Emily Wall

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.

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🎓 Google Scholar   💼 LinkedIn

📍 Math & Science Center W302E   🌐 emilywall.github.io

📄 PDF of CV

Appointments

2021-	**Assistant Professor** Department of Computer 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
2015	**CURO Symposium Best Paper Award**, University of Georgia
2014	**CURO Research Assistantship**, University of Georgia
2014	**Hahn Family Scholarship for Computer Science**, Recipient, University of Georgia
2013	**Hollingsworth Award for Excellence in Mathematics**, Recipient, University of Georgia
2012-2015	**Zell Miller Scholarship**, Recipient, University of Georgia

Publications

Journal Articles

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

Workshop Papers

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

Professional Experience

2015-2020 **Georgia Institute of Technology**, Atlanta, GA
Graduate Research Assistant
Advised by Dr. Alex Endert
Thesis: Detecting and Mitigating Human Bias in Visual Analytics

Summer 2018 **Microsoft Research**, Redmond, WA
Intern, Machine Teaching Group
Mentored by Dr. Gonzalo Ramos
Modeled how experts use machine teaching to train ML classifiers. Developed systematic guidelines to help novices train ML classifiers.

Summer 2016 **Pacific Northwest National Laboratory**, Richland, WA
Intern, Visual Analytics Group
Mentored by Lyndsey Franklin and Kris Cook
Developed heuristics to characterize bias in real-time from user interaction sequences

2013-2015 **Jet Propulsion Laboratory**, Pasadena, CA
Intern, Systems Engineering Group
Advised by Marc Sarrel
Used SysML and principles of Model-Based Systems Engineering to visualize network flows for Lockheed Martin's Orion capsule

Fall 2014 **University of Georgia**, Athens, GA
Undergraduate Research Assistant
Advised by Dr. Don Potter
Developed neural network to predict solar radiation in Georgia; funded by the Georgia Power Advanced Solar Initiative

Fall 2013 **University of Georgia**, Athens, GA
Undergraduate Research Assistant
Advised by Dr. Liming Cai
Used sequence alignment techniques to determine coevolution of species with a common ancestor

Spring 2013 **University of Georgia**, Athens, GA
Undergraduate Research Assistant
Advised by Dr. Prashant Doshi
Created simulation and programmable interface for Parrot A.R. Drone quadcopters to serve as a testbed for autonomous decision making with UAVs

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Grants & Funding

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

Instructor

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

Teaching Assistant

Spring 2019 **Introduction to Information Visualization (CS 4460)** (133 students)
Georgia Institute of Technology

Fall 2017 **Information Visualization (CS 7450)** (74 students)
Georgia Institute of Technology

Fall 2013 **Introduction to Computing and Programming (CSCI 1301)**
University of Georgia

Fall 2012 **Introduction to Computing and Programming (CSCI 1301)**
University of Georgia

Guest Lecturer

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

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.

Mentoring

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
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	**Organizing Committee**
	Elections Chair, VIS 2021
>	**Program Committee Member**
	IEEE VIS, 2021
	Vis4Good Workshop at IEEE VIS, 2021
	IEEE VIS Short Papers, 2020
	VISxAI Workshop at IEEE VIS, 2019
	CHI Late Breaking Work, 2018
2020-2021	**Organizer**
	TRust and EXpertise in Visual Analytics (TREX) Workshop at IEEE VIS 2021
	TRust and EXpertise in Visual Analytics (TREX) Workshop at IEEE VIS 2020
2017	**Panelist**
	Advancing Visualization Inclusion and Diversity (AVID) Workshop at IEEE VIS
>	**Reviewer**
	IEEE VIS: 2017-2021
	CHI: 2018-2021
	TVCG: 2018-2021
	EuroVis: 2020-2021
	CG&A: 2021
	CSCW: 2021
	International Journal of Human-Computer Studies: 2019
	KDD IDEA: 2017
	VAST Challenge: 2016

Institutional Service

2021	**Faculty Search Committee**
	Computer Science Department, Emory University
2021	**Graduate Admissions Committee**
	Computer Science Department, Emory University

2018-2020	**Graduate Student Council Chair**
	Representative of graduate students in the School of Interactive Computing, Georgia Tech
2017-2018	**Graduate Student Council Travel Committee**
	Responsible for reviewing and awarding travel grants to graduate student applicants in the College of Computing, Georgia Tech

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 2021	**Visualization Summer Camp**
	Minneapolis, MN
Oct 2019	**NextProf Nexus Workshop**
	Atlanta, GA
Jun 2019	**Summer Institute on Bounded Rationality**
	Berlin, Germany
Apr 2018	**CRA-W Grad Cohort Workshop**
	San Francisco, CA
Oct 2016	**Grace Hopper Celebration of Women in Computing**
	Houston, TX
Apr 2016	**CRA-W Grad Cohort Workshop**
	San Diego, CA