Phillip M. Grice

Curriculum Vitae

Pittsburgh, PA
☎ (563) 419-2345
www.PhillipGrice.com

Experience

MAY 2022 – PRESENT
Principal Robotics Software Engineer, *Blue River Technology*, Pittsburgh, PA (remote).
- Developing automation for the next generation of farming

JAN 2021 – MAY 2022
Senior Principal Robotics Software Engineer, *iRobot*, Pittsburgh, PA (remote).
- Implemented static- and dynamic-analysis testing enhancements used for all robot software, regularly identifying software defects early in development and before deployment to customers
- Developed code quality metrics used by multiple teams to monitor and improve development practices
- Open-source Software Review Board member - streamlining iRobot's use of and contribution to open-source projects

MAR 2019 – JAN 2021
Senior Software Engineer, Robotics, *Bossa Nova Robotics*, Pittsburgh, PA.
- Lead engineer on remote robot operations systems supporting >550 deployed robots via 3rd-party L1 staff
- Technical team lead for all remote operations and human-robot interaction features
- Release manager for all robot software, tracking performance through QA and multi-stage fleet deployments
- Integrated 3rd-party, web-based tools for robot monitoring and control, improving security, accessibility, scalability, and cost-efficiency of remote robot operations
- Designed and built novel robot HRI behaviors to elicit human assistance, reducing field service dispatches
- Drove cross-functional efforts between autonomy, field support, and remote operations to continually improve fleet performance and reliability
- Guided product development with multiple vendors to ensure that provided products met company needs quickly and efficiently

SEP 2017 – MAR 2019
Robotics Scientist, *Bossa Nova Robotics*, Pittsburgh, PA.
- Technical team lead for development of novel, event-driven remote fleet monitoring stack
- Responsible for the maintenance and improvement of multiple areas of the robot codebase
- Designed and deployed new architecture to a core business logic module to improve quality and maintainability
- Provided expert guidance on human-robot interaction and human-factors design across the company

AUG 2010 – AUG 2017 **Graduate Research Assistant**, *Georgia Tech*, Atlanta, GA.

- Designed and evaluated an assistive mobile manipulation system for individuals with severe motor impairments
  - Incorporated regular, expert user feedback during system development in a rapid, iterative design process to improve functionality and usability
  - Provided a >5x average score improvement on a standardized manipulation test for target users
  - Enabled one user with profound motor impairments to perform 17 distinct tasks at home
- Led the development and technology transfer of Autobed, a Raspberry Pi-based module enabling web-based control of a home hospital bed
- Built a novel, wearable safety sensor (the Wouse) to detect wincing using machine learning for real-time data processing
- Integrated complex research systems on multiple real robots and designed and conducted evaluations on these systems
- Communicated via numerous peer-reviewed publications and public presentations to both technical and non-technical audiences

SEP 2008 – MAY 2010 **Undergraduate Researcher**, *Brown University*, Providence, RI.

- Designed and built a novel, optically-powered nerve cuff for functional electrical stimulation
- Evaluated device, including mechanical, electrical, and biocompatibility testing
- Performed *in vivo* testing in a small animal model
- Presented my results to students and faculty in a public seminar and via written report

MAY – JUL 2010 **E2S2I Summer Intern**, *Air Force Institute of Technology*, Wright-Patterson AFB, OH.

- Made system improvements to a ground-based prototype of the space-based hyperspectral Chromotomography Experiment (CTEx), visibly improving optical image quality and simplifying use
- Established workflow for data collection and processing
- Presented results to students and faculty, including active-duty military, in a public seminar

MAY – AUG 2009 **Directed Energy Summer Intern**, *Air Force Institute of Technology*, Wright-Patterson AFB, OH.

- Developed a novel model of Terahertz radiation propagation through brownout conditions based upon empirical measurements
- Incorporated this model into an existing software product for atmospheric radiation transmission
- Presented results at the Directed Energy Professional Society Annual Meeting

MAY – AUG 2008 **Directed Energy Summer Intern**, *Air Force Institute of Technology*, Wright-Patterson AFB, OH.

- Led the development and calibration of a camera-based system for high-temperature BRDF acquisition
- Performed optical and mechanical design and developed software for image processing and data analysis
- Presented results both at the Directed Energy Professional Society Annual Meeting

Education

AUG 2017 **Ph.D. – Robotics**, *Georgia Institute of Technology*, Atlanta, GA.

Dissertation: *Assistive Mobile Manipulation for Users with Severe Motor Impairments*
Core Study Areas: Human-Robot Interaction, Perception, Controls

MAY 2010 **Sc.B. – Biomedical Engineering & Latin**, *Brown University*, Providence, RI.
cum laude, departmental honors

Skills

Expertise: Quality Software Development, Complex Systems Integration (Hardware & Software), Robust Autonomy, Remote Operations UI/UX, Human-Robot Interaction, User-centered Research Design & Data Analysis

Languages: Python, Modern C++, Bash, JavaScript, HTML5 & CSS3, Arduino, MATLAB, LabVIEW

Software: ROS, git, CMake, Linux, Docker, PCL, OpenCV, FFMpeg, jQuery/jQueryUI, OpenRAVE, Stage, svn, AWS, LaTeX

Hardware: Electronics Prototyping, Soldering, PCB Design (Eagle), CAD (SolidWorks), 3D printing

Awards

2016 National Network for Manufacturing Innovation (NNMI): Georgia Tech Student Poster Competition – 2nd Place

2016 Residential Care Facilities for the Elderly Authority of Fulton County Scholar Award

2015 Residential Care Facilities for the Elderly Authority of Fulton County Scholar Award

2014 Residential Care Facilities for the Elderly Authority of Fulton County Scholar Award

2012 National Science Foundation – Graduate Research Fellowship Program Fellow

2011 George Family Foundation – George Fellowship

2010 Georgia Institute of Technology – President's Fellowship

2010 Tau Beta Pi

2006 Eagle Scout

Publications

Journals

2019 **A System for Bedside Assistance that Integrates a Robotics Bed and a Mobile Manipulator.** AS Kapusta, **PM Grice**, HM Clever, Y Chitalia, D Park, and CC Kemp. *PLoS ONE 14(10):e0221854*. March 2019.

2019 **In-home and Remote Use of Robotic Body Surrogates by People with Profound Motor Deficits. PM Grice** and CC Kemp. *PLoS ONE 14(3):e0212904.* March 2019. **2019 PLoS One Editor's Pick.*

2013 **Robots for Humanity: A Case Study in Assistive Mobile Manipulation.** TL Chen, M Ciocarlie, S Cousins, **PM Grice**, K Hawkins, K Hsiao, CC Kemp, C-H King, DA Lazewatsky, A Leeper, H Nguyen, A Paepcke, C Pantofaru, WD Smart, L Takayama. *IEEE Robotics and Automation Magazine (RAM), Special Issue on Assistive Robotics.* Vol. 20. March 2013.

2012 **A Technique to Measure Optical Properties of Brownout Clouds for Modeling Terahertz Propagation.** ST Fiorino, JA Deibel, **PM Grice**, MH Novak, J Spinoza, L Owens, S Ganti. *Applied Optics*. 51(16):3605-3613. June 2012.

Conferences

2016 **Autobed: Open Hardware for Accessible Web-Based Control of an Electric Bed. PM Grice**, Y Chitalia, M Rich, HM Clever, CC Kemp. *Rehabilitation Engineering and Assistive Technology Society of North America, 2016 Annual Conference.* Washington, DC, USA. July 13, 2016.

2014 **Assistive Mobile Manipulation for Self-Care Tasks Around the Head.** KP Hawkins, **PM Grice**, TL Chen, C-H King, CC Kemp. *2014 IEEE Symposium on Computational Intelligence in Robotic Rehabilitation and Assistive Technologies.* Orlando, FL. December 2014.

2013 **Whole-Arm Tactile Sensing for Beneficial and Acceptable Contact During Robotics Assistance. PM Grice**, MD Killpack, A Jain, S Vaish, J Hawke, CC Kemp. *Rehabilitation Robotics (ICORR), 2013 IEEE International Conference on.* June 2013.

2012 **Robots for Humanity: User-Centered Design for Assistive Mobile Manipulation.** TL Chen, M Ciocarlie, S Cousins, **PM Grice**, K Hawkins, K Hsiao, CC Kemp, C-H King, DA Lazewatsky, A Leeper, H Nguyen, A Paepcke, C Pantofaru, WD Smart, L Takayama. *Intelligent Robots and Systems (IROS), 2012 IEEE/RSJ International Conference on.* pp. 2434-2435. October 2012.

2012 **The Wouse: A Wearable Wince Detector to Stop Assistive Robots. PM Grice**, A Lee, H Evans, CC Kemp. *21st IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN).* pp. 165-172. September 2012.

2010 **Lab Measurements to Support Modeling Terahertz Propagation in Brownout Conditions.** ST Fiorino, **PM Grice**, MJ Krizo, RJ Bartell, JD Haiducek, SJ Cusumano. *SPIE Defense, Security, and Sensing*. April 2010.

2009 **Modeling THz Propagation in Brownout Conditions. PM Grice.** 12th Annual Directed Energy Symposium. San Antonio, TX. November 3, 2009.

2008 **Image Based BRDF Acquisition. PM Grice.** *11th Annual Directed Energy Symposium.* Honolulu, HI. November 18, 2008.

Presentations & Workshops

2017 **7 Day In-home Evaluation: Mobile Manipulator Robot. PM Grice**, HM Clever. *TechSAge State of the Science Conference.* Atlanta, GA, USA. March 27, 2017.

2016 **Assistive Mobile Manipulation: Designing for Operators with Motor Impairments. PM Grice**, CC Kemp. *Socially & Physically Assistive Robotics for Humanity, RSS 2016 Workshop.* Ann Arbor, MI, USA. May 18, 2016.

2014 **A System for Reaching in Unknown Clutter that Integrates Model Predictive Control, Learning, Haptic Mapping, and Planning.** T Bhattacharjee[1], **PM Grice**[1], A Kapusta[1], MD Killpack[1], D Park[1], CC Kemp. *IROS 2014 Workshop: 3rd Workshop on Robots in Clutter: Perception and Interaction in Clutter.* September 18, 2014. [1]*Listed Alphabetically.*

2012 **Robots for Humanity: Developing Assistive Mobile Manipulation. PM Grice**, TL Chen, M Ciocarlie, S Cousins, K Hawkins, K Hsiao, C-H King, D Lazewatsky, A Leeper, H Nguyen, A Paepcke, C Pantofaru, W Smart, L Takayama, CC Kemp. *2012 Biomedical Engineering Society Annual Meeting – Assistive Technology & Robotics in Rehabilitation Engineering.* October 2012.

2009 **Modeling THz Propagation in Brownout Conditions. PM Grice.** *Directed Energy Education Workshop.* San Antonio, TX, USA. November 6, 2009.

2008 **2008 AFIT DE Summer Intern Program.** M Houle, B McClung, **PM Grice.** *Directed Energy Education Workshop.* Honolulu, HI. November 21, 2008.

Internal Presentations

2017 **Assistive Mobile Manipulation for Users with Severe Motor Impairments. PM Grice**. *Defense of Ph.D. Dissertation.* Atlanta, GA. June 12, 2017.

2016 **Whole-arm Tactile Sensing for Beneficial and Acceptable Contact During Robotics Assistance. PM Grice**. *National Network for Manufacturing Innovation (NNMI): Georgia Tech Student Poster Competition.* Atlanta, GA. March 29, 2016.

2015 **Assistive Mobile Manipulation for Users with Severe Motor Impairments. PM Grice**. *Dissertation Proposal, Robotics Ph.D. Program, Georgia Institute of Technology.* Atlanta, GA. July 31, 2015.

2014 **A System for Reaching in Unknown Clutter that Integrates Model Predictive Control, Learning, Haptic Mapping, and Planning. PM Grice**. *RoboGrads Student Seminar, Institute for Robotics and Intelligent Machines.* Atlanta, GA. September 25, 2014.

2012 **Robots for Humanity: Developing Assistive Mobile Manipulation. PM Grice.** *Graduate and Post-doc (GaP) Seminar, Institute for Bioengineering and Biosciences.* Atlanta, GA. October 17, 2012.

2011 **Robots for Humanity: An Accessible Interface for Mobile Manipulation by the Motor Impaired. PM Grice**, TL Chen, H Nguyen, CC Kemp. *RIM Keeps You on the Edge, Center for Robotics and Intelligent Machines.* Atlanta, GA. April 28, 2011.

2010 **An Optically Powered Nerve Cuff for Functional Electrical Stimulation. PM Grice.** *Undergraduate Research Honors Symposium.* Brown University. Providence, RI. April, 2010.

Teaching & Mentorship

2016 Summer **Research Mentor** *Yuuna Hoshi* - Undergraduate Researcher

2014 – 2015 **Research Mentor** *Megan Rich* - Undergraduate Researcher

2013 – 2014 **Research Mentor** *Yen Huang* - Undergraduate Researcher

2013 Spring **Teaching Assistant** BMED 3110 - Quantitative Engineering Physiology Lab. I

2012 Fall	**Teaching Assistant** BMED 3110 - Quantitative Engineering Physiology Lab. I
2012 Fall	**Research Mentor** *Anjana Kallarackal* - Undergraduate Researcher
2011 November	**Instructor** Robotics Merit Badge, BSA Troop 231