

Chris Smith Crawford Jr.

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EDUCATION

Ph.D., Human-Centered Computing, University of Florida

Dissertation: Applying Block-Based Programming to Neurofeedback Application Development

Advisor: Dr. Juan E. Gilbert

B.S. in Computer Science

University of Alabama, Tuscaloosa, AL

RESEARCH INTERESTS

Brain-Computer Interface (BCI), Human-Robot Interaction (HRI), Human-Computer Interaction (HCI)

Work Experience

- **[Assistant Professor at the University of Alabama]** Department of Computer Science (8/16/2017)
 - **[UX Design and Prototyping Intern at Intel]** UX/Software Engineering (05/5 – 08/8, 2015)
 - **[Perceptual Interface Intern at Intel]** Software Engineering (05/5 – 08/8, 2014)
 - **[HTML5/Node.js Software Engineering Intern at Intel]** Software Engineering (05/20 – 08/30, 2013)
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PUBLICATIONS

Journals

- J.1.** Andujar, M., Crawford, C. S., Nijholt, A., Jackson, F., & Gilbert, J. E. (2015). **Artistic brain-computer interfaces: the expression and stimulation of the user's affective state.** *Brain-Computer Interfaces*, 2(2-3), pp. 60–69.

Conference Papers (Refereed)

- C.1.** Stegman, P., Crawford, C.S., and Gray, J., (2018). **WebBCI: An Electroencephalography Toolkit Built on Modern Web Technologies.** *HCI International 2018*, July 15-20, 2018, Las Vegas, NV, USA.
Status: Accepted
- C.2.** Crawford, C.S., Andujar, M., and Gilbert, J.E., (2018). **Brain Computer Interface for Novice Programmers.** *ACM SIGCSE Technical Symposium on Computer Science Education*, February 21-24, 2018, Baltimore, MA, USA. Status: Accepted
- C.3.** Crawford, C.S., Andujar, M., and Gilbert, J.E., (2017). **Neurophysiological Heat Maps for Human-Robot Interaction Evaluation.** In *Proceedings of 2017 AAAI Fall Symposium Series: Artificial Intelligence for Human-Robot Interaction AAAI Technical Report FS-17-01*, November 9-11, 2017, Arlington, VA, USA, pp. 90-93.
- C.4.** Crawford, C.S., and Gilbert, J.E. (2017). **NeuroBlock: A Block-Based Programming Approach to Neurofeedback Application Development.** In *Proceedings of the 2017 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, Raleigh, NC, USA, pp. 303-307, October 11-14, 2017.
- C.5.** Lieblein, R., Hunter, C., Garcia, S., Andujar, M., Crawford, C. S., & Gilbert, J. E. (2017). **NeuroSnap: Expressing the User's Affective State with Facial Filters.** In *International Conference on Augmented Cognition* (pp. 345-353). Springer, Cham.
- C.6.** Crawford, C.S., Andujar, M., Jackson, F., Appllys, I., & Gilbert, J.E. (2016). **Using a Visual Programming Language to Interact with Visualizations of Electroencephalography Signals.** In *Proceedings of the 2016 American Society for Engineering Education Southeastern Section (ASEE SE)*, Tuscaloosa, AL, March 13-15, 2016.

- C.7. Crawford, C.S., Badea, C., Bailey, S.W., & Gilbert, J.E. (2015). **Using Cr-Y Components to Detect Tongue Protrusion Gestures**. In Proceedings of the 33rd Annual ACM CHI 2015 Conference Extended Abstracts, pp. 1331-1336, Seoul, Republic of Korea, April 18-23, 2015.
- C.8. Crawford, C.S. & Gilbert, J.E. (2015). **Towards Analyzing Cooperative Brain-Robot Interfaces Through Affective and Subjective Data**. In Proceedings of the 10th Annual ACM/IEEE International Conference on Human-Robot Interaction Extended Abstracts pp. 231-232. 2015.
- C.9. Crawford, C.S., Andujar, M., Jackson, F., Remy, S., & Gilbert, J.E. (2015). **User Experience Evaluation Towards Cooperative Brain-Robot Interaction**, In Proceedings 17th International Conference Human-Computer Interaction: Design and Evaluation, HCI International 2015, pp. 184–193, Los Angeles, CA, August 2-7, 2015, M. Kurosu (Ed.): Human-Computer Interaction, Part I, Springer LNCS 9169, DOI: 10.1007/978-3-319-20901-2_17.
- C.10. Crawford, C.S., Mack, N., Eugene, W., & Gilbert, J.E. (2015). **Televoting: Secure, Overseas Voting**, In Proceedings 3rd International Conference Human Aspects of Information Security, Privacy, and Trust HCI International 2015, pp. 487–494, Los Angeles, CA, August 2-7, 2015, T. Tryfonas and I. Askoxylakis (Eds.): HAS 2015, Springer LNCS 9190, DOI: 10.1007/978-3-319-20376-8_43.
- C.11. Dawson, S., Crawford, C.S., Dillon, E. & Anderson, M. (2015). **Affecting operator trust in intelligent multirobot surveillance systems**. In Robotics and Automation (ICRA), IEEE International Conference, pp. 3298-3304.
- C.12. Crawford, C.S., Andujar M., Remy S., & Gilbert, J.E. (2014). **Cloud Infrastructure for Mind-Machine Interface**, In Proceedings on the International Conference on Artificial Intelligence (ICAI), pp. 127-133.
- C.13. Dawson, S., Crawford, C., Dillon, E. & Anderson, M. (2012). **Examining the Expectations of Autonomy and Human Intervention in a Multi-robot Surveillance Task**, 50th Southeast Regional ACM Conference, Tuscaloosa AL, March 2012.
- C.14. Anderson, Monica., Crawford, C.S., Kilgo, P. and Stanforth, M. (2011). **Work in Progress: Enabling robot device discovery through robot device descriptions**, 2nd International Workshop on Domain-Specific Languages and models for ROBotic systems, San Francisco, CA, USA, September 2011.

Conference Papers (Invited)

- C.15. Andujar, M., Garcia, S., Lieblein, R., Cerillo, N., Crawford, C.S., Hunter, C., Gilbert, J.E. (2017). **NeuroSnap: Expressing User’s Affective State with Facial Filters**. HCI International 2017. Status: Accepted.

Invited Talks

- IT.1. **“Brain-Robot Interaction & Applying Block-Based Programming to Neurofeedback Application Development”**, Computer Science Department Colloquium Series, University of Alabama, Tuscaloosa, Alabama, 2016
- IT.2. **“Brain-Robot Interaction & Applying Block-Based Programming to Neurofeedback Application Development”**, Computer Science Department Colloquium Series, University of Alabama, Tuscaloosa, Alabama, 2017
- IT.3. **“Neural Methods of Brain-Robot Interaction”**, ISTEAM Seminar Series, University of Florida, Gainesville, Florida, 2016

Funding

Andujar, A., Crawford, C., Jackson, F. & Gilbert, J.E., Brain-Computer Interface Research & Development, Intel Corp., 8/15/2015 – 8/14/2017, \$300,000.

CURRENT RESEARCH PROJECTS

[Project Team Lead] Applying Block-Based Programming to Neurofeedback Application Development

About: Researching novel ways of designing an intuitive and robust BCI software platform that leverages block-based programming.

PAST RESEARCH PROJECTS

[Project Co-Lead] Brain-Drone Race, University of Florida

About: A competition featuring users' cognitive ability and mental endurance. During this event competitors are required to out-focus opponents in a drone drag race fueled by electrical signals emitted from the brain. (<https://www.youtube.com/watch?v=C0s3w-wqcl8>)

[Project Co-Lead] Brain-Robot Interaction: Mind-Machine Control Over the Web, University of Florida

About: A method to control machines (e.g. drones, humanoids, etc.) over the web with cognitive commands from the user. The idea is to provide flexibility for users to control machines located at their home while they are on the go.

[Project Lead] Gesture & Physiological Driven Visualization, University of Florida

About: Researching novel ways of displaying visualization in real time based on motion and physiological data

[Project Lead] Televoting: An Alternative Approach to Internet Voting for Deployed Military Personnel, University of Florida

About: Developing system that allows military and overseas voters to cast a ballot privately. By coupling live video streaming technology with a secure ballot submitting process, Televoting presents a voting alternative that avoids many of the factors that are responsible for rejected and uncounted ballots.

[Project Member] ARTSI Workshop in a Box: Turnkey solution for providing robotics workshops to middle and high school students, University of Alabama

About: Research aimed at developing a single point resource for those getting started in robotics outreach. Studies and software development was focused on creating effective materials that are accessible to those who may have limited knowledge of robotics or limited experience in middle school outreach.

[Project Member] Multi-robot surveillance simulation: Expectations of autonomy and human intervention in a multi-robot surveillance task, University of Alabama

About: Research investigated several approaches for cooperative surveillance using multiple UAVs. The primary goal of this study was to discover whether an autonomous, semi-autonomous, or manual system perform better for surveillance tasks.

[Project Member] Extending support for the Calliope robot to Player/Stage, University of Alabama

About: Prior to this project the Calliope robot only was supported in the robot platform Tekkotsu. Development was completed to extend support for Calliope to Player, a popular robot control interface.

PAST TEACHING EXPERIENCE

[Web Development Instructor at Clemson University, School of Computing] Teaching Assistant (08/5 – 12/4, 2012)

- Taught a semester-long section (~19 students) of an introductory web development course lab.
 - Responsible for preparing and presenting supplementary lectures and grading
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Service

- **[Reviewer]** IEEE Journal of Biomedical and Health Informatics (2017)
- **[Judge]** Richard Tapia Conference ACM Student Research Competition (2017)
- **[Panel Member]** Richard Tapia Conference AI and Social Responsibility (2017)
- **[Program Committee]** 2nd Block and Beyond VL/HCC Workshop (2017)
- **[Reviewer]** Human-Robot Interaction (HRI), ACM International Conference (2016)
- **[Reviewer]** Conference on Human Factors in Computer Systems (CHI), ACM International Conference (2016)
- **[Program Committee]** 11th International Conference, Human-Robot Interaction International Pioneers Workshop (2016)
- **[Book Reviewer]** Learning JavaScript Robotics, Cassandra Perch (2015)
- **[Lead Instructor]** CodeIT Day STEM engagement outreach program
 - Taught MakeMakey Course, Clemson, SC (2013)
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 - Taught NAO Robot Course, Gainesville, FL (2015)
- **[Mentor]** Helped develop the University of Alabama's Boys and Girls Club virtual mentoring program (2015)
- **[Lead Instructor]** Eastside High School Hour of Code (2015)

- Taught Scratch course, Gainesville, FL (2015)
- **[Reviewer]** Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference (2012)
- **[Instructor]** Finch robot outreach
 - Taught course on programming finch robot using web based educational software I developed (2011)

PROFESSIONAL ORGANIZATIONS

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| • Brain-Computer Interface Society | 2016 – Present |
| • Phi Kappa Phi Honor Society | 2014 – Present |
| • Human-Factors and Ergonomics Society (HFES) | 2012 – Present |
| • Institute of Electrical and Electronics Engineers (IEEE) | 2012 – Present |
| • National Society of Black Engineers (NSBE) | 2008 – Present |
| • Association for Computing Machinery (ACM) | 2008 – Present |