

# ANIRBAN MUKHOPADHYAY

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## Areas of Interest and Expertise

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- Developing functional probes and agents to explore generative AI in information and creative work
- Studying team-AI collaboration in shared generative AI-powered workspaces
- Generating and evaluating design ideas based on crowdsourcing, sensemaking, and leadership frameworks

## Education

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### Virginia Tech

Jan 2021 – May 2026 (Expected)

PhD in Computer Science with a focus in Human-Computer Interaction (GPA: 4.0)

Blacksburg, Virginia

Dissertation: Scaling Up **OSINT** Investigations through Training, Crowdsourcing, and Human-AI Collaboration

### Jadavpur University

Aug 2014 – May 2018

Bachelor of Engineering in Computer Science (GPA: 3.6)

Kolkata, India

## Work Experience

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### Microsoft

May 2023 – Aug 2023

Design Research Intern in Mixed Reality Design and UX Research team

Redmond, Washington

- Led a generative research study on understanding perceptions of trust in Copilot-driven AI experiences.
- Developed a scenario-based study design after a thorough literature review. This study focused on the effectiveness, preferred methods of interaction, and potential issues in 3 distinct scenarios faced by information workers depicted through storyboards, each varying in levels of importance and risk.
- Presented recommendations to partner teams for system relevance, transparency, human control, and data privacy based on findings from semi-structured interviews with 8 internal employees.

### Microsoft

May 2023 – Aug 2022

PhD Software Engineering Intern in Mixed Reality Design and UX Research team

Redmond, Washington

- Improved 3D map interactions in Mixed Reality through a human-centered approach.
- Identified challenges, brainstormed ideas, prototyped and evaluated intuitive navigation interactions for Hololens 2 using Unity and MRTK.

### Microsoft

Jun 2018 – Dec 2020

Software Engineer (Full-stack) in SharePoint Taxonomy

Hyderabad, India

- Instrumented and analyzed service telemetry and boosted reliability to 99.99%, ensuring robust user experiences.
- Developed REST API endpoints and integrated them to modernize the user interface for filtering SharePoint lists using React.
- Collaborated cross-functionally with design and PM teams and geographically distributed development teams.

## Selected Research Projects

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### Enhancing Human-AI Co-Creativity by Supporting Leadership Behavior | LLM Agents, Survey

- Developed a GPT-powered chatbot with Node.js to support 5 teams (21 participants) in designing educational Capture-the-Flag challenges (CTFs) for Open Source Intelligence (OSINT).
- Improved team-AI collaboration with agentic workflows that supported leadership behaviors like planning, clarifying goals, monitoring progress, and providing feedback. The system was deployed during Fall 2024.

### Generative AI in Collaborative OSINT Investigations | Co-design workshop, Focus Group, Survey

- Led a co-design study to introduce LLMs for addressing technical and collaboration challenges in cybersecurity vulnerability assessment using OSINT.
- Conducted 10 two-hour-long design workshops with 6 undergraduates over a year to explore novel design ideas across the intelligence cycle. Applied matchmaking for generative AI to test its utility and challenges in a team of novices.
- Curated prompts and developed design implications for generative AI based on 3 successful real-world vulnerability assessments. Identified design goals for supporting leadership in these team-based investigations.

## Flexible Crowdsourcing Framework for Complex Sensemaking Tasks | *Crowdsourcing, Interview, Thematic analysis*

- Applied Design-Based Research to aid 6 experts including journalists, fact-checkers, and law enforcement officers in leveraging crowdsourcing for discovery and verification of social media content.
- Collaborated with 30 undergraduates over a semester to refine task decomposition, ensure ethical and high-quality investigations, and improve expert-led synchronous collaboration.
- Conducted thematic analysis of 10 interviews, including 5 with experts and 5 student focus groups to demonstrate the system's effectiveness in scaling up complex sensemaking tasks.

## Collaborative CTFs to Investigate Misinformation | *Web Development, Log analysis, Visualization*

- Developed a web app for 40 students using a Research through Design approach over a semester, blending collaboration and competition to debunk online misinformation.
- Designed surveys, conducted usability evaluations for design iteration and analyzed system logs to assess team strategies and evolving impact of rubric modifications.

## Publications

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### *Peer-reviewed Conference Papers*

**A. Mukhopadhyay**, K. Luther. 2024. [OSINT Clinic: Co-designing AI-Augmented Collaborative OSINT Investigations for Vulnerability Assessment](#) (Under Revision at CHI 2025)

**A. Mukhopadhyay**, S. Venkatagiri, K. Luther. 2024. [OSINT Research Studios: A Flexible Crowdsourcing Framework to Scale Up Open Source Intelligence Investigations](#). In Proceedings of the ACM on Human-Computer Interaction 8. CSCW1 (2024): 1-38. <https://doi.org/10.1145/3637382> (CSCW 2024)

S. Venkatagiri, **A. Mukhopadhyay**, D. Hicks, A. Brantly, and K. Luther. 2023. [CoSINT: Designing a Collaborative Capture the Flag Competition to Investigate Misinformation](#). In Proceedings of the 2023 ACM Designing Interactive Systems Conference (DIS '23). Association for Computing Machinery, New York, NY, USA, 2551–2572. <https://doi.org/10.1145/3563657.3595997> (DIS 2023)

### *Selected Workshop Papers and Posters*

**A. Mukhopadhyay**, K. Luther. Fostering Collaboration and Creativity in Red Teaming for OSINT Education. In Workshop on The Human Factor in AI Red Teaming: Perspectives from Social and Collaborative Computing. (CSCW 2024)

T. Craycroft, E. Dettman, A. Jones, P. Ludwig, V. Pang, **A. Mukhopadhyay**, K. Luther. [Hosting an OSINT-focused Capture the Flag \(CTF\) Competition: Leveraging Creativity, Collaboration, and Artificial Intelligence](#). Talk at Academic Symposium on Cybersecurity, Emerging Networks, and Technologies (ASCENT) 2024, held at Virginia Tech, Blacksburg.

**A. Mukhopadhyay**, S. Venkatagiri, and K. Luther. [Developing Collaboration and Competition Skills in a Crowd of Student OSINT Investigators](#). In Workshop on Supporting Workers in Developing Effective Collaboration Skills for Complex Work. (CSCW 2023)

**A. Mukhopadhyay**, S. Venkatagiri, and K. Luther. [Towards Designing a Flexible Expert-led Crowdsourcing Framework for Investigating Misinformation](#). In Workshop on Designing Credibility Tools to Combat Mis/Disinformation: A Human-Centered Approach. (CHI 2022)

## Research Skills and Methods

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**Design Methods:** Co-design, Design-based Research, Research through Design, Scenario-based Design, Contextual Inquiry, Human-Centered Design

**Tools and Libraries:** Figma, OpenAI Assistants API, LangChain, Tensorflow, pandas, scikit-learn, Unity

**Web Development:** Django, Flask, Python, C#, Node.js, React, Java Script, HTML

**Design Process:** Personas, Journey Mapping, Wire-framing, Rapid Prototyping, Crowdsourcing, Experiment Design, Survey Design, User Interviews, Qualitative Data Analysis, Log Analysis (Telemetry), Usability Evaluations

## Relevant Coursework

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**HCI:** Human-AI Interaction (Explainable AI focus), CSCW & Social Computing, Information Visualization, Usability Engineering, Statistics in Research

**Data Science and AI:** Human-AI Interaction (Deep Learning focus), Deep Learning, Data Analytics