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 novel UI attacks, proposed a four-category taxonomy for such attacks within the **WebXR** ad ecosystem.
    * Developed a **3D spatial log framework** and quantitative **interaction metrics** to assess user engagement in WebXR.
    * Conducted a 100-participant in-lab **between-subjects** user study using **qualitative** and **quantitative** methods to assess user perceptions of attack categories across apps with varying interaction demands.
- Secure group pairing of co-located Mixed Reality (MR) headsets addressing potential adversarial threats.
    * Developed a novel **localization system** for pairing **MR** headsets using eye-tracking, hand-tracking **sensor signals** and spatial anchors.
    * Designed a high-entropy random hand gesture generator by anchoring a 2D gesture grid in world coordinates and detecting hand positions from the **camera view**.
    * Designed a **CNN-LSTM** network leveraging eye-tracking and IMU **sensor data** to detect synthetic data and secure pairing against adaptive adversaries.
    * Designed and conducted in-lab **user studies** to evaluate system success rate, scalability, and usability.
- GPU based side-channel attack in XR.
    * Identified **low-resolution GPU metrics** related to object rendering in XR.
    * Fingerprinted **100 XR apps** (WebXR and standalone) and **XR content** within the apps with over 90% accuracy using classical **ML** and **DL** models (e.g., random forest, SVM, CNN, LSTM).

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.