

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)

PUBLICATIONS

Journals

- J.1.** Crawford, C. S., Gilbert, J. E. (2019 – In press) Brains and Blocks: Introducing Novice Programmers to Brain-Computer Interface Application Development, ACM Transactions on Computing Education (TOCE)
- J.2.** 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.** Holloman, A., Egbert, W., Stegman, P., Cioli, N., Crawford, C.S. (2019 – In press). **Leveraging Neurophysiological Information to Augment Interpretation of Responses to Vulnerable Robot Behaviors.** In 2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI), pp. 566-567. IEEE, 2019.
- C.2.** Mines, E., Crawford, C.S. (2019). **Brain Butler: The Proactive Personal Assistant.** In Proceedings of the 2019 ACM Southeast Conference (pp. 273-274). ACM.
- C.3.** Hernandez-Cuevas, B., Sawyers, E., Bently, L., Crawford, C.S., and Andujar, M. (2019 – In press). **Neurophysiological Closed-loop Control for Competitive Multi-Brain Robot Interaction.** In International Conference on Applied Human Factors and Ergonomics. Springer, Cham.
- C.4.** Stegman, P., Crawford, C.S., and Gray, J. (2018). **WebBCI: An Electroencephalography Toolkit Built on Modern Web Technologies.** In International Conference on Augmented Cognition (pp. 212-221). Springer, Cham.
- C.5.** Cioli, N., Holloman, A., and Crawford, C. (2018). **NeuroBrush: An Artistic Multi-Modal, Interactive Painting Competition.** CHI 18' Artistic BCI Workshop, April 22, 2018, Montreal, QC, Canada. Status: Accepted
- C.6.** 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, pp. 32 -37.
- C.7.** 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.8. 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.9. 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.10. Crawford, C.S., Andujar, M., Jackson, F., Applrys, 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.11. 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.12. 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.13. 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.14. 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.15. 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.16. 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.17. 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.18. 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.19. 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. “**Toward Physiological Computing Education**”, Kennesaw State University, Kennesaw, GA, 2019
- IT.2. “**Integrating Brain-Computer Interfaces and Robotics**”, WeRockIt Conference, Huntsville, AL, 2019
- IT.3. “**Brain-Robot Interaction**”, Morgan State University, Baltimore, MD, 2018
- IT.4. “**SIGGRAPH: Brain-Computer Interface for All**”, SIGGRAPH, Vancouver, Canada, 2018
- IT.5. “**Brain-Robot Interaction & Applying Block-Based Programming to Neurofeedback Application Development**”, Talladega College, Talladega, AL, 2017
- IT.6. “**Brain-Robot Interaction & Applying Block-Based Programming to Neurofeedback Application Development**”, Inclusive Making Lecture, Northwestern University, Evanston, IL, 2017
- IT.7. “**Brain-Robot Interaction & Applying Block-Based Programming to Neurofeedback Application Development**”, Computer Science Department Colloquium Series, University of Alabama, Tuscaloosa, Alabama, 2017
- IT.8. “**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.

Crawford, C., Denham, A., Exploring Physiological Computing Education in the Alabama Black Belt, 7/2018 – 7/2020, \$274, 910

Service

Organizing Committees / Panels

- [Program Committee] Human-Robot Interaction (HRI), ACM International Conference (2020)
- [Steering Committee] NSF STEM+C Steering Committee (2019)
- [Program Committee] BCI for Art and Games Workshop (2019)
- [Program Committee] 3rd Block and Beyond VL/HCC Workshop (2019)
- [WIP Co-Chair] International Symposium on End-User Development (2019)
- [NSF Review Panel] (2017, 2018, 2019)
- [Program Committee] 2nd Block and Beyond VL/HCC Workshop (2017)
- [Program Committee] 11th International Conference, Human-Robot Interaction International Pioneers Workshop (2016)

Conference / Journal / Book Service

- [Reviewer], International Conference on Multimodal Interaction (2018)
- [Reviewer] Artistic BCI Book (2018)
- [Reviewer], AAAI (2018)
- [Reviewer] IEEE Journal of Biomedical and Health Informatics (J-BHI) (2017)
- [Reviewer] Human-Robot Interaction (HRI), ACM International Conference (2016, 2017, 2018)
- [Reviewer] Conference on Human Factors in Computer Systems (CHI), ACM International Conference (2016)
- [Book Reviewer] Learning JavaScript Robotics, Kassandra Perch (2015)
- [Reviewer] Intelligent Robots and Systems (IROS), IEEE/RSJ International Conference (2012)

Outreach

- **[Panel Member]**, Conference on Human Factors in Computer Systems (CHI) Mentoring symposium (2018)
- **[Reviewer]**, NeuroTechX Student Competition (2018)
- **[Judge]** Richard Tapia Conference ACM Student Research Competition (2017)
- **[Panel Member]** Richard Tapia Conference AI and Social Responsibility (2017)
- **[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)
- **[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 |
| • Human-Factors and Ergonomics Society (HFES) | 2012 – Present |
| • Institute of Electrical and Electronics Engineers (IEEE) | 2012 – Present |
| • Association for Computing Machinery (ACM) | 2008 – Present |