

## **Aaron W. Johnson**

Curriculum Vitae

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University of Michigan  
Engineering Education Research Program  
Aerospace Engineering Department  
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### **EDUCATION**

- 2015 Massachusetts Institute of Technology, Cambridge, MA  
Ph.D., Humans in Aerospace  
Minor area: Science, Technology and Society
- 2010 Massachusetts Institute of Technology, Cambridge, MA  
S.M., Aeronautics and Astronautics
- 2008 University of Michigan, Ann Arbor, MI  
B.S.E., Aerospace Engineering

### **APPOINTMENTS**

- 2017–Present Lecturer I  
Aerospace Engineering Department  
College of Engineering  
University of Michigan, Ann Arbor, MI
- 2016–Present Postdoctoral Research Fellow  
Engineering Education Research  
College of Engineering  
University of Michigan, Ann Arbor, MI
- 2014–2016 Postdoctoral Research Associate  
Center for Engineering Education and Outreach  
School of Engineering  
Tufts University, Medford, MA

## Curriculum Vitae

### PUBLICATIONS

#### Peer-Reviewed Journal Papers

- Johnson, A.W., Blackburn, M.W., Su, M.P., & Finelli, C.J., "How a Flexible Classroom Affords Active Learning in Electrical Engineering," *IEEE Transactions on Education*. (Submitted for initial review.)
- Johnson, A.W., Willner-Giwerc, S., & Grogan, P.T., "Pre-college Students' Development and Verification of Requirements during a Systems Engineering Design Challenge," *Journal of Pre-college Engineering Education*. (Submitted for initial review.)
- 2017 Johnson, A.W., Wendell, K.B., & Watkins, J., "Examining Experienced Teachers' Noticing of and Responses to Students' Engineering," *Journal of Pre-college Engineering Education*, 7.1, 2017: Article 2. Invited reprint of Johnson, Wendell, & Watkins (2016). doi: 10.7771/2157-9288.1162
- 2017 Johnson, A.W., Duda, K.R., Sheridan, T.B., & Oman, C.M., "A Closed-Loop Model of Operator Visual Attention, Situation Awareness, and Performance across Automation Mode Transitions," *Human Factors*, 59.2, 2017: 229-241. doi:10.1177/0018720816665759

#### Peer-Reviewed Conference Papers

- 2017 Johnson, A.W., & Finelli, C.J., "Responsive Teaching in Undergraduate Engineering Courses," 2017 ASEE Annual Conference, Columbus, OH, June 2017.
- 2017 Finelli, C., & Johnson, A., "Work in Progress: Flipping the circuits classroom: The impact of pre-class reading and in-class active learning on student and instructor," 2017 IEEE Global Engineering Education Conference (EDUCON), Athens, Greece, April 2017.
- 2016 Johnson, A.W., Willner-Giwerc, S., Grogan, P.T., & Danahy, E.E., "Pre-college Students' Use of Systems Engineering Methods in Design," 2016 IEEE Frontiers in Education Conference, Erie, PA, October 2016.
- 2016 Johnson, A.W., Wendell, K.B., & Watkins, J., "Dimensions of Experienced Responsive Teaching in Engineering," 2016 ASEE Annual Conference, New Orleans, LA, June 2016. Honorable mention, Best paper competition, ASEE Pre-College Engineering Education Division. Reprinted by invitation in the *Journal of Pre-college Engineering Education*.
- 2016 Johnson, A.W., Willner-Giwerc, S., Grogan, P.T., "Developing a Systems Engineering Activity for Middle School Students using LEGO Robotics," 2016 ASEE Annual Conference, New Orleans, LA, June 2016.
- 2016 Wendell, K.B., Watkins, J., & Johnson, A.W., "Noticing, assessing, and responding to students' engineering: Exploring a responsive teaching approach to engineering design," 2016 ASEE Annual Conference, New Orleans, LA, June 2016.

## Curriculum Vitae

- 2015 Yang, L.A., Johnson, A.W., & Portsmore, M.D., “Eliciting Informed Designer Patterns from Elementary Students with Open-Ended Problems,” 2015 ASEE Annual Conference, Seattle, WA, June 2015.
- 2014 Johnson, A.W., Duda, K.R., Oman, C.M., & Sheridan, T.B., “Dynamic Task Allocation in Operational Systems: Issues, Gaps, and Recommendations,” 2014 IEEE Aerospace Conference, Big Sky, MT, March 2014.
- 2013 Clark, T.K., Johnson, A.W., & Stimpson, A.J., “Going for Three: Predicting the Likelihood of Field Goal Success with Logistic Regression,” MIT Sloan Sports Analytics Conference, Boston, MA, March 2013.
- 2012 Wen, H.Y., Johnson, A.W., Duda, K.R., Oman, C.M., & Natapoff, A., “Decision-Making and Risk-Taking Behavior in Lunar Landing,” Human Factors and Ergonomics Society 56<sup>th</sup> Annual Meeting, Boston, MA, October 2012.
- 2012 Johnson, A.W., Clark, T.K., & Stimpson, A.J., “Turning the Tide: Big Plays and Psychological Momentum in the NFL,” MIT Sloan Sports Analytics Conference, Boston, MA, March 2012. Republished with modifications in *Football Outsider’s Almanac 2012*, Ed. Aaron Schatz.

### Theses

- 2014 Ph.D. Dissertation: Analyzing the Effects of Dynamic Task Allocation on Human-Automation System Performance, October 2014. Stanley Roscoe Award for Best Doctoral Dissertation, Aerospace Human Factors Association.
- 2010 S.M. Dissertation: An Integrated Traverse Planner and Analysis Tool for Future Lunar Surface Exploration, May 2015.

### Conference Papers

- 2012 Alibay, F., Desaraju, V., Cowlagi, R., Duda, J.E., Johnson, A.W., & Hoffman, J.A., “Multi-Vehicle Lunar Operations Simulation Using SEXTANT,” SPACE 2012 Conference, Pasadena, CA, September 2012.
- 2011 Gilkey, A.L., Kobrick, R.L., Johnson, A.W., Hoffman, J.A., & Newman, D.J., “Evaluation of a Surface Exploration Traverse Analysis and Navigation Tool,” 41st International Conference on Environmental Systems, Portland, OR, July 2011.
- 2010 Johnson, A.W., Hoffman, J.A., Newman, D.J., Mazarico, E.M., & Zuber, M.T., “An Integrated Traverse Planner and Analysis Tool for Future Planetary Exploration,” SPACE 2010 Conference, Anaheim, CA, August–September 2010.
- 2009 Johnson, A.W., Newman, D.J., Waldie, J.M., & Hoffman, J.A., “An EVA Mission Planning Tool based on Metabolic Cost Optimization,” 39<sup>th</sup> International Conference on Environmental Systems, Savannah, GA, July 2009.

## Curriculum Vitae

### Conference Posters and Abstracts

- 2017 Johnson, A.W., & Finelli, C.J. "Supporting Different Instructor Pedagogies and Student Activities in a Flexible Classroom Space," 2017 International Forum on Active Learning Classrooms, Minneapolis, MI, August 2017.
- 2017 Johnson, A., & Finelli, C. "A Seven-Course Classroom: Different Uses of a Flexible Classroom Space," Poster presented at the 2016 University of Michigan Center for Research on Learning and Teaching in Engineering Research & Scholarship in Engineering Education Poster Fair, Ann Arbor, MI, March 2017.
- 2016 Rogers, C., Hammer, D., Portsmore, M., Milto, E., Watkins, J., Johnson, A., & Bratzel, B., "The Dimensions of Solution Diversity in Novel Engineering: An Integrated Approach to Teaching Engineering and Literacy," Poster presented at the 2016 National Science Foundation DR K-12 PI Meeting, Washington, DC, June 2016.
- 2014 Johnson, A.W., & Kaderka, J.D., "Pilot Visual Scan Patterns during Lunar Landing Mode Transitions," Poster presented at the 2014 NASA Human Research Program Investigators' Workshop, Galveston, TX, February 2014.
- 2013 Johnson, A.W., & Kaderka, J.D., "The Effect of Vehicle Control Mode on Operator Attention During Mode Transitions and Failure Detection," Poster presented at the 2013 NASA Human Research Program Investigators' Workshop, Galveston, TX, February 2013.
- 2012 Wen, H.Y., Johnson, A.W., Duda, K.R., Oman, C.M., & Natapoff, A., "Investigating Human-Automation Task Allocation in Lunar Landing Through Simulation and Human Subject Experiments," Poster presented at the NASA Human Research Program Investigators' Workshop, Houston, TX, February 2012.
- 2010 Johnson, A.W., Hoffman, J.A., Newman, D.J., Mazarico, E.M., & Zuber, M.T., "An Integrated EVA Mission Planner and Support Tool for Lunar Exploration," Poster presented at the 2010 NASA Human Research Program Investigator's Workshop, Houston, TX, February 2010.
- 2009 Johnson, A., Dowding, J., Marquez, J., Sierhuis, M., Newman, D., Hoffman, J., & Clancey, W., "An Integrated EVA Mission Planner and Support Tool for Lunar Exploration," Poster presented at the 2009 Lunar Science Forum, NASA Ames Research Center, Moffett Field, CA, July 2009.

### Science Communication Articles

- 2014 Johnson, G., & Johnson, A., "[Bike Lakes Don't Cause Traffic Jams If You're Smart About Where You Build Them](#)," FiveThirtyEight, ESPN, 11 April 2014.
- 2013 Johnson, A., "[How do birds sit on high-voltage power lines without getting electrocuted?](#)" Ask an Engineer, MIT, 10 Dec 2013.
- 2013 Johnson, A., "[How can a person ride a motorcycle 100 mph but not stand up in 100 mph wind?](#)" Ask an Engineer, MIT, 3 Dec 2013.

## Curriculum Vitae

- 2013 Johnson, A., "[How many solar panels do I need on my house to become energy independent?](#)" Ask an Engineer, MIT, 19 Nov 2013.
- 2013 Johnson, A., "[Is there a way to detect my car's keyless remote if I don't know where it is?](#)" Ask an Engineer, MIT, 8 Oct 2013.

### Science Communication Videos

- 2014 "[The Science of Bouncing](#)," MIT+K12 Videos, 7 July 2014.
- 2014 "[The Slug Life, Part 2: Floating in Orbit](#)," MIT+K12 Videos, 17 April 2014.
- 2014 "[The Slug Life, Part 1: Gravity Weights for Everyone](#)," MIT+K12 Videos, 17 April 2014.
- 2012 "[Earth's Tilt, Part 2: Land of the Midnight Sun](#)," MIT+K12 Videos, 3 Dec 2012.
- 2012 "[Earth's Tilt, Part 1: The Reason for the Seasons](#)," MIT+K12 Videos, 14 Nov 2012.
- 2012 "[The Rock Cycle](#)," MIT+K12 Videos, 1 Nov 2012.
- 2012 "[Fast Processes of the Earth's Surface](#)," MIT+K12 Videos, 21 Sept 2012.
- 2012 "[Layers of the Earth](#)," MIT+K12 Videos, 21 Sept 2012.
- 2012 "[The Forces on an Airplane](#)," MIT+K12 Videos, 12 April 2012.
- 2012 "[Take a Spin on the Centrifuge](#)," MIT+K12 Videos, 21 Feb 2013.
- 2012 "[Space: So Close, So Far](#)," MIT+K12 Videos, 3 Feb 2012.

### INVITED TALKS, POSTERS, AND PANEL DISCUSSIONS

- 2017 Johnson, A., "Changes in Operator Attention and Cognition during Manual Control Takeover," presentation at the University of Michigan Aerospace Engineering 585 Graduate Seminar Series, Ann Arbor, MI, 12 Jan. 2017.
- 2016 Johnson, A., et al. "STEM Education: An exploration of current programs at all levels in MA State and corporate support initiatives," panel discussion at the 2016 AUVSI New England Robotica Conference, Devens, MA, 9 June 2016.
- 2016 Johnson, A., Rogers, C., Lehrman, P., & Tobin, R., "Interdisciplinary Peer Learning in the Science and Engineering of Music," invited poster presented at the 29<sup>th</sup> Tufts University-wide Teaching Conference, Medford, MA, 24 May 2016.
- 2016 Johnson, A., "Sports Analytics for Fun ~~and Profit~~," invited lecture delivered for Statistics and Probability course at MIT, Cambridge, MA, 9 May 2016.
- 2015 Johnson, A., "Changes in Pilots' Attention and Thinking when they Take Over the Controls," presentation at the Tufts University Mechanical Engineering Colloquium Series, Medford, MA, 3 Dec. 2015.

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- 2014 Johnson, A., “Dynamic Task Allocation in Operational Systems,” invited presentation delivered for Human, Remote, and Autonomous Systems in Air, Sea, and Space course at MIT, Cambridge, MA, 12 Nov. 2014.
- 2012 Johnson, A., “Analyzing the Effects of Dynamic Task Allocation on Human-Automation System Performance,” invited presentation at NASA Ames Research Center, 6 Nov. 2012.

### TEACHING EXPERIENCE

#### University Level

- 2017, 2018 Sole instructor, Introduction to Solid Mechanics & Aerospace Structures (Michigan) – undergraduate level
- 2016 Sole instructor, The Science and Engineering of Music (Tufts) – undergraduate level. Nominated as representative of “a truly excellent college course” by two graduating seniors.
- 2015 Instructor, Simple Robotics (Tufts) – first-year level
- 2015 Instructor, Bioengineering Journal Article Seminar (MIT) – graduate level
- 2014 Teaching assistant, Introduction to Aerospace Engineering and Design (MIT) – first-year level
- 2013 Supporting instructor & teaching assistant, Human Systems Engineering (MIT) – undergraduate/graduate level. Graduate Teaching Assistantship Award, MIT Department of Aeronautics and Astronautics.

#### Pre-College Level

- 2014–2016 Workshop Facilitator, Tufts University Center for Engineering Education and Outreach.
- 2012–2014 Instructor, MIT Office of Engineering Outreach Programs (OEOP) Saturday Engineering Enrichment and Discovery (SEED) Program.
- 2010 Instructor, MIT Office of Engineering Outreach Programs (OEOP) Saturday Engineering Enrichment and Discovery (SEED) Program.

### MENTORSHIP EXPERIENCE

- 2017–Present Sarah Bork, graduate student, University of Michigan
- 2017–Present Candace Wiwel, Undergraduate Research Opportunity Program (UROP) student, University of Michigan
- 2017–Present Max Blackburn, Summer Undergraduate Research in Engineering (SURE) student, University of Michigan
- Summer 2017 Magel Su, undergraduate research assistant, University of Michigan

## Curriculum Vitae

2014–2017 Sara Willner-Giwerc, undergraduate research assistant, Tufts University

### HONORS, AWARDS, AND FELLOWSHIPS

- 2016 The Science and Engineering of Music course nominated as representative of “a truly excellent college course” by two graduating seniors.
- 2016 Honorable mention, best paper competition, ASEE Pre-College Engineering Education Division, at the 2016 ASEE Annual Conference.
- 2016 Stanley Roscoe Award for Best Doctoral Dissertation, Aerospace Human Factors Association.
- 2011–2014 Draper Laboratory Fellow, Charles Stark Draper Laboratory, Inc., Cambridge, MA.
- 2014 Graduate Teaching Assistantship Award, MIT Department of Aeronautics and Astronautics.
- 2013 Sherry Modestino Award, MIT Man-Vehicle Laboratory.
- 2012 Second place, XCOR Student Showcase Competition: Great Exploration Ideas for the Future, at the MIT150 Symposium “Earth, Air, Ocean and Space: The Future of Exploration.”
- 2008–2009 Donald W. Douglas Fellowship, MIT Department of Aeronautics and Astronautics.
- 2004–2008 Clara E. Mara Scholar, University of Michigan College of Engineering.
- 2008 Aerospace Engineering Distinguished Achievement Award, University of Michigan College of Engineering.
- 2006–2008 James B. Angell Scholar (8 terms), University of Michigan.
- 2005 William J. Branstrom Freshman Prize, University of Michigan.

### GRANTS

- 2017 Co-I (unofficial), National Science Foundation Improving Undergraduate STEM Education Program, “Impact of Flexible Classroom Spaces on Faculty Pedagogy and Student Behavior,” [Award DUE-1711533](#), PI Cynthia Finelli, (\$300,000).
- 2015 PI, Tufts University Center for Engineering Education and Outreach Innovation Grant, “Teaching Systems Engineering by Building LEGO Robots in Subsystem Teams,” (\$3,144).
- 2015 Co-I, Tufts University Center for Engineering Education and Outreach Innovation Grant, “Surveying International Differences in Teaching and Learning,” (\$5,000).

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### PROFESSIONAL DEVELOPMENT ACTIVITIES

#### Facilitator

- 2016–2017 Engineering Education Research Professional Development Series, University of Michigan
- Fall 2015 Novel Engineering Professional Development, Diné College, Tsailé, AZ

#### Participant

- Summer 2017 NextProf for the University of Michigan Future Faculty Workshop, University of Michigan
- Fall 2016 Introduction to Survey Design Workshop, University of Michigan
- Fall 2016 Responsible Conduct of Research and Scholarship Workshop Series, University of Michigan
- Summer 2014 Communicating Science National Workshop (ComSciCon), Cambridge, MA
- Summer 2013 Graduate Student Teaching Certificate Program, MIT

#### SERVICE

- 2017 Judge, University of Michigan Richard and Eleanor Towner Prize for Outstanding Ph.D. Research
- 2017–Present Coordinator, University of Michigan Engineering Education Research Journal Club
- 2016–Present Reviewer, ASEE Annual Conference
  - 2017 Reviewer, *IEEE Transactions on Education*
  - 2016 Reviewer, 2016 IEEE Frontiers in Education Conference.
  - 2015 Reviewer, *Journal of Qualitative Analysis in Sports*.
  - 2013 Reviewer, *IEEE Transactions on Human-Machine Systems*.
  - 2012 Chair, Current Student Research Panel, MIT Man-Vehicle Laboratory MVL@50 Symposium, 14 Sept. 2012.
  - 2012 Student Involvement Chair, MIT Graduate Association of Aeronautics and Astronautics.
- Fall 2011 Graduate Student Council Representative, MIT Graduate Association of Aeronautics and Astronautics.
- Spring 2010 Academic Chair, MIT Graduate Association of Aeronautics and Astronautics.



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### RESEARCH AND WORK EXPERIENCE

- 2010–2011 Intern, University of Michigan Office of Undergraduate Admissions, Ann Arbor, MI.
- 2009 Graduate Student Intern, NASA Ames Research Center, Moffett Field, CA.
- 2008 Summer Intern, NASA Jet Propulsion Laboratory, Pasadena, CA.
- 2007 Research Assistant, Air Force Research Labs, Wright Patterson AFB, OH & University of Michigan, Ann Arbor, MI.

### MEMBERSHIPS

- 2015–Present Member, American Society for Engineering Education

### PRESS COVERAGE

- 2017 Feature: “[Researchers study impact of flexible classroom spaces on learning, teaching](#),” University of Michigan News, 29 Sept 2017.
- 2017 Feature: “Sound Engineering,” Mechanical Engineering: The Magazine of ASME, Mar 2017.
- 2013 Feature: “[Aaron Johnson and Going for Three](#),” ESPN Numbers Never Lie, 6 May 2013.
- 2013 Feature: “[How numbers can reveal hidden truths about sports](#),” MIT News, 1 Mar 2013.
- 2012 Feature: “[Post-Interception ‘Momentum’ is a Myth, Researchers Say](#),” Wired.com, 20 Sept 2012.
- 2012 Feature: “[Magic Kettles, Jumping Goats: MIT Takes New Approach To Online Teaching](#),” WBUR, 17 July 2012.
- 2012 Feature: “[MIT+K12 and Khan Academy Team Up to Make Awesome Science Videos](#),” Tested.com, 25 April 2012.