Anirban Mukhopadhyay

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Areas of Interest and Expertise

- 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

Virginia Tech **Jan 2021 – Aug 2026 (08/26)**
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

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

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

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

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

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