

**Ayanna M. Howard, Ph.D.**  
**Professor and Linda J. and Mark C. Smith Chair in Bioengineering**  
**School of Electrical and Computer Engineering**  
**Georgia Institute of Technology**

**I. EARNED DEGREES**

*B.S. Computer Engineering*, Brown University, May 1993.

*M.S. Electrical Engineering*, University of Southern California, December 1994.

*Ph.D. Electrical Engineering (Minor: Computer Science)*, University of Southern California, May 1999.

- Dissertation: *Recursive Learning for Deformable Object Manipulation*; Thesis advisor: George A. Bekey, Gordon Marshall Professor of Engineering and University Professor

*M.B.A.* (Masters of Business Administration, concentration in Strategy), Claremont Graduate University, May 2005.

*Certification*, Certificate in Assistive Technology Applications (ATACP), California State University, Northridge - College of Extended Learning, September 2014.

**II. PROFESSIONAL**

*IIA. Academic Positions*

- **Associate Professor**, Georgia Institute of Technology 7/05-7/12  
School of Electrical and Computer Engineering (Adjunct in College of Computing)
- **Motorola Foundation Professor**, Georgia Institute of Technology 7/12-8/2015  
School of Electrical and Computer Engineering (Adjunct in College of Computing)
- **Professor and Linda J. and Mark C. Smith Chair in Bioengineering** 8/15-present  
Georgia Institute of Technology, School of Electrical and Computer Engineering  
(Adjunct in College of Computing)

*IIB. Administrative Positions*

- **Deputy Manager**, NASA's Jet Propulsion Laboratory 9/03-6/05  
Strategic University Research Partnership Office, Office of Chief Scientist
- **Founder and Director**, Human-Automation Systems (HumAnS) Lab 7/05-present  
Georgia Institute of Technology, <http://humanslab.ece.gatech.edu/>
- **Program Chair – Robotics PhD Program**, Georgia Institute of Technology 8/10-8/13  
College of Engineering and College of Computing
- **Chief Technology Officer and Founder**, Zyrobotics, LLC. 9/13-present  
<http://www.zyrobotics.com>
- **Associate Director of Research**, Institute for Robotics and Intelligent Machines (IRIM) 11/13-11/15  
Georgia Institute of Technology, <http://robotics.gatech.edu>
- **Associate Chair for Faculty Development**, School of Electrical and Computer Engineering 4/16-present  
Georgia Institute of Technology

*IIC. Industry/Research Lab Positions*

- **Computer Scientist**, Advanced Technology Section 6/93-12/96  
NASA's Jet Propulsion Laboratory, Pasadena, California
- **Information Systems Engineer**, Information Technologies Research Section 1/97-2/99

NASA's Jet Propulsion Laboratory, Pasadena, California

- **Robotics Researcher**, Telerobotics Research and Applications Group  
NASA's Jet Propulsion Laboratory, Pasadena, California 2/99-9/02
- **Senior Robotics Researcher**, Mobility Systems Concept Development Section  
NASA's Jet Propulsion Laboratory, Pasadena, California 9/02-6/05

### III. TEACHING

#### III.A. Individual Student Guidance

III.A.1. Ph.D. Students – 13 Graduated, 3 In-Progress

III.A.2. M.S. Thesis Students – 7 Graduated

III.A.3. Undergraduate Research Students – 60 undergraduate students; Awards - 1<sup>st</sup> place – NSBE regional poster competition 2006, Best Undergraduate Research Proposal – ECE Fair 2007, People's Choice Award – Intel Scholars competition 2007, President's Undergraduate Research Award 2007, 2015 RESNA Design Competition Finalist, 2016 Intel-Cornell Cup Competition Finalist

#### III.B. Curriculum Development and Training

1. Instruction Software: Artificial Intelligence Toolkit (Released in 2003) - An educational software package developed to train future scientists and engineers on advanced autonomy technologies and to enhance understanding and knowledge of three soft computing methods, namely fuzzy logic, neural networks, and genetic algorithms. [http://www.openchannelsoftware.com/projects/AI\\_Toolkit](http://www.openchannelsoftware.com/projects/AI_Toolkit)
2. New Graduate Course Development: Implementation and Control of Robotic Systems - This graduate-level course was first developed and taught in Spring 2006. The focus of the course is to train students on some of the fundamental issues associated with robot control, from a biological perspective that forms the basis of many current developments in robotics. In the course design, students are immersed in understanding current state-of-the-art in autonomy, machine learning techniques, and human-robot interaction, to name a few.
3. Educational Software: Mars2020 Robotic Adventure Game - A futuristic game/simulation environment developed to introduce middle and high school students to the fundamentals of robotic programming. Over 80 middle school children were trained through various summer workshops during the active grant years 2007–11.
4. I-Natural Vertically Integrated Project Team – Instructed/Managed a multi-year multidisciplinary research team of undergraduate students tasked to design, build, and test interfaces that enable humans to naturally interact with robots (whether physical or virtual) in performing activities of daily living. Long-term goal was to enable significant advancement of large-scale design projects for eventual product commercialization (Jan 2011-May 2016). Awards include: 2012 Cornell Cup Finalist (<http://www.systemseng.cornell.edu/intel/>), 2016 Robot Art Honorable Mention (<http://robotart.org/>)
5. Techie-Trekie Living-Learning Community – Faculty host of living-learning community that focused on exploring space exploration opportunities and the limitations/hazards associated with future space colonization (Sept 2010-May 2013).
6. Opportunity Research Scholars (ORS) Faculty Advisor – Faculty advisor to undergraduate research team that focused on projects to challenge them in developing innovative software and hardware solutions to address robotic challenges (Aug 2010-May 2016).
7. NSF Innovation Corps (I-Corps) Adjunct Faculty – Member of teaching team focused on helping university-led teams foster entrepreneurship that will lead to the commercialization of technology that has been supported previously by NSF-funded research. The I-Corps curriculum provides real-world, hands-on, immersive learning about what it takes to successfully transfer knowledge into products and processes that benefit society. ([http://www.nsf.gov/news/special\\_reports/i-corps/](http://www.nsf.gov/news/special_reports/i-corps/)) (April 2016 – June 2016).

### IV. SCHOLARLY ACCOMPLISHMENTS

\* *Boldface font is used to identify co-authors who were students being advised by Professor Howard*

#### IV.A. Published Books and Parts of Books

1. E. Tunstel, H. Seraji, A. Howard, Chapter 11: “Soft Computing Approach to Safe Navigation of Autonomous Planetary Rovers,” *Intelligent Control Systems Using Soft Computing Methodologies*, Eds. Zilouchian and Jamshidi, CRC Press, 2001.

2. E. Tunstel, A. Howard, T. Huntsberger, A. Trebi-Ollenu, J. Dolan, "Applied Soft Computing Strategies for Autonomous Field Robotics," *Autonomous Robotic Systems: Soft Computing and Hard Computing Methodologies and Applications*, Eds. Zhou, Moravall, and Ruan, vol. 116, pgs. 75-102, Physica-Verlag, 2003.
3. A. Howard, E. Tunstel, "Using Geospatial Information for Autonomous Systems Control," *Frontiers of Geographic Information Technology*, Eds. Rana and Sharma, Springer Science, Dec. 2005.
4. A. Howard, E. Tunstel, "A Self-Contained Traversability Sensor for Safe Mobile Robot Guidance in Unknown Terrain," *Applied Soft Computing Technologies: The Challenge of Complexity*, Abraham, A.; Baets, B.D.; Köppen, M.; Nickolay, B. (Eds.), Springer, May 2006.
5. A. Howard, E. Tunstel (Editors), *Intelligence for Space Robotics*, TSI Press, San Antonio, Texas, July 2006.
6. A. Howard, **S. Remy**, **C.H. Park**, **H.W. Park**, and **D. Brooks**, "Intelligent robotics for assistive healthcare and therapy," *The Path to Autonomous Robots*; G. Sukhatme (Ed.), Springer Science, November 2008.
7. **S. Williams**, **D. Brooks**, A. Howard, "Robot Vision for Science-Driven Navigation in Challenging Arctic Environments," *Robot Vision: New Research*; T. Matsuda (Ed.), Nova Science, 2009.
8. **S. García-Vergara**, **L. Brown**, **H.W. Park**, and Ayanna M. Howard, "Engaging Children in Play Therapy: The Coupling of Virtual Reality (VR) Games With Social Robotics," *Serious Games, Alternative Realities, and Play Therapy*; A. Brooks, S. Braham, L. Jain (Eds.), Studies in Computational Intelligence (Springer SCI), 2013.
9. G. E. Drayer and A.M. Howard, "A Granular Sensor-Fusion Method for Regenerative Life Support Systems," *Multisensor Data Fusion: From Algorithms and Architectural Design to Applications*; H. Fourati (Ed.), CRC Press, 2015.
10. J. Borenstein, A. Howard, A. Wagner, "Pediatric Robotics and Ethics: The Robot is Ready to See You Now But Should It Be Trusted?" *Robot Ethics 2.0*, P. Lin, K. Abney, G. Bekey (Eds.), Oxford University Press, 2016.
11. A. Howard, Y.P. Chen, C. H. Park, "From Autism Spectrum Disorder to Cerebral Palsy: State-of-the-Art in Pediatric Therapy Robots," *Encyclopedia of Medical Robotics*, J. P. Desai (Ed.), World Scientific Publishing Company, 2016.
12. A. Howard, Y.P. Chen, C. H. Park, "From Autism Spectrum Disorder to Cerebral Palsy: State-of-the-Art in Pediatric Therapy Robots," *Encyclopedia of Medical Robotics*, J. P. Desai (Ed.), World Scientific Publishing Company, to appear 2017.
13. P. Robinette, A. Howard, A.R. Wagner, "Conceptualizing Overtrust in Robots: Why Do People Trust a Robot That Previously Failed?," *Autonomy and Artificial Intelligence: A threat or savior?*, F. Lawles, R. Mittu, D. Sofge, S. Russell (Eds), Springer, to appear 2017.

## **IV.B. Refereed Publications**

### *IV.B.1. Refereed Journal Publications*

1. A. Howard, C. Padgett, "A generalized approach to real-time pattern recognition in sensed data," *Pattern Recognition*, vol. 32:12, pgs. 2069-2071, Dec. 1999.
2. A. Howard, G. Bekey, "Intelligent Learning for Deformable Object Manipulation," *Autonomous Robots*, 9 (1): pgs. 51-58, August 2000.
3. A. Howard, H. Seraji, "Vision-Based Terrain Characterization and Traversability Assessment," *Journal of Robotic Systems*, 18(10), pgs. 577-587, 2001.
4. A. Howard, H. Seraji, "An Intelligent Terrain-Based Navigation System for Planetary Rovers," *IEEE Robotics and Automation Magazine*, vol. 8, no. 4, pgs. 9-17, December 2001.
5. H. Seraji and A. Howard, "Behavior-Based Navigation on Challenging Terrain: A Fuzzy Logic Approach," *IEEE Transactions on Robotics and Automation*, 18(3), pgs. 308-321, June 2002.
6. E. Tunstel, A. Howard, H. Seraji, "Rule-based reasoning and neural network perception for safe off-road robot mobility," *Expert Systems*, 19(4), pgs. 191-200, Sept. 2002.
7. E. Tunstel, A. Howard, "Approximate Reasoning for Safety and Survivability of Planetary Rovers," *Fuzzy Sets and Systems*, vol. 134, no. 1, pgs. 27-46, Feb. 2003.
8. A. Howard, C. Padgett, "An Adaptive Learning Methodology for Intelligent Object Detection in Novel Imagery Data," *NeuroComputing*, vol. 51, pgs. 1-11, March 2003.
9. A. Howard, H. Seraji, "Multi-Sensor Terrain Classification for Safe Spacecraft Landing," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 40, Issue 4, pgs. 1122-1131, October 2004.
10. A. Howard, H. Seraji, B. Werger, "Global and Regional Path Planners for Integrated Planning and Navigation," *Journal of Robotic Systems*, vol. 22, no. 12, pgs. 767-778, December 2005.
11. Z. Dodds, L. Greenwald, A. Howard, S. Tejada, J. Weinberg, "Components, Curriculum, and Community: Robots and Robotics in Undergraduate AI Education," *AI Magazine*, Vol. 27, pgs. 11-22, Spring 2006.

12. A. Howard, "A Systematic Approach to Predict Performance of Human-Automation Systems," *IEEE Transactions on Systems, Man, and Cybernetics--Part C*, Vol. 37, No. 4, July 2007.
13. A. Howard, **L. Parker**, **B. Smith**, "A Learning Approach to Enable Locomotion of Multiple Robotic Agents Operating in Natural Terrain Environments," *International Journal of Intelligent Automation and Soft Computing*, Vol. 14(1), pgs. 47-59, 2008.
14. A. Howard, **S. Remy**, "Utilizing Virtual Environments to Enable Learning in Human-Robot Interaction Scenarios," *International Journal of Virtual Reality*, Vol. 7(1), pgs. 9-14, 2008.
15. **S. Remy**, A. Howard, "Learning Approaches Applied to Human-Robot Interaction for Space Missions," *International Journal of Intelligent Automation and Soft Computing*, Vol. 14, No. 3, pgs. 249-262, 2008.
16. **B. Smith**, M. Egerstedt, A. Howard, "Automatic Generation of Persistent Formations for Multi-Agent Networks Under Range Constraints," *ACM/Springer Mobile Networks and Applications Journal*, Vol. 14, No. 3, pgs. 322 – 335, 2009.
17. **B. Smith**, A. Howard, J. McNew, Jiuguang-Wang, M. Egerstedt, "Multi-robot deployment and coordination with Embedded Graph Grammars," *Autonomous Robots*, Vol. 26 (1), pgs. 79-98, January 2009.
18. **A. Viguria**, A. Howard, "An Integrated Approach for Achieving Multi-Robot Task Formations," *IEEE/ASME Transactions on Mechatronics*, Vol. 14 (2), pgs. 176-186, April 2009.
19. **S. Williams**, A. Howard, "Developing Monocular Visual Odometry and Pose Estimation for Arctic Environments," *Journal of Field Robotics*, Vol. 27(2), pgs. 145-157, March 2010.
20. **A. Viguria**, A. Howard, "Probabilistic Analysis of Market-Based Algorithms for Initial Robotic Formations," *International Journal of Robotics Research*, Vol. 29, No. 9, pgs. 1154–1172, August 2010.
21. **S. Williams**, **L. Parker**, A. Howard, "Calibration and Validation of Earth-observing Sensors using Deployable Surface-based Sensor Networks," *IEEE Journal of Selected Topics in Earth Observations and Remote Sensing*, Vol. 3, No. 4, pgs. 427-432, Dec. 2010.
22. **A. Howard**, **B. Jones**, N. Serrano, "An Integrated Sensing Approach for Entry, Descent, and Landing of a Robotic Spacecraft," *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 47(1), pgs. 295-304, Jan. 2011.
23. M.B. Blake, **S. Remy**, A. Howard, "Towards Robotic Access to WWW Resources Using Service-Oriented Computing and Web Interfaces," *IEEE Robotics and Automation Magazine*, Vol. 18(2), pgs. 33-43, June 2011.
24. **D. Brooks**, A. Howard, "Quantifying Upper-Arm Rehabilitation Metrics for Children through Interaction with a Humanoid Robot," *Applied Bionics and Biomechanics*, Vol. 9(2), pgs. 157-172, 2012.
25. A. Howard, **C.H. Park**, **S. Remy**, "Using Haptic and Auditory Interaction Tools to Engage Students with Visual Impairments in Robot Programming Activities," *IEEE Transactions on Learning Technologies*, Vol. 5(1), pgs. 87-95, Jan 2012.
26. **S. Williams**, **L. Parker**, A. Howard, "Terrain Reconstruction of Glacial Surfaces via Robotic Surveying Techniques," *IEEE Robotics and Automation Magazine*, Vol. 10(4), pgs. 59-71, December 2012.
27. **C. H. Park**, A. M. Howard, "Telepresence Robotic Technology for Individuals with Visual Impairments Through Real-time Haptic Rendering," *Journal of Korea Robotics Society*, vol. 8(3), Sept. 2013.
28. R. Dorsey, **C.H. Park**, A. Howard "Developing the Capabilities of Blind and Visually Impaired Youth to Build and Program Robots," *Journal on Technology and Persons with Disabilities*, Vol. 1, pg. 57-69, 2014.
29. G. Drayer, A. Howard, "Modeling and Simulation of an Aquatic Habitat for Bioregenerative Life Support Research," *Acta Astronautica*, Volume 93, Pages 138–147, January 2014.
30. Y-P. Chen, S. Lee, A. Howard, "Effect of Virtual Reality on Improving Upper-Extremity Function in Children with Cerebral Palsy: A Meta-Analysis," *Pediatric Physical Therapy*, 2014 Fall; 26(3):289-300.
31. **C. H. Park**, A. Howard, "Robotics-based Telepresence using Multi-modal Interaction for Individuals with Visual Impairments," *International Journal of Adaptive Control and Signal Processing*, doi: 10.1002/acs.2519, June 2014.
32. A. Howard, **H.W. Park**, "Using Tablet Devices to Engage Children with Disabilities in Robotic Educational Activities," *Journal on Technology and Persons with Disabilities*, vol. 2:96-107, Dec. 2014, <http://hdl.handle.net/10211.3/133378>.
33. Y-P. Chen, A. Howard, "Effects of robotic therapy on upper-extremity function in children with cerebral palsy: A systematic review," *Developmental Neurorehabilitation*, 2014 Apr 11, doi:10.3109/17518423.2014.899648.
34. **L. Brown**, A. Howard, "Assessment of Engagement for Intelligent Educational Agents: A Pilot Study with Middle School Students," *Computers in Education Journal*, Number 4, October 2014.
35. C.H. Park, E.S. Ryu, A. Howard, "Telerobotic Haptic Exploration in Art Galleries and Museums for Individuals with Visual Impairments," *IEEE Transactions on Haptics*, 8(3):327-38, Jul-Sep 2015.
36. Y-P. Chen, **S. García-Vergara**, A. Howard, "Effect of a home-based virtual reality intervention for children with cerebral palsy using SuperPop VR™ evaluation metrics – A feasibility study," *Rehabilitation Research and Practice*, Volume 2015 (2015), Article ID 812348, 9 pages, September 2015.

37. **A. Spears**, M. West, M. Meister, J. Buffo, C. Walker, T. R. Collins, A. Howard, B. Schmidt, "The Icefin Under-Ice Unmanned Underwater Vehicle: Development and Deployment in Antarctica," *IEEE Robotics and Automation Magazine*, December 2016.
38. **P. Robinette**, A. Howard, R. Wagner, "The Effect of Robot Performance on Human-Robot Trust in Time-Critical Situations," *IEEE Transactions on Human-Machine Systems*, PP(99), 1-12, 2017.
39. J. Stout, B. Tamer, H. M. Wright, L. Clarke, S. Dwarkadas, A. Howard, "Research on Grad Cohort: An Intervention to Retain Women Graduate Students in Computing," *Frontiers in Psychology*, 2017.

#### IV.B.2. Refereed Conference Publications

1. A.M. Howard, G.A. Bekey, "Recursive Learning for Deformable Object Manipulation," *8<sup>th</sup> Int. Conf. Advanced Robotics (ICAR)*, pgs. 939-943, Monterey, CA, July 1997.
2. A. Howard, C. Padgett, C. Liebe, "A Multi-Stage Neural Network for Automatic Target Detection," *IEEE Int. Joint Conference on Neural Networks (IJCNN)*, pgs. 231-236, Anchorage, Alaska, May 1998.
3. A. Howard, C. Padgett, K. Brown, "Intelligent Target Detection in Hyperspectral Imagery," *13<sup>th</sup> Intern. Conference on Applied Geologic Remote Sensing*, Vancouver, Canada, March 1999.
4. A. Howard, G. Bekey, "Intelligent Learning for Deformable Object Manipulation," *IEEE Intern. Symposium on Computational Intelligence in Robotics and Automation*, pgs. 15-20, Monterey Bay, CA, Nov. 1999.
5. A. Howard, C. Padgett, K. Brown, "Real Time Intelligent Target Detection and Analysis with Machine Vision," *3<sup>rd</sup> International Symposium on Intelligent Automation and Control*, Maui, HI, June 2000.
6. A. Howard, G. Bekey, "A Learning Methodology for Robotic Manipulation of Deformable Objects," *8<sup>th</sup> International Symposium on Robotics and Applications*, Maui, HI, June 2000.
7. A. Howard, H. Seraji, "A Real-Time Autonomous Rover Navigation System," *World Automation Congress*, Maui, HI, June 2000.
8. A. Howard, H. Seraji, "Real-Time Assessment of Terrain Traversability for Autonomous Rover Navigation," *IEEE/RSJ Intern. Conf. on Intelligent Robots and Systems (IROS)*, pgs. 58-63, Takamatsu, Japan, Nov. 2000.
9. C. Padgett, A. Howard, S. Udomkesmalee, "Shape Based Object Recognition Using a Fast Analog Convolution Processor," *NASA/DoD Second Biomorph Explorer Workshop*, Pasadena, CA, Dec. 2000.
10. E. Tunstel, A. Howard, H. Seraji, "Fuzzy Rule-Based Reasoning for Rover Safety and Survivability," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 1413-1420, Seoul, Korea, May 2001.
11. H. Seraji, A. Howard, E. Tunstel, "Safe Navigation on Hazardous Terrain," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 3084-3091, Seoul, Korea, May 2001.
12. A. Howard, H. Seraji, E. Tunstel, "A Rule-Based Fuzzy Traversability Index for Mobile Robot Navigation," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, vol. 1, pgs. 3067-3071, Seoul, Korea, May 2001.
13. H. Seraji, A. Howard, E. Tunstel, "Terrain-Based Navigation of Planetary Rovers: A Fuzzy Logic Approach," *6th Int. Symposium on Artificial Intelligence, Robotics and Automation in Space*, Montreal, Canada, June 2001.
14. A. Howard, E. Tunstel, D. Edwards, A. Carlson, "Enhancing Fuzzy Robot Navigation Systems by Mimicking Human Visual Perception of Natural Terrain Traversability," *Joint 9th IFSA World Congress and 20th NAFIPS International Conference*, Vancouver, Canada, July 2001.
15. S. Mobasser, C.C. Liebe, A. Howard, "Application of Fuzzy Logic in Sunsensor Data Interpretation," *2<sup>nd</sup> International Conference on Intelligent Technologies (InTech'2001)*, Bangkok, Thailand, Nov. 2001.
16. S. Mobasser, C.C. Liebe, A. Howard, "Fuzzy Image Processing in Sun Sensor," *10th IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, pgs. 1337-1342, Melbourne, Australia, Dec. 2001.
17. C.C. Liebe, S. Mobasser, C.J. Wrigley, Y. Bae, A. Howard, J. Schroeder, "Micro Sun Sensor," *IEEE Aerospace Conference*, vol. 5, pgs. 2263-2273, Big Sky, Montana, March 2002.
18. A. Howard, "A Novel Information Fusion Methodology for Intelligent Terrain Analysis," *IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, pgs. 1472-1475, Honolulu, HI, May 2002.
19. E. Tunstel, A. Howard, "Sensing and Perception Challenges in Planetary Surface Robotics," *IEEE Sensors 2002*, vol. 2, pgs.1696-1701, Orlando, FL, June 2002.
20. A. Howard, H. Seraji, "A Rule-Based Fuzzy Safety Index for Landing Site Risk Assessment," *9th International Symposium on Robotics and Applications*, Orlando, FL, June 2002.
21. S. Mobasser, C.C. Liebe, A. Howard, "Fuzzy Image Processing in Sun Sensor," *International Fuzzy Systems Association World Congress*, Istanbul, Turkey, June 2003.
22. A. Howard, G. Rodriguez, "Validating Mission Relevance of Autonomy Technologies through Increased Science Return," *Workshop on Machine Learning in Space Systems, 20th International Conference on Machine Learning*, pgs. 31-35, Washington, D.C., August 2003.

23. A. Howard, B. Werger, H. Seraji, "Integrating Terrain Maps into a Reactive Navigation Strategy" *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 2012-2017, Taipei, Taiwan, September 2003.
24. A. Howard, E. Graham, "Bridging the Gap between Space Robotics Research and Robotics Education," *AAAI Symp. on Accessible, Hands-on AI/Robotics Education*, pgs. 126-128, San Jose, CA, March 2004.
25. A. Howard, et. al. "A Methodology to Determine Impact of Autonomy Technologies on Space Science Mission," *10<sup>th</sup> International Symposium on Robotics and Applications*, Seville, Spain, June 2004.
26. A. Howard, et. al, "A Reconfigurable Robotic Exploration Vehicle for Extreme Environments," *10<sup>th</sup> International Symposium on Robotics and Applications*, Seville, Spain, June 2004.
27. A. Howard, E. Tunstel, "A Self-Contained Traversability Sensor for Safe Mobile Robot Guidance in Unknown Terrain," *9<sup>th</sup> Online World Conference on Soft Computing in Industrial Applications*, Sept. 2004.
28. A. M. Howard, "A Methodology to Assess Performance of Human-Robotic Systems in Achievement of Collective Tasks," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pgs. 377-382, Edmonton, Canada, August 2005.
29. E. Tunstel, A. Howard, M. Maimone, A. Trebi-Ollenu, "Mars Exploration Rover Baseline for Flight Rover Autonomy Technology Assessment," *8th Int. Symposium on Artificial Intelligence, Robotics and Automation in Space (i-Sairas)*, Munich, Germany, Sept. 2005.
30. A. Howard, B. Werger, H. Seraji, "A human-robot mentor-protégé relationship to learn off-road navigation behavior," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, pgs. 430-435, Waikoloa, Hawaii, Oct. 2005.
31. A. Howard, **W. Paul**, "A 3D Virtual Environment for Exploratory Learning in Mobile Robot Control," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, pgs. 306-310, Waikoloa, Hawaii, Oct. 2005.
32. G. Thomas, A. Howard, A. Williams, **A. Alston-Moore**, "Multi-Robot Task Allocation in Lunar Mission Construction Scenarios," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, pgs. 518-523, Hawaii, Oct. 2005.
33. N. Serrano, M. Bajracharya, A. Howard, H. Seraji, "A Novel Tiered Sensor Fusion Approach for Terrain Characterization and Safe Landing Assessment," *IEEE Aerospace Conference*, Big Sky, Montana, March 2006.
34. A. Howard, "Role Allocation in Human-Robot Interaction Schemes for Mission Scenario Execution," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 3588-3594, Orlando, FL, May 2006.
35. **B. Jones**, A. Howard, "An Imaging Technique for Safe Spacecraft Landing and Autonomous Hazard Avoidance," *IEEE Int. Conf. on Space Mission Challenges for Information Tech.*, Pasadena, CA, July 2006.
36. A. Howard, **G. Cruz**, "Adapting Human Leadership Approaches for Role Allocation in Human-Robot Navigation Scenarios," *11th Int. Symposium on Robotics and Applications*, Budapest, Hungary, July 2006.
37. A. Howard, "Fuzzy logic selection of surface feature observations for small proximity operations," *6th International Symposium on Soft Computing for Industry*, Budapest, Hungary, July 2006.
38. A. Howard, **B. Smith**, M. Egerstedt, "Realization of the Sensor Web Concept for Earth Science using Mobile Robotic Platforms," *IEEE Aerospace Conference*, Big Sky, Montana, March 2007.
39. A. Howard, E. Graham, "To Encourage and Excite the Next Generation of Engineers through Human-Robot Interaction Projects for Space Exploration," *American Society for Engineering Education Annual Conference*, Hawaii, June 2007.
40. A. Howard, **C. H. Park**, "Haptically Guided Teleoperation for Learning Manipulation Tasks," *Robotics: Science and Systems: Workshop on Robot Manipulation*, Atlanta, GA, June 2007.
41. **B. Johns**, A. Howard, "Stability and Gait Optimization of a Hybrid Legged-Wheeled Rover," *10th International Conference on Climbing and Walking Robots (CLAWAR)*, pgs. 226- 233, Singapore, July 2007.
42. **B. Smith**, M. Egerstedt, A. Howard, "Automatic Generation of Persistent Formations for Multi-Agent Networks under Range Constraints," *Int. Conf. on Robot Comm. and Coordination*, Athens, Greece, Oct. 2007.
43. A. Howard, **L. Parker**, "A Hierarchical Strategy for Learning of Robot Walking Strategies in Natural Terrain Environments," *IEEE Int. Conf. on Systems, Man, and Cybernetics (SMC)*, pgs. 2336-2341, Canada, Oct. 2007.
44. **S. Remy**, A. Howard, "In Situ Interactive Teaching of Trustworthy Robotic Assistants," *IEEE Int. Conf. on Systems, Man, and Cybernetics (SMC)*, pgs. 1280-1285, Montreal, Canada, Oct. 2007.
45. **A. Viguria**, A. Howard, "Upper-Bound Cost Analysis of a Market-Based Algorithm Applied to the Initial Formation Problem," *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, pgs. 2326-2331, San Diego, CA, Oct. 2007.
46. **C.H. Park**, A. Howard, "Vision-based Force Guidance for Improved Human Performance in a Teleoperative Manipulation System," *IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS)*, pgs. 2126-2131, San Diego, CA, 2007.
47. **B. Smith**, M. Egerstedt, A. Howard, "Automatic Deployment and Formation Control of Decentralized Multi-Agent Networks," *IEEE Int. Conf. on Robotics and Automation*, pgs. 134-139, Pasadena, CA, May 2008.
48. **S. Williams**, A. Howard, "A Single Camera Terrain Slope Estimation Technique for Natural Arctic Environments," *IEEE Int. Conf. on Robotics and Automation*, pgs. 2729-2734, Pasadena, CA, May 2008.

49. A. Howard, **S. Remy**, **H.W. Park**, "Learning of Arm Exercise Behaviors: Assistive Therapy based on Therapist-Patient Observation," *RSS: Workshop on Interactive Robot Learning*, Zurich, Switzerland, June 2008.
50. **S. Remy**, A. Howard, "Quantifying Coherence when Learning Behaviors via Teleoperation," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, pgs. 471-476, Munich, Germany, August 2008.
51. A. Howard, **H.W. Park**, C. Kemp, "Extracting Play Primitives for a Robot Playmate by Sequencing Low-Level Motion Behavior," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, pgs. 360-365, Munich, Germany, August 2008.
52. **A. Viguria**, A. Howard, "A Probabilistic Model for the Performance Analysis of a Distributed Task Allocation Algorithm," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 3117-3122, Kobe, Japan, May 2009.
53. **B. Smith**, J. Wang, M. Egerstedt, A. Howard, "Automatic Formation Deployment of Decentralized Heterogeneous Multiple-Robot Networks with Limited Sensing Capabilities," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 730-735, Kobe, Japan, May 2009.
54. **D. Brooks**, A. Howard, "Mobility Reconfiguration for Terrain Exploration using Passive Perception," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 2623-2628, Kobe, Japan, May 2009.
55. **S. Remy**, A. Howard, "Predicting the Robot Learning Curve based on Properties of Human Interaction," *AAAI Symp. on Agents that Learn from Human Teachers*, San Jose, CA, March 2009.
56. A. Trevor, **H.W. Park**, A. Howard, C. Kemp, "Playing with Toys: Towards Autonomous Robot Manipulation for Therapeutic Play," *IEEE Int. Conf. on Robotics and Automation*, pgs. 2139-2145, Kobe, Japan, May 2009.
57. **S. Remy**, **C.H. Park**, A.M. Howard, "Improving the performance of ANN training with an unsupervised filtering method," *Int. Joint Conf. on Neural Networks*, pgs. 2627-2633, Atlanta, GA, June 2009.
58. **S. Williams**, A. Howard, "Towards Visual Arctic Terrain Assessment," *7<sup>th</sup> Int. Conf. on Field and Service Robotics*, pgs. 91-100, Cambridge, MA, July 2009.
59. **L. Parker**, A. Howard, "Assistive Formation Maintenance for Human-Led Multi-Robot Systems," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, pgs. 2350-2355, San Antonio, TX, Oct. 2009.
60. **D. Brooks**, A. Howard, "Upper Limb Rehabilitation and Evaluation of Children Using a Humanoid Robot," *2<sup>nd</sup> Workshop on Child, Computer, and Interaction*, Cambridge, MA, Nov. 2009.
61. **C.H. Park**, A. Howard, "Towards Real-Time Haptic Exploration using a Mobile Robot as Mediator," *IEEE Haptics Symposium*, pgs. 289-292, Cambridge, MA, March 2010.
62. **C.H. Park**, J.W. Yoo, A. Howard, "Transfer of Skills between Human Operators through Haptic Training with Robot Coordination," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 229-235, Anchorage, AK, May 2010.
63. **H.W. Park**, A. Howard, "Understanding a Child's play for Robot Interaction by Sequencing Play Primitives using Hidden Markov Models," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, pgs. 170-177, Anchorage, AK, May 2010.
64. **S. Williams**, **S. Remy**, A. Howard, "3-D Simulations for Testing and Validating Robotic-Driven Applications for Exploring Lunar Pole," *AIAA Infotech@Aerospace 2010*, Atlanta, GA, April 2010.
65. **S. Williams**, **M. Hurst**, A. Howard, "Development of a Mobile Arctic Sensor Node for Earth-Science Data Collection Applications," *AIAA Infotech@Aerospace 2010*, Atlanta, GA, April 2010.
66. **L. Parker**, **B. English**, **M. Chavis**, A. Howard, "Improvements To Satellite-Based Albedo Measurements Using In Situ Robotic Surveying Techniques," *AIAA Infotech@Aerospace 2010*, Atlanta, GA, April 2010.
67. **H.W. Park**, A. Howard, "Case-Based Reasoning for Planning Turn-Taking Strategy with a Therapeutic Robot Playmate," *IEEE Int. Conf. on Biomedical Robotics and Biomechatronics*, pgs. 40-45, Japan, Sept. 2010.
68. **D. Brooks**, A. Howard, "A Computational Method for Physical Rehabilitation Assessment," *IEEE Int. Conf. on Biomedical Robotics and Biomechatronics (BioRob)*, pgs. 442-447, Tokyo, Japan, Sept. 2010.
69. **S. Williams**, A. Howard, "Horizon Line Estimation In Glacial Environments Using Multiple Visual Cues," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Shanghai, China, May 2011.
70. **C. H. Park**, **S. Remy**, A. Howard, "Visualize Your Robot with Your Eyes Closed: A Multi-modal Interactive Approach Using Environmental Feedback," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Shanghai, China, May 2011.
71. **A. Curtis**, J. Shim, E. Gargas, A. Srinivasan and A. M. Howard, "Dance Dance Pleo: Developing a Low-Cost Learning Robotic Dance Therapy Aid," *10th Int. Conf. on Interaction Design and Children*, MI, June 2011.
72. R. Dorsey, A. Howard, "Measuring the Effectiveness of Robotics Activities in Underserved K-12 Communities outside the Classroom," *American Society for Engineering Education Annual Conf*, Vancouver, CA, June 2011.
73. **G. Drayer**, A. Howard, "Modeling, Design and Simulation of a Reconfigurable Aquatic Habitat for Life Support Control Research," *41st International Conference of Environmental Systems*, Portland, OR, July 2011.
74. **G. Drayer**, A. Howard, "A FAM-based Switched Control Approach for the Automation of Bioregenerative Life Support Systems," *41st International Conference of Environmental Systems*, Portland, OR, July 2011.

75. **P. Robinette**, A. Howard, "Emergency Evacuation Robot Design," 3<sup>rd</sup> Int. Joint Topical Meeting on Emergency Preparedness & Response and Robotics & Remote Systems, Knoxville, TN, August 2011.
76. **P. Robinette**, A. Howard, "Incorporating a Model of Human Panic Behavior for Robotic-Based Emergency Evacuation," *IEEE Int. Sym. on Robot and Human Interactive Communication*, August 2011, Atlanta, GA.
77. **H. Mei, L. Parker**, A. Howard, "Digital Elevation Model (DEM) Generation from Contour Maps for Robotic Surveying," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Anchorage, AK, Oct. 2011.
78. **L. Parker**, A. Howard, "Adaptive Robot Navigation Protocol for Estimating Variable Terrain Elevation Data," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Anchorage, AK, Oct. 2011.
79. S. Koziol, D. Lenz, S. Hilsenbeck, S. Chopra, P. Hasler, and A. Howard, "Using Floating-Gate Based Programmable Analog Arrays for Real-Time Control of a Game-Playing Robot," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Anchorage, AK, Oct. 2011.
80. **C.H. Park**, A. Howard, "Real World Haptic Exploration for Telepresence of the Visually Impaired," *ACM/IEEE International Conference on Human-Robot Interaction (HRI 2012)*, Boston, MA, March 2012.
81. **G. Drayer**, A. Howard, "A Granular Approach to the Automation of Bioregenerative Life Support Systems that Enhances Situation Awareness" *2012 IEEE Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA)*, New Orleans, LA, March 2012.
82. **P. Robinette**, P. Vela, A. Howard, "Information Propagation Applied to Robot-Assisted Evacuation," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, May 2012.
83. **J. Gregory**, A. Howard, C. Boonthum-Denecke, "Wii Nunchuk Controlled Dance Pleo! Dance! to Assist Children with Cerebral Palsy by Play Therapy," *25th Int. Florida Artificial Intelligence Research Society Conference*, May 2012.
84. **D. Brooks**, Y-P. Chen, A. Howard, "Simulation versus Embodied Agents: Does either induce better human adherence to physical therapy exercise?" *IEEE Int. Conf. on Biomedical Robotics and Biomechanics (BioRob)*, Rome, Italy, June 2012.
85. **H. Taylor**, B. Lee, J. Jhingory, **G. Drayer**, A. Howard, "Development and Evaluation of User Interfaces for Situation Observability in Life Support Systems." *42nd International Conference on Environmental Systems (ICES)*, San Diego, California, July 2012.
86. **L. Roberts, H.W. Park**, and A. M. Howard, "Robots and Therapeutic Play: Evaluation of a Wireless Interface Device for Interaction with a Robot Playmate," *34th Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'12)*, San Diego, California, August 2012.
87. **P. Robinette**, A. M. Howard, "Trust in Emergency Evacuation Robots," *10th IEEE International Symposium on Safety Security and Rescue Robotics (SSRR 2012)*, College Station, TX, Nov. 2012.
88. **G. Valentin**, A. Howard, "Dealing with Childhood Obesity: Passive versus Active Activity Monitoring Approaches for Engaging Individuals in Exercise," *IEEE Biorobotics and Biosignals Conference*, Brazil, February 2013.
89. **H. W. Park**, A. Howard, "TabAccess, a Wireless Controller for Tablet Accessibility for Individuals with Limited Upper-Body Mobility," *IEEE Biorobotics and Biosignals Conference*, Brazil, February 2013.
90. **P. Robinette**, A. Wagner, A. Howard, "Building and Maintaining Trust Between Humans and Guidance Robots in an Emergency," *2013 AAAI Spring Symposium: Trust and Autonomous Systems*, Stanford, CA, March 2013.
91. **C.H. Park**, A. Howard, "Real-Time Haptic Rendering and Haptic Telepresence Robotic System for the Visually Impaired," *IEEE World Haptics Conference 2013*, Daejeon, Korea, April 2013.
92. **L. Parker, R. Coogle**, A. Howard, "Estimation-Informed, Resource-Aware Robot Navigation for Environmental Monitoring Applications," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Karlsruhe, Germany, May 2013.
93. **C.H. Park**, A. Howard, "Engaging Students with Visual Impairments in Engineering and Computer Science through Robotic Game Programming," *120th American Society for Engineering Education (ASEE) Annual Conference*, Atlanta, GA, June 2013.
94. A. Howard, **D. Brooks**, E. Brown, A. Gebregiorgis, Y.P. Chen, "Non-Contact versus Contact-based Sensing Methodologies for In-Home Upper Arm Robotic Rehabilitation," *13th Int. Conf. on Rehabilitation Robotics (ICORR)*, Seattle, WA, June 2013.
95. **S. García-Vergara**, Y-P Chen, A. Howard, "Super Pop VR<sup>TM</sup>: an Adaptable Virtual Reality Game for Upper-Body Rehabilitation," *Human-Computer Interaction (HCI) International Conference*, Las Vegas, NV, July 2013.
96. **M. E. Nixon**, Y-P. Chen, A. M. Howard, "Quantitative Evaluation of the Microsoft Kinect for Use in an Upper Extremity Virtual Rehabilitation Environment," *Int. Conf. on Virtual Rehabilitation (ICVR)*, Philadelphia, PA, August 2013.

97. **K. DeMarco**, M. West, A. Howard, "A Forward-Looking Sonar Simulation for Underwater Human-Robot Interaction Scenarios," *IEEE OCEANS Conference*, San Diego, CA, September 2013.
98. **L. Brown**, R. Kerwin, A. Howard, "Applying Behavioral Strategies for Student Engagement Using a Robotic Educational Agent," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Manchester, UK, Oct. 2013 (*Best Paper Award Finalist*).
99. **M. Nixon**, A. Howard, "Applying Gaming Principles to Virtual Environments for Upper Extremity Therapy Games," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Manchester, UK, Oct. 2013.
100. **K. DeMarco**, M. West, A. M. Howard, "Sonar-Based Detection and Tracking of a Diver for Underwater Human-Robot Interaction Scenarios," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Manchester, UK, Oct. 2013.
101. **R. Coogle**, A. Howard, "The Iceberg Observation Problem: Using Multiple Agents to Monitor and Observe Ablating Target Sources," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Manchester, UK, Oct. 2013.
102. **L. Brown**, A. Howard, "Engaging Children in Math Education using a Socially Interactive Humanoid Robot," *IEEE-RAS International Conference on Humanoid Robots*, Atlanta, GA, Oct. 2013.
103. **L. Brown**, A. Howard, "The Positive Effects of Verbal Encouragement in Mathematics Education Using A Social Robot," *IEEE Integrated STEM Education Conference*, Princeton, NJ, March 2014 (*Best Paper Award*).
104. **A. Spears**, M. West, T. Collins, A. Howard, "Determining Underwater Vehicle Movement from Sonar Data in Relatively Featureless Seafloor Tracking Missions," *IEEE Winter Applications of Computer Vision Conference*, Steamboat Springs, CO, March 2014.
105. **S. García-Vergara**, A. Howard, "Three-Dimensional Fitt's Law Model used to Predict Movement Time in Serious Games for Rehabilitation," *Human-Computer Interaction (HCI) International Conference*, Crete, Greece, June 2014.
106. **H. W. Park**, **R. Coogle**, A. Howard, "Using a Shared Tablet Workspace for Interactive Demonstrations during Human-Robot Learning Scenarios," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Hong Kong, China, June 2014.
107. **C.H. Park**, A. Howard, "Haptic Visualization of Real-World Environmental Data for Individuals with Visual Impairments," *Human-Computer Interaction (HCI) International Conference*, Crete, Greece, June 2014.
108. **G. Dramer**, A. Howard, "Evaluation of an Introductory Embedded Systems Programming Module using Hands-on Learning Methods," *121st American Society for Engineering Education (ASEE) Annual Conference*, Indianapolis, IN, June 2014.
109. **L. Brown**, A. Howard, "A Real-Time Model to Assess Student Engagement during Interaction with Intelligent Educational Agents," *121st American Society for Engineering Education (ASEE) Annual Conference*, Indianapolis, IN, June 2014.
110. **H. W. Park**, A. Howard, "Engaging Children in Social Behavior: Interaction with a Robot Playmate Through Tablet-Based Apps," *Rehabilitation Eng. and Technology Society of North America (RESNA) Annual Conference*, Indianapolis, IN, June 2014.
111. J. MacCalla, A. Howard, "A Plush Switch for Accessing Tablet-Based Applications for Children with Mild to Severe Motor Limitations," *Rehabilitation Eng. and Technology Society of North America (RESNA) Annual Conference*, Indianapolis, IN, June 2014.
112. **L. Brown**, A. Howard, "Gestural Behavioral Implementation on a Humanoid Robotic Platform for Effective Social Interaction," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, Edinburgh, Scotland, August 2014.
113. **P. Robinette**, A. Wagner, A. Howard, "Assessment of Robot Guidance Modalities Conveying Instructions to Humans in Emergency Situations," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, Edinburgh, Scotland, August 2014.
114. **S. Garcia-Vergas**, M. Serrano, Y.P. Chen, A. Howard, "Developing a Baseline for Upper-Body Motor Skill Assessment using a Robotic Kinematic Model," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, Edinburgh, Scotland, August 2014.
115. C.H. Park, K. Wilson, A. Howard, "Pilot Study: Supplementing Surgical Training for Medical Students Using a Low-Cost Virtual Reality Simulator," *26th IEEE Int. Symposium on Computer-Based Medical Systems*, New York, May 2014.
116. **A. Spears**, M. West, B. Schmidt, T. Collins, and A. M. Howard, "Modification of the Yellowfin Autonomous Underwater Vehicle for Use in Under-Ice Missions," *AUVSI's Unmanned Systems*, Orlando, FL, May 2014.
117. **A. Spears**, M. West, T. Collins, and A. M. Howard, "Evaluation of Sonar and Video Data Collection Efforts in an Under-Ice Environment Using an Unmanned Underwater Vehicle," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, San Diego, CA, May 2014.

118. **K. DeMarco**, M. West, and A. M. Howard, "Underwater Human-Robot Communication: A Case Study with Human Divers," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, San Diego, CA, May 2014.
119. **A. Spears**, M. West, T. Collins, and A. M. Howard, "Acoustic Sonar and Video Sensor Fusion for Landmark Detection in an Under-Ice Environment," *IEEE OCEANS Conference*, St. John's, New Newfoundland, September 2014.
120. **A. Spears**, M. West, T. Collins, M. Meister, B. Schmidt, and A. M. Howard, "Design and Development of an Under-Ice Autonomous Underwater Vehicle for use in Polar Regions" *IEEE OCEANS Conference*, St. John's, New Newfoundland, September 2014.
121. **K. DeMarco**, M. West, and A. M. Howard, "Autonomous Robot-Diver Assistance through Joint Intention Theory," *IEEE OCEANS Conference*, St. John's, New Newfoundland, September 2014.
122. **B. English**, A. Howard, "Engagement Study of an Integrated Rehabilitation Robotic Tablet-Based Gaming System," *IEEE Int. Workshop on Advanced Robotics and its Social Impacts*, Evanston, IL, Sept. 2014.
123. A. Howard, J. MacCalla, "Pilot Study to Evaluate the Effectiveness of a Mobile-Based Therapy and Educational App for Children," *ACM Sensys Workshop on Mobile Medical Applications – Design and Development*, Memphis, TN, Nov. 2014.
124. **B. English**, A. Howard, "Encouraging Specific Intervention Motions via a Robotic System for Rehabilitation of Hand Function," *IEEE Symp. on Computational Intelligence in Robotic Rehabilitation and Assistive Technologies*, Orlando, Florida, Dec. 2014.
125. H. W. Park, A. Howard, "Robot Learners: Interactive Instance-Based Learning and Its Application to Therapeutic Tasks," *AI for Human-Robot Interaction, 2014 AAAI Fall Symposium*, Arlington, VA, Nov. 2014.
126. L. Conrad, A. Howard, "The Impact of a Robotics Summer Undergraduate Research Experience on Increasing the Pipeline to Graduate School," *American Society for Engineering Education (ASEE) Annual Conference*, Seattle, WA, June 2015 (accepted).
127. **S. García-Vergara**, H. Li, A. Howard, "Increasing Super Pop VR<sup>TM</sup> Users' Intrinsic Motivation by Improving the Game's Esthetics," *Human-Computer Interaction (HCI) International Conference*, Los Angeles, CA, August 2015 (accepted).
128. J. MacCalla, J. Xu, A. Howard, "Enhancing Self-Motivation through Design of an Accessible Math App for Children with Special Needs," *Human-Computer Interaction (HCI) International Conference*, Los Angeles, CA, August 2015.
129. C. H. Park, N. Pai, J. Bakthavatchalam, Y. Li, M. Jeon, A. Howard, "Robotic Framework for Music-based Emotional and Social Engagement with Children with Autism," *AAAI-15 Workshop on Artificial Intelligence Applied to Assistive Technologies and Smart Environments*, Austin, TX, Jan. 2015.
130. J. MacCalla, J. Xu, A. Howard, "Integration of Common Core Math Standards into Gaming Apps for Children with Motor Limitations," *Rehabilitation Eng. and Technology Society of North America (RESNA) Annual Conference*, Denver, CO, June 2015.
131. **A. Moreno**, C. Rozell, A. Howard, "Restricting Vocabulary Size in Pediatric Augmentative and Alternative Communication," *Rehabilitation Eng. and Technology Society of North America (RESNA) Annual Conference*, Denver, CO, June 2015.
132. H.W. Park, A. Howard, "Retrieving Experience: Interactive Instance-based Learning Methods for Building Robot Companions," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Seattle, WA, May 2015.
133. **L. Brown, S. Garcia-Vergas**, A. Howard, "Evaluating the Effect of Robot Feedback on Motor Skill Performance in Therapy Games," *IEEE Int. Conf. on Systems, Man, and Cybernetics*, Hong Kong, Oct. 2015.
134. C. H. Park, M. Jeon, A. Howard, "Robotic Framework with Multi-Modal Perception for Physio-Musical Interactive Therapy for Children with Autism," *5th Int. Conf. on Development and Learning and on Epigenetic Robotics*, Providence, RI, Aug 2015.
135. **P. Robinette**, A. Howard, and A. R. Wagner, "Timing is Key for Robot Trust Repair," *7th International Conference on Social Robotics (ICSR 2015)*, Paris, France, Oct. 2015.
136. **A. Spears**, M. West, M. Meister, C. Walker, J. Buffo, T. Collins, A. Howard, B. Schmidt, "Design and Antarctic Testing of the Icefin Vehicle," *IEEE OCEANS Conference*, Washington, DC., Oct. 2015.
137. **A. Spears**, M. West, T. Collins, A. Howard, "Automatic Texture and Anomaly Mapping in Under-Ice Video Datasets," *IEEE OCEANS Conference*, Washington, DC., Oct. 2015.
138. **A. Spears**, M. West, T. Collins, A. Howard, "Sonar and Video Fusion for Vehicle Trajectory Estimation in Under-Ice Environments," *IEEE OCEANS Conference*, Washington, DC., Oct. 2015.
139. **G. Valentin**, J. Alcaininho, M. Jackson, A. Howard, T. Starner, "Towards a canine-human communication system based on head gestures," *12th International Conference on Advances in Computing Entertainment (ACE)*, Malaysia, Nov. 2015.

140. **P. Robinette**, A. Howard, A. Wagner, "Overtrust of Robots in Emergency Evacuation Scenarios," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, New Zealand, March 2016.
141. **P. Cloutier**, H. W. Park, J. MacCalla, A. Howard, "It's All in the Eyes: Designing Facial Expressions for an Interactive Robot Therapy Coach for Children," *8<sup>th</sup> Cambridge Workshop on Universal Access and Assistive Technology*, Cambridge, UK, March 2016.
142. R. Zhang, J. Barnes, J. Ryan, M. Jeon, C. H. Park and A. Howard, "Musical Robots for Children with ASD using a Client-Server Architecture," *22nd Annual Int. Conference on Auditory Display*, Canberra, Australia, July 2016.
143. **P. Robinette**, A. Wagner, A. Howard, "Assessment of Robot to Human Instruction Conveyance Modalities Across Virtual, Remote and Physical Robot Presence," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, New York, NY, August 2016.
144. **S. García-Vergara, L. Brown**, Y.P. Chen, A. Howard, "Increasing the Efficacy of Rehabilitation Protocols for Children via a Robotic Playmate Providing Real-time Corrective Feedback," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, New York, NY, August 2016.
145. M. Serrano, Y.P. Chen, A. Howard, P. Vela, "Automated Feet Detection for Clinical Gait Assessment," *Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'16)*, Orlando, FL, August 2016.
146. M. Serrano, Y.P. Chen, A. Howard, P. Vela, "Lower Limb Pose Estimation for Monitoring the Kicking Patterns of Infants," *Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'16)*, Orlando, FL, August 2016.
147. **G. Valentin**, "Creating Collar-sensed Motion Gestures for Dog-Human Communication in Service Applications," *20<sup>th</sup> International Symposium on Wearable Computers (ISWC)*, Heidelberg, Germany, Sept. 2016.
148. **K. DeMarco**, N. Toit, A.M. Howard, "Tracking Multiple Fragmented Objects with 2D Imaging Sonar," *IEEE Oceans Conference*, Monterey, CA, Sept. 2016.
149. **K. DeMarco**, A.M. Howard, "Classifying Objects in 2D Imaging Sonar via Tracking of Diver Fins," *IEEE Oceans Conference*, Monterey, CA, Sept. 2016.
150. **A. Spears**, M. West, B. Schmidt, T. Collins, A. Howard, "Under-ice Camera and Sonar Simulation for Visual Navigation," *IEEE Oceans Conference*, Monterey, CA, Sept. 2016.
151. **B. Ge**, H.W. Park, A. Howard, "Identifying Engagement from Joint Kinematics Data for Robot Therapy Prompt Interventions for Children with Autism Spectrum Disorder," *8th International Conference on Social Robotics (ICSR 2016)*, Kansas City, MO, Nov. 2016.
152. **D. Bryant, J. Boyd, J. Harris, M. Smith, S. García-Vergara**, Y-P. Chen, A. Howard, "An Infant Smart-Mobile System to Encourage Kicking Movements in Infants At-Risk of Cerebral Palsy," *IEEE International Workshop on Advanced Robotics and its Social Impacts*, Austin, TX, March, 2017.
153. A. Howard, C. Zhang, E. Horvitz, "Addressing Bias in Machine Learning Algorithms: A Pilot Study on Emotion Recognition for Intelligent Systems," *IEEE International Workshop on Advanced Robotics and its Social Impacts*, Austin, TX, March, 2017.
154. **B. English**, A. Howard, "The Effects of Musical Cues on Motor Learning Using a Robotic Wrist Rehabilitation System," *IEEE International Workshop on Advanced Robotics and its Social Impacts*, Austin, TX, March, 2017.

### *III.B.3. Refereed Conference Posters*

1. A. Howard, H. Seraji, B. Werger, "Fuzzy Terrain-Based Path Planning for Planetary Rovers," *9<sup>th</sup> International Symposium on Robotics and Applications*, Honolulu, HI, May 2002.
2. E. Graham, A. Howard, "An Internship Model for Culturally Relevant Success for Native American High School Students," *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, December 2004.
3. J. Walls, A. Howard, A. Homaifar, B. Kimiaghali, "A Generalized Framework for Autonomous Formation Reconfiguration of Multiple Spacecrafts," *IEEE Aerospace Conference*, pgs. 397-406, Big Sky, Montana, March 2005.
4. A. Howard, E. Graham, "Crossing the technology gap between higher-learning and the classroom environment," *American Association for Higher Education National Conference*, Atlanta, March 2005.
5. R. Dorsey, A. Howard, "Examining the Effects of Technology-Based Learning on Children with Autism: A Case Study," *IEEE Intern. Conf. on Advanced Learning Technologies*, Athens, GA, July 2011.
6. **H.W. Park**, A. Howard, "Understanding child's play by sequencing play primitives and planning turn-taking strategy for a therapeutic robot playmate," *Pediatric Research Retreat: Frontiers in Pediatric Science*, Jan. 2012.

7. **D. Brooks**, A. Howard, "Quantifying physical therapy metrics through robotic assistance," *Pediatric Research Retreat: Frontiers in Pediatric Science*, January 2012.
8. A. Howard, **L. Roberts**, **S. Garcia**, R. Quarells, "Using Mixed Reality to Map Human Exercise Demonstrations to a Robot Exercise Coach," *Int. Symposium on Mixed and Augmented Reality*, Atlanta, GA, Nov. 2012.
9. **H. W. Park**, A. Howard, "Providing tablets as collaborative-task workspace for human-robot interaction," *8th ACM/IEEE International Conference on Human-Robot Interaction*, pgs: 207-208, Tokyo, Japan, March 2013.
10. Y-P Chen, S-Y Lee, A. Howard, "Effect of Virtual Reality on Upper Extremity Function in Children with Cerebral Palsy: A Meta-Analytic Review," *APTA Combined Sections Meeting 2014*, Nevada, February 2014.
11. **P. Robinette**, A. R. Wagner, and A. M. Howard, "Evaluating Social Responses of Humans to Evacuation Guidance Robots Using Web-Based Experiments," *Atlanta Workshop on Computational Social Science*, Atlanta, GA, 2013.
12. **S. Garcia-Vergara**, A. Howard, "An Objective Measure of Upper Extremity Kinematics in Children during Rehabilitation Sessions," *Atlanta Chapter Society for Neuroscience*, November 2013.
13. J. MacCalla, A. Howard, "A Mobile Device to Enable Access to Pediatric Therapy Apps for School-Age Children with Upper-Body Motor Impairments," *Pediatric Research Conference*, Atlanta, GA, April 2014.
14. Y-P Chen, **S. Garcia-Vergara**, A. Howard, "Test-retest reliability and minimal detectable change in the Super Pop VR™ game: A reaching kinematics movement analysis game," *APTA Combined Sections Meeting 2015*, Indiana, February 2015.
15. R. Zhang, M. Jeon, C. H. Park, A. Howard, "Robotic Sonification for Promoting Emotional and Social Interactions of Children with ASD," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Portland, OR, March 2015.
16. Y-P Chen, **S. Garcia-Vergara**, A. Howard, "Effect of a home-based virtual reality intervention for children with cerebral palsy using SuperPop VR™ evaluation metrics – A feasibility study," *APTA NEXT Conference and Exposition*, National Harbor, MD, June 2015.
17. **B. Ge**, H.W. Park, A. Howard, "Learning Spatio-temporal Features of Prompting during Robot Intervention for Children with Autism," *IEEE Int. Conf. on Robotics and Automation (ICRA)*, Seattle, WA, May 2015.
18. H. J. Kim, T. Azad, C. H. Park, M. Jeon, and A. M. Howard, "Towards Physio-Musical Interactive Robotic Therapy for Children with Autism," *ICRA 2015 Workshop on Rehabilitation Robotics and Human-Robot Interaction*, Seattle, WA, May 2015.
19. E. Bermudez, M. Layman, E. Shepard, Y-P Chen, **S. Garcia-Vergara**, A. Howard, "Test-retest reliability and minimal detectable change in the Super Pop VR™ game in healthy children," *APTA Combined Sections Meeting*, Anaheim, CA, February, 2016.
20. C.H. Park, M. Jeon, A. Howard, "Interactive Robotic Framework for Multi-sensory Therapy for Children with Autism Spectrum Disorder," *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, New Zealand, March 2016.
21. R. Beville, C.H. Park, A. Howard, M. Jeon, "Behavioral Analysis Automation for Music-Based Robotic Therapy for Children with Autism Spectrum Disorder," *IEEE Int. Symp. on Robot and Human Interactive Communication (RO-MAN)*, New York, NY, August 2016.
22. **S. Garcia-Vergara**, **P. Robinette**, Y-P Chen, and A. Howard, "Validation of a Physical Rehabilitation Game using Markerless versus Marker-Based Motion Capture Systems," *Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'16)*, Orlando, FL, August 2016.
23. **A. Coates**, A. Howard, "Employing Gestural Behaviors and Visual Cues on a Humanoid Robot to Increase Affect Recognition among Children with Autism," *Annual Int. Conf. of the IEEE Engineering in Medicine and Biology Society (EMBC'16)*, Orlando, FL, August 2016.
24. C. Beegle, A. Rollins, J. Tyra, Y-P Chen, **S. Garcia-Vergara**, A. Howard, "Test-retest reliability and minimal detectable change in the Super Pop VR™ game: A reaching kinematics movement analysis game," *APTA Combined Sections Meeting 2017*, San Antonio, TX, February 2017.
25. Y. Chen, **S. Garcia-Vergara**, A. Howard, "Examining the Effect of Feedback from a Humanoid Robot on Reaching Kinematics in Children with Cerebral Palsy," *NEXT Conference*, American Physical Therapy Association, Boston, MA, June 2017, June 2017.
26. L Clackum, F. Fayyza, T. Gordon, K. Lansing, Y-P. Chen, **S. Garcia-Vergara**, A. Howard, B. Weissman, J. Hallman-Copper, "Effect of Rhythmic Auditory Stimulation in Virtual Reality Games to Improve Arm Function in Children with Cerebral Palsy: A Case Study," *NEXT Conference*, American Physical Therapy Association, Boston, MA, June 2017, June 2017.

#### **IV.C. Other Publications**

##### *IV.C.1. Invited Papers*

1. A. Howard, G. Bekey, "Robotics Become Capable of Handling a Rubber Ball," *Advanced Manufacturing Technology*, John Wiley & Sons, Nov. 2000
2. L. Canamero, et. al., "The 2004 AAAI Spring Symposium Series," *AAAI Magazine*, 25(4), Winter 2004.

#### **IV.D. Presentations**

##### *IV.D.1 Invited Keynotes, Lectures, and Presentations*

1. *Tutorial*: "Robotics in the 21st Century," Society of Women Engineers Regional Conference, Santa Monica, CA, February 2000.
2. *Tutorial*: "Hybrid Systems: Effective ways to combine genetic algorithms, neural networks, and fuzzy systems for real-world applications," World Automation Congress, Maui, HI, June 2000.
3. *Speaker*: "Robotics and Artificial Intelligence," Santa Monica City College, March/Sept. 2000.
4. *Speaker*: "Robotics Research at JPL," North Carolina A&T Computer Science Colloquium, Greensboro, NC, Sept. 2001.
5. *Speaker*: "Neural Networks, Robotics, Fuzzy Logic, Machine Vision, What's It All About?" 2<sup>nd</sup> Annual Careers in Math, Science, and Technology Conference, Pasadena, CA, Jan 2003.
6. *Panelist*: "Women Working on Mars," National Engineers Week WebCast, Pasadena, CA, Jan 2003.
7. *Panelist*: "Doing Business with Private and Governmental Space Agencies," California Space Authority, San Luis Obispo, CA, Feb. 2003.
8. *Invited Keynote*: Tinker AFB: "The Souls of Black Folk (100th Anniversary)," Oklahoma, March 2003.
9. *Speaker*: "Robots in Space," Astronomy Guest Lecture Series, Santa Monica College, CA, May 2003.
10. *Workshop*: "Going to Mars ... JPL Style," National Society of Black Engineers National Conference, Anaheim, CA, March 2003.
11. *Speaker*: "Autonomous Systems for Space Exploration," Astronomy Colloquium, California State University, Los Angeles, CA, October 2003.
12. *Workshop*: "Space Explorers-Exploring the Universe," Young African American Women's Conf., Nov. 2003.
13. *Invited Speaker*: "Smart Robots for Space Exploration," Pacific Science Center Space Lecture Series, Seattle, Dec. 2003.
14. *Invited Speaker*: "Robots for Space Exploration," Chabot Science Center Distinguished Lecture Series, Oakland, CA, Feb. 2004.
15. *Speaker*: "Artificial Intelligence for Space Robotics: How Smart is Smart?" University of Southern California, March 2004.
16. *Speaker*: "Artificial Intelligence for Autonomous Control in Space," von Karmen Lecture Series, Pasadena, CA, April 2004.
17. *Speaker*: "Human-Inspired Techniques for Exploring Space," Mt. Wilson Observatory Lecture Series, CA, April 2004.
18. *Invited Speaker*: "Research in Behavior-Based Navigation Strategies for Planetary Robots," Robotics, Controls, and Mechatronics Colloquium, University of Washington, May 2004.
19. *Panelist*: "The Supersmart Robots are Coming," Technology Summit for Business Solutions, Los Angeles, CA, June 2004.
20. *Invited Panelist*: "Innovation and Transformation: Big New Ideas," ideaFestival, Lexington, KY, Sept. 2004.
21. *Invited Keynote*: Lexmark Corp: "From the Spacecraft to the Desktop - Technological Advances in Everyday Life," Kentucky, Sept. 2004.
22. *Invited Keynote*: UC San Diego: "Preparing for the Excitement in Engineering," California, Oct. 2004.
23. *Panelist*: "Life after High School Panel," Governor's Conference on Women and Families, CA, Dec. 2004.
24. *Invited Speaker*: "Applying Human-Based Intelligence Techniques to Space Robotics," Rowan University, Dec. 2004.
25. *Invited Speaker*: "Robot Learning: Human-Inspired Techniques for Space and Field Robotics," Annual National Academy of Engineering Meeting, April 2006.
26. *Speaker*: "Human-Inspired Techniques for Robotic Control," Neuromorphic Engineering Workshop, Telluride, CO, July 2006.
27. *Invited Speaker*: "Human-Inspired Techniques: Smart Robots for Space Exploration," Buena Vista University, Storm Lake, IA, Nov. 2006.
28. *Invited Speaker*: "Robot Learning: Humanized Intelligence for Space and Field Robotics," NAE German-American Frontiers of Engineering Conference, Hamburg, Germany, April 2007.
29. *Speaker*: "Career Choice – Research in Space Robotics," California Institute of Technology Targeted Minority Student Education Speaker Series, Nov. 2007.
30. *Invited Speaker*: "The Design of Robotics and Their Societal Usefulness," CUSP Conference, Chicago, Illinois,

September 2008.

31. *Invited Keynote*: “Traversing Through the Robotics World of Research,” Louis Stokes Alliance for Minority Participation Research Symposium, Roanoke, WV, April 2009.
32. *Speaker*: “Intelligent robotics for assistive healthcare and therapy,” Morehouse MBRS Lecture Series, Atlanta, GA, Oct. 2009.
33. *Invited Keynote*: “Lessons Learned Traversing Through the Robotics World of Research,” HBCU-UP National Research Conference, Atlanta, GA, Oct 2009.
34. *Invited Speaker*: “Robots and Climate Change: Using a Science Network of Mobility Operators that Explore in Snow (SnoMotes),” University of Seville, Seville, Spain, Nov. 2009.
35. *Invited Panel Speaker*: “Work-Life Flexibility for Faculty,” University of Washington, On-Ramps into Academia Workshop, Seattle, WA, Oct. 2009.
36. *Gilbreth Lectureship*: “Robot Learning: Humanized Intelligence for Space and Field Robotics,” National Academy of Engineering’s National Meeting, Washington, DC, Feb 2010.
37. *Invited Keynote*: “SnoMotes - Robotic Scientific Explorers for Understanding Climate Change,” Carolinas Women in Computing Conference (CRA-W/CDC Distinguished Lecturer), Columbia, SC, Nov. 2010.
38. *Virtual Scientist Series*: “SnoMotes” Boston Public High School (Match, English, John O’Bryant), May 2010.
39. *Invited Speaker*: “Sciencemakers - Dinosaurs Unearthed,” Detroit Science Museum, Detroit, MI, Feb. 2011.
40. *Invited Panel Speaker*: “Navigating the Tenure and Promotion Process,” NSF Academic Career Mentoring Workshop, Los Angeles, CA, Feb. 2011.
41. *Invited Keynote*: “Robotic Scientific Explorers for Understanding Climate Change,” Tapia Celebration of Diversity in Computing Conference, April 2011.
42. *Invited Panel Speaker*: “Building Your Teaching Program,” University of Washington, On-Ramps into Academia Workshop, Seattle, WA, May 2011.
43. *Invited Speaker*: “Robotic Scientific Explorers for Understanding Climate Change,” National Security Agency (NSA), Fort Meade, MD, Oct. 2011.
44. *Invited Speaker*: “Atlanta: Connections in Science,” Fernbank Science Center, Atlanta, GA, Feb. 2012.
45. *Invited Speaker*: “Roving the Icy Planet: Robotic Explorers for Understanding Climate Change,” JHU Applied Physics Laboratory, Laurel, MD, Feb. 2012.
46. *Panel Speaker*: “Launching a Research Program,” NSF Academic Career Mentoring Workshop, Atlanta, GA, March 2012.
47. *Invited Speaker*: “Roving the Icy Planet: Robotic Explorers for Understanding Climate Change,” John Hopkins University, Baltimore, MD, April 2012.
48. *Invited Keynote*: “Intelligent Robotics for Assistive Healthcare and Therapy,” IEEE Atlanta Section Regional Conference, Atlanta, GA, April 2012.
49. *Seminar Lecture*: “Assistive Robotics for Health and Education,” Morehouse College Pre-Freshmen Summer Science Program, Atlanta, GA, June 2012.
50. *Speaker*: “Music-Induced Interventions for Children with Cerebral Palsy,” Grammy Foundation - Atlanta Board Meeting, Atlanta, GA., September 2012.
51. *Invited Panel Speaker*: “Work-Life Balance for Faculty,” University of Washington, On-Ramps into Academia Workshop, Seattle, WA, Oct. 2012.
52. *Invited Keynote*: “Pediatric Robotics@Home, Work, Play,” Peach State LSAMP Conference, Athens, GA, October 2012.
53. *Invited Keynote*: “Pediatric Robotics@Home, Work, Play,” Peach State LSAMP - 7th Annual Fall National Symposium and Research Conference, Athens, GA, Oct. 2012.
54. *Invited Speaker*: “Making Robots Smart(er),” TedTalk – TedYouth Day, New York, NY, Nov. 2012.
55. *Invited Speaker*: “Intelligent robotics for healthcare applications,” University of Arkansas-Little Rock Fall Colloquium, Little Rock, AK, Nov. 2012.
56. *Invited Keynote*: “Pediatric Robotics@Home, Work, Play,” MESA Conference, Georgia Perimeter College, Atlanta, Feb. 2013.
57. *Invited Speaker*: “Multi-Modal Communication Schemes for Human-Robot Interaction,” National Security Agency (NSA), Fort Meade, MD, March 2013.
58. *Traveling Speaker – U.S. Embassy Speaker and Specialist Program*: “Women in STEM, IT, and High Technology,” U.S. Embassy, Tel Aviv, Israel, April 19-24, 2013.
59. *Invited Speaker*: “Robots in Play: Human-Robot Interaction Schemes for Pediatric Therapy,” CMU Robotics Institute Seminar Series, Pittsburgh, PA, April 2013.
60. *Invited Speaker*: “Robots in Play: Human-Robot Interaction Schemes for Pediatric Therapy,” Marquette University, Milwaukee, WI, April 2013.
61. *Invited Keynote*: “Robotics and Assistive Technologies: Their Emerging Role in Healthcare,” 26th International FLAIRS Conference, St. Pete Beach, FL, May 2013.

62. *Invited Panel Speaker*: “Creating Robotic Systems That Assist Humanity,” SACNAS Annual Conference, San Antonio, TX, October 2013.
63. *Invited Panel Speaker*: “Building Your Professional Persona,” 2014 CRA-W Graduate Cohort Program, Santa Clara, CA, April 2014.
64. *Invited Speaker*: “Robotics and Assistive Technologies: Their Emerging Role in Healthcare,” Florida State University, Tallahassee, FL, April 2014.
65. *Invited Speaker*: “Robotics and Assistive Technologies: Their Emerging Role in Healthcare,” (IGERT) Seminar Series, University of Pittsburgh, Pittsburgh, PA, April 2014.
66. *Invited Session Speaker*: FiRST (Frontiers in Rehabilitation Science and Technology) : Bioengineering, American Physical Therapy Association Next Conference, Charlotte, NC, June 2014.
67. *Traveling Speaker – U.S. Embassy Speaker and Specialist Program*: “Robotics – Opportunities in the 21 century economy,” U.S. Embassy, India (Mumbai, Hyderabad, Chennai), August 31-Sept. 4th, 2013.
68. *Invited Technology Demonstrator*: Workshop on virtual reality, video games, and physical disabilities, Annual Meeting - American Academy for Cerebral Palsy and Developmental Medicine, San Diego, CA, Sept. 2014.
69. *Invited Session Keynote*: “Robots and Gaming – Therapy for Children with Disabilities,” IROS, Chicago, IL, Sept. 2014.
70. *Speaker*: “Breaking the Glass Ceiling: Lessons Learned Traversing Through the Robotics World,” IEEE RAS Women in Engineering Leadership Luncheon, Chicago, IL, Sept. 2014.
71. *Speaker*: “Real-Life Challenges for the Deployment of Healthcare Robotics,” IROS Workshop: Assistive Robotics for Individuals with Disabilities: HRI Issues and Beyond, Chicago, IL, Sept. 2014.
72. *Speaker*: “Research from the Academic Lab to Startup: The Growth Pains of Tech Transfer,” IROS Industry Forum: Perspectives on Entrepreneurship in Robotics and Automation, Chicago, IL, Sept. 2014.
73. *Invited Speaker*: “Robotics and Assistive Technologies: Their Emerging Role in Healthcare,” Brown University, Providence, RI, November 2014.
74. *Invited Speaker*: “Robotics and Assistive Technologies: Their Emerging Role in Healthcare,” Tufts University, Medford, MA, November 2014.
75. *Invited Speaker*: “Robot-Assisted Therapy for Children with Cerebral Palsy,” Texas A&M Robotics Symposium, College Station, TX, January 2015.
76. *Invited Speaker*: “Robot-Assisted Therapy for Children with Physical Disabilities,” University of Pennsylvania GRASP Seminar, Philadelphia, PA, February 2015.
77. *Invite Speaker*: “Robots – Their Role in Healthcare,” Seminar: Robot Invasion: Are Smart Products Running Your Life?, Cooper Hewitt, Smithsonian Design Museum, New York, NY, February 2015.
78. *Invited Keynote*: “Designing Robots for Real People,” HybridConf, Dublin, Ireland, August 2015.
79. *Panel Speaker*: “Undergraduate research: Making the most of a summer experience,” 2015 Southeast Women in Computing Conference, October 2015
80. *Speaker*: “The Problem with the Economy is that it Doesn’t Need You Anymore,” Platform Summit 2015, Atlanta, GA., October 2015.
81. *Invited Keynote*: “Breaking the Glass Ceiling: Lessons Learned Traversing Through the Robotics World,” Southeast Women in Computing Conference, Atlanta, GA, November 2015.
82. *Invited Keynote*: “Socially Assistive Robotics for Pediatric Therapy,” IEEE Conference on Research on Equity and Sustained Participation in Engineering, Computing, and Technology, Atlanta, GA, August 2016.
83. *Invited Speaker*: “Robots: The Mind in The Machine,” City Arts & Lectures, San Francisco, CA, Feb. 2016.
84. *Invited Speaker*: “The Role of Robotics for Engaging Children with Special Needs in Therapy,” University of Delaware, Newark, DE, March 2016.
85. *Invited Panel Speaker*: “What Can Every Entrepreneur Learn from Robots?” IEEE Global Entrepreneurship Summit (IEEE N3XT), Austin, TX, September 2016.
86. *Panel Speaker*: “Recent Winners – If I Only Knew Then, What I Know Now,” Small Business Innovation Research (SBIR) New England Regional Summit, Boston, MA, October 2016.
87. *Invited Keynote*: “Robotics and Artificial Intelligence,” Technical College System of Georgia Annual Leadership Conference, Savannah, GA, October 2016.
88. *Invited Panel Speaker*: “Furthering the Role of Women as Leaders in High Tech Small Businesses,” 2016 SBIR New England Regional Summit @ MIT, Boston, MA, October 2016.
89. *Invited Panel Speaker*: “The Implications of Artificial Intelligence,” Chicago Ideas Festival, Chicago, IL, Oct. 2016.
90. *Panel Speaker*: “Paths and Strategies to Successful and Fulfilling Careers in Academia,” IEEE-WIE Leadership Summit Women, Atlanta, GA, November 2016.
91. *Invited Keynote*: “The Future of Robotics and Intelligent Machines”, California Educational Technology Professionals Association Annual Conference, Sacramento, CA, November 2016.
92. *Invited Panel Speaker*: “Ensuring your Visibility”, CRA-W Career Mentoring Workshop, Washington, D.C.,

November 2016.

93. *Invited Speaker*: “Bridging your interests: Combining Skills and Passion to Enable Innovation,” Women Empowered in Science, Technology, Engineering, and Mathematics Conference, Urbana-Champaign, IL, January 2017.
94. *Invited Keynote*: “Designing Assistive Robots and Technologies for Pediatric Care,” AAAI Symposium on Educational Advances in Artificial Intelligence, San Francisco, CA, Feb. 2017.

#### *IV.D.2. Media Interviews and Highlights*

1. Science@NASA, "Brainy 'Bots," [http://science.nasa.gov/headlines/y2001/ast29may\\_1.htm](http://science.nasa.gov/headlines/y2001/ast29may_1.htm), May 2001.
2. Space Daily, “Send in the Robots,” <http://www.spacer.com/news/robot-01b.html>, May 2001.
3. NASA Tech Briefs, “Who’s Who at NASA,” August 2001.
4. Mars Exploration Program, Mars Today, “JPL's Bionic Woman, Dr. Ayanna Howard,” <http://marsprogram.jpl.nasa.gov/spotlight/ayannaHoward01.html>, August 2002.
5. Imagiverse Online Interview, “An Interview with Ayanna Howard,” [http://www.imagiverse.org/interviews/ayannahoward/ayanna\\_howard\\_16\\_08\\_02.htm](http://www.imagiverse.org/interviews/ayannahoward/ayanna_howard_16_08_02.htm), August 2002.
6. NASA TV Live Interview, “JPL’s Mechanical Women: Dr. Ayanna Howard,” March 2003.
7. NASA First Person, “JPL robotics engineer Dr. Ayanna Howard,” <http://www.jpl.nasa.gov/news/profiles/first-person.cfm>, August 2003.
8. MIT Technology Review Magazine, “Top 100 Young Bold Innovators of 2003,” Oct. 2003.
9. Apogee Book Space Series, “Women of Space: Cool Careers on the Final Frontier,” October 2003.
10. Brown University Daily Herald, “Brown graduate bridges human-machine divide,” Nov. 2003.
11. Science Next Wave Online Magazine, “Fuzzy Logic: Adventures in Artificial Intelligence,” Nov. 2003.
12. Diversity Careers Magazine, “Dr. Ayanna Howard, JPL Robotics Expert,” January 2004.
13. NSBE Magazine, “JPL Engineer in a Class of Her Own,” January/February 2004.
14. NASA Connect Video Series, “PSA: The Astronaut’s Helper,” <http://connect.larc.nasa.gov/programs/2003-2004/psa/index.html>, January 2004.
15. PBS Dragonfly TV, “Episodes of Scientific Adventures: Space”, <http://pbskids.org/dragonflytv>, May 2004.
16. NASA Space Science and Technology Series, “Robots with Brains,” [http://www.nasa.gov/missions/science/f\\_robotics.html](http://www.nasa.gov/missions/science/f_robotics.html), June 2004.
17. TIME Magazine, “Innovators/Artificial Intelligence: Forging the Future,” <http://www.time.com/time/magazine/article/0,9171,1101040614-646372,00.html>, June 14, 2004.
18. IEEE Spectrum, “Dream Jobs 2005,” February 2005.
19. CRISIS Magazine, “The Visionaries,” May/June 2006.
20. CEISMC Gazette, “Georgia Tech’s Bionic Woman,” [http://www.ceismc.gatech.edu/gazette/2006\\_11/2006\\_11\\_howard.aspx](http://www.ceismc.gatech.edu/gazette/2006_11/2006_11_howard.aspx), November 2006.
21. PBS (KCTS Television), “The Innovators: Designing the Future,” September 2007.
22. Associated Press, “New breed of robots could soon wander Antarctica” (recast at CNN, Washington Post, NPR, Fox News, Discovery Channel, Wired, CBSNews.com, and most popular read item at Yahoo!News in late May), Press Release: <http://www.gatech.edu/newsroom/release.html?id=1905&ga=1>, May 2008.
23. USA Today, “SnoMotes go to Ends of the Earth,” November 2008.
24. Diverse Issues in Higher Education, “Emerging Scholars,” January 2009.
25. GT Alumni Magazine, “Faculty Profile: Office Space,” July 2009.
26. Upscale Magazine, “Design Essentials,” Sept/Oct 2009.
27. CNN, “Robots to the Rescue: Search-and-rescue bots,” March 2011.
28. Fox News 8 Cleveland, “Visually Impaired Children Learn to Program Robots,” February 2012.
29. ASEE Prism Magazine, “Robots Unlimited: An Engineer Reaches for Mars, the Arctic, and Pediatrics,” April 2012.
30. “Device Helps Children with Disabilities Access Tablets” (recast at CNET, Science360, Disability Scoop, Mobile & Apps, Engadget, The Engineer, ASEE First Bell, MedGadget), Press Release: <http://www.gatech.edu/newsroom/release.html?nid=176061>, Dec 2012.
31. MobileDIA, “This Scientist Shows Us How to Unlock Our Superpowers,” <http://www.2machines.com/articles/185665.html>, November 2013.
32. Euroweb: Electronic Urban Report, “Aio Wireless: Tech Savvy & Proud: Dr. Ayanna Howard,” <http://www.euroweb.com/2014/02/aio-wireless-tech-savvy-proud-dr-ayanna-howard/>, Feb. 2014.
33. VIBE.com, “Interview: Dr. Ayanna Howard Talks 'RoboCop,' Coding And The Future Of Technology,” <http://www.vibe.com/article/inteview-dr-ayanna-howard-talks-robocop-coding-and-future-technology>, Feb. 2014.

34. Sloan Science and Film, “Real Science: Robocop,” <http://scienceandfilm.org/articles/reel-science-robocop/>, Feb. 2014.
35. VentureWell, “Profile: I-Corps Team Zyrobotics,” <http://venturewell.org/profile-i-corpsteam-zyrobotics>, Sept. 2014.
36. Startup Directory, “Zyrobotics: A Tech Startup Enabling Freedom through Technology,” <http://startup.directory/zyrobotics-georgia-tech-startup>, September 2014.
37. Robohub, “25 Women in Robotics You Need to Know About,” <http://robohub.org/25-women-in-robotics-you-need-to-know-about-2014>
38. Science Careers, “Building the Bionic Women,” October 2014, [http://sciencecareers.sciencemag.org/career\\_magazine/previous\\_issues/articles/2014\\_10\\_09/credit.a1400251](http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2014_10_09/credit.a1400251)
39. Georgia Tech Research Horizons, “VentureLab helps Georgia Tech faculty, staff, and students launch companies,” <http://www.rh.gatech.edu/features/hatched>, November 2014.
40. Business Insider, “23 of the most powerful women engineers in the world,” <http://www.businessinsider.com/most-powerful-women-engineers-in-2015-2015-5?#no-19-zyrobotics-ayanna-howard-5/>, May 2015.
41. Hansel Minutes, “March Is For Makers: Learning Robots with Dr. Ayanna Howard of Zyrobotics,” <http://hanselminutes.com/467/march-is-for-makers-learning-robots-with-dr-ayanna-howard-of-zyrobotics>, March 2015.
42. Hypepotamus, “Robotics Entrepreneur Helps Children With Disabilities,” <http://www.hypepotamus.com/companies/zyrobotics>, May 2015.
43. Google Economic Report, “The Web is Working for Georgia Businesses,” <http://www.google.com/economicimpact/reports/ga.html>, May 2015.
44. NPR – Atlanta, “Ga. Tech Engineer Creates Robotic Therapist Of The Future,” <http://wabe.org/post/ga-tech-engineer-creates-robotic-therapist-future>, June 2015.
45. The Internet of Unintended Consequences, “Radio Show: Robots with Dr. Ayanna Howard,” <http://tiouc.com/radio-show-082615-robots-with-dr-ayanna-howard>, September 2015.
46. The Root 100, [http://www.theroot.com/articles/lists/2015/09/the\\_root\\_100\\_2015/ayanna\\_howard.html](http://www.theroot.com/articles/lists/2015/09/the_root_100_2015/ayanna_howard.html), September 2015
47. GeorgiaTrend, “Trendsetters: Smart Fun” <http://www.georgiatrend.com/January-2016/Trendsetters-Smart-Fun>, January 2016.
48. Beyond Classically Beautiful, “Meet 5 Fearless Black Women Who Are Entrepreneurial Powerhouses,” <http://beyondclassicallybeautiful.com/2016/01/meet-5-fearless-black-women-who-are-entrepreneurial-powerhouses>, January 2016.
49. Black Enterprise, “Meet Dr. Ayanna Howard: Robotician, AI Scientist, and Old School #Blerd,” <http://www.blackenterprise.com/technology/meet-dr-ayanna-howard-robotician-ai-scientist-and-old-school-blerd>, January 2016.
50. NOVA, “Rise of the Robots,” <http://www.pbs.org/wgbh/nova/tech/rise-of-the-robots.html>, February 2016.
51. CBS News, “In emergencies, people place too much trust in robots,” <http://www.cbsnews.com/news/in-emergencies-people-place-too-much-trust-in-robots/>, March 2016.
52. Glamour Magazine, “Like a Boss: Meet the Winners of Glamour's Annual Starters Project,” <http://www.glamour.com/inspired/2016/03/glamour-starters-project-2016-winners>, March 2016.
53. Creative Loafing, “Ayanna Howard Wants to Save the World,” <http://clatl.com/freshloaf/archives/2016/03/30/ayanna-howard-wants-to-save-the-world>, March 2016.
54. Black Enterprise, 10 Black Women Changing the World via Science and Technology, <http://www.blackenterprise.com/technology/10-black-women-changing-the-world-via-science-and-technology/5>, April 2016
55. Black Sci-Fi.com, “Interview With Robotician Dr. Ayanna Howard,” <http://www.blacksci-fi.com/interview-with-robotician-dr-ayanna-howard>, April 2016
56. OperationalizeBeauty.com, “Beauty is...strength and confidence,” <https://operationalizebeauty.com/2016/04/20/beauty-is-strength-and-confidence/>, April 2016.
57. Science, “Do I have to leave to launch?” <http://www.sciencemag.org/careers/2016/05/do-i-have-leave-launch>, May 2016.
58. Atlanta Journal Constitution (AJC), “Georgia Tech professor helps children with special needs experience technology,” <http://talktown.blog.myajc.com/2016/05/10/georgia-tech-professor-helps-children-with-special-needs-experience-technology>, May 2016.
59. Elle Magazine, “10 Badass Female Scientists Changing the World,” <http://www.elleuk.com/life-and-culture/culture/news/a32234/10-badass-female-scientists-changing-the-world/>, October 2016.
60. Mental Floss, “9 Women Changing the Future of Robotics,” <http://mentalfloss.com/article/86921/9-women-changing-future-robotics>, October 2016.

61. BizTech Magazine, "How Will AI Impact Business and Society?" <https://www.biztechmagazine.com/article/2016/10/chicago-ideas-week-2016-how-will-ai-impact-business-and-society>, October 2016.
62. Fox 5 News, "Robot helps kids with cerebral palsy build muscle control," <http://www.fox5atlanta.com/health/fox-medical-team/220208638-story>, November 2016.
63. Healthcare Dive, "Is there a robot in the house?" <http://www.healthcaredive.com/news/is-there-a-robot-in-the-house/432477>, December 2016.
64. Black Enterprise, "Black Female Robotics Scientist Launches STEM Startup," <http://www.blackenterprise.com/technology/black-female-robotics-scientist-stem-startup/>, January 2017.
65. CGTN America, "Ayanna Howard: A robot for everyone," <http://america.cgtn.com/2017/01/21/ayanna-howard-a-robot-for-everyone>, January 2017.
66. MIT Technology Review, "A Robot Physical Therapist Helps Kids with Cerebral Palsy," <https://www.technologyreview.com/s/603614/a-robot-physical-therapist-helps-kids-with-cerebral-palsy>, Feb. 2017.

#### *IV.D.3. Conference Presentations with Proceedings (non-refereed)*

1. A.M. Howard, G.A. Bekey, "Prototype system for automated sorting and removal of bags of hazardous waste," *Intelligent Robots and Computer Vision XV: Algorithms, Techniques, Active Vision and Materials Handling*, Proc. SPIE 2904, pgs. 271-277, Boston, MA, Nov. 1996.
2. A. Howard, **A. Viguria**, "Controlled Reconfiguration of Robotic Mobile Sensor Networks using Distributed Allocation Formalisms," *NASA Science Technology Conference (NSTC)*, Adelphi, Maryland, June 2007.
3. A. Howard, "A Virtual Tutor to Promote Learning of Artificial Intelligence Techniques," *International Workshop on Virtual Instructors*, Washington, DC, May 2007.
4. **S. Williams, A. Viguria, A. M. Howard**, "A Robotic Mobile Sensor Network for Achieving Scientific Measurements in Challenging Environments," *NASA Science Technology Conference*, Maryland, June 2008.
5. **L. Parker, A. M. Howard**, "Real-Time Robotic Surveying for Unexplored Arctic Terrain," *NASA Science Technology Conference*, Maryland, June 2010.
6. A. Howard, "Robots Learn to Play: Robots Emerging Role in Pediatric Therapy," *26th Int. Florida Artificial Intelligence Research Society Conference*, May 2013.

#### *IV.D.4. Conference Presentations without Proceedings*

1. "NASA Mars Rover: Behind the Scenes @JPL," National Society of Black Engineering National Conference, Dallas, TX, March 2004.
2. "Knowledge Transfer in the Classroom: Bridging the Gap Between Technology and Education...As Only NASA Can," National Organization for the Professional Advancement of Black Chemists and Chemical Engineers Annual Conference, San Diego, CA, April 2004.
3. **S. Williams, A. Howard**, "Evaluation of Visual Navigation Methods for Lunar Polar Rovers in Analogous Environments," IEEE ICRA Planetary Rovers Workshop, Anchorage, AL, May 2010.
4. A. Howard, "Intelligent Robotics for Assistive Healthcare and Therapy," SJTU-GT Bilateral Workshop, Shanghai Jiao Tong University, June 2010.
5. R. Dorsey, A. Howard, "AutiSTEM: Using Scratch to Explore Computational Thinking through Game-Design and Robotics for Students with Autism," Scratch@MIT 2012, Boston, MA, July 2012.
6. R. Dorsey, A. Howard, "Aropability: Accessible Robot Programming for Students with Disabilities," 30th Annual Closing The Gap Conference, Minneapolis, MN, October 2012.
7. R. Dorsey, **C.H. Park, A. Howard**, "Robotics for Youth with Visual Impairments," *28th Annual International Technology and Persons with Disabilities Conference*, San Diego, CA, February 2013.
8. A. Howard, **H.W. Park**, "Using Tablets and Robots to Engage Children with Disabilities in STEM," 31st Annual Closing The Gap Conference, Minneapolis, MN, October 2013.
9. D. Marghitu, T. Mitrano, A. Howard, "Bringing Accessibility into the Classroom: Practice and Proof," EDUCAUSE 2013 Annual Conference, Anaheim, CA, October 2013.
10. A. Howard, **S. Garcia-Vergara, L. Brown, H.W. Park**, "Engaging Children in Rehabilitation through Virtual Reality Robot-Assisted Therapy Approaches," IROS 2013 Workshop on Healthcare Robotics and Wearable Systems, November 2013.
11. A. Howard, **H.W. Park**, "Using Tablet Devices to Engage Children with Disabilities in Robotic Educational Activities," 29<sup>th</sup> Annual International Technology and Persons with Disabilities Conference, San Diego, CA, March 2014.
12. **R. Coogle, A. Howard**, "A Multiagent Robotic System for In-Situ Modeling and Observation of Icebergs", American Geophysical Union's 46th annual Fall Meeting, San Francisco, CA, December 2013.

## IV.E. OTHER SCHOLARLY ACCOMPLISHMENTS

### *IV.E.1. Technology Innovations* (filed by NASA as available for public licensing)

1. Software for Fuzzy Logic Navigation of Mobile Robots, NASA NTR 21199, 2000
2. A Software Tool for Real-Time Terrain Classification, NASA NTR 21234, 2001
3. Cognitive Sensor Technology, NASA NTR 30283, 2001
4. Path Planning Graphical User Interface, NASA NTR 30320, 2001
5. Software for Rover Path Planning using Vision-Based Terrain Characteristics, NASA NTR 30744-CP, 2002
6. Software for Integrating Terrain Maps into Reactive Navigation Strategies, NASA NTR 30794, 2002
7. A Novel Reconfigurable Robot for Navigation on Rough Terrain, NASA NTR 30890, 2002
8. Artificial Intelligence Toolkit to Enhance Understanding and Knowledge, NASA NTR 40496, 2003
9. A Fuzzy Logic Engine for Space Applications, NASA NTR 40461, 2003

### *IV.E.2. Patents*

1. Patent: G. Brant, A. Howard, "Reprise Encryption System for Digital Data," US 2005/0044388 A1, Feb. 24, 2005.
2. Provisional Patent: B. Johns, A. Howard, "BYROBOT – A New Reconfigurable Hybrid Legged-Wheeled Rover," USPTO serial number 61/034,721, March 7, 2008.
3. Patent: A. Howard, et. al. "Methods, Controllers and Computer Program Products for Accessibility to Computing Devices," USPTO serial number 61/642,200, May 2012.
4. Patent: A. Howard, L. Brown, H.W. Park, "Method and System for Facilitating Interactions between A Robot and User," USPTO serial number 61/897,406, Oct. 2013.
5. Patent: A. Howard, J. Harding, "Toy Controller for Providing Input to a Computing Device," USPTO serial number 14/256,641, April 2014.
6. Provisional Patent: A. Howard, H. W. Park, J. Harding, "Interactive Therapy Robot System," U.S. Provisional Patent Appl. No. 62/186,106, June 2015.

## V. SERVICE

### V.A. PROFESSIONAL CONTRIBUTIONS

#### *V.A.1. Membership on Editorial and Advisory Boards*

1. Associate Editor, *Int. Journal of Intelligent Automation and Soft Computing*, 3 papers/year, 2000-2014
2. Scientific Advisory Committee, National Research Council Study on the Scientific Context for the Exploration of the Moon, 2006-2007
3. Associate Editor, IEEE Robotics and Automation Conference Editorial Board, 8-10 papers/year, 2006-2013
4. Scientific Advisory Committee, National Research Council Study on NASA's Exploration Technology Development Programs, 2007-2008
5. Advisory Board Member, On-Ramps into Academia Program, 2009-2012
6. Scientific Board Member, *NASA's Mars Exploration Rover/Spirit Review Board*, 2009
7. Associate Editor, *IEEE Transactions on Systems, Man, and Cybernetics*, 5 papers/year, 2010-2016
8. Advisory Board Member, CEISMC Science, Learning, Design, Engineering, and Robotics Program, 2011-2014
9. Scientific Review Committee, WTEC Study on the International Assessment of R&D in Human-Robot Interaction (HRI), 2011-2012
10. Board Member, CRA Committee on the Status of Women in Computing Research (CRA-W), 2014 - present
11. Scientific Review Committee & Vehicle Intelligence Group Leader, National Academies Panel on Mechanical Science and Engineering at the Army Research Laboratory, 2015-2016
12. Member, IDA/DARPA Defense Science Study Group (DSSG), 2014-2015
13. Advisory Board Member, Medtech Women @ Southeastern Medical Device Association, 2016-present
14. Advisory Member, DARPA Information Science and Technology (ISAT) Study Group, 2016-present
15. Associate Editor, *IEEE Transactions on Robotics*, 2016-present
16. Advisory Board Member, *American Association for the Advancement of Science (AAAS) Committee on Opportunities in Science (COOS) Board*, 2017-present

#### *V.A.2. Review Panels*

1. Reviewer, NASA NRA Cross Enterprise Technology Development Program (CETDP), 2000

2. NASA Faculty Awards for Research (FAR) Program, 2002
3. Reviewer, Louisiana Board of Regents R&D Grants Program, 2002, 2003, 2010, 2011
4. NSF Review Panels, 2004-2015
5. Reviewer, NASA Idaho EPSCoR Program, 2007
6. NSERC College of Reviewers, Canada Research Chairs Program, 2007, 2012
7. Reviewer, Health Systems Institute Seed Grant Program, 2007-2009
8. Grace Hopper Celebration of Women in Computing Scholarship Reviewer, 2007, 2008
9. Peer Reviewer, British Columbia Innovation Council, 2009
10. Reviewer, AAAS Research Competitiveness Program, 2009
11. National Research Council Study on NASA's Planetary Science Decadal, 2009-2010
12. Robotics: Science and Systems 2010 Workshop Evaluation Committee, 2010, 2012
13. U.S. Army Corps of Engineers' Engineer Research and Development Center peer reviewer, 2011
14. Peer Reviewer, Cognitive Sciences Call 2011 of the Vienna Science and Technology Fund, 2011
15. Reviewer, AAMAS-13 Doctoral Consortium, 2013
16. Reviewer, HIP-ACTSI Healthcare Innovation Program, 2012-2015
17. Reviewer, NASA Space Technology Research Fellowship (NSTRF), 2014
18. Committee Member, A Richard Newton ABIE Award Selection Committee, 2016
19. Committee Member, Anita Borg Institute A. Richard Newton Educator Award Selection Committee, 2016

#### *V.A.3. Reviewing Papers for Journals:*

1. *Journal of Intelligent Automation and Soft Computing*, 12 papers, 2002-2010
2. *Autonomous Robots*, 7 papers, 2003-2006, 2010
3. *EURASIP Journal on Applied Signal Processing*, 2 papers, 2003-2004
4. *IEEE Transactions on Robotics (and Automation)*, 9 papers, 2004-2011
5. *IEEE Transactions on Mobile Computing*, 1 paper, 2004
6. *IEEE Transactions on Evolutionary Computation*, 1 paper, 2004
7. *IEEE/ASME Transactions on Mechatronics*, 3 papers, 2004, 2008, 2015
8. *IEEE Transactions on Neural Networks*, 2 papers, 2005-2006
9. *Journal of Field Robotics*, 5 papers, 2006-2010
10. *IEEE Aerospace and Systems*, 3 papers, 2006, 2011, 2012
11. *Annals of Mathematics and Artificial Intelligence*, 1 paper, 2007
12. *IEEE Transactions on Systems, Man, and Cybernetics*, 6 papers, 2007-2011
13. *IEEE Transactions on Control Systems Technology*, 1 paper, 2008
14. *Educational Technology & Society Journal*, 1 paper, 2009
15. *Biomedical Signal Processing and Control*, 1 paper, 2010
16. *ACM Transactions on Intelligent Systems*, 2 paper, 2011
17. *Communications of the ACM*, 1 paper, 2012
18. *IEEE Transactions on Learning Technologies*, 2 papers, 2012, 2017
19. *International Journal of Robotics Research*, 1 paper, 2012
20. *Mechanism and Machine Theory*, 1 paper, 2013
21. *International Journal of Adaptive Control and Signal Processing*, 1 paper, 2013
22. *Sensors*, 1 paper, 2013
23. *Artificial Intelligence*, 1 paper, 2014
24. *Journal of Biomedical and Health Informatics*, 1 paper, 2014
25. *Robotica*, 1 paper, 2014
26. *Developmental Neurorehabilitation*, 1 paper, 2014
27. *Journal of Intelligent and Robotic Systems*, 1 paper, 2014
28. *IEEE Systems, Man, and Cybernetics Magazine*, 1 paper, 2015
29. *Journal of Aerospace Information Systems*, 1 paper, 2015
30. *Journal on Technology and Persons with Disabilities*, 2 papers, 2016
31. *Computers in Biology and Medicine*, 1 paper, 2017

#### *V.A.4. Reviewing Papers for Conferences:*

1. IEEE International Conference on Robotics and Automation, 18 papers, 2002-2010, 2014-2015
2. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 20 papers, 2004-2014
3. International Conference on Advanced Robotics (ICAR), 9 papers, 2005, 2009
4. IEEE Int. Conference on Systems, Man, and Cybernetics, 24 papers, 2005-2006, 2010, 2013
5. International Joint Conference on Artificial Intelligence, 15 papers, 2006

6. ACM/IEEE Conference on Human-Robot Interaction, 12 papers, 2006-2015
7. International Conf. on Robot Communication and Coordination, 4 papers, 2007
8. IEEE International Conference on System of Systems Engineering, 1 paper, 2007
9. Int. Joint Conference on Neural Networks, 5 papers, 2009
10. IEEE Conference on Automation Science and Engineering, 1 paper, 2011
11. American Society for Engineering Education Annual Conference, 4 papers, 2013, 2014
12. IEEE-RAS International Conference on Humanoid Robots, 3 paper, 2013, 2015
13. IEEE Workshop on Advanced Robotics and its Social Impacts (ARSO), 1 paper, 2013
14. Int. Symposium on Artificial Intelligence, Robotics and Automation in Space (i-SAIRAS), 5 papers, 2014
15. IEEE Symposium Series on Computational Intelligence, 3 papers, 2014
16. HRI Pioneers Workshop, 7 papers, 2014-2016
16. RSS 2014 workshop on Human-Robot Collaboration in Manufacturing, 2 papers, 2014
17. Rehabilitation Eng. and Technology Society of North America Annual Conference, 5 papers, 2015

#### *V.A.5. Co-Chairs/Chairs and Program Committees*

1. Co-Chair, AAAI Symposium on Accessible Hands-on AI and Robotics Education Workshop, 2004
2. Tutorial Chair, Program Committee Member, IEEE Int. Conference on Systems, Man and Cybernetics, 2005
3. Program Committee, International Conference on Advanced Robotics (ICAR), 2005, 2007, 2009
4. Program Committee, IEEE/RSJ International Conference on Intelligent Robots, 2005, 2006
5. Program Committee, FLAIRS AI Education, 2006, 2007
6. Poster Program Committee, IEEE Int. Conference on Robotics and Automation, 2006
7. Program Committee, Int. Joint Conf. on Artificial Intelligence (IJCAI), 2007
8. Program Committee, IEEE Conference on System of Systems Engineering, 2007
9. Co-Chair, IEEE ICRA Workshop on Robotics in Challenging and Hazardous Environments, 2007
10. Program Committee, Int. Conf. on Robot Communication and Coordination, 2007, 2009
11. Organizing Committee, BIRS Workshop on Mentoring for Engineering Academia, 2006-2007
12. Finance Chair, 2008 IEEE International Conference on Robotics and Automation, 2006-2008
13. Local Organizing Chair, 2009 International Joint Conference on Neural Networks, 2008-2009
14. Program Committee, International School in Robotics and Intelligent Systems, 2009
15. Space Exploration Track Chair, 2010 Aerospace Systems Conference, 2008-2010
16. Program Committee, Robotics: Science and Systems Conference (RSS), 2009, 2017
17. Chair, HRI ICRA Robot Challenge, 2009
18. Local Organizing Chair, 2011 IEEE Int. Symp. on Robot and Human Interactive Communication, 2009-2011
19. Program Committee, Int. Symposium on Distributed Autonomous Robotic Systems, 2010, 2014
20. Program Committee, IEEE Int. Conference on Systems, Man and Cybernetics, 2006-07, 2013-14, 2016
21. Human-Machine Systems Program Co-Chair, IEEE Int. Conference on Systems, Man and Cybernetics, 2011
22. Program Committee, IEEE Biosignals and Biorobotics conference, 2014
23. Co-Chair, AAAI-13 and AAAI-14 Doctoral Consortium, 2013 – 2014
24. Program Committee, IEEE Int. Symp. on Safety, Security, and Rescue Robotics, 2012, 2013, 2015
25. Chair, 2014 ICRA Ph.D. Forum, 2014
26. Co-Chair, CRA-W Grad Cohort Workshop, 2014 – present
27. Program Committee, AAAI Doctoral Consortium, 2015, 2016
28. Program Co-Chair, International Conference on Social Robotics, 2016
29. Program Committee, IEEE Symp. on Computational Intelligence in Robotic Rehabilitation and Assistive Technologies, 2016
30. Program Committee, Robotics: Science and Systems Conference Workshops, 2016
31. Program Committee, IEEE Symposium Series on Computational Intelligence, 2016
32. Scientific Committee of the Science and Research Track, Annual International Technology and Persons with Disabilities Conference, 2017
33. Program Chair, IEEE Workshop on Advanced Robotics and its Social Impacts, 2017
34. Program Committee, IEEE Int. Symposium on Robot and Human Interactive Communication, 2016
35. Program Committee, HRI Pioneers Workshop, 2017
36. Poster Committee Member, Richard Tapia Celebration of Diversity in Computing Conference. 2017

#### *V.A.6. Membership in Professional Organizations*

1. IEEE Senior Member, IEEE Robotics and Automation Society, 1999-present
2. Member, American Association of Artificial Intelligence, 2002-2013, 2016-present
3. Senior Member, Society of Women Engineers, 2001-2005

4. Member, Georgia Electronic Design Center, 2005-present
5. Alumni Member, National Society of Black Engineers (NSBE), 2007-2014
6. Member, American Society for Engineering Education, 2011-present
7. Member, Rehabilitation Engineering and Assistive Technology Society, 2013-present
8. Member, Association for Computing Machinery (ACM), 2016-present

## **V.B. CAMPUS CONTRIBUTIONS**

### *V.B.1. NASA JPL*

1. Council Member, JPL Director's Advisory Council for Women, 1999-2001
2. Technical Reviewer, JPL Director's Research and Development Fund, 2003, 2004
3. Reviewer, NASA Small Business Innovative Research Proposals, 2002-2004
4. Proposal Reviewer, NASA Graduate Student Research Program, 2004
5. Board Member, JPL Minority Education Initiatives Advisory Board, 2002-2005
6. Technical Recruiter, Jet Propulsion Laboratory, 1999-2005
7. JPL National Society of Black Engineers (NSBE) Convention Planning Team, 2003-2004
8. Speakers Bureau, Jet Propulsion Laboratory, 1998-2005

### *V.B.2. University/College of Engineering, Georgia Institute of Technology*

1. Speaker, GT Mars Society, 2006
2. Speaker, GT AASU Success Panel, 2006
3. Speaker, GT Women's Resource Center Summer Speaker Series, 2006
4. Instructor, COE Technology, Engineering and Computing Camp, 2007
5. Keynote Speaker, Introduce a Girl to Engineering Day, 2006, 2008
6. ECE Faculty Representative, Robotics Ph.D. Program Committee, 2008 - present
7. Academic Senate/General Faculty Representative, 2006-2008
8. Lunch Keynote Speaker, College of Engineering Tech Camp, 2008
9. Freshman Experience - Hot Topic Dinner Speaker, April 2010
10. ThinkBig Faculty Leader, Techie-Trekie, Aug 2010-May 2013
11. Chair, Robotics PhD Program, Aug 2010-July 2013
12. GT X-College Committee, Nov 2010-2012
13. EVPR/Provost GT-FIRE Review Panelist, 2011, 2016
14. Co-Chair, GT Strategic Committee - Revitalizing Undergraduate Education, 2011 – 2012
15. COE Associate-to-Full Professor RPT Committee, 2012 - 2016
16. Associate Vice President for Research Search Committee, 2013
17. Committee Member, College of Computing MOOMS Working Group, 2012-2013
18. Grand Challenges Faculty Fellow, 2015 – present
19. Center for Serve-Learn-Sustain Associate/Assistant Director Search Committee, 2016
20. PRIME Research Experiences for Teachers Faculty Advisor, 2015-2016

### *V.B.3. School of ECE, Georgia Institute of Technology*

1. ECE Representative, Georgia Tech Engineering and Computing Career Conference, 2005, 2006
2. Georgia Tech Women in ECE (WECE) Talk on Graduate Schools, 2005
3. Member, ECE Undergraduate Committee, 2005, 2009-2010
4. ECE Representative, Family Affair, 2006
5. Instructor, ECE HOT Days Camp, 2006-2007
6. ECE Hightower Chair Search Committee, 2006
7. Presenter, ECE FIRST LEGO League Camp, 2007
8. ECE Strategic Plan Steering Committee, 2007
9. ECE Academic Career Panel, 2009
10. IEEE GT Student Chapter Faculty Presentation, December 2009
11. ECE FACES Fellows mentor – 2009-2012
12. CS4911 (Senior Design) team advisor, Spring 2010
13. ECE Faculty Presentation, September 2010
14. VIP (Vertically-Integrated Project) I-Natural team advisor, Jan 2010-May 2016
15. Member, ECE Chair Search Committee, 2011 – 2012
16. ECE Statutory Advisory Committee, 2012 – 2015

17. Member, ECE Graduate Committee, 2015-present

### **V.C. OTHER CONTRIBUTIONS**

1. Engineering Advisor, FIRST (2001-2002) - Nonprofit founded to inspire students through participation in annual robotics competitions.
2. Space Expert, Challenger Center for Space Science Education, Space Day 2002 - Program designed to encourage students through interaction with visiting space experts, 2002.
3. Computer Tutor, Restore, Inc. - Provided computer training for a battered women's shelter, 1998-2002.
4. Founder, Pasadena Delta Academy - Mentoring program for young teen girls focused on math, science, and technology education, 2001-2004
5. Co-Founder, JUMP (JPL Undergraduate Mentoring Program for Women) Provides mentoring support to undergraduate engineering students, 2001-2005
6. Consulting: Bitstar International, Seattle, WA - Developed neural network software package for financial forecasting, 2001.
7. Consulting: Veritouch Ltd., New York - Developed information security system using biometrics for database mining. Patent Filed "Reprise Encryption System for Digital Data" in 2003.
8. NASA SBIR Sub-topic Manager for Mars In-situ Robotics Technology, 2003-2005
9. NSF ADVANCE Visiting Scholar, Electrical Engineering Department (Robotics, Automation, Control, and Mechatronics Group), University of Washington. Host: Dr. D. Denton/Dr. E. Riskin, May 2004.
10. Presenter: "Cool Jobs in Engineering," IEEE Engineers Week Global Marathon, March 2006.
11. Academic Mentor, Committee on Status of Women in Computing Research Distributed Mentor Project, 2007.
12. Career Coach, NSF ADVANCE Cross-Disciplinary Initiative for Minority Women Faculty Conf., April 2008.
13. Morehouse College Minority Biomedical Research Support-Research Initiative for Scientific Enhancement Mentor, 2009-2010.
14. Virtual Scientist guest lecturer - Match Charter Schools, English High School, John D. O' Bryant School of Math and Science, Boston, MA., March 2010.
15. Guest Presenter at Various K-12 schools (2005 – present): West Contra Costa Unified School District, Grady High School, Chamblee Middle School, Montgomery Elementary School, Ralph J. Bunche Middle School, Annual Back to School with the HistoryMakers, etc.

### **VI. HONORS AND AWARDS**

1. JPL Technology and Applications Program (TAP) Honor Award, 2000
2. Lew Allen Award of Excellence for significant technical contributions, 2001
3. NASA Honor Award for Safe Robotic Navigation Task, 2002
4. San Francisco Airport Museum Honoree, African-American technology trailblazers in Calif., 2002
5. Best Paper Award, 9th International Symposium on Robotics and Applications, 2002
6. NASA Space Act Award for Path Planning Graphical User Interface, 2003
7. MIT Technology Review Top 100 Young Innovators of the Year, 2003
8. Engineer of the Year Award, Los Angeles Council of Engineers and Scientists, 2004
9. Allstate Insurance Distinguished Honoree for achievement in science, 2004
10. Selected participant, NAE Symposium on Frontiers of Engineering, 2004
11. NASA Space Act Award for Fuzzy Logic Engine for Space Applications, 2004
12. Selected presenter, National Academy of Science Frontiers of Science Symposium, 2005
13. California Women in Business Award for Science and Technology, 2005
14. IEEE Early Career Award in Robotics and Automation, 2005
15. 2006 Class of Young Global Leaders, 2006
16. Selected participant, NAE German-American Frontiers in Engineering Symposium, 2007
17. GT-ECE Outreach Award, 2008
18. GT-Faculty Woman of Distinction Award, 2008
19. NSBE Janice Lumpkin Educator of the Year Award, 2009
20. NAE Gilbreth Lectureship, 2010
21. GT Class of 1934 Outstanding Interdisciplinary Activities Award, 2013
22. GT Residential Life Cornerstone Award for Outstanding Contributions to the Community, 2013
23. A. Richard Newton Educator ABIE Award, Anita Borg Institute, 2014
24. The Root 100 Honoree, 2015
25. Computer Research Association's A. Nico Habermann Award, 2016
26. Brown Engineering Alumni Medal, 2016
27. AAAS-Lemelson Invention Ambassador, 2016-present