Melanie Bancilhon, Ph.D.

Postdoctoral Research Scientist, Humans in Complex Systems, Army Research Laboratories
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Interdisciplinary Researcher with strong expertise in human-computer interaction, data visualization, human-AI teaming and decision-making. My work explores how individual differences shape behavior and performance across complex cognitive and interactive tasks.

RESEARCH INTERESTS

HCI | Data visualization | Interactive Interfaces | Mixed-Initiative Interfaces | Uncertainty Communication | Human-AI Teaming | Decision-Making | User-Centered Design | Explainable AI | Visual Search | Cognition & Perception

EDUCATION

Washington University in St. Louis August 2019 - May 2024
Ph.D. in Computer Science
- Advisor: Alvitta Ottley
- Thesis Committee: Cindy Xiong, Alexa Siu, Chien-Ju Ho, William Yeoh

Smith College
B.A. Computer Science and Architecture August 2015 - May 2019

RESEARCH EXPERIENCE

Postdoctoral Research Fellow August 2024 - Present
Army Research Laboratory & George Washington University | *Humans in Complex Systems, Washington DC*

- Designed and executed experiments to investigate how users interact with AI-generated suggestions during visual search tasks
- Led data analysis efforts, including exploratory modeling, statistical testing, and visualization of behavioral patterns
- Fostered cross-institutional collaboration between academic and government researchers to advance applied human-AI interaction research

Research Intern June 2023 - August 2023
IBM | *AI, Yorktown Heights NY*

- Conducted in-depth qualitative interviews with software engineers to uncover workflow challenges and usability gaps in existing microservice recommendation tools
- Designed a framework to augment AI-generated microservice recommendations by incorporating real-time user interaction patterns and behavioral signals
- Built an interactive, transparent visual interface to support human-AI collaboration, enabling users to explore, adjust, and validate recommendations
- Led observational studies and qualitative evaluations to assess the system's usability, interpretability, and effectiveness in real-world development workflows

Research Intern June 2022 - August 2022
Adobe | *Document Intelligence, San Jose CA*

- Conducted formative interviews with legal and business professionals to understand current contract review workflows,

bottlenecks, and the cognitive demands of high-stakes decision-making
• Designed a hybrid human-AI reviewing strategy that balances efficiency and interpretability, aiming to reduce annotation time while preserving critical business insights
• Developed a mixed-initiative interface enabling reviewers to interact with AI-generated clause predictions, inspect model confidence scores, and override system outputs
• Integrated explainability features to support trust calibration and facilitate more accurate, efficient contract inspection

Research Intern June 2018 - August 2018
Nokia Bell Labs | Social Dynamics, Cambridge UK

• Conducted large-scale data mining and geospatial analysis to uncover historical, cultural, and societal patterns embedded in the naming of urban streets across major global cities
• Developed a data pipeline to extract, clean, and enrich street name datasets using natural language processing and entity linking with external knowledge bases (e.g., Wikidata)
• Identified geographic and temporal disparities in representation (e.g., gender imbalance in commemorative naming) and highlighted how urban toponymy reflects local values, politics, and identity

PUBLICATIONS

Conference Proceedings

The Anatomy of a Plea: How Uncertainty, Visualizations & Individual Differences Shape Plea Bargain Decisions
Bancilhon M., Ottley A. & Jordan. A.
Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI), 2025

Trust Calibration for Joint Human-AI Decision-making in Dynamic and Uncertain Contexts
Marusich L., Files B., **Bancilhon M.**, Rawal J., Raglin A.
Proceedings of the 27th International Conference on Human-Computer Interaction (HCII), 2025.

Why Combining Text and Visualization Could Improve Bayesian Reasoning: A Cognitive Load Perspective
Bancilhon M., Wright AJ., Sunwoo H., Crouser R J. & Ottley A.
ACM Conference on Human Factors in Computing Systems (CHI), 2023.

VizXP: A Visualization Framework for Conveying Explanations to Users in Model Reconciliation Problems
Kumar A., Vasileiou S., **Bancilhon M.**, Ottley A. & Yeoh W.
Proceedings of the International Conference on Automated Planning and Scheduling (ICAPS), 2021.

Let's Gamble: How a Poor Visualization Can Elicit Risk Behavior.
Bancilhon, M., Liu, Z. & Ottley, A.
IEEE Visualization Conference Short Papers, 2020.

Journal articles

Streetonomics: Quantifying culture using street names
Bancilhon M., Constantinides M., Bogucka EP., Aiello LM. & Quercia D.
PLoS ONE, 16(6): e0252869, 2021.

Cartographic Design of Cultural Maps
Bogucka, E.P., Constantinides, M., Aiello, L.M, Quercia, D., So, W. & **Bancilhon, M**.
IEEE Computer Graphics and Applications, 2020.

Workshop Papers

Beyond English: Centering Multilingualism in Data Visualization
Rakotondravony, N., Dhawka, P., & **Bancilhon, M**.
IEEE VIS Workshop on Visualization for Social Good, 2023.

Did You Get The Gist Of It? Understanding How Visualization Impacts Decision-Making.
Bancilhon, M. & Ottley, A.
IEEE VIS Workshop on Visualization Psychology, 2020.

Expectation Versus Reality: The Failed Evaluation of a Mixed-Initiative Visualization System
Ha, S., **Bancilhon, M**. & Ottley, A.
IEEE VIS Fail Fest: A Workshop on Celebrating the Scientific Value of Failure, 2020.

Book Chapters

Toward an Optimized Human-AI Reviewing Strategy for Contract Inspection
Bancilhon M., Siu A., Rossi R. & Lipka N.
The New Era of Business Intelligence, IntechOpen, 2024.

Improving Evaluation Using Visualization Decision-Making Models: A Practical Guide
Bancilhon, M., Padilla, L., Ottley, A.
In Visualization Psychology, Springer, 2023.

SKILLS

Python | R | SQL | Javascript | HTML/ CSS | d3.js | Swift | Tableau | Git | AWS | Machine Learning | Artificial Intelligence | Human-AI teaming | Data Visualization | Interactive Interfaces | Decision-Making | Experimentation | Statistical Analyses | Quantitative Research | Qualitative Research | Participatory Design

AWARDS & DISTINCTIONS

- IEEE VIS Inclusivity and Diversity Scholar (2022)
- Grace Hopper Celebration Scholar (2018)
- NSF SCH Workshop Smart Health in the AI and COVID Era Student Awardee (2021)

SERVICE & COMMUNITY

- Reviewer (ACM CHI, IEEE VIS, IEEE TVCG, CSCW, EuroVis, CRPI)
- Organizer (IEEE Visualization for Communication Workshop, EuroVis Short Papers International Program Committee)
- Outreach and Diversity (WashU First Gen Program Mentor, WashU Graduate Student Senate Representative, Tapia Conference Mentor, BrightPath STEAM Mentor)