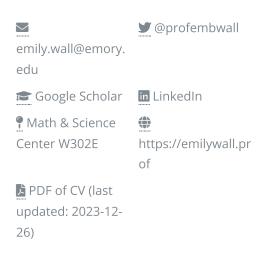
# Emily Wall, Ph.D.

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.



# **Appointments**

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**

2020 <b>VGTC Best Dissertation</b> , Honorable Mention	1
2019 <u>GVU Foley Scholar</u> , Recipient, Georgia Institu Technology	ute of
2019 <b>D.E. Shaw Exploration Fellowship</b> , Recipient	t
2019- 2020 Siemens FutureMaker Fellowship, Recipient	t
2018 GVU Foley Scholar, Finalist, Georgia Institute Technology	e of
2017 <b>Graduate Student Symposium</b> , Participant,	AT&T Labs
2017 <b>Doctoral Colloquium</b> , Participant, IEEE VIS	
2017- 2020 Graduate Fellowship for STEM Diversity (GF	SD), Recipien
NSF Graduate Research Fellowship Program Mention	m, Honorable
Department of Defense SMART Fellowship, (Declined)	Recipient
2015- 2019 President's Fellowship, Recipient, Georgia In Technology	nstitute of

# **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 | Nideo 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.

₽DF

# **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 | 目 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

### 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 | E Talk | Video | Wideo 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**

### 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), 2022.

🖺 PDF | 🖿 Supplemental | 🖪 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.



# 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.



### 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.



## **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.



#### **Theses**

#### **Detecting and Mitigating Human Bias in Visual Analytics**

Emily Wall

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



# **Grants & Funding**

### Research

2023-2026 Advancing Visualization Decision Support through Mitigating Confirmation Bias

NSF IIS-HCC

Role: Pl

Co-PI: <u>Dr. Cindy Xiong</u> Funded: \$683,097 (Emory)

2023 2026 Toward Interventions For Equitable University Admissions
 With Visual Analytics

Emory Office of Provost: Racial Justice/Racial Equity

Role: P

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

2023- Developing Behavior Change Interventions for Responsible

Data Science

**Emory University Research Committee** 

Role: PI

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-Pls: Dr. Daniel Drane, Dr. Ammar Kheder, Noah Okada,

Dr. Joshua Chern, and Dr. Donald Bearden

Funded: \$50,000

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

19 Vaccine Hesitancy

HealthCare Innovation Seed Grant

Role: Co-l

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

<sup>2023</sup> Pedagogy Mini Grant

Spring

Human-Computer Interaction (CS 485/584), Emory University

Funded: \$350

Purpose: purchase Google cardboard for a virtual reality

design module

<sup>2022 Fall</sup> 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

2023

Fall Information Visualization (CS 441 / 541) (36 students)

Part of the Arts & Social Justice Program

mory University

Spring 2023	Human-Computer Interaction (CS 485 / 584) (34 students) Emory University
Fall 2022	<b>Information Visualization (CS 485 / 584)</b> (41 students) Emory University
Spring 2022	Human-Computer Interaction (CS 485 / 584) (40 students) Emory University
Fall 2021	<b>Information Visualization (CS 485 / 584)</b> (26 students) Emory University

## **Guest Lecturer**

Oct 2023	<b>Visual Analytics</b> 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	<b>Visual Analytics</b> 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	<b>Visual Analytics</b> 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**

Good and Bad Biases in Innovation, Decision Making, and Beyond > November 2023. Emory Center for Mind, Brain, and Culture.

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. 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**

<sup>2019</sup>- Yanan Da

Ph.D. Computer Science and Informatics, Emory University

<sup>2019</sup>- 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

<sup>2021-</sup> Shiyao Li

Ph.D. Computer Science and Informatics, Emory University

<sup>2022-</sup> 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**

<sup>2024</sup> Tommy Skodje

Thesis: Immersive Memory Tasks
B.S. Computer Science, Emory University

2024 Yousef Rajeh

Thesis: Al-Powered VR Therapy

B.S. Computer Science, Emory University

# Thesis Committee (Undergraduate)

<sup>2023</sup> 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)

## <sup>2023</sup> 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)

## 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

### 2023 Kevin Wu

Thesis: CONSchema: Schema matching with semantics and constraints

B.S. Honors Computer Science, Emory University (after Emory: Software Engineer, Capital One)

and Computer Science, Emory University

### 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

Audrey Bu, B.S. Quantitative Sciences (Sociology Track) & Mathematics, Emory University, Class of 2025

	Measuring gender and racial biases in university admissions
2022- 2023	<b>Yijun Liu</b> , 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-	Organizing Committee
2024	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 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 <u>Data Science Club</u> 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

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

VISxAl Best Paper Award Selection Committee: 2021 CHI Best Paper Award Selection Committee: 2022

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	<b>Highlights from IEEE VIS 2019</b> , 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	CRA-W Grad Cohort Workshop
2018	San Francisco, CA
Oct 2016	Grace Hopper Celebration of Women in Computing Houston, TX
Apr 2016	CRA-W Grad Cohort Workshop San Diego, CA