Shwetha Rajaram

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University of Michigan, Ann Arbor
School of Information

Overview

I am an HCI systems researcher and PhD candidate at the University of Michigan School of Information, where I am advised by Dr. Michael Nebeling.

As we approach the everyday use of augmented reality (AR), **my research explores how to enable safer and more privacy-friendly AR experiences for end-users and bystanders**.

In a first thread of research, **I develop AR authoring tools and design frameworks** that equip AR designers and developers with tools **to mitigate potential security & privacy (S&P) harms**. My prior work explores the design of S&P-informed interaction techniques for multi-user AR scenarios [C4] and incorporating an implicit threat modeling process within AR prototyping tools [C5].

In a second thread of ongoing work, **I am developing techniques to aid end-users' privacy decision-making** as they use AR in always-on scenarios and dynamic contexts. Specifically, I am exploring generative AI and human-AI collaboration techniques to elicit users' privacy preferences and determine ideal configurations of AR interfaces that balance usability and privacy goals.

Research interests: human-computer interaction (HCI), augmented & virtual reality (AR/VR), usable security & privacy, human-AI collaboration

Education

University of Michigan, Ann Arbor — SEPT 2020 - present
Ph.D. in Information
Advisor: Prof. Michael Nebeling

**completed a year of coursework in the UM School of Information Masters program (with a full scholarship), before matriculating to PhD* — SEPT 2019 - MAY 2020

B.S.E. in Computer Science & Engineering — SEPT 2015 - MAY 2019

Publications

Peer-Reviewed Full Papers

[C7] Shwetha Rajaram*, Nels Numan*, Bala Kumaravel, Nicolai Marquardt, Andrew D. Wilson. **BlendScape: Enabling End-User Customization of Video-Conferencing Environments through Generative AI.** — UIST 2024

[C6] Nels Numan*, Shwetha Rajaram*, Bala Kumaravel, Nicolai Marquardt, Andrew D. Wilson. **Creating Context-Rich Collaborative Spaces Through Generative 3D Scene Blending.** — UIST 2024

[C5] Shwetha Rajaram, Franziska Roesner, Michael Nebeling. **Reframe: An Augmented Reality Storyboarding Tool for Character-Driven Analysis of Security & Privacy Concerns.** — UIST 2023

[C4] Shwetha Rajaram, Chen Chen, Franziska Roesner, Michael Nebeling. **Eliciting Security & Privacy-Informed Sharing Techniques for Multi-User Augmented Reality.** — CHI 2023

[C3] Shwetha Rajaram, Michael Nebeling. **Paper Trail: An Immersive Authoring System for Augmented Reality Instructional Experiences.** — CHI 2022

[C2] Michael Nebeling, Shwetha Rajaram, Liwei Wu, Yifei Cheng, Jaylin Herskovitz. **XRStudio: A Virtual Production and Live Streaming System for Immersive Instructional Experiences.** — CHI 2021

[C1] Michael Nebeling, Maximillian Speicher, Xizi Wang, Shwetha Rajaram, Brian D. Hall, Zijian Xie, Alexander R. E. Raistrick, Michelle Aebersold, Edward G. Happ, Jiayin Wang, Yanan Sun, Lotus Zhang, Leah E. Ramsier, Rhea Kulkarni. **MRAT: The Mixed Reality Analytics Toolkit.** — CHI 2020 Best Paper Award

Peer-Reviewed Journal Articles

[J1] Abraham Mhaidli, Shwetha Rajaram, Selin Fidan, Gina Herakovic, Florian Schaub. **Manipulation In VR Marketing: A Content Analysis Of Virtual Reality Marketing Experiences.** — IEEE Security & Privacy, 2023

Workshop Papers

[W4] Shwetha Rajaram. **Enabling Safer Everyday Augmented Reality Experiences: Usable Privacy Interventions for AR Creators and End-Users.** — UIST 2024 Doctoral Symposium

[W3] Shwetha Rajaram, Michael Nebeling. **Balancing Accessibility and Privacy Considerations in the Design of AR Assistive Technologies.** — CHI 2024

[W2] Shwetha Rajaram, Michael Nebeling. **Extending AR Authoring Tools with Built-in Support for Privacy and Security Analysis.** — CHI 2022

[W1] Shwetha Rajaram, Franziska Roesner, Michael Nebeling. **Designing Privacy-Informed Sharing Techniques for Multi-User Augmented Reality.** — SOUPS 2021

Professional Experience

Meta Reality Labs Research, Toronto, ON, Canada — MAY 2024 - AUG 2024
Mentor: Christopher Collins

Microsoft Research, Redmond, WA — MAY 2023 - AUG 2023
Research Intern
Mentors: Andy Wilson, Nic Marquardt, Bala Kumaravel
Topic: Generative AI techniques to facilitate collaboration

JP Morgan Chase, Jersey City, NJ — JAN - DEC 2018
Software Engineering Intern

John Deere, Moline, IL — MAY - AUG 2017
Information Technology Intern

Teaching Experience

University of Michigan, Ann Arbor

Graduate Student Instructor, SI 659: Developing AR/VR Experiences — 2022, 2024

Graduate Student Instructor, SI 559: Introduction to AR/VR Application Design — 2021, 2023

Instructional Aide, EECS 493: User Interface Development 2019

Scholarships & Awards

University of Michigan Rackham Predoctoral Fellowship SEPT 2024- AUG 2025

ACM-Women Scholarship FEB 2023

CHI 2020 Best Paper Award MAY 2020

Society of Women Engineers Outstanding Collegiate Member OCT 2019

MLK Spirit Award, UM College of Engineering JAN 2019

Service

Assistant to Program Chairs

UIST 2021

Reviewing

ACM Conference on Human Factors in Computing Systems **(CHI)** 2021-2024
Full Papers & Late-Breaking Work

ACM Symposium on User Interface Software and Technology **(UIST)** 2023-2024

ACM Conference On Computer-Supported Cooperative Work And Social Computing **(CSCW)** 2023-2024

ACM Designing Interactive Systems **(DIS)** 2023

IEEE International Symposium on Mixed and Augmented Reality **(ISMAR)** 2021-2024

IEEE Conference on Virtual Reality and 3D User Interfaces **(IEEE VR)** 2024

Leadership & Outreach

Washtenaw Elementary Science Olympiad (WESO) SEP 2011 - present
Event Supervisor

Society of Women Engineers (SWE) at UMich APR 2016 - APR 2019
President, Executive Board
Secretary, Executive Board
Summer Engineering Exploration Camp Director
Elementary Outreach Officer

Women+ Excelling More in Mathematics, Engineering and Science (F.E.M.M.E.S.) APR 2016 - present
Website Developer
Grants Manager
STEM Activities Coordinator

Academic Mentoring

Master Thesis supervision

Anhua Wu, University of Michigan School of Information *(Masters)* AUG 2024 – present

Research Assistants

Macarena Peralta, University of Michigan Computer Science *(Undergraduate)* NOV 2022 – present

Chen Chen, University of Michigan School of Information *(Masters)* JUN 2021 - APR 2022

Jihee Yoon, University of Michigan School of Information *(Masters)* JAN 2022 - APR 2022

Sereen Kallerackal, University of Michigan School of Information *(Masters)* FEB - APR 2021

Maya Subramanian, University of Michigan Computer Science *(Undergraduate)* JAN - MAR 2021

I Hun Chan, University of Michigan Computer Science *(Undergraduate)* JAN - MAR 2021

Skills

Research Methods: HCI systems research, mixed-methods user studies, user-driven elicitation, interviews, focus groups

Programming Languages: C#, HTML/Javascript, Python

AR/VR Technologies
SDKs: Unity Engine (ARFoundation, Vuforia, MRTK) and A-Frame
Devices: mobile AR, HoloLens 1/2, Meta Quest, Windows Mixed Reality headsets

Generative AI Technologies: developed interactive systems using image generation techniques (Stable Diffusion) and large language models (GPT)

Coursework

Ph.D. Courses

Privacy in Information Technology, Human-Computer Interaction, Research Methods, Human-AI Interaction, Algorithms & Societal Implications, Introduction to Statistics and Data Analysis, Information Science Theory, Educational Technology Design

Masters in Information Courses

Developing AR/VR Experiences, Engineering Interactive Systems, Contextual Inquiry, Graphic Design, Fundamentals of Human Behavior, Game Development Research, Independent Study (AR/VR)

Selected Undergraduate Courses

Game Development, User Interface Development, Web Systems, Intro to Computer Security, Intro to Machine Learning, Data Structures and Algorithms, Intro to Computer Organization, Computer Science Theory, Interaction Design, Drawing