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

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

2023 Arts and Social Justice, Fellow

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

Belief Decay or Persistence? A Mixed-Method Study on Belief Movement Over Time
S. Gupta, A. Karduni, and *E. Wall*
Computer Graphics Forum (Proc. EuroVis'23), 2023.
PDF | Talk | Video FF

A Qualitative Interview Study of Distributed Tracing Visualisation: A Characterisation of Challenges and Opportunities
T. Davidson, *E. Wall*, and J. Mace
IEEE Transactions on Visualization and Computer Graphics (Proc. VIS'23), 2023.
PDF

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

Let's Get Vysical: Perceptual Accuracy in Visual & Tactile Encodings
Z. Xu, K. Williams, and *E. Wall*
IEEE Information Visualization (VIS) Short Papers, 2023.
PDF | Supplemental

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

2023-2026 **Toward Interventions For Equitable University Admissions With Visual Analytics**
Emory Office of Provost: Racial Justice/Racial Equity
Funded: $148,850

2023-2024 **Developing Behavior Change Interventions for Responsible Data Science**
Emory University Research Committee
Funded: $30,000

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

Other

2023 Spring — **Scholarly Writing And Publishing (SWAP) Fund Award**
Emory University
Funded: $2,250
Purpose: hire editor to assist with NSF CAREER proposal writing

2023 Spring — **Pedagogy Mini Grant**
Human-Computer Interaction (CS 485/584), Emory University
Funded: $350
Purpose: purchase Google cardboard for a virtual reality design module

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

Teaching

Instructor

Spring 2023 — **Human-Computer Interaction (CS 485 / 584)** (34 students)
Emory University

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

Feb 2023 — **Accessibility and Universal Design in HCI**
Affordable and Sustainable Healthcare Technologies (BMI 585), Emory University

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.

Other 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

Graduate 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

2023- **Thomas Davidson**
Ph.D. Computer Science and Informatics, Emory University

Undergraduate Honors Thesis Advisees

2024 **Tommy Skodje**
Thesis: Immersive Memory Tasks
B.S. Computer Science, Emory University

Thesis Committee (Undergraduate)

2023 **Elijah Chou**
Thesis: Measuring creativity in computer programming: A code distance approach

B.S. Highest Honors Computer Science, Emory University (after Emory: M.S. student, Emory)

2023 **Chen Gong**
Thesis: Evaluating Speaker Diarization in Transcripts: A Text-based Approach with the TDER Metric and the TranscribeView System
B.S. Highest Honors Computer Science, Emory University (after Emory: M.S. student)

2023 **Alexandra Li**
Thesis: Signaface: Face Generation for SSL/TLS Certificate Change Detection
B.S. Highest Honors Computer Science, Emory University (after Emory: Ph.D. student, CMU)

2023 **Noah Okada**
Thesis: Development of Immersive Cognitive Tasks for Use in Human Memory Research
B.S. Highest Honors Computer Science and Neuroscience, Emory University (after Emory: Ph.D. student, CalTech)

2023 **Peyton Robertson**
Thesis: Vulnerability Detection: A Machine Learning Approach to Identifying Security Vulnerabilities In Code
B.S. Honors Computer Science, Emory University (after Emory: Cybersecurity Engineer, Microsoft)

2023 **Sierra Talbert**
Thesis: Human.exe: Generating Critical Theories of Humanity in Human-Computer Interaction
B.S. Highest Honors Women, Gender, and Sexuality Studies and Computer Science, Emory University

2023 **Kevin Wu**
Thesis: CONSchema: Schema matching with semantics and constraints
B.S. Honors Computer Science, Emory University (after Emory: Software Engineer, Capital One)

2023 **Ruby Wu**
Thesis: ClusT: Interactive Visualization Tool for Deep Constrained Clustering on Tweets
B.S. Honors Computer Science, Emory University (after Emory: M.S. student, CMU)

2023 **Zach Zaiman**
Thesis: AudioStrike: Acoustic Identification of Keystrokes to Enhance End-to-End Session Integrity
B.S. Highest Honors Computer Science, Emory University (after Emory: Software Engineer, Microsoft)

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

Mentoring

2022- **Julietta Zhu**, B.S. Quantitative Sciences (Psychology Track), Emory University, Class of 2024
Improving self reflection on academic productivity

2022- **Yijun Liu**, B.S. Quantitative Sciences, Emory University, Class of 2024
Detecting Dunning-Kruger Effect in data visualization

2022-2023 **Zhongzheng Xu**, B.S. Computer Science, Emory University, Class of 2023 (after Emory: M.S. student, Brown)
Visual and tangible data accessibility

2021-2023 **Randy Truong**, B.S. Computer Science and Quantitative Sciences, Emory University, Class of 2023 *(after Emory: Pacific Northwest National Laboratory)*
Eliciting affective response using visualization and sonification

2021-2022 **Zhou (Serena) Fang**, B.S. Quantitative Sciences, Emory University, Class of 2022 *(after Emory: 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 **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
after Emory: MS Health Sciences Informatics Student at Johns Hopkins

Service

Professional Service

2021-2022 **Organizing Committee**
Elections Chair, VIS 2021-2023

> **Program Committee Member**
ACM FAccT, 2023
IEEE VIS, 2021-2023
BELIV Workshop on *"Designing and Evaluating Visualizations for an Ethical, Inclusive, and Responsible Future"*, 2022
EuroVis, 2022
ACM CHI, 2022, 2024
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

> **Panelist**

Women in Tech Panel, Emory Data Science Club and ProgramHers, 2023
Equity in Vision Science at Object Perception, visual Attention, and visual Memory (OPAM) conference, 2021
Advancing Visualization Inclusion and Diversity (AVID) Workshop at IEEE VIS, 2017

> **Reviewer (Papers)**

Nature: 2023
IEEE VIS: 2017-2023
CHI: 2018-2023
Universal Access in the Information Society (UAIS): 2023
FAccT: 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

> **Reviewer (Funding)**

Austrian Science Fund (FWF): 2023
Natural Sciences and Engineering Research Council of Canada: 2022
National Science Foundation: 2021

> **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

2020-2021 **Faculty Search Committee**
Computer Science Department, Emory University

2020-2023 **Graduate Admissions Committee**
Computer Science Department, Emory University

> **Honors Program Selection Committee**
Computer Science Department, Emory University, 2023

> **Panelist**
DEI Statement Panel, Emory University, 2021
Innovations in Online Teaching Panel, Emory University, 2021

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 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