

interests

human-computer interaction, social computing, physiological sensing, mixed reality, social connection

education

2015 - 2020

Ph.D. & M.S. in Human-Computer Interaction

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA

Ph.D. Thesis: *Fostering Social Connection through Expressive Biosignals*

Committee: Laura Dabbish (co-chair), Geoff Kaufman (co-chair), Mayank Goel, John Tang

2009 - 2014

M.S.E. in Computer Graphics and Game Technology

B.S.E. in Digital Media Design

University of Pennsylvania, School of Engineering and Applied Science, Philadelphia, PA

Advisors: Norman Badler, Stephen Lane

experience

2020 - 2022

Research Scientist, Snap Inc.

HCI Research Team, New York, NY

- Led research involving teams of research scientists, engineers, designers, and product managers on novel technologies that promote self-expression and social presence
- Conducted research on digital handcrafting in AR [c1], understanding AR activism [c3], and disability representation in avatars [in submission], eliciting design recommendations for AR and avatar platforms such as Lens Studio and Bitmoji
- Presented findings and design insights to the CTO, product teams, and the academic community
- Mentored and collaborated with Ph.D. interns from interdisciplinary backgrounds, and academic research teams studying co-located social AR [c2, w1]
- Provided internal consultancy to research and product teams for user research best practices

2015 - 2020

Researcher, Human-Computer Interaction Institute

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA

- Designed, developed, and deployed interventions that facilitate social connection through sensed physiological data that convey emotional experiences [c4-c9]

2018 - 2020

Research Intern, Snap Inc.

HCI Research Team, Seattle, WA, Mentor: Andrés Monroy-Hernández

- Designed and developed Significant Otter, an Apple Watch app that enables sharing sensed context through biosignals-driven playful avatars. Featured on the Apple app store and Product Hunt, with more than 60,000 installations [Summer 2019-Spring 2020]
- Designed and developed Animo, a Fitbit Versa app that enables heart rate sharing with close others [Summer 2018]
- Conducted field studies with couples who used Significant Otter [3] and Animo [5], showing that smartwatch communication with biosignals can enhance authentic social connection and presence

2014 - 2015

Software Engineer, LinkedIn

Content Ingestion Team, New York, NY

- Developed backend infrastructure for ingesting content from third party websites within LinkedIn
- Supported over 300 million LinkedIn users through content shared on the news feed, user profiles, and the Pulse application

2012 - 2013

Research Assistant, SIG Center for Computer Graphics

University of Pennsylvania, Computer and Information Science, Philadelphia, PA

- Developed motion filtering tool for editing motion capture data for virtual characters
- Conducted a user study on animated characters edited using the tool, revealing the effects of posture and dynamics on perceptions of emotion and emotion intensity, respectively [c10]

publications

conference
proceedings

- c1. Zhang, L., Chen, T., Seow, O., Chong, T., Kratz, S., Tham, Y.J., Monroy-Hernández, A., Vaish, R. & **Liu, F.** (2022). Auggie: Encouraging Effortful Communication through Handcrafted Digital Experiences. To appear in *Proceedings of the ACM on Human-Computer Interaction (CSCW 2022)*.
- c2. Epstein, D., **Liu, F.**, Monroy-Hernández, A., & Wang, D. (2022). Revisiting Piggyback Prototyping: Examining Benefits and Tradeoffs in Extending Existing Social Computing Systems To appear in *Proceedings of the ACM on Human-Computer Interaction (CSCW 2022)*.
- c3. Silva, R. M.L., Cruz, E. P., Rosner, D.K., Kelly, D., Monroy-Hernández, A., & **Liu, F.** (2022). Understanding AR Activism: An Interview Study with Creators of Augmented Reality Experiences for Social Change. *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI 2022)*.
- c4. **Liu, F.**, Park, C., Tham, Y., Tsai, T., Dabbish, L., Kaufman, G., & Monroy-Hernández, A. (2021). Significant Otter: Understanding the Role of Biosignals in Communication. *Proceedings of the ACM CHI Conference on Human Factors in Computing Systems (CHI 2021)*.
Best Paper Honorable Mention.
- c5. **Liu, F.**, Kaufman, G., & Dabbish, L. (2019). The Effect of Expressive Biosignals on Empathy and Closeness for a Stigmatized Group Member. *Proceedings of the ACM on Human-Computer Interaction (CSCW 2019)*. 3, 201.
- c6. **Liu, F.**, Esparza, M., Pavlovskaja, M., Kaufman, G., Dabbish, L., & Monroy-Hernández, A. (2019). Animo: Sharing Biosignals on a Smartwatch for Lightweight Social Connection. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp 2019)*. 3(1),18.
- c7. **Liu, F.**, Dabbish, L., & Kaufman, G. (2017). Can Biosignals be Expressive? How Visualizations Affect Impression Formation from Shared Brain Activity. *Proceedings of the ACM on Human-Computer Interaction (CSCW 2018)*. 1, 71.
- c8. **Liu, F.**, Ford, D., Parnin, C. & Dabbish, L. (2017). Selfies as Social Movements: Influences on Participation and Perceived Impact on Stereotypes. *Proceedings of the ACM on Human-Computer Interaction (CSCW 2018)*. 1, 72.
- c9. **Liu, F.**, Dabbish, L., & Kaufman, G. (2017). Supporting Social Interactions with an Expressive Heart Rate Sharing Application. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (UbiComp 2017)*, 1(3), 77.
- c10. Normoyle, A., **Liu, F.**, Kapadia, M., Badler, N. I., & Jörg, S. (2013). The effect of posture and dynamics on the perception of emotion. *Proceedings of the ACM Symposium on Applied Perception (SAP 2013)*, (pp. 91-98). ACM.

doctoral
symposium

- d1. **Liu, F.** (2019). Expressive Biosignals: Authentic Social Cues for Social Connection. *Proceedings of the ACM CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI 2019 Doctoral Consortium)*.

workshop
papers

- w1. Mahajan, S., McDonald, D.Q., Vallet, R., **Liu, F.**, Smith, G., & Solovey, E.T. (2022). Concept Design for Family Well-being with Knitted Touch Sensors and Augmented Reality. In *Workshop on Tangible Interaction for Supporting Well-being (CHI 2022 Workshop)*.
- w2. **Liu, F.**, Dabbish, L., & Kaufman, G. (2018). Biosignals-Driven Expressivity in Virtual Reality Avatars. In *Workshop on Novel Interaction Techniques for Collaboration in VR (CHI 2018 Workshop)*.
- w3. **Liu, F.**, Kaufman, G., & Dabbish, L. (2016). Design Considerations for Expressive Biofeedback in Social Interactions. In *Workshop on Collocated Interaction: New Challenges in 'Same Time, Same Place' Research (CSCW 2016 Workshop)*.

skills

Methods

Interviews, Surveys, Field Studies, Prototyping, Experimental Design, Usability Testing, Contextual Inquiry, Storyboarding, Design Sprint, Game Design, Data Visualization

Programming

Java, Python, JavaScript, HTML, CSS

Software

Adobe Creative Suite, Figma, Sketch, Unity, Autodesk Maya, SPSS, Atlas.ti, NVivo

teaching

- 2020 **Teaching Assistant, 05-410/05-610: User-Centered Research & Evaluation**
Carnegie Mellon University, School of Computer Science, Pittsburgh, PA
Led a recitation of 18 students, created section lectures, held office hours, and graded assignments.
- 2016 - 2019 **Research Advisor, Human-Computer Interaction Institute**
Carnegie Mellon University, School of Computer Science, Pittsburgh, PA
Advised 24 Masters and undergraduate students (including majors in Computer Science, Design, Art, Architecture, and Cognitive Science) on projects for understanding and designing systems that integrate biosignals into social contexts, including mobile applications, visualizations, desktop chat systems, and interactive virtual reality experiences.
- 2018 **Teaching Assistant, 05-430/05-630: Programming Usable Interfaces**
Carnegie Mellon University, School of Computer Science, Pittsburgh, PA
Led a lab section of 44 students, created lab lessons and homework assignments, held office hours, and graded assignments and exams.
- 2014 **Teaching Assistant, CIS660: Advanced Computer Graphics**
University of Pennsylvania, School of Engineering and Applied Science, Philadelphia, PA
Graded assignments and held office hours.
- 2011 - 2014 **Head Teaching Assistant, CIS110: Introduction to Computer Programming**
University of Pennsylvania, School of Engineering and Applied Science, Philadelphia, PA
Managed and assigned duties to TAs, planned staff meetings, organized TA training and retreat. Led a lab section of 20 students, held office hours, graded assignments and exams.

services

- 2017 - present Reviewer: CHI, CSCW, DIS, IMWUT, UIST, PLOS ONE, TEI
- 2018 - 2019 Women@SCS: PhD Board Member, Grad/Undergrad Mentoring Event Organizer
- 2018 Student Volunteer: CSCW (SV t-shirt competition winner)
- 2016 - 2020 Webmaster: eheart lab

honors

- 2019 Grace Hopper Celebration Student Scholarship
- 2018 CMU Center for Machine Learning and Health Fellowship in Digital Health
- 2017 Snap Research Fellowship Honorable Mention
- 2017 CMU Presidential Fellowship
- 2016, 2017 NSF GRFP Fellowship Honorable Mention

invited talks

- 2022 Princeton HCI Seminar, Princeton University
"Fostering Social Connection over Technology"
- 2020 UX Industry Seminar, Birmingham City University
"Fostering Social Connection over Technology"
- 2019 Digital Media: Telepresence, Empathy, and Spatial Immersion class, Harvard University
"Fostering Social Connection through Expressive Biosignals"
- 2019 Center for Machine Learning and Health Fellow Day, Carnegie Mellon University
"Leveraging physiological data to promote social connection for positive well-being"
- 2019 DUB Seminar, University of Washington
"Expressive Biosignals: Lightweight Cues for Social Connection"
- 2019 Innovation with Impact, Carnegie Mellon University
"Enhancing Expressivity in Virtual Reality with Biosignals"