Dr. MATTHEW JOHNSON
30 Gathering Green West
Pensacola, FL 32502
(850) 291-1099 mjohnson@ihmc.us

Education

Institution	Major	Degree	Year
Delft University of Technology, Delft, The Netherlands	Computer Science	Ph.D., Cum Laude	2014
Texas A&M – Corpus Christi, Corpus Christi, Texas	Computer Science	M.S.	2001
University of Notre Dame, South Bend, Indiana	Aerospace Engineering	B.S.	1992

Research Interests

Autonomy, Human-Machine System Design, Human-Machine Teamwork, Human-Robot Interaction, Trust, Robotics, Control Theory, Interface Design, Artificial Intelligence, Software Engineering, Java Programming Practices.

Professional Experience

2014- present Research Scientist, Institute for Human and Machine Cognition
- Leading advanced research in the area of autonomous capabilities and human-machine teamwork. Developing the ideas, writing proposals, managing teams of developers and delivering advanced technological capabilities on time and within budget.

2002-2014 Research Associate, Institute for Human and Machine Cognition
- Leading advanced research in the area of autonomous capabilities and human-machine teamwork. Developing the ideas, writing proposals, technical lead on teams of developers delivering advanced technological capabilities.

2001-2012 U.S. Navy Reserves Flight Instructor, Training Air Wing Five
- Training and mentoring the world's finest aviators and officers to be the next generation of leader's for the Department of Defense.

2000-2001 U.S. Navy Senior Officer of IT Division, Training Air Wing Four
- Lead the development, management and administration of all Training Air Wing Four operational software and managed the Air Wing's IT division.

1992-2001 U.S. Naval Aviator Active Duty
- Naval aviator and aircraft commander qualified to instruct in both fixed and rotary wing aircraft. Held leadership positions in maintenance, operations and administration and managed enlisted personnel, junior officers and flight students.

Selected Recent Projects

- Working with Xerox PARC to brainstorm human-machine teaming concepts. (2017-present)
- Working with AeroVironment to explore the complexities of people controlling large numbers of vehicles. (2017-present)
- Working with NASA on characterizing the nature of foundational and applied research that need to evolve in order to develop advanced intelligent technologies that reduce cost, enhance performance and improve safety. (2017-present)
- *Humanoid Avatar Robots for Co-exploration of Hazardous Environments* (2012-present) – Co-principal Investigator for this NRI project exploring the role and effectiveness of humanoid robots as avatars in hazardous environments. Developing humanoid behaviors and advanced interface concepts to enable complex work using both Boston Dynamics Atlas robot and NASA's Valkyrie robot.
- *Aircrew Labor In-Cockpit Automation System (ALIAS) (2015-2016) – Subcontractor to Humatics/Aurora developing a robotic copilot. Our role was developing a knowledge acquisition process that captures the knowledge necessary for all aspects of flight and is extensible across heterogeneous airframes.*

- *Policy Governed Autonomous Vehicle Collaboration* (2015-2016) – Principal investigator for this Interdigital project working on multi-drone collaboration in support of residential package delivery.
- *Context Augmented Robotic Interaction Layer* (2014-2017) – Co-principal investigator collaborating with CHI systems on this NASA SBIR developing a framework for representing context, and for using this context to enable robot adaptive decision-making and behavior in NASA mission related scenarios.
- *Fleet Management Services* (2015-2016) – Co-principal Investigator for this collaboration with Nissan and NASA. IHMC works on hierarchical interfaces in support of managing fleets of autonomous vehicles and those assisting them.
- *DARPA Robotics Challenge* (2012-2015) – Co-principal Investigator for IHMC and lead human-machine system designer. Out team placed first or second in all three phases of this international competition with over 46 teams competing across three years of competition.
- *Human-Autonomy Teaming for Terminal Area Automation* (2015) – Principal investigator for this NASA/Northrup Grumman project working on the challenges of automating terminal area tugs.
- *Enabling Micro–Air Vehicle Operations in Tactical Urban Environments through Human-Machine Teaming* (2012-2014) – Principal Investigator for this AFRL project focused on UAV navigation through cluttered environments without direct flight control.
- *NASA Rotorcraft Noise Minimization* (2012-2014) – Principal Investigator for this NASA project focused on constraint based planning of noise minimal flight trajectories for rotorcraft.
- *NASA Low Gravity Bipedal Walking* (2009-2010) – Software engineer for developing walking gaits suitable for low gravity using NASA's Active Response Gravity Offload System (ARGOS) at Johnson Space Center in Houston.
- *CSUSB Information Sharing* (2009-2010) – Software engineer and designer for this ARL project showing how a combination of semantic technologies, advanced policy frameworks, and dissemination services can help support the information needs of a soldier.
- *DARPA Little Dog (2006-2009)* – Software Engineer for this DARPA project focused on robust quadrupedal locomotion over rough terrain. Although no official results are published, our team place in the top of most evaluations including the final competition.

Recent Lectures, Tutorials and Presentations

30 NOV 2017 Embry-Riddle President's Symposium: "The Future Role of AI and Autonomy for UAS"
22 AUG 2017 HRT Summer School invited speaker: "Human-Machine Teaming"
25 MAY 2017 John's Hopkins Applied Physics Lab: "The Future of Humans & Machines"
10 MAY 2017 Organized and ran AFRL Robotics Bootcamp
09 APR 2017 Georgia Tech invited speaker
30 MAR 2017 CogSIMA invited speaker: "Interdependence as a Framework for Situation Awareness"
02 MAR 2017 John's Hopkins Applied Physics Lab invited speaker
29 JUL 2016 Workload Assessment workshop: "New Perspectives on Workload in Human/Machine Teams"
17 MAY 2016 FLAIRS Keynote – "No AI is an Island" – Key Largo, FL
29 FEB 2016 Presented on Humanoids and Robotics at the PCC Engineering Forum
20 FEB 2016 Presented "Rise of the Humanoid Robots" at PensaCon
12 NOV 2015 Presented about humanoid robots at Border Sessions – the Netherlands
15 OCT 2015 Organized and presented Human & Machine Teamwork in the Air Force Context
29 AUG 2015 Tutorial on Coactive Design for NPS - IHMC
18 MAR 2014 Presented Coactive Design to NASA's Future In-Space Operations workgroup - telecon
03 FEB 2014 Presented Coactive Design to Marine Corps Warfighting Lab and Naval Post Graduate School
19 NOV 2014 Presented at Coactive Design to National Robotics Initiative PI meeting – Washington DC
02 OCT 2014 Invited Speaker at Cooperation of Robots and Sensor Networks Summer School - Germany
10 JUN 2014 Presented at Interactive Intelligence workshop - the Netherlands
28 APR 2014 Class lecture for TU Delft Context project – the Netherlands
17 APR 2014 Presented DRC work to NASA Ames Intelligent Robotics Group – NASA Ames

04 APR 2014 Plenary talk at Tulane Engineering Forum – New Orleans
01 APR 2014 Presented DRC to local Rotary club - Pensacola
25 MAR 2014 Presented Coactive Design at HRI - Germany
27 MAR 2014 Presented DRC work to II and 3ME groups at Delft – The Netherlands
31 JAN 2014 Presented DRC work Association for Unmanned Vehicle Systems International - Pensacola
13-17 JAN 2014 Organized and ran Coactive Design workshop for DSO National Laboratories - Singapore

Selected Publications (complete list at https://www.ihmc.us/groups/mjohnson/)

- Johnson, M., Bradshaw, J. M., & Feltovich, P. J. (2017). Tomorrow's Human–Machine Design Tools: From Levels of Automation to Interdependencies. Journal of Cognitive Engineering and Decision Making.
- Johnson, M., Shrewsbury, B., Bertrand, S., Calvert, D., Wu, T., Duran, D., Stephen, D., Mertins, N., Carff, J., Rifenburgh, W. and Smith, J. (2017). Team IHMC's Lessons Learned from the DARPA Robotics Challenge: Finding Data in the Rubble. Journal of Field Robotics, 34(2), 241-261.
- Johnson, M., Shrewsbury, B., Bertrand, S., Wu, T., Duran, D., Floyd, M., Abeles, P., Stephen, D., Mertins, N., Lesman, A. and Carff, J. (2015). Team IHMC's Lessons Learned from the DARPA Robotics Challenge Trials. Journal of Field Robotics, 32(2), pp.192-208.
- Johnson, M., Bradshaw, J. M., Hoffman, R. R., Feltovich, P. J., & Woods, D. D. (2014). Seven Cardinal Virtues for Human-Machine Teamwork: Examples from the DARPA Robotic Challenge. *IEEE Intelligent Systems*, November/December 2014 (vol. 29 iss. 6), pp. 74-80.
- Johnson, M., J.M. Bradshaw, P. J. Feltovich, C. M. Jonker, M. B. van Riemsdijk, and M. Sierhuis. (2104) Coactive design: Designing support for interdependence in joint activity. *Journal of Human-Robot Interaction*, Vol. 3, No. 1, pp. 43-69.
- Bradshaw, J. M., Hoffman, R. R., Johnson, M., & Woods, D. D. (2013). The Seven Deadly Myths of "Autonomous Systems." *IEEE Intelligent Systems*, *28*(3), 54–61. doi:10.1109/MIS.2013.70
- Johnson, M., Bradshaw, J. M., Feltovich, P. J., Jonker, C., van Riemsdijk, B., & Sierhuis, M. (2012). Autonomy and Interdependence in Human-Agent-Robot Teams. Intelligent Systems, IEEE, March/April 2012 (vol. 27 iss. 2), pp. 43-51.
- Johnson, M., Bradshaw, J. M., Feltovich, P. J., Hoffman, R. R., Jonker, C., van Riemsdijk, B., & Sierhuis, M. (2011). Beyond Cooperative Robotics: The Central Role of Interdependence in Coactive Design. *IEEE Intelligent Systems*, 26, 81-88.
- Bradshaw, J. M., P. J. Feltovich, and M. Johnson. (2011) "Human-Agent Interaction." Chap. 13 In Handbook of Human-Machine Interaction, edited by G. Boy. 293-302: Ashgate.

Synergistic Activities

- CalvIO Industrial Robotics board member
- MIT PhD committee member
- Developed and maintain electronic medical record (EMR) system for Hope Center Medical Clinic in Haiti
- Children of Christ Home (Haitian orphanage) board member
- Working with UWF to develop Intelligent Systems Ph.D. program
- Organizer of workshop on Human-Agent-Robot-Teamwork 2015
- Finance Chair for Human-Robot Interaction conference 2011-2012
- Science Saturday Youth Education Teacher
- Mess Hall Science Museum volunteer
- Best Robotics mentor