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.

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edu

☐ Google Scholar
 ☐ LinkedIn
 ☐ Math & Science
Center W302E
 https://emilywall.pr
 of

☐ PDF of CV (last
updated: 2024-0404)

Appointments

2021- Assistant Professor

Department of Computer Science (Affiliate) Center for Data Science Emory University

²⁰²⁰⁻ 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

B.S. in Computer Science & Mathematics

University of Georgia summa cum laude

Honors & Awards

.025	Arts and Social Justice, Fellow
.020	VGTC Best Dissertation, Honorable Mention
:019	GVU Foley Scholar , Recipient, Georgia Institute of Technology
.019	D.E. Shaw Exploration Fellowship, Recipient
019-	Siemens FutureMaker Fellowship, Recipient
018	GVU Foley Scholar, Finalist, Georgia Institute of Technology
.017	Graduate Student Symposium, Participant, AT&T Labs
017	Doctoral Colloquium, Participant, IEEE VIS
017-	Graduate Fellowship for STEM Diversity (GFSD), Recipient
017	NSF Graduate Research Fellowship Program, Honorable Mention
017	Department of Defense SMART Fellowship, Recipient (Declined)
:015- :019	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.



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.

₽DF

 \mathbf{Q} (Best Paper, runner up) VisHiker's Guide to Evaluation: Competing Considerations in Study Design

E. Wall, C. Xiong, and Y-S. Kim IEEE Computer Graphics and Applications, 2022.



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 | Ħ 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 |
 III Talk | III Video | I

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.

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

Trust Junk and Evil Knobs: Calibrating Trust in Al Visualization

E. Wall, L. Matzen, M. El-Assady, P. Masters, H. Hosseinpour, A. Endert, R. Borgo, P. Chau, A. Perer, H. Schupp, H. Strobelt, and L. Padilla *IEEE Pacific Visualization Conference*, 2024.

PDF

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 | 🖪 Talk | ▶ Video FF

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

Visual Salience to Mitigate Gender Bias in Recommendation Letters

Y. Da, M. Chen, B. Altschuler, Y. Bu, and *E. Wall*

Workshop on Visualization for Social Good (VIS4Good, at VIS'23), 2023.

PDF | ■ Supplemental | 日 Talk

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.

₽DF

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

2024-2029

Promoting Metacognition in Visual Analytics

NSF CAREER Award

ole: Pl

Funded: \$643,965 (Emory)

²⁰²³⁻ Advancing Visualization Decision Support through

2027 Mitigating Confirmation Bias

NSF IIS-HCC

Role: PI

Co-PI: Dr. Cindy Xiong

Funded: \$683,097 (Emory) / \$1,198,084 (total)

²⁰²³⁻ Toward Interventions For Equitable University Admissions

With Visual Analytics

Emory Office of Provost: Racial Justice/Racial Equity

Role: PI

Co-PI: Dr. Wesley Longhofer Funded: \$148,850

2023- Developing Behavior Change Interventions for Responsible

Data Science

Emory University Research Committee

Role: Pl

Funded: \$30,000

2023- Developing an Immersive Cognitive Task for Expanding the

Assessment of Memory in Pediatrics

Pediatric Research Alliance Pilot Grant

Role: Co-I

Co-PIs: Dr. Daniel Drane, Dr. Ammar Kheder, Noah Okada,

Dr. Joshua Chern, and Dr. Donald Bearden

Funded: \$50,000

²⁰²²⁻ A Novel Web-based Decision Aid Tool for Reducing COVID-

²⁰²³ **19 Vaccine Hesitancy**

HealthCare Innovation Seed Grant

Role: Co-I

Co-Pls: Dr. Ambar Kulshreshtha, Dr. Shivani Patel, Dr. Piyush

Kumar

Funded: \$24,995

Other

²⁰²³ Scholarly Writing And Publishing (SWAP) Fund Award

Spring

Emory University

Funded: \$2,250

Purpose: hire editor to assist with NSF CAREER proposal

writing

2023

Pedagogy Mini Grant

Spring

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 2024	Human-Computer Interaction (CS 485 / 584) (29 students) Emory University
Fall 2023	Information Visualization (CS 441 / 541) (36 students) Part of the Arts & Social Justice Program Emory University
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

Mar 2024	Information Visualization Environmental Health Seminar: Impact Evaluation of Global and Environmental Health Programs and Projects (EH 590R), Emory University
Oct 2023	Visual Analytics Human-Al Interaction (CS 485/585), Emory University
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

- > *March 2024*. Scientific Computing and Imaging (SCI) Institute at University of Utah.
- > September 2022. Emory SON Center for Data Science.
- > September 2022. ATLAS Institute at University of Colorado Boulder.

Good and Bad Biases in Innovation, Decision Making, and Beyond

> November 2023. Emory Center for Mind, Brain, and Culture.

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
- > 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. 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.
- 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

2019-

Graduate Advisees

- 2019-Yanan Da Ph.D. Computer Science and Informatics, Emory University
- 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**

²⁰²⁴ Tommy Skodje

Thesis: A Virtual Reality Toolkit for Evaluating Memory in Epilepsy Patients

B.S. Honors Computer Science, Emory University (after

Emory: M.S. student)

Thesis Committee (Undergraduate)

²⁰²⁴ Yijun Liu

Thesis:

B.S. Computer Science, Emory University

2024 Cole Smith

Thesis: Urinary RNA Biomarkers in Extracellular Vesicles from Post-DRE Urine to Predict Aggressive Prostate Cancer B.S. Highest Honors Chemistry, Minor Computer Science, Emory University

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 Textbased 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)

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

2023-	Audrey Bu, B.S. Quantitative Sciences (Sociology Track) & Mathematics, Emory University, Class of 2025 Measuring gender and racial biases in university admissions
2022- 2023	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

Star Liu, B.S. Quantitative Sciences, Emory University, Class
 of 2021

Developed system for <u>visualizing health inequities</u> during the COVID-19 pandemic, first author of case study on <u>COVID-19</u>

Health Equity Dashboard

after Emory: MS Health Sciences Informatics Student at Johns Hopkins

Service

Professional Service

2021 Organizing Committee

Doctoral Colloquium Chair, VIS 2024

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, 2024

ACM CHI, 2022, 2024

Vis4Good Workshop at IEEE VIS, 2021

IEEE VIS Short Papers, 2020

VISxAl Workshop at IEEE VIS, 2019

CHI Late Breaking Work, 2018

Organizer

Visualization for Social Good Workshop at IEEE VIS 2023
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

Establishing and Thriving in an Academic Career @ IEEE VIS, 2023

What is a Visual Analytics contribution, and how is it changing? @ IEEE VIS, 2023

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: 2017-2024 CHI: 2018-2024

Universal Access in the Information Society (UAIS): 2023

FAccT: 2023

TVCG: 2018-2023 EuroVis: 2020-2024 ACM TiiS: 2022

Cognitive Research: 2022

CG&A: 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

20202021 Faculty Search Committee
2021 Computer Science Department, Emory University

20202024 Graduate Admissions Committee
2024 Computer Science Department, Emory University

> Honors Program Selection Committee
2025 Computer Science Department, Emory University, 2023

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

Battling Bias. Ep. 3, Tech Unbound Podcast. Listen
with Josh Preston

Other Professional Activities

Sep 2023	Human-Centered Approaches for Provenance in
	Automated Data Science
	Dagstuhl, Wadern, Germany
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