# Emily Wall

My research involves decision making using data visualization 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 will be joining the Department of Computer Science at Emory University as an Assistant Professor in Fall 2021. I am currently completing a Postdoc at Northwestern University with Jessica Hullman and Steve Franconeri (Summer 2020 - Summer 2021). I completed my Ph.D. in Computer Science at Georgia Tech in 2020.

✉ emily.wall@emory.edu          🎓 Google Scholar

🌐 emilywall.github.io           in LinkedIn

🐦 @embwall                      📄 PDF of CV

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## Appointments

2021-          **Assistant Professor**
               Department of Computer Science
               Emory University

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

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## 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*

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## Honors & Awards

2019           **GVU Foley Scholar**, Recipient, Georgia Institute of Technology

2019           **D.E. Shaw Exploration Fellowship**, Recipient

2019           **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

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## 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

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## 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

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## 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**, Seattle, 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

## 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

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# Teaching

## 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

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## Guest Lectures

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

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# Presentations

## Invited Talks

**As We Are: Detecting and Mitigating Human Bias in Visual Analytics**
> *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.

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## 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.

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# Mentoring

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| 2020-2021 | **Jenni Hutson**, B.A. Computer Science and Radio/TV/Film, Northwestern University, Class of 2021<br>Developed system for visualization recommendations that support decision making |
| 2020 | **Star Liu**, B.S. Quantitative Sciences, Emory University, Class of 2021<br>Developed system for visualizing health inequities during the COVID-19 pandemic, first author of case study on COVID-19 Health Equity Dashboard |
| 2020 | **Jamal Paden**, B.S. Computer Science, Georgia Institute of Technology, Class of 2020<br>Conducted usability testing for bias mitigation interventions |
| 2017-2018 | **Yingxiao Ouyang**, M.S. HCI, Georgia Institute of Technology, Class of 2019<br>Conducted usability testing and prototyping for bias mitigation interventions<br>*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

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*

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# Service

## Professional Service

> **Program Committee Member**
IEEE VIS Short Papers, 2020
VISxAI Workshop at IEEE VIS, 2019
CHI Late Breaking Work, 2018

> **Reviewer**
IEEE VIS: 2017-2020
CHI: 2018-2020
TVCG: 2018-2020
EuroVis: 2020
International Journal of Human-Computer Studies: 2019
KDD IDEA: 2017
VAST Challenge: 2016

2020    **Organizer**
TRust and EXpertise in Visual Analytics (TREX) Workshop at IEEE VIS

2017    **Panelist**
Advancing Visualization Inclusion and Diversity (AVID) Workshop at IEEE VIS

## Institutional Service

2018-2020    **Graduate Student Council Chair**, School of Interactive Computing
Representative of graduate students in the School of Interactive Computing

2017-2018    **Graduate Student Council Travel Committee**
Responsible for reviewing and awarding travel grants to graduate student applicants
in the College of Computing

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# 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

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