Chandrika **Mukherjee**

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About Me

• Ph.D. student skilled in integrating qualitative and quantitative research methods, leveraging a background in software engineering and machine learning to assess security and privacy limitations in emerging systems, and develop solutions that enhance user experience.

• Incoming Systems & Infra SWE PhD Intern @ Meta (Summer '25).

Programming Languages

C++ • C • Python • R • Javascript • React • Java • C# • SQL

Tools and Frameworks

TensorFlow • PyTorch • Keras • Pandas • Scikit-Learn • Unity • A-Frame • GraphQL • Git • Qualtrics

Methods

Survey Development • Inferential Statistics • System Design • Usability Testing • Machine Learning

Research Area Experience

Usable Security and Pirvacy • Human-Computer Interaction • Digital Safety • Extended Reality (VR/AR/MR)

Researh Publications

[1] *Shadowed Realities: An Investigation of UI Attacks in WebXR, [USENIX Security Symposium, 2025]*
Chandrika Mukherjee, Reham Mohamed, Arjun Arunasalam, Habiba Farrukh, and Z. Berkay Celik

[2] *StareToPair: Gesture-based Group Pairing for Mixed Reality, [In Submission]*
Reham Mohamed, **Chandrika Mukherjee**, Habiba Farrukh, Antonio Bianchi, and Z. Berkay Celik

[3] *On designing a fast-deployable 'localized' GIS platform for using 'offline' during post-disaster situation, [**EmeRTeS workshop in ICDCN**, 2019]*
Partha Sarathi Paul, **Chandrika Mukherjee**, Bishakh Chandra Ghosh, Sudipta Pandit, Sujoy Saha, Subrata Nandi

Experience

Usable Security & Privacy/HCI Researcher — **Aug. 2023-Current**
Purdue University · West Lafayette, IN

- Investigating user perception of UI attacks in WebXR within the advertising ecosystem.
  - Identified five novel UI attacks and developed a four-category taxonomy for such attacks within the **WebXR ad ecosystem**, highlighting contributing UI properties.
  - Developed a **spatial logging framework** for WebXR and a suite of metrics for data collection and quantitative analysis to assess impact through user studies.
  - Conducted a 100-participant, in-lab **between-subjects** user study using both **qualitative** and **quantitative** methods to investigate user perceptions of identified attack categories and their impact on interaction behavior across diverse application types (e.g., gaming, shopping, reading, travel).
- Secure group pairing of co-located Mixed Reality (MR) headsets addressing potential adversarial threats.
  - Developed a novel **localization system** for pairing **mixed-reality (MR)** headsets, using eye-tracking, hand-tracking **sensor signals** and spatial anchors.
  - Designed a high-entropy random hand gesture generator by fixing position of a 2D gesture grid in world coordinates and detecting hand positions from the **camera view** to defend against replay attacks.
  - Designed a **CNN-LSTM** network that learns distinct features from eye tracking and IMU **sensor data** to detect synthetic data, securing the pairing process against adaptive adversaries.
  - Designed and conducted in-lab **user studies** to evaluate the system's success rate, scalability, and usability.

Software Engineering Intern — **May 2022 - August 2022**
Meta · NYC, USA

- Worked on a **privacy-focused infra** team within **Messenger**.
  - Developed a UI tool for detecting sensitive database access within code blocks, enabling the team leads to ensure data privacy prior to production release.
  - Built another UI tool to map data flows across Meta's privacy assets, enhancing transparency and control.

Software Engineer — **July 2019 - August 2021**
HSBC · Pune, India

- Worked as a **full-stack Java developer** on a credit monitoring product used by relationship managers at HSBC.
  - Developed features including automated email and SMS notifications for credit limit approval status, rate calculations for customer portfolios, rule assignments for securities in the daily batch process, and credit summaries using JasperReports.
  - Contributed to code management, production releases using Git, and provided support for the production batch in client regions.

Education

Purdue University — **August 2027 (Expected)**
Ph.D. Student in Department of Computer Science · GPA 3.83 · West Lafayette, IN, USA

Purdue University — **December 2023**
M.S. in Computer Science · GPA 3.83 · West Lafayette, IN, USA

National Institute of Technology, Durgapur — **June 2019**
B.Tech in Computer Science and Engineering · GPA 9.16 · Durgapur, WB, India

Leadership Experience

Teaching Assistant - Purdue University — **August 2022-Current**

- Led recitation sessions on Discrete Mathematics and evaluated assignments for over 200 students.
- Served as the in-person instructor for introductory programming in Python and MATLAB for first-year engineering students (~50 students), while managing undergraduate teaching assistants to support the course.
- Conducted professional development workshops for undergraduates on React and Git.