Emily Wall, Ph.D.

My research involves decision making using data visualizations and visual analytics. I develop computational strategies to characterize human limitations in decision making (e.g., cognitive bias) and design interventions to promote reflective data analysis and decision making processes. I am an Assistant Professor in the Computer Science Department at Emory University. I completed my Ph.D. in Computer Science at Georgia Tech in 2020 and was a postdoctoral researcher at Northwestern University 2020-2021.

✉ emily.wall@emory.edu

🐦 @profembwall

🎓 Google Scholar

in LinkedIn

📍 Math & Science Center W302E

🌐 emilywall.github.io

📄 PDF of CV

Appointments

2021- **Assistant Professor**
Department of Computer Science
(Affiliate) Center for Data Science
Emory University

2020-2021 **Postdoctoral Researcher**
Department of Computer Science
Northwestern University

Education

2020 **Ph.D. in Computer Science**
Georgia Institute of Technology
Thesis: Detecting and Mitigating Human Bias in Visual Analytics
Committee: Alex Endert, John Stasko, Polo Chau, Brian Fisher, Wenwen Dou

2015 **B.S. in Computer Science & Mathematics**
University of Georgia
summa cum laude

Honors & Awards

2020	**VGTC Best Dissertation**, Honorable Mention
2019	**GVU Foley Scholar**, Recipient, Georgia Institute of Technology
2019	**D.E. Shaw Exploration Fellowship**, Recipient
2019-2020	**Siemens FutureMaker Fellowship**, Recipient
2018	**GVU Foley Scholar**, Finalist, Georgia Institute of Technology
2017	**Graduate Student Symposium**, Participant, AT&T Labs
2017	**Doctoral Colloquium**, Participant, IEEE VIS
2017-2020	**Graduate Fellowship for STEM Diversity (GFSD)**, Recipient
2017	**NSF Graduate Research Fellowship Program**, Honorable Mention
2017	**Department of Defense SMART Fellowship**, Recipient (Declined)
2015-2019	**President's Fellowship**, Recipient, Georgia Institute of Technology

Publications

Journal Articles

VisHiker's Guide to Evaluation: Competing Considerations in Study Design
E. Wall, C. Xiong, and Y-S. Kim
IEEE Computer Graphics and Applications, 2022.
📄 PDF

VIBE: A Design Space for VIsual Belief Elicitation in Data Journalism
S. Mahajan, B. Chen, A. Karduni, Y-S. Kim, and *E. Wall*
Computer Graphics Forum (Proc. EuroVis'22), 2022.
📄 PDF | 📄 Slides

Left, Right, and Gender: Exploring Interaction Traces to Mitigate Human Biases
E. Wall, A. Narechania, A. Coscia, J. Paden, and A. Endert
IEEE Transactions on Visualization and Computer Graphics (Proc. VIS'21), 2021.
📄 PDF | 📄 Talk | ▶ Video | ⏭ Video FF

Lumos: Increasing Awareness of Analytic Behavior during Visual Data Analysis

A. Narechania, A. Coscia, *E. Wall*, and A. Endert

IEEE Transactions on Visualization and Computer Graphics (Proc. VIS'21), 2021.

📄 PDF | </> System & Code | ▦ Talk | ▶ Video | ⏭ Video FF

VitaLITy: Promoting Serendipitous Discovery of Academic Literature with Transformers & Visual Analytics

A. Narechania, A. Karduni, R. Wesslen, and *E. Wall*

IEEE Transactions on Visualization and Computer Graphics (Proc. VIS'21), 2021.

📄 PDF | </> System & Code | ▦ Talk | ▶ Video | ⏭ Video FF

A Heuristic Approach to Value-Driven Evaluation of Visualizations

E. Wall, M. Agnihotri, L. Matzen, K. Divis, M. Haass, A. Endert, and J. Stasko

IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis'18), 2019.

📄 PDF | ▦ Talk | 🌐 Website | ⏭ Video FF

Podium: Ranking Data Using Mixed-Initiative Visual Analytics

E. Wall, S. Das, R. Chawla, B. Kalidindi, E. Brown, and A. Endert

IEEE Transactions on Visualization and Computer Graphics (Proc. VAST'17), 2018.

📄 PDF | ▦ Talk | ▶ Video | ⏭ Video FF | 🖥 Demo

AxiSketcher: Interactive Nonlinear Axis Mapping of Visualizations through User Drawings

B.C. Kwon, H. Kim, *E. Wall*, J. Choo, H. Park, and A. Endert

IEEE Transactions on Visualization and Computer Graphics (Proc. VAST'16), 2017.

📄 PDF | ▶ Video

Conference Proceedings

Toward a Design Space for Mitigating Cognitive Bias in Vis

E. Wall, J. Stasko, and A. Endert

IEEE Information Visualization (VIS) Short Papers, 2019.

📄 PDF | 📁 Supplemental | ▦ Talk | ⏭ Video FF

A Markov Model of Users' Interactive Behavior in Scatterplots

E. Wall, A. Arcalgud, K. Gupta, and A. Jo

IEEE Information Visualization (VIS) Short Papers, 2019.

📄 PDF | ▦ Talk | ⏭ Video FF

A Formative Study of Interactive Bias Metrics in Visual Analytics Using Anchoring Bias

E. Wall, L. Blaha, C. Paul, and A. Endert

Proceedings of the 17th IFIP TC 13 International Conference on Human-Computer Interaction (INTERACT'19), 2019.

📄 PDF | ▶ Video

Using Expert Patterns in Assisted Interactive Machine Learning: A Study in Machine Teaching

E. Wall, S. Ghorashi, and G. Ramos

Proceedings of the 17th IFIP TC 13 International Conference on Human-Computer Interaction (INTERACT'19), 2019.

📄 PDF | ▶ Video

Warning, Bias May Occur: A Proposed Approach to Detecting Cognitive Bias in Interactive Visual Analytics

E. Wall, L. Blaha, L. Franklin, and A. Endert

IEEE Visual Analytics Science and Technology (VAST), 2017.

📄 PDF | ▦ Talk | ▶ Video | ▸▸ Video FF

Supporting Team-First Visual Analytics through Group Activity Representations

S.K. Badam, Z. Zeng, *E. Wall*, A. Endert, and N. Elmqvist

Graphics Interface, 2017.

📄 PDF | ▶ Video

Refereed Workshop Papers

Perception of Skill in Visual Problem Solving: An Analysis of Interactive Behaviors, Personality Traits, and the Dunning-Kruger Effect

M. Chen and *E. Wall*

Workshop on TRust and EXpertise in Visual Analytics (TREX, at VIS'22), 2022.

📄 PDF

COVID-19 Health Equity Dashboard - Addressing Vulnerable Populations

S. Liu, *E. Wall*, S. Patel, and Y. Park

Visualization for Communication (VisComm, at VIS'20), 2020.

📄 PDF

Four Perspectives on Human Bias in Visual Analytics

E. Wall, L. Blaha, C. Paul, K. Cook, and A. Endert

DECISIVe: Workshop on Dealing with Cognitive Biases in Visualizations (at InfoVis'17), 2017.

📄 PDF

Book Chapters

Four Perspectives on Human Bias in Visual Analytics

E. Wall, L. Blaha, C. Paul, K. Cook, and A. Endert

Cognitive Biases in Visualizations, Ed. G. Ellis, Springer, 2018, Chapter 3, pp. 29-42.

📗 Book | 🔖 Chapter

Theses

Detecting and Mitigating Human Bias in Visual Analytics

Emily Wall

Georgia Tech, School of Interactive Computing Ph.D. Thesis. April 2020.

📄 PDF

Grants & Funding

Research

2022-2023	**A Novel Web-based Decision Aid Tool for Reducing COVID-19 Vaccine Hesitancy** HealthCare Innovation Seed Grant Co-PIs: Dr. Ambar Kulshreshtha, Dr. Shivani Patel, Dr. Piyush Kumar Funded: $24,995
2019-2020	**Toward Mitigating Cognitive Bias for Data-Driven Decision Making with Visual Analytics** Siemens FutureMaker Fellowship Co-PIs: Dr. Alex Endert Funded: $101,435
2019	**Detecting and Mitigating Human Bias in Visual Analytics** GVU Foley Scholar Co-PIs: Dr. Alex Endert Funded: $5,000
2017-2020	**Toward Mitigating Cognitive Bias for Data-Driven Decision-Making With Visual Analytics** Graduate Fellowship for STEM Diversity (GFSD) Co-PIs: Dr. Alex Endert Funded: $20,000 / year for 3 years
2014	**Predicting Solar Radiation in Georgia** CURO Research Assistantship Co-PIs: Dr. Don Potter Funded: $1,000

Teaching

2022 Fall **Pedagogy Mini Grant**
Information Visualization (CS 485/584)
Funded: $350
Purpose: fund user study incentives for course projects that are pursuing publication

Teaching

Instructor

Fall 2022 **Information Visualization (CS 485 / 584)** (41 students)
Emory University

Spring 2022 **Human-Computer Interaction (CS 485 / 584)** (40 students)
Emory University

Fall 2021 **Information Visualization (CS 485 / 584)** (26 students)
Emory University

Guest Lecturer

Nov 2022 **Bias in Data-Driven Decision Making: Perception, Cognition, and Metacognition**
Introduction to Information Visualization (CS 4460), Georgia Institute of Technology

Oct 2021 **Visual Analytics**
Data Visualization (CompSci 765), University of Wisconsin

Feb 2019 **Introduction to Javascript**
Introduction to Information Visualization (CS 4460), Georgia Institute of Technology

Dec 2017 **Cognition in Visualization**
Information Visualization (CS 7450), Georgia Institute of Technology

Nov 2017 **Visual Analytics**
Information Visualization (CS 7450), Georgia Institute of Technology

Jun 2017 **Visualization Design: Do's and Don'ts**
Introduction to Information Visualization (CS 4460), Georgia Institute of Technology

Presentations

Invited Talks

Cognition & Visualization @ Emory: A Visualization Viewpoint on Mitigating Metacognitive Deficits
> *September 2022.* Emory SON Center for Data Science.
> *September 2022.* ATLAS Institute at University of Colorado - Boulder.

Bias in Visualization: Considering Equity through Research
> *November 2021.* Object Perception, visual Attention, and visual Memory (OPAM) conference. 👤 Watch

As We Are: Detecting and Mitigating Human Bias in Visual Analytics
> *April 2021.* University of Utah, Data Science Seminar. Virtual Seminar.
> *October 2020.* Pacific Northwest National Laboratory. Virtual Brown Bag.
> *September 2020.* Emory University. Atlanta, GA. 👤 Abstract
> *May 2020.* CMU & AFRL, Center for Excellence on Human-Machine Teaming. Virtual Brown Bag.
> *May 2020.* Siemens. Virtual Brown Bag.
> *March 2020.* Cornell University, Info Science Colloquium. Ithaca, NY. 👤 Abstract
> *February 2020.* University of Washington, Allen School Colloquium. Seattle, WA. 👤 Watch
> *February 2020.* Emory University. Atlanta, GA. 👤 Abstract
> *February 2020.* New York University. New York, NY. 👤 Abstract
> *February 2020.* University of Wisconsin. Madison, WI.

Left, Right, and Gender: Mitigating Implicit Human Bias in Visual Analytics
> *January 2020.* Georgia Institute of Technology, GVU Brown Bag. Atlanta, GA. 👤 Watch

The Interactive Analytics Library: Treating Interaction as Data
> *May 2017.* Pacific Northwest National Laboratory. Richland, WA.

Posters and Demonstrations

Warning, Bias May Occur: Detecting and Mitigating Cognitive Bias in Visual Analytics (Poster & Demo)
> *October 2019.* Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.
> *June 2019.* Summer Institute on Bounded Rationality. Berlin, Germany.
> *April 2019.* Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.

Warning, Bias May Occur: A Proposed Approach to Detecting Cognitive Bias in Interactive Visual Analytics (Demo)
> *April 2018.* CRA-W Grad Cohort. San Francisco, CA.
> *April 2018.* Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.

> *April 2017*. Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.

Podium: Ranking Data Using Mixed-Initiative Visual Analytics (Poster & Demo)
> *April 2018*. Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.
> *April 2017*. Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.
> *April 2018*. CRA-W Grad Cohort. San Diego, CA.
> *April 2016*. Georgia Institute of Technology, GVU Demo Showcase. Atlanta, GA.

Students

Advisees

2019-	**Yanan Da** Ph.D. Computer Science and Informatics, Emory University
2019-	**Ziwei Dong** Ph.D. Computer Science and Informatics, Emory University
2019-	**Shrey Gupta** (co-advised w/ Avani Wildani) Ph.D. Computer Science and Informatics, Emory University
2021-	**Shiyao Li** Ph.D. Computer Science and Informatics, Emory University
2022-	**Mengyu (Bonnie) Chen** Ph.D. Computer Science and Informatics, Emory University

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Thesis Committee

2022	**Christina Chance** Thesis: Accuracy of African American Vernacular English for Closed Captioning on Zoom B.S. Honors Computer Science, Emory University (now: Ph.D. student, UCLA)

Mentoring

2022-	**Zhongzheng Xu**, B.S. Computer Science, Emory University, Class of 2023 HCI
2021-	**Randy Truong**, B.S. Computer Science and Quantitative Sciences, Emory University, Class of 2023

Eliciting affective response using visualization and sonification

2021-2022 **Zhou (Serena) Fang**, B.S. Quantitative Sciences, Emory University, Class of 2022 *(now: M.S. Biomedical Informatics, Harvard)*
Incorporating topic modeling in a visual analytic system for conducting literature reviews

2021-2022 **Yiping (Jessie) Liang**, B.S. Computer Science and Applied Math, Emory University, Class of 2022
Conducting user study and evaluation for assessing impact of data representation on confirmation bias

2020-2021 **Jenni Hutson**, B.A. Computer Science and Radio/TV/Film, Northwestern University, Class of 2021
Developed system for visualization recommendations that support decision making

2020 **Star Liu**, B.S. Quantitative Sciences, Emory University, Class of 2021
Developed system for visualizing health inequities during the COVID-19 pandemic, first author of case study on COVID-19 Health Equity Dashboard
Now: MS Health Sciences Informatics Student at Johns Hopkins

2020 **Jamal Paden**, B.S. Computer Science, Georgia Institute of Technology, Class of 2020
Conducted usability testing for bias mitigation interventions, coauthor of Left, Right, and Gender

2017-2018 **Yingxiao Ouyang**, M.S. HCI, Georgia Institute of Technology, Class of 2019
Conducted usability testing and prototyping for bias mitigation interventions
Now: UX Designer at Walmart Labs

2017 **Qiaochu Mu**, M.S. HCI, Georgia Institute of Technology, Class of 2018
Conducted usability testing and prototyping for bias mitigation interventions
Now: UX Designer at Alibaba Group

2016-2017 **Bharath Kalidindi**, B.S. Computer Science, Georgia Institute of Technology, Class of 2018
Developed system for ranking data from user interaction, coauthored publication of Podium
Now: Software Engineer at Yahoo

Service

Professional Service

2021-2022	**Organizing Committee** Elections Chair, VIS 2021-2023
>	**Program Committee Member** BELIV Workshop on *"Designing and Evaluating Visualizations for an Ethical, Inclusive, and Responsible Future"*, 2022 IEEE VIS, 2021-2022 EuroVis, 2022 ACM CHI, 2022 Vis4Good Workshop at IEEE VIS, 2021 IEEE VIS Short Papers, 2020 VISxAI Workshop at IEEE VIS, 2019 CHI Late Breaking Work, 2018
>	**Organizer** Visualization for Social Good Workshop at IEEE VIS 2022 TRust and EXpertise in Visual Analytics (TREX) Workshop at IEEE VIS 2021 TRust and EXpertise in Visual Analytics (TREX) Workshop at IEEE VIS 2020
2021	**Panelist** Equity in Vision Science at Object Perception, visual Attention, and visual Memory (OPAM) conference
2017	**Panelist** Advancing Visualization Inclusion and Diversity (AVID) Workshop at IEEE VIS
>	**Reviewer** National Science Foundation: 2021 IEEE VIS: 2017-2022 CHI: 2018-2023 TVCG: 2018-2022 EuroVis: 2020-2022 ACM TiiS: 2022 Cognitive Research: 2022 CG&A: 2021 CSCW: 2021 International Journal of Human-Computer Studies: 2019 KDD IDEA: 2017 VAST Challenge: 2016
>	**Session Chair** Questioning Data and Data Bias @ IEEE VIS 2022 Guidelines and Accessibility @ EuroVIS 2022 Interaction and Animation @ IEEE VIS 2020
>	**Other Committees** VISxAI Best Paper Award Selection Committee: 2021 CHI Best Paper Award Selection Committee: 2022

Institutional Service

>	**Panelist**	
	DEI Statement Panel, Emory University, 2021	
	Innovations in Online Teaching Panel, Emory University, 2021	
2020-2021	**Faculty Search Committee**	
	Computer Science Department, Emory University	
2020-2022	**Graduate Admissions Committee**	
	Computer Science Department, Emory University	

Selected Media

Nov 2019	**A Reflection on VIS2019: Or, How Doomed Are We?** Medium Blog Post, Multiple Views on Visualization Research Explained. 🔖 Read by Michael Correll
Nov 2019	**Highlights from IEEE VIS 2019**, Uncharted Software Blog. 🔖 Read by Rosa Romero-Gómez
May 2019	**Battling Bias**. Ep. 3, Tech Unbound Podcast. 🎧 Listen with Josh Preston

Other Professional Activities

Aug 2022	**Interactive Visualization for Fostering Trust in ML** Dagstuhl, Wadern, Germany
Aug 2022	**Emory CFDE Summer Teaching Intensive** Emory University
Jun 2022	**Visualization Summer Camp** Atlantic City, NJ
Fall 2021	**Emory CFDE Grantseekers' Institute** Emory University
Oct 2021, June 2020	**Emory College Online Teaching Strategies (ECOTS)** Emory University
Aug 2021	**Visualization Summer Camp** Minneapolis, MN
Oct 2019	**NextProf Nexus Workshop** Atlanta, GA
Jun	**Summer Institute on Bounded Rationality**

2019   Berlin, Germany

Apr   **CRA-W Grad Cohort Workshop**
2018   San Francisco, CA

Oct   **Grace Hopper Celebration of Women in Computing**
2016   Houston, TX

Apr   **CRA-W Grad Cohort Workshop**
2016   San Diego, CA