

Daniel Johnathan Barber, Ph.D.

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Education

University of Central Florida, Orlando

- Ph.D. in Modeling and Simulation 2012
- M.S. in Computer Engineering (Intelligent Systems Track) 2006
- B.S. in Computer Engineering 2004

Computer Skills

Programming Languages

- Expert in C/C++ and Java
- Proficient in Python, C#, HTML, XML, PHP

Software Libraries

- Qt5, OpenCV, Boost, OpenSceneGraph, wxWidgets, zlib, LZMA, bzip2, libpng, libjpeg, TinyXML, TinyXML2, MathGL, json-cpp, libvlc, JAUS++

Development Environments and Build Tools

- Visual Studio, CMake, QtCreator, Eclipse, Netbeans

Operating Systems

- Windows, Linux (Ubuntu), and OSX

Software Applications

- Microsoft Office, SPSS, Subversion, SSH, Doxygen

Security Clearance

Secret Clearance, Defense Industrial Security Clearance Office. Expires 2018.

Experience

2012 – Present DUJO, LLC. Orlando, FL

Founder and Chief Technology Officer

- Management of all software product development resulting in tools for synchronization, distribution, and analysis of data for research and selection.
- Creator of DUJO Engine, a multi-platform and user-friendly software application to design, measure, and analyze experiment data from physiological and simulation data sources.
- Creator of DUJO Surveys, a reconfigurable product for creation of custom surveys or presentation of other stimuli used in research and other human-factors applications.

2015 - Present University of Central Florida Institute for Simulation and Training Orlando, FL

Assistant Professor in Autonomous Systems

- Management of large projects including research for the U.S. Army Research Laboratory (ARL, Navy, Air Force, Nuclear Regulatory Commission (NRC), and commercial entities working with sponsors and interdisciplinary teams to achieve ecologically valid results, quality applications, and transitioned tools and applications.
- Experienced working within multi-disciplinary teams of computer engineers, electrical engineers, mechanical engineers, industrial engineers, mathematicians, graphics designers, and human-factors psychologists to support efforts requiring diverse skills set in the fields of robots, simulation, metric evaluation and development, human-computer interaction, and training.
- Management of software engineers and undergraduate/graduate student assistants for development of prototype hardware and software used within human-in-the-loop research. Example software applications include dynamic reconfigurable simulation test beds for Human Robot Interaction and Nuclear Power Plant operators.
- Faculty Advisor and mentor for the Robotics Club at UCF, a student organization participating in international air, ground, surface, and underwater robotics competitions sponsored by the Association for Unmanned Vehicle Systems International (AUVSI).
- Lead multiple Science, Technology, Engineering, and Mathematics (STEM) outreach efforts to encourage public interest in robotics through construction of dynamic and interactive exhibits demonstrated at the Orlando Science Center, Florida FIRST Lego League, and Battle Bots events.
- Principal Investigator in Human Robot Interaction for U.S. ARL Robotics Collaborative Technology Alliance, developing advanced multimodal interfaces for squad-level human robot teaming.

2008 – 2015 University of Central Florida Institute for Simulation and Training Orlando, FL

Research Associate

- Management of large projects including research for the U.S. Army Research Laboratory (ARL, Navy, Air Force, Nuclear Regulatory Commission (NRC), and commercial entities working with sponsors and interdisciplinary teams to achieve ecologically valid results, quality applications, and transitioned tools and applications.

- Experienced working within multi-disciplinary teams of computer engineers, electrical engineers, mechanical engineers, industrial engineers, mathematicians, graphics designers, and human-factors psychologists to support efforts requiring diverse skills set in the fields of robots, simulation, metric evaluation and development, human-computer interaction, and training.
- Management of software engineers and undergraduate/graduate student assistants for development of prototype hardware and software used within human-in-the-loop research. Example software applications include dynamic reconfigurable simulation test beds for Human Robot Interaction and Nuclear Power Plant operators.
- Faculty Advisor and mentor for the Robotics Club at UCF, a student organization participating in international air, ground, surface, and underwater robotics competitions sponsored by the Association for Unmanned Vehicle Systems International (AUVSI) receiving over \$40,000 in cash awards.
- Lead multiple Science, Technology, Engineering, and Mathematics (STEM) outreach efforts to encourage public interest in robotics through construction of dynamic and interactive exhibits demonstrated at the Orlando Science Center, Florida FIRST Lego League, and Battle Bots events.
- Academic Lead and Principal Investigator for NSF Innovation Corps (I-Corps) project as part of the University of Central Florida I-Corps Sites Program: Enhancing Technology Commercialization to Develop a World-Class Innovation Ecosystem.
- Mentor for Lake Highland Preparatory School's ASPIRE Research Program.
- Successfully completed two NRC operator training courses and one NRC Technical Training Center (TTC) visit, gaining knowledge base to effectively assist in design of simulations for experiments for Nuclear Power Plant operations.
- Developed a multimodal interface combining speech and gesture inputs with visual and auditory feedback for collaboration with robot teammate.
- Completed training course for a Pressurized Water Reactor (PWR) simulator developed by GSE Systems, and adapted it to provide additional experimental controls for human-in-the-loop research.
- Lead the creation of the Experimental Platform for Instrumentation and Control (EPIC), a Java-based environment to simulate Nuclear Power Plan control panels for controlled experimentation.
- Created a gesture recognition system capable of classifying over 21 gestures and integrated it with the BigDog platform from Boston Dynamics for supervised control using arm and hand gestures.
- Created a training and experimentation application called "Tacton Presenter," for investigation of tactile icons and phrases using a Tactile Belt.
- Developed a multimedia presenter application for presentation of static images, video, and other media in controlled laboratory experiments with data logs synchronized to multiple physiological sensors.
- Created a plugin-based data analysis application, called "Log Reports," for bulk processing of raw data generated by simulations and physiological sensors for rapid data analyses in statistical packages like SPSS.
- Developed a live robot test environment for investigation of different multi-robot formations for resource or high value target protection.
- Created several autonomous robotic platforms supporting JAUS for use in Live Virtual and Constructive environments.
- Expanded upon the Mixed Initiative Experimental (MIX) Testbed, an open-source simulation environment for human-robot interaction research to support reconfigurable Operator Control Units (OCU) to test different interface paradigms for supervisory control of multiple heterogeneous unmanned systems. This MIX multi-robot configuration was awarded as a Top 5 Technical Demonstration for Methodology and Impact at the NATO Human Factors & Medicine (HFM) – 217 Panel Workshop on "Supervisory Control of Multiple Uninhabited Systems" on 8 May 2012 in Prague, Czech Republic.
- Creator of a plugin-based software suite for integration of multiple physiological sensors called "MultiSensor" capable of synchronizing EEG, ECG, GSR, fNIR, TCD, and Eye Tracking data with simulation events in real-time.
- Developed real time-generation of physiological data metrics from EEG, ECG, fNIR, TCD, and Eye Tracker sensors over dynamic type periods and simulation events for driving closed-loop training applications.
- Created a Remote Weapons System (RWS) prototype for the Engagement Skills Trainer 2000 simulator to investigate the role and effect of an RWS in dismounted teams.
- Developed a prototype cultural training and data collection environment enabling a subject matter expert to "puppeteer" multiple culturally relevant virtual avatars.
- Designed and executed human-in-the-loop experiments for human robot interaction.
- Performed statistical analyses of data collected from human-in-the-loop experimentation using SPSS.
- Published and presented internationally throughout the domains of Psychology and Engineering.
- Served as committee member for dissertations in Modeling and Simulation, contributing to academic and scientific rigor and additional outside advising.

2007 – 2008

University of Central Florida Institute for Simulation and Training

Orlando, FL

Visiting Faculty

- Experienced working within multi-disciplinary teams of computer engineers, electrical engineers, mechanical engineers, industrial engineers, mathematicians, graphics designers, and human-factors psychologists to support efforts requiring diverse skills set in the fields of robots, simulation, metric evaluation and development, human-computer interaction, and training.
- Management of undergraduate/graduate student assistants for development of prototype hardware and software used within human-in-the-loop research. Example software applications include dynamic reconfigurable simulation test beds for Human Robot Interaction.
- Created JAUS++, a multi-platform open source implementation of the Joint Architecture for Unmanned Systems (JAUS) used academic and commercial applications within the United States and internationally.
- Creator of the Mixed Initiative Experimental (MIX) Testbed, an open-source simulation environment for human-robot interaction research involving supervisory control of an unmanned ground system.
- Created software application for real-time capture of video feeds from multiple USB-cameras for synchronization with physiological data.
- Created software application to visually track position and orientation of ROOMBA robot using OpenCV.

2003 - 2006

Robotics Laboratory at UCF

Orlando, FL

Student Researcher

- Robotics laboratory manager, facility maintenance and resource allocations to projects.
- Project leader and system designer for autonomous ground vehicles.
- Developed machine vision programs using neural networks, rule based systems, and statistical classifiers for obstacle avoidance systems.
- Developed world-modeling and path-planning software for autonomous navigation with obstacle avoidance.
- Created cross-platform C++ software architecture for connecting different types of navigation sensors including digital compass and GPS.
- Wrote cross-platform C++ software libraries for connecting to different types of video sources using DirectShow, Video For Linux, and other libraries.
- Developed filtering systems for integration of multiple sources of position data generated by robotic vehicle sensors. Example data sources include GPS and wheel encoders.
- Designed and created control and communication software used by ground and surface robotic vehicles.
- Designed and constructed electrical and power distribution systems for ground vehicles.
- Developed Printed Circuit Boards (PCB) for electronics used on ground vehicles.

2004 – 2006

University of Central Florida Institute for Simulation and Training

Orlando, FL

Graduate Student Research Assistant

- Computer vision based arm and hand gesture recognition development with facial recognition tracking for guidance of robotic vehicles.
- Designed miniature robotic vehicles for navigation within a scaled Military Operations in Urban Terrain (MOUT) facility used for human-in-the-loop experimentation.
- Developed software and electronics for remote sharing of control of miniature robotic vehicles using multiple distributed operator stations.
- Created an interactive website for dissemination of information using PHP and MySQL.
- Conducted experiments with human participants.
- Developed stimuli for HRI experiments.
- Conference publications for dissemination of research findings.

Volunteer Work

2007 – 2014

Robotics Club at UCF

Orlando, FL

Faculty Advisor and Mentor

- Advise students on projects for international robotics competitions and senior design projects.
- Conducted special topics lectures in system design, machine learning, computer vision, and C/C++.
- Lead student teams to multiple awards at competitions sponsored by the Association for Unmanned Vehicle Systems International (AUVSI) and IEEE, totaling over \$43,500 in cash prizes.
- RoboBoats Competition
 - 2014 3rd Place - \$3,500.00
 - 2013 2nd Place - \$2000.00
 - 2012 4th Place - \$3,000.00
 - 2011 3rd Place - \$4,000.00
 - 2010 2nd Place - \$5,000.00
 - 2009 1st Place - \$6,000.00
 - 2008 1st Place - \$8,000.00
- Intelligent Ground Vehicle Competition
 - 2013 – JAUS Challenge Winner - \$250.00

- 2011 2nd Place Overall - \$7,250.00
- RoboSub Competition
 - 2012 8th Place Gladiator Challenge - \$500.00
 - 2011 8th Place Second Chance Award - \$1000.00
 - 2010 8th Place Second Chance Award - \$1000.00
 - 2009 4th Place
- IEEE SoutheastCon
 - 2012, 2011, 2010 – Top 10 Hardware Competition
 - 2009 3rd Place Hardware Competition
 - 2008 3rd Place Hardware Competition

Funding

Principal Investigator

- 2015 National Science Foundation (NSF). *I-Corps Participant: University of Central Florida I-Corps Sites Program: Enhancing Technology Commercialization to Develop a World-Class Innovation Ecosystem*. \$2,500.00.
- 2014-2015 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Investigating Tactical Multi-Modal Soldier-Robot Exchanges*. CTA \$150,000.00.
- 2014-2015 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Integrated Research (IR): Platforms and Testbeds for Integrated Research - Multi-Modal Display*. CTA \$200,000.00.
- 2013-2014 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Evaluating Tactical Command and Coordination Vocabulary and Protocols*. CTA \$147,000.00.
- 2013-2014 U.S. Army Research Laboratory (ARL). *Advanced Pilot Research Initiative (ARPI): Trust and Transparency in Human Robot Interaction (HRI)*. IDIQ \$100,000.00.
- 2010-2011 U.S. Army Research Development and Engineering Command (RDECOM). *RAOS: TO#47: RoboLeader Supervisory Control Simulations (SCS) for the SOURCE ATO*. IDIQ \$76,000.00.
- 2008-2009 U.S. Army Research Development and Engineering Command (RDECOM) Simulation Training and Technology Center (STTC). *RAOS: TO#23: Intuitive User Interfaces to Games and Virtual Worlds*. IDIQ \$32,268.00.

Co-Principal Investigator

- 2014-2017 U.S. Army Research Laboratory (ARL). *Robot-Aided Intelligence Surveillance and Reconnaissance (RAISR)*. CA \$350,000.00.
- 2012-2017 Nuclear Regulatory Commission (NRC). *Human Performance Test Facility*. IDIQ \$1,565,836.00.
- 2012 Naval Air Warfare Center Training Systems Division (NAWCTSD). *Tool for Real-time Intelligent Evaluation of Physiological and Operational Data (TRIEPOD)*. STTR Phase I sub-contract from Stottler-Henke \$24,000.00.
- 2012-2013 Army Research Laboratory ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Evaluating Tactical Command and Coordination Vocabulary and Protocols*. \$170,000.00
- 2012-2013 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Shared Mental Models for Soldier-Robot (SR) Teaming*. CTA \$122,485.00.
- 2012-2013 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Situation Awareness in Human-Robot Teams*. CTA \$135,000.00.
- 2011-2014 U.S. Army Research Development and Engineering Command (RDECOM). *Human Robot Interaction (HRI) Analysis for Training Simulations and Operational Neuroscience (HATS-ON)*. IDIQ \$2,793,416.00.
- 2011-2012 Army Research Laboratory ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Gestures, Posture, and Haptics in Human Robot (HR) Communication*. CTA \$120,000.00.
- 2011-2012 Army Research Laboratory ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Integrating Multi-Modal Human Robot (HR) Communications in Live and Virtual Environments*. CTA \$57,230.00.
- 2010-2011 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Integrating Multi-Modal Human Robot (HR) Communications in Live and Virtual Environments*. CTA \$34,548.25.
- 2010-2011 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Gestures, Posture, and Haptics in Human Robot (HR) Communications*. CTA \$66,450.00.
- 2010 U.S. Army Research Laboratory (ARL). *Robotics Collaborative Technology Alliance (RCTA) Human Robot Interaction (HRI): Multi-Modal Communication*. CTA \$67,290.00.

- 2009-2012. U.S. Office of Naval Research. *Modeling the Effects of Temperament on Society (METS)*. Grant \$150,000.00.
- 2009-2011 Army Research Laboratory (ARL). *Human Agents for Training and Simulation (HATS)*. \$500,000.00.
- 2009-2010 U.S. Department of Defense (DoD). *Human, Social, and Cultural Behavior – Intelligent Resource Operational Network (HSCB-IRON) for Training and Analysis*. Grant \$589,652.00.

Co-Investigator or Senior Investigator

- 2011-2013 John Templeton Foundation. *Space, Science, and Spirituality: Simulating Awe and Wonder*. Grant \$299,541.00.
- 2010-2011 Office of Naval Research (ONR). *Development of Pilot Training Technology for Analysis of Medical Datasets*. Responsible for Economy Stimulus Award \$75,000.00.
- 2009-2011 Office of Naval Research (ONR); *Perceptually-informed Virtual Environments (PerceiVE)*. STTR Phase I and II \$400,000.00.

Refereed Journals

- Mercado, J.E., Rupp, M., Chen, J. Y.C., Barnes, M.J., **Barber, D.**, Procci, K. (under review). Intelligent Agent Transparency in Human-agent Teaming for Multi-UxV Management. *Journal of Human Factors and Ergonomics Society*.
- Abich IV, J., Barber, D. (under review). The Impact of Human-Robot Multimodal Communication on Mental Workload, Usability, and Expectations. *Journal of Human Robot Interaction*.
- Abich IV, J., **Barber, D.** (under review). The Impact of Human-Robot Multimodal Communication on Mental Workload, Usability, and Expectations. *Journal of Human Robot Interaction*.
- Barber, D.**, Reinerman-Jones, Matthews, G. (2014). Towards a Tactile Language for Human-Robot Interaction: Two Studies of Tacton Learning and Performance. *Journal of Human Factors and Ergonomics Society*. doi: 10.1177/0018720814548063.
- Matthews, G., Reinerman-Jones, L., **Barber, D.**, Abich IV, J. (2014). The Psychometrics of Mental Workload: Multiple Measures are Sensitive but Divergent. *Journal of Human Factors and Ergonomics Society*. doi: 10.1177/0018720814539505.

Refereed Book Chapters

- Lackey, S., **Barber, D.**, Reinerman-Jones, L.E., Ortiz, E., and Fanfarelli, J. (2014). Human Robot Communication. In K. Hale & K. Stoney (Eds.) *Handbook of Virtual Environments*, 2nd ed. ISBN: 9781466511842.
- Vice, J., Skinner, A., Berka, C., Reinerman-Jones, L., **Barber, D.**, Pojman, N., Tan, V., et al. (2011). Perceptually-Informed Virtual Environment (PerceiVE). In D. Schmorow & C. Fidopiastis (Eds.), *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems* (1st ed.). Orlando, FL: Springer.
- Barber, D.**, Reinerman-Jones, L., Lackey, S., & Hudson, I. (2011). Augmenting Robot Behaviors Using Physiological Measures. In D. Schmorow & C. Fidopiastis (Eds.), *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems* (1st ed., pp. 567–572). Orlando, FL: Springer. Retrieved from <http://www.springerlink.com/index/0749J54312411843.pdf>.
- Barber, D.**, & Hudson, I. (2011). Distributed Logging and Synchronization of Physiological and Performance Measures to Support Adaptive Automation Strategies. In D. Schmorow & C. Fidopiastis (Eds.), *Foundations of Augmented Cognition. Directing the Future of Adaptive Systems* (1st ed., pp. 559–566). Orlando, FL: Springer. Retrieved from <http://www.springerlink.com/index/88071XR777827L64.pdf>.
- Reinerman-Jones, L., **Barber, D.**, Lackey, S., & Nicholson, D. (2010). Developing Methods for Utilizing Physiological Measures. In M. Tadeusz, K. Waldemar, & V. Rice (Eds.), *Advances in Understanding Human Performance: Neuroergonomics, Human Factors Design, and Special Populations*. Miami, Florida.
- Barber, D.**, Schatz, S., & Nicholson, D. (2010). AVATAR: Developing a Military Cultural Role-Play Trainer. In D. Schmorow & D. Nicholson (Eds.), *Advances in Cross-Cultural Decision Making* (Advances i.). Miami, Florida: CRC Press.
- Fidopiastis, C., Drexler, J., **Barber, D.**, Cosenzo, K., Barnes, M., Chen, J. Y. C., & Nicholson, D. (2009). Impact of Automation and Task Load on Unmanned System Operator's Eye Movement Patterns. In D. D. Schmorow, I. V. Estabrooke, & M. Grootjen (Eds.), *Foundations of Augmented Cognition, Neuroergonomics, and Operational Neuroscience* (pp. 229-238). San Diego, CA: Springer. doi:10.1007/978-3-642-02812-0_27.

Conference Proceedings

- Barber, D.**, Abich IV, J., Phillips, E., Talone, A., Jentsch, F., Hill, S. (2015). Field assessment of multimodal communication for dismounted human-robot teams. In the proceedings of the 59th Human Factors and Ergonomics Society Annual Meeting.
- Barber, D.**, Beck, C. (2015). Effects of Tacton Names and Learnability. In the proceedings of Human

- Computer Interaction International (HCII), Las Angeles, CA, August.
- Abich IV, J., **Barber, D.**, Reinerman-Jones, L. (2015). Experimental environments for dismounted human-robot multimodal communications. In the proceedings of Human Computer Interaction International (HCII), Las Angeles, CA, August.
- Hill, S. G., **Barber, D.**, Evans, A. W. (2015). Achieving the Vision of Effective Soldier-Robot Teaming: Recent Work in Multimodal Communication. HRI'15 Extended Abstracts, March 2–5, 2015, Portland, OR, USA. ACM 978-1-4503-3318-4/15/03. <http://dx.doi.org/10.1145/2701973.2702026>.
- Lackey, S.J., Maraj, C.S., **Barber, D.** (2014). Immersion, Presence, and Flow in Robot-Aided ISR Simulation-Based Training. In the proceedings of the 2014 Winter Simulation Conference, Savannah, GA, December 7 – 10.
- Reinerman-Jones, L., Parchment, A., Matthews, G., **Barber, D.**, Lackey, S.J. (2014). Cerebral Blood Flow Velocity and Stress as Predictors of Decision Making. In the proceedings of the 58th Human Factors and Ergonomics Society Annual Meeting, Chicago, Illinois, October 27 - 31.
- Mercado, J.E., Reinerman-Jones, L., **Barber, D.**, Leis, R. (2014). Investigating Workload Measures in the Nuclear Domain. In the proceedings of the 58th Human Factors and Ergonomics Society Annual Meeting, Chicago, Illinois, October 27 - 31.
- Leis, R., Reinerman-Jones, L., Mercado, J., **Barber, D.**, Sollins, B. (2014). Nuclear Power Plant Task Workload Across Repeated Sessions. In the proceedings of the 58th Human Factors and Ergonomics Society Annual Meeting, Chicago, Illinois, October 27 - 31.
- Reinerman-Jones, L.E., Matthews, G. Abich, J., & **Barber, D.** (2014). Psychophysiological Metrics for Workload are Demand-Sensitive but Multifactorial. Proceedings of the Annual International Meeting of the Human Factors and Ergonomics Society (HFES), Chicago, IL.
- Teo, G., Reinerman-Jones, L., **Barber, D.**, Hudson, I. (2014). Determining Language for Human Robot Navigational Commands. In the proceedings of the 58th Human Factors and Ergonomics Society Annual Meeting, Chicago, Illinois, October 27 - 31.
- Harris, J., **Barber, D.** (2014). Speech and Gesture Interfaces for Squad Level Human Robot Teaming. In the proceedings of SPIE Defense, Security, and Sensing – Unmanned Systems Technology, Baltimore, Maryland USA, May 5 - 9.
- Barber, D.**, Wohleber, R.W., Parchment, A., Jentsch, F., Elliott, L. (2014). Development of a Squad Level Vocabulary. In *Virtual, Augmented and Mixed Reality. Designing and Developing Virtual and Augmented Environments* (pp. 139-148). Springer International Publishing.
- Lackey, S.J., **Barber, D.**, Martinez, S. (2014). Recommended Considerations for Human-Robot Interaction Communication Requirements. In the proceedings of Human Computer Interaction International, Crete, Greece, June 22 – 27.
- Wiltshire, T.J., **Barber, D.**, Fiore, S.M. (2013). Towards Modeling Social-Cognitive Mechanisms in Robots to Facilitate Human-Robot Teaming. In the proceedings of Human Factors and Ergonomics Society, San Diego, California, September 30 – October 4.
- Descheneaux, C. Reinermain-Jones, L., **Barber, D.**, (2013). Hemispheric Differences and Spatial Ability in Robot to Human Tactile Communications. In the proceedings of Human Factors and Ergonomics Society, San Diego, California, September 30 – October 4.
- Barber, D.**, Lackey, S., Reinerman-Jones, L., Hudson, I. (2013). Visual and Tactile Interfaces for Bi-Directional Human Robot Communication. In the proceedings of SPIE Defense, Security, and Sensing - Unmanned Systems Technology, Baltimore, Maryland USA, April 29 – May 3.
- Lackey, S., **Barber, D.**, Reinerman, L., Badler, N. I., & Hudson, I. (2011). Defining Next-Generation Multi-Modal Communication in Human-Robot Interaction. Proceedings of the 55th Human Factors and Ergonomics Society Conference. doi:10.1177/1071181311551095.
- Reinerman-Jones, L., Taylor, G., Sprouse, K., **Barber, D.**, & Hudson, I. (2011). Adaptive Automation as a Task Switching and Task Congruence Challenge. Proceedings of the 55th Human Factors and Ergonomics Society Annual Meeting. doi:10.1177/1071181311551041.
- Vice, J., Skinner, A., Berka, C., Reinerman-jones, L., **Barber, D.**, Pojman, N., Tan, V., et al. (2011). Use of Neurophysiological Metrics within a Real and Virtual Perceptual Skills Task to Determine Optimal Simulation Fidelity Requirements. Proceedings of the 2011 International Conference on Virtual and mixed reality (pp. 387-399).
- Ortiz, E., **Barber, D.**, Stevens, J., & Finkelstein, N. (2009). Simulation to Assess an Unmanned System's Effect on Team Performance. The Interservice/Industry Training, Simulation & Education Conference (I/ITSEC). Orlando, FL.
- Barber, D.**, & Nicholson, D. (2009). Intelligent Resource Operational Network (IRON) for Cultural Modeling. 18th Conference on Behavior Representation in Modeling and Simulation (pp. 147-148). Sundance, UT.
- Varcholik, P., **Barber, D.**, & Nicholson, D. (2008). Interactions and Training with Unmanned Systems and the Nintendo Wii mote. The Interservice/Industry Training, Simulation & Education Conference (I/ITSEC) (Vol. 2008, pp. 1-9). Orlando, FL.
- Barber, D.**, Davis, L., Nicholson, D., Chen, J. Y. C., & Finkelstein, N. (2008). The Mixed Initiative Experimental (MIX) Testbed for Human Robot Interactions with Varied Levels of Automation. 26th Army Science Conference. Orlando, FL.
- Barber, D.**, Leontyev, S., Sun, B., Davis, L., Nicholson, D., & Chen, J. Y. C. ; (2008). The Mixed-Initiative Experimental Testbed for Collaborative Human Robot Interactions. 2008 International Symposium on Collaborative Technologies and Systems (pp. 483-489). Irvine, CA: IEEE. doi:10.1109/CTS.2008.4543968.

- Barber, D.**, Davis, L., Kemper, D., Smith, P., & Nicholson, D. (2007). Collaborative Human Robot Interactions in Combined Arms Operations. 2007 International Symposium on Collaborative Technologies and Systems (pp. 88-92). Orlando, FL: IEEE. doi:10.1109/CTS.2007.4621742.
- Barber, D.**, Becker, B. C., & Gonzalez, F. G. (2006). Discover Vision: A Framework for Building, Evaluating, and Testing Performance Based Machine Vision Applications. Association for Unmanned Systems International (AUVSI) North America. Orlando, FL.
- Barber, D.**, Sims, V. K., Chin, M. G., Velie, M., Sushil, D. J., Pepe, A. A., Ellis, L. U., Finkelstein, N., & Shumaker, R. (2006). Anthropomorphism of textured faces. Proceedings of the Human Factors and Ergonomics Society, 50.
- Roberts, T., **Barber, D.**, Becker, B. C., & Gonzalez, F. (2005). Software design for an autonomous ground vehicle for the 13th annual intelligent ground vehicle competition. In D. P. Casasent, E. L. Hall, & J. Roning (Eds.), Intelligent Robots and Computer Vision XXIII: Algorithms, Techniques, and Active Vision (Vol. 6006, p. SPIE - The International Society for Optical Engineering). SPIE. doi:10.1117/12.630962.
- Sims, V. K., Chin, M. G., Yordon, R. E., Sushil, D. J., **Barber, D.**, Owens, C. W., Smith, H. S., Dolezal, M.J., Shumaker, R., & Finkelstein, N. (2005). When Function Follows Form: Anthropomorphism of Artifact "Faces." Proceedings of the Human Factors and Ergonomics Society, 47.
- Sims, V. K., Chin, M. G., Sushil, D. J., **Barber, D.**, Ballion, T., Clark, B. R., Garfield, K. A., Dolezal, M.J., Shumaker, R., & Finkelstein, N. (2005). Anthropomorphism of Robotic Forms: A Response to Affordances? Proceedings of Human Factors and Ergonomics Society, 47.

Invited Presentations

- Barber, D.**, Abich, J., & Reinerman-Jones, L. (May, 2015). Multimodal Communication for Dismounted Human-Robot Teams. Invited address at the Department of Defense Human Factors and Ergonomics Technical Advisory Group (DoD HFE TAG) Meeting 69.
- Selkowitz, A., Boyce, M., Lakhmani, S., **Barber, D.**, Chen, J. Y.C. (May, 2015). The Effects of Agent Transparency on Human Interaction with an Autonomous Squad Member. Invited address at the Department of Defense Human Factors and Ergonomics Technical Advisory Group (DoD HFE TAG) Meeting 69.
- Barber, D.** (February, 2015). Florida Unmanned Systems Business Exp. Invited panel sessions on Science, Technology, Engineering, and Mathematics (STEM). Wyndham Orlando Resort, Orlando, FL.
- Reinerman-Jones, L.E., **Barber, D.**, & Teo, G. (May, 2014). Development of a Squad Level Vocabulary for Human-Robot Interaction. Invited address at the Department of Defense Human Factors and Ergonomics Technical Advisory Group (DoD HFE TAG) Meeting 68.

Patents

- System and Method for Visual Correlation of Digital Images. U.S. Application No. 14/161,155, filed January 22, 2014. Patent Pending.

Media & Coverage

Barber, D. (2013). STTC Supports Successful IST Robotics Club. Team Orlando, retrieved March 22, 2014 from <http://www.teamorlando.org/sttc-supports-successful-ist-robotics-club/>.

Hudson, I., Barber, D. (2013). ARL Supported Robotics Club Takes 2nd Place, retrieved March 22, 2014 from <http://www.teamorlando.org/arl-supported-robotics-club-takes-2nd-place/>.

Real Life 101 (2010). Real Life 101 Visits the University of Central Florida's Institute for Simulation and Training, Episode 135, <http://www.rl101.com/episodes-past.html#season10-11>.

UCF (2009). UCF Opportunity Minutes – Robotics Club. Retrieved March 22, 2014 from <http://youtu.be/VpiJncuAig0>.

The Daily Buzz (2011). Robotics Club at UCF Transformers Move Promotion, retrieved March 22, 2014 from <http://youtu.be/izVpFa-RSZM>.

Awards

- 2014 – University of Central Florida Millionaire's Award
- 2014 – Lake Highland Preparatory School's ASPIRE Research Program Outstanding Mentor
- 2013 – University of Central Florida Innovator Award
- 2012 – University of Central Florida Innovator Award
- 2012 – Lake Highland Preparatory School's ASPIRE Research Program Outstanding Mentor

Dissertations

Co-Advisor

Harris, Jonathan (Spring 2016). Industrial Engineering, University of Central Florida.

Committee Member

Maxwell, Douglas B (Summer 2015). Modeling and Simulation, University of Central Florida.

Rebecca Leis (Spring 2016). Modeling and Simulation, University of Central Florida.

Descheneaux, Charles (Spring 2015). Modeling and Simulation, University of Central Florida.

Salcedo, Julie (Summer 2014). Modeling and Simulation, University of Central Florida.