

SCHOLARSHIP

Jerry Alan Fails

Since arriving at Montclair State University in 2009, I have been actively engaged in research while balancing a 3/3 teaching load with 1-2 hrs/wk of TA support for the CS1 course. The general focus of my research is Human-Computer Interaction (HCI). HCI researchers seek to understand, support, design, and improve the interaction that occurs between people and computational technologies. My specific research focus is to design technologies with and for children and families. Much of my work seeks to promote exploration and enhance collaboration and discourse between children. Many of my current research projects leverage my expertise in mobile computing as well as my experience with databases. Integral to much of my research are the unique interdisciplinary collaborations that facilitate the breadth of expertise necessary to investigate real-world solutions that improve the user experience. By investing in building these interdisciplinary relationships, I have been a major contributor to several interdisciplinary funded grants.

My two main research goals are to improve design methods and techniques, and to innovate and develop new technologies appropriate for children and families. My primary expertise is working with children ages 6-11. In 2009, the year I assumed my tenure-track position at Montclair State University (MSU), I founded an HCI lab that is home to my intergenerational design team (Kidsteam). This team of children (ages 6-11) and adults works together to design and improve technologies with and for children. As design partners, the adults bring needed expertise, as do the children. This process gives children voice in the design of technologies intended to be used by them. Kidsteam meets twice a week during the school year, and has led to many publications and collaborations, which have and promise to yield future publications and funding.

Prior to being at MSU, I was at the University of Maryland (UMD) in the Human-Computer Interaction Lab (HCIL). The HCIL, which celebrated its 31st Anniversary this year, is one of the oldest HCI laboratories in the nation and world, and is known for its rigorous, collaborative and interdisciplinary research. While at UMD in the HCIL, my research focused on developing educational technology projects for young children, highlighting the design and iterative process of creation. Much of this work was with the HCIL Kidsteam, where I assumed several significant roles including the following: leading numerous sessions, working with industry partners (e.g. Microsoft, National Park Service, Fisher Price) to design the methods to be used, facilitating sessions and more.

Recently, through several design sessions with the Kidsteam I direct at Montclair State University, I have developed with my students an app and a platform currently called Geotagger. Geotagger is a citizen science mobile application and online environment for identifying geolocated items of interest, sharing these items, and having collaborative discussions regarding these observations. While designed for children, the application has been deployed in two freshman ecology classes at Montclair State University and Rutgers University. By the end of the year we anticipate having beta Android, alpha iOS, and alpha web versions. Another current project is developing an online innovation community for children and parents where my Kidsteam will share techniques that have worked in the research arena and encourage children to explore innovating with their friends and parents and sharing these innovations in a safe forum. Kidsteam and I have also worked with tangible computing devices including Sifteo cubes and novel input devices such as LeapMotion.

While my primary expertise is in designing technologies with and for children, I have also developed new interactions and interfaces for other user groups including younger children (ages 4-6) and older adults (ages 60+). I am also investigating designing technologies for families by working with families in a participatory manner. HCI and participatory design researchers have illustrated how user-centered design is important for various demographics. In all of my research, my guiding principle is that it is not enough to build technology – technology must make an impact to individuals and society at large, including members of often over-looked demographic groups. I encourage my students to take a similar perspective.

In this quickly evolving world an interdisciplinary approach is a necessity. Computer science research is flourishing in several areas by building intra- and inter-departmental bridges and partnerships with other disciplines and researchers. The interdisciplinary study of HCI affords several promising collaborations with new colleagues. At UMD I had the opportunity to work closely with Dr. Allison Druin and my interdisciplinary doctoral program cohorts on several systems designed for children including Tangible Flags and Mobile Stories. I also worked on an information visualization project with Dr. Ben Shneiderman and designed, built, and evaluated a mouse for older adults with Dr. François Guimbretière. While here at Montclair State University I have collaborated with colleagues in Computer Science, Ecology, Biology, Children Services, Education, and more.

While collaborating within my field and with other colleagues is essential, students also play a critical role in my research. Teaching and mentoring enhance research. By sharing examples from my research and research field, students not only see applications of the principles, but also begin thinking about creating new technologies and expanding the field of research. Students may present interesting new ideas or express interest in pursuing research, which opens doors to mentoring opportunities and hands-on research experience. At Monclair State University I have mentored more than twenty undergraduate students, and eight Master's students.

A good portion of my research involves mobile devices. In the last decade mobile devices have emerged as the computing platform of the future. Three quarters of the world's population has access to a mobile phone. In the U.S. more than half of these phones are smartphones. Although mobile devices are commonplace, mobile devices have several limitations due mainly to their size; these limitations impact their utility. I believe some of these limitations can be mitigated and others leveraged to create strengths. In this time of widespread distribution, collaborative interfaces can help overcome these perceived weaknesses. In my research I have investigated collaborative interfaces and will continue research in this area.

Since 2009, I have published five journal articles, a book chapter, seven peer reviewed (double-blind) full conference papers, four workshop and short papers, and I have co-taught a tutorial about designing with and for children at every ACM SIG-CHI since 2008. One of my conference papers was co-authored with an undergraduate student. One of my journal articles has been identified by the journal as being the most cited article from that journal. In total I have more than 20 peer reviewed scholarly outputs, and others that were invited. I have mentored more than twenty undergraduate students, and eight Master's students.

I am actively engaged in attaining and seeking funding. I have acted as Co-PI or Senior Personnel on grants totaling more than \$4,000,000. I am actively pursuing other opportunities, and have submitted proposals as PI, Co-PI or Senior Personnel that have not yet been funded seeking total funds for an additional \$4,000,000. Currently I am working with collaborators on proposals to be submitted in the next year for interdisciplinary projects in the citizen science arena (with collaborators in computer science and biology) and technological exploratory math education environments (with collaborators in math education).

In the next five years, I anticipate further exploring technologies designed with and for children and families. I will continue to explore citizen science technologies that encourage children to explore, observe, collaborate, and understand and explain the natural world. I will also continue to build interdisciplinary relationships to help address the hard problems that require expertise from various perspectives. I look forward to continuing to innovate design methods and technologies for children and families.

Envisioning the future and making the future become reality is the role of academic research in Computer Science. Frequently assessing oneself and thoughtfully processing critical feedback is instrumental in polishing research. Research, like personal progress, is an iterative process of constantly reflecting, reviewing, designing, creating and evaluating. This is a process I enjoy, and I look forward to continuing to contribute to my specific field of research and the HCI and CS communities.