2023 VGTC Visualization Significant New Researcher Award

Leilani Battle, University of Washington

The 2023 VGTC Visualization Significant New Researcher Award goes to Leilani Battle in recognition of her work on interactive data-intensive systems for exploratory data analysis.

Battle is an Assistant Professor in the Paul G. Allen School for Computer Science & Engineering at UW, where she co-directs the Interactive Data Lab. She is also an active member of the UW Database Group. Prior to UW, she was an Assistant Professor at the University of Maryland, College Park and completed her Ph.D. at MIT supervised by Dr. Michael Stonebraker. She was named one of the MIT Technology Review's 35 Innovators Under 35 in 2020. She is also a recipient of the 2022 TCDE Rising Stars award, 2023 Sloan Fellowship, and the NSF CRII and NSF CAREER awards. Battle' research has received the VIS 2022 Best Short Paper Award as well as honorable mentions for Best Paper at VIS 2021 and CHI 2023.

While data exploration systems can accelerate insight discovery and data-driven decision making, they also influence which insights an analyst uncovers and in turn the decisions that depend on these insights. Battle's research reveals how data exploration systems can slow down, confuse, bias, and even mislead analysts. These challenges point to a fundamental question driving her research: *how can we design adaptive systems to amplify the strengths and mitigate the weaknesses of both human analysts and systems?*

To answer this question, Battle studies how an analyst's reasoning process affects the way they approach data exploration tasks. Then, she derives systems optimizations, UI features, and performance benchmarks to match observed patterns in human exploration behavior. For example, through research led by PhD graduate Zehua Zeng (now at Intel) and in collaboration with researchers at Adobe, Battle co-developed a framework capturing how visualization recommendation systems behave based on how they are optimized: by pruning the range of visualizations to consider, streamlining how valid candidates are ranked, or both. Using this framework, the team ran a user study to test how analysts respond to various recommendation strategies while completing real-world analysis tasks. The resulting paper received a Best Paper Honorable Mention at VIS 2021 for showing how these systems can be benchmarked.

Battle has generalized this user-centered analysis approach to a variety of contexts. For example, she co-developed the first performance benchmark for testing database systems when connected to dashboards providing real-time feedback for user interactions, which she presented at the SIGMOD 2020 database conference. Through research led by PhD graduate Deepthi Raghunandan (now at NASA), Battle co-developed the first model to explain how Jupyter users' notebook editing behaviors evolve over time, which received a Best Paper Honorable Mention at CHI 2023. Battle used a similar approach to investigate how Stack Overflow users program visualizations in D3. Her findings reveal a gulf between how these users conceptualize visualization designs and how they reason about D3's code structure, as well as opportunities to fill this gap using automated techniques, leading to a VIS 2022 Best Short Paper award.

Alongside her research contributions, Battle has co-chaired multiple workshops to strengthen collaborations between database, HCI, and visualization researchers, co-founded the Visualization for Social Good (Vis4Good) workshop with Michelle Borkin, Michael Correll, Lane Harrison, and Evan Peck to highlight visualization work with societal impact at IEEE VIS, and served as a columnist for ACM Interactions Magazine. She is currently an associate editor for the Journal of Visualization and Interaction (JoVI) and co-directs the DUB Summer REU Program.

From giving feedback on new research ideas to providing emotional support after paper and proposal rejections to celebrating career milestones and more, Battle thanks the many students, mentors, collaborators, academic and industry colleagues, and family and friends who have supported her along the way. She also thanks the NSF, Sloan Foundation, Adobe, VMWare, and ORAU for their support of this research. More details about Battle's work can be found at https://homes.cs.washington.edu/~leibatt/.