

KEFAN XU

Ph.D. Student, Human-Centered Computing, Georgia Tech
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EDUCATION

	Georgia Institute of Technology	
2022 – Present	Ph.D. Student, Human-Centered Computing, 4.0/4.0 Advisor: Dr. Rosa Arriaga	Atlanta, GA, U.S.
	University of Michigan	
2019 – 2021	M.S., Information Science, 4.0/4.0 Advisor: Dr. Mark W. Newman	Ann Arbor, MI, U.S.
	New York University	
2015 – 2019	B.S. Data Science B.S. Interactive Media Arts (Doubled), 3.59/4.0	New York City, NY, U.S. Shanghai, China

PUBLICATIONS

Xu, K., Yan, X. and Newman, M.W. 2022. Understanding People's Experience for Physical Activity Planning and Exploring the Impact of Historical Records on Plan Creation and Execution. CHI Conference on Human Factors in Computing Systems (New Orleans LA USA, Apr. 2022), 1-15.

[In Submission] **Xu, K.**, Yan, X., Newman, M.W., and Arriaga, R.I. 2023. Rethinking Self-Experimentation: Understanding the Effect of Reflective Iteration on Individuals' Physical Activity Planning

[In Submission] Evans, H.I., Ryu, M., Hsieh T., Zhou, J., **Xu, K.**, Akers, K.W., Sherrill, A.M. and Arriaga, R.I. 2023. Using Sensor-Captured Patient-Generated Data to Support Clinical Decision-making in PTSD Therapy

AWARDS

2022	Google Health Equity Research Initiative Google
2021	IHPI/HSR Summer Student Fellowship University of Michigan
2019	NYU Founders Day Award New York University
2016	Tel Aviv University Summer Scholar Program Tel Aviv University

RESEARCH EXPERIENCE

	Graduate Research Assistant School of Interactive Computing, Georgia Tech	
2022 – Present	Researcher in the Ubicomp Health and Wellness lab , investigating supporting low-SES population with diabetes foot ulcers (DFU) , as part of an ADA Grant .	Atlanta, GA, U.S.

Graduate Research Assistant | School of Information, University of Michigan

2019 - 2022

Ann Arbor, MI, U.S.

Student researcher, developed low-burden **experience sampling method (ESM)** for **older adults** with chronic fatigue.

Research Intern | Michigan Medicine, University of Michigan

2021 - 2022

Ann Arbor, MI, U.S.

Student research intern, developed web platform, **Taperology**, to facilitate clinicians' taper theory for **benzodiazepine misuses**.

Research Intern | College of Design and Innovation, Tongji University

2018

Shanghai, China

Student research intern in the **iDVX lab**, developed and evaluated a **facial expression dataset**, which helps generate personas for designers.

RESEARCH PROJECTS

Diabetes Ubiquitous Computational Sensing System (DUCSS)

2022 - Present

Collaboration with
Emory University and
Grady Memorial
Hospital

User Study Design: Designing user studies to uncover diabetes patients' self-management challenges, utilizing a user-centric approach. **Caregiver-Patient Dynamics:** Exploring caregiving dynamics in diabetes management, illuminating collaborative aspects. **Sensor Tech Development:** Leading the creation of patient-empowering sensors and mobile technologies, bridging clinical and patient spheres. **Self-Management Systems:** Innovating systems enhancing diabetes patients' self-management practices and patient-clinician communication.

Understanding the Effect of Iterative Reflection on Individuals' Weekly Planning of Physical Activity

2021 - 2023

Collaboration with
University of
Michigan

[In Submission]

Framework Implementation: Integrated the conceptualized physical activity planning framework within the functional Planneregy app. **Deployment:** Managed the seamless deployment of the Planneregy app via Apple's TestFlight service, ensuring efficient testing. **Usability Studies:** Carried out comprehensive usability studies to assess the app's user-friendliness and effectiveness. **42-Day User Study:** Orchestrated a 42-day user study, dedicated to assessing user experiences within the newly proposed framework. **HCI Paper and Design Insights:** Summarized the results of the 42-day study into an HCI paper, offering valuable design insights for prospective research endeavors.

FITBIT as Tech Probe: Understanding how Personal Tracking Devices can Promote Physical Activity in Low-SES Older Adults

2022 - Present

Funded by Google
Health Equity
Initiative

Barrier Analysis: Examined the obstacles faced by low technology literacy individuals when engaging with technology. **Design Evaluation:** Evaluated design methodologies intended for low technology literacy users, pinpointing their strengths and limitations. **Refined Design Approach:** Developing a methodology for crafting technology solutions that are intuitive and accessible to individuals with limited technology literacy. **Prototyping and Evaluation:** Designing and deploying functional technology prototypes to empirically evaluate the proposed design principles, ensuring their effectiveness for low technology literacy populations.

Prolonged Exposure Collective Sensing System (PECSS)

2022 - Present

Collaboration with
Emory University

Patient Insight: Delved into PTSD patients' practices, uncovering their treatment experiences. **Clinical Workflow Analysis:** Studied step-by-step clinical procedures of Prolonged Exposure therapy, grasping the treatment process. **Clinician-Facing Tool Development:** Designed, evaluated, and implemented tools for clinicians, optimizing patient management and treatment strategies. **Patient-Facing Tool Creation:** Creating, assessing, and deploying patient tools, aiding Prolonged Exposure therapy and clinician communication.

Understanding Individual's Sense Making in Contextual Situated Sedentary Behavior Data

2022 – Present

Collaboration with
University of
Michigan

User Study Design: Designing user studies aimed at unveiling the diverse ways in which individuals make sense of their physical activity data. **Sensor Utilization Investigation:** Probing the feasibility and utility of various sensors in capturing holistic information about people's physical activity. **ESM Refinement:** Refining existing Experience Sampling Methods to encompass richer annotated data, enabling a more accurate depiction of individuals' physical activity habits. **System Development:** Conceptualizing and deploying a system that seamlessly amalgamates physical activity data, empowering individuals to gain comprehensive insights into their activity levels.

Understanding the Dynamics of Chronic Disease Family Caregiving Experience: Using Caregiving Reddits as a Probe

2022 – Present

Subreddit Exploration: Conducted analysis of posts originating from caregiving subreddits, unraveling the multifaceted nature of enduring informal caregiving encounters. **Initial Post Compilation:** The meticulous compilation of 120 foundational posts was achieved by tapping into four distinct caregiving forums and their accompanying comments. **Author-Driven Continuity:** Pursued an author-centric approach, further harvesting relevant posts spanning their caregiving journey, sequenced in chronological order. **Qualitative and Quantitative Insight:** My research delves into both qualitative and quantitative realms, parsing these posts to elucidate the fluid dynamics characterizing caregiving experiences.

Examining the Effect of Summary of Historical Planning Data on People's Planning and Execution of Subsequent Daily Physical Activity

2021 – 2022

Accepted by
CHI2022

Examined people's experiences of planning regular moderate aerobic exercises with historical planning records. **App Development:** Developed an iOS application named Physicify, empowering users to strategize physical exercise plans and reflect on prior planning histories. **Two-Stage User Study Design:** Designed a two-phase user study, assessing participants' exercise planning encounters with and without historical data. **28-Day User Study Implementation:** Conducted a 28-day user study with seventeen participants, aiming to glean qualitative insights into Physicify's utilization. **Findings and Insights:** Findings suggested historical planning records could effectively shape future exercise plans by establishing connections between past failures and identifying uncertainty levels in forthcoming schedules.

Leveraging large-scale national data to understand, reduce, and prevent benzodiazepine-related harms among older adults

2021 – 2022

Website Design and Deployment: Designed and deployed a clinician-facing website, aiming to enhance communication regarding benzodiazepine misuse between clinicians and patients. **Algorithm Design:** Conceptualized and devised the taper calculator algorithm, empowering clinicians to formulate tailored taper schedules for their patients. **Tracking Mechanisms Development:** Crafted tracking mechanisms that enabled clinicians to closely monitor patients' progress during the tapering process. **Interview-Based Assessment:** Conducted interviews with clinicians, soliciting their insights and experiences, in order to gauge the efficacy of the website in routine care.

Low-burden Activity Pacing for Chronic Fatigue Self-Management

2019 – 2022

ESM Refinement: Developed seven reporting mechanisms (Proactive, Signal-Based, Event-Based, Post-Activity, Time-Based, Context-Based, CAR) inspired by self-tracking literature. Designed low-burden hybrid Experience Sampling Methods (ESM) solutions for limited energy individuals. **Cardiac Rehab Exploration:** Investigated activity practices of cardiac rehab patients, informed mobile app development incorporating activity pacing. **Chronic Condition Management:** Devised recurrent tracking-reflection mechanism aiding daily energy management for chronic conditions. **Prototypes Development:** Crafted mobile app prototypes aligned with the recurrent mechanism concept. **Activity Pacing Development:** Implemented "Pace to Plan" platform using React Native and Google Firebase, enhancing health experiences through HCI.

Intelligent Design of Emotional Expression Sketches in Storyboards

2018 **Facial Sketch Dataset Design:** Created FaceX dataset, containing five million vector-drawing sketches for Sketch-RNN neural networks. Emotional Expression Generator: Utilized FaceX for training EmoG, a Sketch-RNN-based emotional expression generator. **User Study & Evaluation:** Recruited 21 participants for a user study on EmoG's use in emotional storyboard creation. **Effectiveness Assessment:** Evaluated EmoG's efficiency in accurately conveying emotions in storyboards. Quantitative analysis via ANOVA tests. **Ease of Use and Effectiveness:** Demonstrated EmoG's user-friendliness and efficacy in creating expressive drawings.

REVIEWER

2022 **IEEEICHI2022**

2022 **CHI 2022 Late-Breaking Work**

MENTORING EXPERIENCE

2022 - 2023 **Diptark Bose | Master Student | Now Software Development Engineer at Apple**
Supervised Diptark in developing the PECSS platform for veterans with PTSD.

2022 - 2023 **Hao Yuan | Master Student | Now PhD Student at the Drexel University**
Supervised Hao in conducting user recruitment and users studies with diabetes foot ulcer patients.

2022 - 2023 **Abhinav Thukral | Master Student | Now UX Designer**
Supervised Abhinav in developing DUCSS platform for clinicians and patients to monitor diabetes foot ulcers.

2022 - Present **Cynthia Baseman | Master Student**
Supervising Cynthia in developing study protocols to understand the experience of DFU patients and their caregivers.

2023 - Present **Austin Rubinger | Undergraduate Student**
Supervising Austin in collecting and analyzing Reddit content posted by informal caregivers.

2023 - Present **Nikita George | Undergraduate Student**
Supervising Nikita in collecting and analyzing Reddit content posted by informal caregivers.

TALK

2023 **CRIDC Poster Competition 2023**

SKILLS

RESEARCH

Interviews • Co-Design • Grant Writing
Thematic Analysis • Literature
Review • Contextual Inquiry
Focus Group • Usability Evaluation
Affinity Mapping • User-Centered
Design • Ethnographic Research
Prototyping and Interaction Design
User Personas and Scenarios
Cross-Cultural Research

TOOLS

Unity • Git • Jupyter Notebook
Visual Studio Code • Xcode
Adobe Creative Suite
(Ai, Ps, Ae, Au, An, Pr)
Sketch • Invision • Figma
Tableau • NVivo
Hype 3 • Microsoft Office

LANGUAGES

Python • Java • C++
C# • Swift • HTML / CSS
/ JavaScript • React
Native • Processing • R
MySQL • d3.js • p5.js
ARKit • TensorFlow

KOWNLEDGE

Information Visualization • Databases
Develop Mobile Experience
UI/UX Design • AR/VR
Fundamental Human Behavior
Design Consumer Health Technology
Graphic Design • Motion Design
Interaction Design • 3D Modeling