Ashley Suh

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Research Interests: I elevate how humans analyze, communicate, and make decisions with data by creating intuitive, engaging, and thoughtful visual interfaces. I strive to make advanced analytics (data science, machine learning, artificial intelligence) both accessible and interpretable to those without highly-technical backgrounds.

Research Areas: Data Visualization, Visual Analytics, Human-Computer Interaction, Visual Communication, Human-Centered AI, Human-Machine Teaming, ML/AI Explainability, UI/UX Design, Cognitive Science

Education

Exp. 2023 — **Ph.D. Computer Science,** *Tufts University*
Advisor: Remco Chang

2018 - 2020 — **M.S. Computer Science,** *Tufts University*
Advisor: Remco Chang

2015 - 2018 — **B.S. Computer Science & Mathematics,** *University of South Florida*
Advisor: Paul Rosen

Employment

May 2022 - — **MIT Lincoln Laboratory - AI Technology & Systems**
Graduate Research Intern, Co-op | *Supervisors*: Steven Gomez, Dennis Ross
Implements novel techniques in visual analytics and explainable AI (`XAI`) to alleviate common challenges and tasks in cyber operations. I evaluate all tools I build using quantitative and qualitative methods in human-centered AI research.

Sum. 2021 — **Novartis - Data Science & AI**
Graduate Research Intern | *Supervisor*: Dylan Cashman
Formulated a set of guidelines to help data scientists better communicate, visualize, and present their machine learning models to subject matter experts, with the goal of increasing model adoption. Guidelines have been adapted into Novartis practices.

Tufts University Pre-College Programs - Coding 101 Intensive
Program Instructor
Instructed and developed a new curriculum for pre-college students to learn Python. Managed 6 TAs in the design of 10 Python labs; created lecture materials with live coding as well as `HTML/CSS` & `Figma` skills-building modules. Course materials.

2020 - 2021 — **Friedman School of Nutrition Science and Policy**
Software Consultant
Managed and secured the frontend, backend, and database (`Ruby on Rails`) of a large-scale, longitudinal nutrition survey dashboard with >10,000 users (`AWeber API` and `Qualtrics API`).

Sum. 2018 — **National Renewable Energy Laboratory - Insight Center**
Undergraduate Research Intern | *Supervisor*: Kristi Potter
Collaborated with power grid engineers on a visual analytic tool to detect and assess energy demand failures in the North American power grid system. Implemented in Processing (`Java`) and as a web application (`D3`, `JavaScript`).

2018 - — **Tufts University - Visual Analytics Lab**
Graduate Research Assistant | *With Prof. Remco Chang*
Leads the development of visual analytic/ML solutions under multiple projects (NSF NRT Fellowship, DARPA D3M Program, NSF HDR); assists in grant writing; helps develop relevant course materials; participates as part-time TA to the CS department.

2017 - 2018 — **University of South Florida - Graphics & Visualization Lab**
Undergraduate Research Assistant | *With Prof. Paul Rosen*
Completed a two-year REU on implementing techniques in Topological Data Analysis for interactive graph visualization. Co-wrote a proposal to the CRA-WP which was accepted for funding in the first year. News article.

2016 - 2017 — **Hillsborough Community College - STEM Transfer Center**
Supplemental Instructor | *With Prof. Don Soash*
Co-instructed two courses in mathematics (College Algebra, Pre-Calculus) and held supplementary labs 3x/week, as part of an initiative by the University of South Florida to promote CC students' transition to studying STEM at a university.

Publications

Journal Articles & Conference Proceedings

[1] **Inferential Tasks as an Evaluation Technique for Visualization**. Ashley Suh, Ab Mosca, Shannon Robinson, Quinn Pham, Dylan Cashman, Alvitta Ottley, Remco Chang. *EuroGraphics & EuroVis Short Papers* (2022)
Best Short Paper Award

[2] **UnProjection: Leveraging Inverse-Projections for Visual Analytics of High-Dimensional Data**. Mateus Espadoto, Gabriel Appleby, Ashley Suh, Dylan Cashman, Mingwei Li, Carlos Scheidegger, Erik W Anderson, Remco Chang, Alexandru Cristian Telea. *IEEE Transactions on Visualization and Computer Graphics* (2021)

[3] **Communicating Performance of Regression Models Using Visualization in Pharmacovigilance**. Ashley Suh, Gabriel Appleby, Erik W Anderson, Luca Finelli, Dylan Cashman. *IEEE Workshop on Visual Analytics in Healthcare (VAHC)* (2021)

[4] **TopoLines: Topological Smoothing for Line Charts**. Paul Rosen, Ashley Suh, Christopher Salgado, Mustafa Hajij. *EuroGraphics & EuroVis Short Papers* (2020)

[5] **Persistent Homology Guided Force-Directed Graph Layouts**. Ashley Suh, Mustafa Hajij, Bei Wang, Carlos Scheidegger, Paul Rosen. *IEEE Transactions on Visualization and Computer Graphics (Proc. InfoVis '19)* (2019)

Pre-Prints & In-Submission

[6] **Visualization Guidelines for Model Performance Communication Between Data Scientists and Subject Matter Experts**. Ashley Suh, Gabriel Appleby, Erik W Anderson, Luca Finelli, Dylan Cashman. *arXiv preprint arXiv:2205.05749* (2022) [In submission to TVCG]

[7] **The Effects of Combining Data Integration and Visual Data Analysis**. Adam Coscia, Ashley Suh, Remco Chang, Alex Endert. (2022) [In submission to TVCG]

[8] **A Grammar for Hypothesis-Driven Visual Analysis**. Ashley Suh, Yilan Jiang, Ab Mosca, Eugene Wu, Remco Chang. *arXiv preprint arXiv:2204.14267* (2022)

Workshop Papers & Posters

[9] **Analysis Without Data: Teaching Students to Tackle the VAST Challenge**. Edward He, Daniel Tolessa, Ashley Suh, Remco Chang. *IEEE Workshop on Visualization Guidelines in Research, Design, and Education* (2022)

[10] **Evaluating Smoothing Techniques for 1D Functions**. Ashley Suh, Christopher Salgado, Mustafa Hajij, Paul Rosen. *Posters of IEEE Visualization (VIS)* (2018)

[11] **Comparing Interactive Graph Visualization Techniques**. Ashley Suh, Mustafa Hajij, Bei Wang, Carlos Scheidegger, Paul Rosen. *Posters of Grace Hopper Celebration (GHC)* (2018)

[12] **Visualizing the Reliability and Security of the North American Grid System**. Ashley Suh, Kristi Potter. *Posters of National Renewable Energy Lab (NREL)* (2018)

[13] **Driving Interactive Graph Exploration Using 0-Dimensional Persistent Homology Features**. Ashley Suh, Mustafa Hajij, Bei Wang, Carlos Scheidegger, Paul Rosen. *Posters of IEEE Visualization (VIS)* (2017)

Awards & Honors

2022	EuroVis Best Short Paper Award (for *Inferential Tasks*)
2021 - 2022	NSF NRT PhD Fellowship (for *Data-Driven Decision-Making with Visual Analytics*)
2020	Graduate Research Finalist, *National Center for Women & Information Technology*
2018 - 2019	Kirk and Janelle Loevner Endowed Fellowship, *Tufts University*
2018	CRA-WP Grace Hopper Celebration Research Scholars Award
	Undergraduate Research Finalist, *National Center for Women & Information Technology*
2017 - 2018	CRA-WP Undergraduate Fellowship (CREU)
2016 - 2018	Dean's List, *University of South Florida Computer Science*

Invited Talks & Conference Presentations

Oct 2022	**From Exploratory to Hypothesis-Driven Visual Analytics** IEEE VIS 2022 Doctoral Colloquium, *Oklahoma City, OK*
Aug 2022	**How to (Effectively) Put AI into the Hands of Cyber Operators** MIT Lincoln Laboratory (AI Technology & Systems), *Lexington, MA*
Jun 2022	**Inferential Tasks as an Evaluation Technique for Visualization** EuroVis 2022 Presentation, *Rome, Italy*

Invited Talks & Conference Presentations (continued)

Nov 2021 **Graphs, Trees, and How to Visualize Them**
Northeastern University, *Boston, MA*

May 2021 **Deriving Structure from Graphs for Visual Data Exploration and Analysis**
Tufts University, *Medford, MA*

Aug 2021 **Communicating the Performance of Machine Learning Models to Subject Matter Experts**
Novartis (Data Science & AI), *Cambridge, MA*

Jun 2020 **TopoLines: Topological Smoothing for Line Charts**
EuroVis 2020 Presentation, *Cambridge, MA*

Oct 2019 **Persistent Homology Guided Force-Directed Graph Layouts**
InfoVis 2019 Presentation, *Vancouver, BC*

Teaching

Spr 2023 **COMP 150: Visual Analytics**, *Tufts University*
Co-Instructor with Prof. Remco Chang

Sum 2021 **Coding 101 Intensive**, *Tufts University Pre-College Programs*
Program Instructor

Fall 2020 **COMP 250: Visualization Seminar**, *Tufts University*
Graduate Teaching Assistant for Prof. Remco Chang

Fall 2019 **COMP 150: Visual Analytics**, *Tufts University*
Graduate Teaching Assistant for Prof. Remco Chang

Spr 2017 **MAC 1140: Precalculus**, *Hillsborough Community College*
Supplementary Lecturer and Co-Instructor with Prof. Don Soash

Fall 2016 **MAC 1105: College Algebra**, *Hillsborough Community College*
Supplementary Lecturer and Co-Instructor with Prof. Don Soash

Mentoring Experience

Fall 2022 **Jiahao Xu**, MSCS Student, *Tufts University*
PhD Supervisor for MS Project
Project: An automatic hypothesis-generation dashboard to assist analysts in performing question-answering with their data.

Harry Li, MSCS Student, *Tufts University*
PhD Supervisor for MS Project
Project: A robust visualization system for exploring and navigating knowledge graphs.

Vanessa Bellotti, REU CS Student, *Tufts University*
PhD Co-Supervisor for REU Project
Project: Evaluating a hypothesis-driven approach to solving VAST Challenges in a visual analytics classroom.

Edward He, REU CS Student, *Tufts University*
PhD Co-Supervisor for REU Project
Project: Evaluating a hypothesis-driven approach to solving VAST Challenges in a visual analytics classroom.

Sum 2022 **Daniel Tolessa**, REU CS Student, *Tufts University*
PhD Supervisor for REU Project
Formalized a student-driven guideline for solving VAST challenges. Outcome was a paper accepted at IEEE VisGuides '22.

Spr 2022 **Kate Hanson**, MS Data Science Student, *Tufts University*
PhD Supervisor for MS Thesis Project
Created a visual recommendation system (`Vue.js` and `D3`) to assist users in selecting a diet suited to their personality type.

Fall 2021 **Ashley Jou**, MS Data Science Student, *Tufts University*
PhD Supervisor for MS Thesis Project
Developed an AutoML framework (`Auto-WEKA`) to model and predict an individual's BMI from longitudinal nutrition data.

Sum 2020 **Quinn Pham**, Undergraduate Student, *Tufts University*
PhD Supervisor for Undergraduate Thesis Project
Ran and analyzed large-scale crowdsourced user studies (`MechTurk`). Outcome was a paper accepted at EuroVis '22.

Service & Activities

Reviewing IEEE TVCG 2021-2022, IJHCS 2021, IEEE VIS 2021, ACM CHI 2020, IEEE VAST 2020, EuroVis 2020.

Committees **Program Committees:** Visualization in Data Science (VDS @ IEEE VIS) 2022.

Volunteering **Student Volunteering:** IEEE VIS 2019-2021, IEEE VCIP 2017.

Service & Activities (continued)

2022 **Tufts Art Datathon - Team Leader**, *Medford, MA*
Led a working group of four women in the analysis and visualization of bias and exclusion in the Tufts Art Gallery. Article

2021 **High School & Pre-College STEM Outreach**, *Medford, MA*
Arranged 10 different panels of faculty and industry speakers from MIT, Tufts, Google, Novartis, MIT Lincoln Lab, Amazon Research, and National Renewable Energy Lab to promote STEM awareness for diverse high school and pre-college students.

2020 **CRA-WP Grad Cohort For Women**, *New Orleans, Louisiana*
Invited as a presenter with full scholarship to share and promote diversity in CS for women.

2017-2018 **CRA-WP Undergraduate Research Project Blog** (CREU)
Maintained a weekly blog through the CRA-W to discuss and promote research conducted as an undergraduate.