mobility](#)” (Oct. 25)  
Morning Edition, NPR, “[Northwestern University Lab Working on 'Smart Wheelchairs'](#)” (Sep. 26)  
Digital Trends, “[Autonomous Wheelchair Could Transform Life for Its Users](#)” (Sep. 15)  
Big Ten Network, “[This Wheelchair from Northwestern Offers Freedom through Autonomy](#)” (Sep. 11)  
Crain's Business Chicago, Innovator Profile, “[Where Robot Meets Wheelchair](#)” (Aug. 11)  
Multiple Sclerosis News Today, “[Science Foundation Awards to Further Work in Rehabilitation Robotics, Online Tools at Northwestern University](#)” (Mar. 7)  
ALS News Today, “[ALS Research to Benefit from National Science Foundation Award for Robotics, Online Communication](#)” (Feb. 29)  
Newswise, “[Promising Young Scientists Receive Prestigious Career Award](#)” (Feb. 25)
- 2014: Medill Reports Chicago, “[Autonomous Robots Give Patients with Paralysis New Mobility](#)” (Jun. 5)
- 2013 – current: Museum of Science and Industry, demo of laboratory robots during National Robotics Week (Chicago IL, USA, each Apr. 2013 – current)



### **Invited Participation:**

- 2017: AI and Amplifying Human Abilities Panel, CCC Symposium on Computing Research Addressing National Priorities and Societal Needs, Panelist and Speaker (Washington DC, USA, *Oct.*)  
AI vs. IQ, Chicago Innovation Awards, Panelist (Chicago IL, USA, *Mar.*)  
Workshop on Interactive Learning, Simons Institute for the Theory of Computing, Participant and Speaker (Berkeley CA, USA, *Feb.*)  
Chicago Brain Trust, Invited Member (Chicago IL, USA, *Jan.-Dec.*)
- 2016: Kellogg Trust Project, Northwestern University, Podcast (Evanston IL, USA, *Nov.*)  
Kellogg on Growth Forum, Northwestern University, Panelist (Evanston IL, USA, *Nov.*)  
Workshop on Algorithms for Human-Robot Interaction, INRIA, Participant (Paris, France, *Jul.*)  
Barbados Workshop on Reinforcement Learning, organized by Richard Sutton et. al, (unable to attend)  
FDA meeting on the development of standards for autonomy in assistive robotic devices (Silver Spring MD, USA, *Mar.*)
- 2015 : The Robot Revolution, Chicago Council on Foreign Affairs, Panelist (Chicago IL, USA, *Nov.*)  
Dagstuhl Seminar on Robot Manipulation Under Uncertainty, Participant and Speaker (Dagstuhl, Germany, *Oct.*)  
Technology & Society Conference, University of Chicago, Panelist and Speaker (Chicago IL, USA, *May*)  
IDEAS Workshop on Engineering and Surgery, Harvard Medical School and Beth Israel Deaconess Medical Center, Participant and Speaker (Boston MA, USA, *Mar.* 2015)
- 2014: USC Symposium on the Futures of Robotics, University of Southern California (Los Angeles CA, USA, *Apr.*)
- 2013 : Computer Science & Education, CS Everywhere Workshop, Northwestern, Panelist (Evanston IL, USA, *Nov.*)

### **Invited Lectures**

- 2016: Advances in Biotechnology (NIH Biotech Training Program), Northwestern Univ. (Evanston IL, USA, *Apr.*)
- 2015: Big Ideas in Medicine, University of Chicago School of Medicine (Chicago IL, USA, *May*)
- 2013: Undergraduate robotics class, University of Notre Dame (South Bend IN, USA, *Mar.*)
- 2012: Summer School in Computational Sensory-Motor Neuroscience (CoSMo) (Chicago IL, USA, *Aug.*)
- 2011: Department of Informatics Summer School, University of Zurich (Zurich, Switzerland, *Jul.*)

### **Invited Talks:**

- 2017: Seminar, Field Museum Women in Science (Chicago IL, USA, *Nov.*)  
Speaker, International Symposium on Wearable & Rehabilitation Robotics (Houston TX, USA, *Nov.*)  
IROS 2017 Workshop on Human-in-the-Loop Manipulation (Vancouver, Canada, *Sep.*)  
IROS 2017 Workshop on Adaptive Control Methods in Assistive Technologies (Vancouver, Canada, *Sep.*)  
IROS 2017 Workshop on Assistance and Service Robotics in a Human Environment (Vancouver, Canada, *Sep.*)  
RSS 2017 Workshop on Resilient Intelligence in Autonomous Systems (Boston MA, USA, *Jul.*)  
Midwest Robotics Workshop (Chicago IL, USA, *May*)  
Featured Speaker, State of the Science Conference, Rehabilitation Engineering Research Center on Technologies to Support Successful Aging with Disability (RERC TechSAge) (Atlanta GA, USA, *Mar.*)  
Seminar, Northern Suburban Special Education District Assistive Tech. Team (Forest Hills IL, USA, *Jan.*)  
Trust Seminar Series, Northwestern University (Evanston IL, USA, *Jan.*)
- 2016: Robotics Seminar, MIT (Boston MA, USA, *Oct.*)  
GRASP Seminar, University of Pennsylvania (Philadelphia PA, USA, *Sep.*)  
Robotics Institute Seminar, Carnegie Mellon University (Pittsburgh PA, USA, *Sep.*)  
Forum for Artificial Intelligence, University of Texas at Austin (Austin TX, USA, *Sep.*)  
RO-MAN 2016 WS on Human-Oriented Appr. for Assistive and Rehab. Robotics (New York NY, USA, *Aug.*)  
Workshop on Algorithms for Human-Robot Interaction, INRIA (Paris, France, *Jul.*)  
Seminar, University of Illinois at Chicago (Chicago IL, USA, *Apr.*)  
Computational Research Day, Northwestern University (Evanston IL, USA, *Apr.*)
- 2015 : Engineering Neuroscience & Health Seminar, University of Southern California (Los Angeles CA, USA, *Nov.*)  
Mechanical & Aerospace Engineering Robotics Research Seminar, UCLA (Los Angeles CA, USA, *Nov.*)  
Workshop on Algorithms for Human-Robot Interaction, UC Berkeley (Berkeley CA, USA, *Nov.*)  
Seminar, Max Planck Institute for Intelligent Systems (Tübingen, Germany, *Oct.*)

- Talk, University of Stuttgart (Stuttgart, Germany, *Oct.*)  
 Centro E. Piaggio Seminar, University of Pisa (Pisa, Italy, *Sep.*)  
 Careers in Science Seminar, NSF REU Program in Medical Informatics (Chicago IL, USA, *Aug.*)  
 NCCR Seminar, École Polytechnique Fédérale de Lausanne (EPFL) (Lausanne, Switzerland, *Jul.*)  
 Talk, University of Zurich (Zurich, Switzerland, *Jul.*)  
 Technology & Society Conference, University of Chicago (Chicago IL, USA, *May*)  
 National Robotics Week Talk, Museum of Science & Industry (Chicago IL, USA, *Apr.*)  
 Information Technology Practice Center, University of Wisconsin Parkside (Kenosha WI, USA, *Apr.*)  
 Harvard Medical School IDEAS Workshop on Engineering and Surgery (Boston MA, USA, *Mar.*)  
 Keynote, SPIE Photonics West (San Francisco CA, USA, *Feb.*)  
 Robotics Seminar, Stanford University (Palo Alto CA, USA, *Feb.*)  
 Robotics & Intelligent Machines Seminar, Georgia Institute of Technology (Atlanta GA, USA, *Jan.*)  
 Neurorecovery & Rehabilitation Lecture, The Institute for Rehabilitation & Research (Houston TX, USA, *Jan.*)  
 Robotics Seminar, Rice University (Houston TX, USA, *Jan.*)  
 2014 : Northwestern Institute on Complex systems (NICO) Seminar (Evanston IL, USA, *Oct.*)  
 RSS 2014 Workshop on Women in Robotics (Berkeley CA, USA, *Jul.*)  
 USC Symposium on the Futures of Robotics, University of Southern California (Los Angeles CA, USA, *Apr.*)  
 National Robotics Week Talk, Museum of Science & Industry (Chicago IL, USA, *Apr.*)  
 2013 : Seminar, Carnegie Mellon University (Pittsburgh PA, USA, *Oct.*)  
 RSS 2013 Workshop on Human Robot Collaboration (Berlin, Germany, *Jun.*)  
 National Robotics Week Talk, Museum of Science & Industry (Chicago IL, USA, *Apr.*)  
 Seminar, University of Notre Dame (South Bend IN, USA, *Mar.*)  
 2012: NU Machine Learning Meetup, Northwestern University (Evanston IL, USA, *Nov.*)  
 Northwestern IEEE Chapter Tech Talk, Northwestern University (Evanston IL, USA, *Feb.*)  
 2011 : Northwestern University (Chicago IL, USA, *Mar.*)  
 University of Zurich (Zurich, Switzerland, *Feb.*)  
 SUNY University at Buffalo (Buffalo NY, USA, *Feb.*)  
 Oregon State University (Corvallis OR, USA, *Feb.*)  
 2010 : Willow Garage (Menlo Park CA, USA, *Jun.*)  
 Carnegie Mellon University—Qatar Campus (Doha, Qatar, *Mar.*)

## PROFESSIONAL ACTIVITIES

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### University Committees

- CS+X Opportunities Committee (Northwestern, 2016 – *present*)  
 Masters of Science in Robotics Curriculum Committee (Northwestern, 2013 – *present*)  
 Undergraduate Computer Science Curriculum Committee (Northwestern, 2011 – *present*)  
 EECS Faculty Search Committee (Northwestern, 2013–2015, 2017)  
 ME Faculty Search Committee (Northwestern, 2014, 2016, 2017)  
 PMR Faculty Search Committee (Northwestern, 2014)

### External Committees and Meetings

- The Future of Robotics and the National Robotics Initiative (NRI), CCC-supported workshops and report (San Francisco CA, USA, *Mar. 2016*, and Atlanta GA, USA, *Sep. 2016*).  
 NIDRR RERC Machines Assisting Recovery from Stroke and Spinal Cord Injury for Reintegration into Society (MARS3) Advisory Board. (Chicago IL, USA, *Sep. 2016*).

### Conference Organizer

- Registration Chair and Local co-Chair, IROS 2014  
 Local Chair, ARSO 2014  
 Workshop co-Chair, HRI 2014

Local Chair, HRI 2011

### **Organizing Committee Member**

RSS 2017 Workshop on *Human-Centered Robotics* (full day)  
AAAI 2016 Fall Symposium Series *Shared Autonomy in Research and Practice* (three days)  
RSS 2016 Workshop on *Socially and Physically Assistive Robotics for Humanity* (full day)  
AAAI 2015 Fall Symposium Series *Artificial Intelligence for Human-Robot Interactions* (three days)  
IROS 2014 Workshop on *Rehabilitation & Assistive Robots* (full day)  
HRI 2014 Workshop on *Algorithmic Human-Robot Interactions* (full day)  
AAAI 2012 Fall Symposium Series *Robots Learning Interactively from Human Teachers (RLIHT)* (three days)  
RSS 2011 Workshop on *The State of Imitation Learning: Understanding its Applications and Promoting its Adoption* (full day)  
IJCAI 2011 Workshop on *Agents Learning Interactively from Human Teachers (ALIHT)* (two days)  
ICRA 2010 Tutorial on *Robot Learning from Demonstration* (half day)  
AAMAS 2010 Workshop on *Agents Learning Interactively from Human Teachers* (full day)

### **PhD Thesis Committee Member**

**Post-defense:** Anastasia Mavrommati (ME, Northwestern University, 2017), Emmanouil Tzorakoleftherakis (ME, Northwestern University, 2017), Elias Thorp (BME, Northwestern University, 2017), Ehsan Noohi (CS, University of Illinois – Chicago, 2016), John Spanias (BME, Northwestern University, 2016), Lauren Miller (ME, Northwestern University, 2015), Andrew Wilson (ME, Northwestern University, 2015), Alex Ansari (ME, Northwestern University, 2015), Yang Bai (ME, Northwestern University, 2015), Jarvis Schultz (ME, Northwestern University, 2014), Tim Caldwell (ME, Northwestern University, 2013), Kevin Kim (EE, Northwestern University, 2013), Ed Kwei-wei Huang (EE, Northwestern University, 2013), Tanveer Abbas (EE, University of Auckland, 2011)

**Pre-defense:** Ian Abraham (ME, Northwestern University), Alexander Broad (CS, Northwestern University), Taosha Fan (ME, Northwestern University), Kathleen Fitzsimmons (ME, Northwestern University), Blair Hu (BME, Northwestern University), Siddarth Jain (CS, Northwestern University), Michael Lucas (CS, Northwestern University), Nili Krausz (BME, Northwestern University), Ahalya Prabhakar (ME, Northwestern University), Lucia Ureche (Engineering, École Polytechnique Fédérale de Lausanne (EPFL)), Matthew Woods (EE, Northwestern University)

### **Journal Associate Editor**

IEEE Robotics and Automation Letters (2015-present)

### **Journal Guest Editor**

Autonomous Robots Special Issue on Assistive and Rehabilitation Robotics (2017)

### **Conference Program Committee Member**

HRI (2015)  
RSS (2017) (Area Chair)

### **Conference Associate Editor**

ICRA (2013)  
IROS (2014 – 2016)  
RO-MAN (2011, 2013)

### **Program Committee Member**

AAAI Robotics Track (2013)  
AAMAS (2010)  
ICSR (2012)  
IJCAI (2013)

RSS (2011, 2014, 2015)

TAROS (2011)

3<sup>rd</sup> International Symposium on New Frontiers in Human-Robot Interaction (2014)

3<sup>rd</sup> International Workshop on Human Behavior Understanding (2012)

#### **Technical Committee Member**

IEEE RAS TC on Human Movement Understanding

IEEE RAS TC on Robot Learning

#### **Panel Reviewer**

NIH (MFSR Study Section, 2016)

NSF (2012, 2014 – 2017)

ONR (2017)

EPFL Fellows (2014)

#### **Journal Reviewer**

Assistive Technology (2015), Autonomous Robots (2009, 2013, 2015, 2017), IEEE Robotics and Automation Letters (2017), IEEE Transactions on Cognitive and Developmental Systems (2017), IEEE Transactions on Neural Systems and Rehabilitation Engineering (2014–2016), IEEE Transactions on Robotics (2010, 2012, 2015), IEEE Transactions on Systems, Man and Cybernetics (2012), International Journal of Robotics Research (2011, 2016), International Journal of Service Robotics (2010), International Journal of Social Robotics (2012), Journal of Field Robotics (2006–2011), Robotics and Autonomous Systems (2010, 2013, 2016), Transactions on Autonomous Mental Development (2013)

#### **Conference Reviewer**

AAAI (2005–2006, 2010), AAAI Spring (2009) and Fall (2016) Symposium, AAMAS (2006–2006, 2010), AISB (2014), BioRob (2014, 2016), HRI (2014, 2017), ICDL (2010), ICORR (2017), ICRA (2006–2008, 2010–2013, 2015, 2016), ICSR (2010, 2012), IROS (2008, 2010), HRI (2007–2008, 2011–2012, 2014), Humanoids (2010, 2012), Robocup (2006), RO-MAN (2010, 2016), RSS (2013, 2016)

#### **Society Member**

AAAI (2009, 2012 – present)

IEEE (2007 – present)

RAS (2010 – present)

Society for Neuroscience (2002–2004)