Melanie Bancilhon, Ph.D.

Postdoctoral Research Scientist, Humans in Complex Systems, Army Research Laboratories

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Interdisciplinary researcher with a background in data visualization and human-computer interaction, with a focus on uncovering how behavioral and cognitive differences shape user interactions. Experienced in designing and conducting mixed-method experiments and generating insights that drive performance across complex tasks.

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PROFESSIONAL EXPERIENCE

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

• Designed and conducted quantitative behavioral assessments to investigate how different users interact with AI-generated suggestions during visual search tasks.
• Fostered cross-institutional collaboration between academic and government researchers to advance applied human-AI interaction research.
• Led data analysis efforts, including exploratory modeling, statistical testing, and visualization of behavioral patterns.
• Oversaw AWS server management and the creation of new data processing pipelines, analytics, and visualizations in Python, Jupyter Notebook, and R.
• Managed SQL database containing gameplay data from ~15.6M users, ensuring accessibility and integrity.

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

• Conducted semi-structured qualitative interviews with software engineers, revealing key pain points including information overload, insufficient granularity and lack of explainability in existing microservice recommendation tools.
• Designed a human-in-the-loop framework for AI-based system CARGO, enabling real-time refinement of microservice boundaries through user-driven labeling.
• Developed an interactive UI prototype integrating data visualizations (HTML/CSS/JS/D3.js) to support the framework and facilitate drill-down exploration, uncertainty communication and human-centered functionalities.
• Led qualitative case-study evaluations demonstrating the prototype'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 knowledge workers to understand their workflow and pain points when reviewing contracts and perception of current AI-based tools.
• Developed an impact-oriented human-AI reviewing framework that facilitates high-stakes decision-making while reducing annotation time and mitigating cognitive demands.
• Built a mixed-initiative UI prototype (HTML/CSS/JS/Dash.js) enabling knowledge workers to strategically inspect contracts using AI-generated clause predictions.

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.

EDUCATION

Washington University in St. Louis   August 2019 - May 2024
Ph.D. in Computer Science

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

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 | Dash.js | Swift | Tableau | Git | AWS | Node.js | Rapid Prototyping | Machine Learning | Artificial Intelligence | Human-AI teaming | Data Visualization | Interactive Interfaces | Decision-Making | Survey Design | Qualtrics | Inferential Statistics | Quantitative Research | Qualitative Research | Usability Testing | User Interviews | Participatory Design

AWARDS & COMMUNITY ENGAGEMENTS

• 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)
• 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)