

ANNIKA MUEHLBRADT

GRADUATE RESEARCHER

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RESEARCH EXPERIENCE

AUTONOMOUS FABRICATION OF EXPERIMENTAL ELECTRONICS | 2020

Implemented a web-based circuit design and manufacturing interface for rapid prototyping of electronics in JavaScript with NodeJS.

Developed an iterative printing method for autonomous 3D printing of functional circuits with new or unknown materials. **(Publication under review).**

REFORM | 2020

Co-investigated the characteristics of F-formations that arise when two or more people engage in a joint activity.

Collected a new dataset for training F-formation detection algorithms and co-developed two new ways to characterize F-formations.

(Publication accepted to IEEE/RSJ IROS).

WHAT'S IN AN ALT TAG? | 2019

Explored methods for generating alt text collaboratively wherein captioners and blind caption consumers work together to generate image descriptions.

Conducted a study using qualitative and quantitative methods to take an in-depth look at the content and quality of captions to formulate what makes a good caption.

Created guidelines for improving automated captioning systems and an open-source dataset of images and good captions. **(Publication under review).**

BRAILLEBLOCKS | 2019

Co-development BrailleBlocks, a set of tangible blocks and pegs, and a game interface for Braille Education.

Assisted in conducting a study to explore how visually impaired children can learn Braille alongside a sighted parent. [\(ACM publication 2020\).](#)

ROBOGRAPHICS | 2019

Assisted in designing dynamic tactile graphics that combine static tactile overlays, a touch screen tablet, and tangible robots.

Assisted in conducting a study to explore how haptic graphics can assist blind adults in exploring graph data, stories, and chemical and biological processes. [\(ACM publication 2019\).](#)

AUDIO-KINETIC GRAPHICS FOR EDUCATION | 2018

Developed a framework to enable educators to create accessible representations of graphical content by combining audio descriptions with kinetic motion.

Created a prototype for authoring and experiencing audio-kinetic graphics and conducted a study with teachers and blind adults to explore how to translate knowledge of visual information to non-visual formats. [\(ACM publication 2018\).](#)

WEARABLE SWIMMING AID FOR BLIND ATHLETES | 2017

Designed and prototyped a wearable swimming aid for blind athletes using a microcontroller, a camera, and the OpenCV computer vision programming library [\(ACM publication 2017\).](#)

EDUCATION

UNIVERSITY OF COLORADO BOULDER

P.h.D. student, Computer Science, 2022

M.S. Computer Science, 2018

COLORADO STATE UNIVERSITY

B.S. Computer Science, 2013

B.S. Applied Computing Technology, 2013
(Minor in Business)

AWARDS

NCWIT Collegiate Award, 2019

[Coleman Institute for Cognitive Disabilities Student Fellowship, 2018](#)

NSF Graduate Research Fellowship Honorable Mentions, 2018

Patricia R. Mohilner Memorial Scholarship, 2013

Otterbox Entrepreneurial Scholarship, 2011

SKILLS

HTML/CSS, JavaScript, NodeJS

PostgreSQL, MongoDB

Python, C#, Java, Arduino

Tableau, JMP

Adobe Photoshop, Illustrator, InDesign

Adobe Premiere Pro, After Effects

Electronics Prototyping

Laser Cutting, 3D Printing

LANGUAGES

English, German

PROFESSIONAL EXPERIENCE

UX RESEARCHER | UNIV. OF COLORADO BOULDER, 2016 - 2017

Conducted user studies about learning in large classrooms with up to 100 students, including contextual inquiries, usability studies, and focus groups resulting in new pedagogical approaches and tools for teaching large lectures.

ENGINEER II | HP INC., 2015 - 2016

Managed third-party integration of graphics cards and drivers, involving directing quality assurance teams, creating benchmarks in C, C++, and C#, and managing release schedule and activities (e.g., integrating drivers into Windows and Linux OS, branding, etc.)

SYSTEMS SOFTWARE ENGINEER | HP INC., 2014 - 2015

Analyzed and optimized performance of virtual desktop solutions by investigating system settings, drivers, firmware, and network architecture to advise on infrastructure requirements for different clients.

SOFTWARE/HARDWARE ENGINEER INTERN | HP INC., 2012 - 2014

Collected and analyzed system performance data to explore software and hardware optimizations for desktop systems.

IT LAB TECHNICIAN | COLORADO STATE UNIV., 2011 - 2012

Managed software deployment for lab computers (e.g., managed group policy and created scripts in Perl and Bash to automated software updates).

SOFTWARE DEVELOPER INTERN | SEMANTIC ARTS INC., 2011

Designed and implemented dynamic visualizations in HTML, CSS, and JavaScript for displaying enterprise architecture ontologies (i.e., large data sets with complex relations)

TEACHING EXPERIENCE

GRADUATE TEACHING ASSISTANT | UNIV. OF COLORADO BOULDER, 2018 - 2020

Instructed complimentary course recitations (labs) for the courses "Fundamentals of Human-Computer Interaction" and "Software Development Methods and Tools" including grading students' work and creating classroom materials such as homework and quizzes.

INSTRUCTOR | UNIV. OF COLORADO BOULDER, 2019

Instructed the course "Software Development Methods and Tools" including lecturing, grading, and creating classroom materials.

PUBLICATIONS

Hedayati, H., Muehlbradt, A., Szafir, D. J., & Andrist, S. (2020). REFORM: Recognizing F-formations for Social Robots. arXiv preprint arXiv:2008.07668.

Gadiraju, V., Muehlbradt, A., & Kane, S. K. (2020, April). BrailleBlocks: Computational Braille Toys for Collaborative Learning. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (pp. 1-12).

Guinness, D., Muehlbradt, A., Szafir, D., & Kane, S. K. (2019, October). RoboGraphics: Using Mobile Robots to Create Dynamic Tactile Graphics. In The 21st International ACM SIGACCESS Conference on Computers and Accessibility (pp. 673-675). ACM.

Guinness, D., Muehlbradt, A., Szafir, D., & Kane, S. K. (2018, November). The Haptic Video Player: Using Mobile Robots to Create Tangible Video Annotations. In Proceedings of the 2018 ACM International Conference on Interactive Surfaces and Spaces (pp. 203-211). ACM.

Muehlbradt, A., Atreya, M., Guinness, D., & Kane, S. K. (2018, October). Exploring the Design of Audio-Kinetic Graphics for Education. In Proceedings of the 2018 on International Conference on Multimodal Interaction (pp. 455-463). ACM.

Kane, S. K., Koushik, V., & Muehlbradt, A. (2018, June). Bonk: accessible programming for accessible audio games. In Proceedings of the 17th ACM Conference on Interaction Design and Children (pp. 132-142).

Muehlbradt, A., Koushik, V., & Kane, S. K. (2017, October). Goby: A wearable swimming aid for blind athletes. In Proceedings of the 19th International ACM SIGACCESS Conference on Computers and Accessibility (pp. 377-378). ACM. ACM.