Research Statement

My research bridges data visualization and perception to drive the design of novel systems for analyzing large and complex datasets. I focus on expanding our knowledge of perception in order to evaluate how visualization design impacts users’ abilities to accomplish their analytical goals. Through this process, I derive quantified insight into the role of perception in interpreting visualizations by gauging how real viewers in natural environments perceive encoded information. I use this knowledge to design systems and techniques that overcome scalability and interpretability limitations in existing designs. The resulting visualizations address research problems across a variety of domains, including genomics, proteomics, biochemistry, and the humanities.

Research Interests


Education

Dissertation: “Perceptually Informed Scalable Sequence Comparison.”
Thesis Committee: Michael Gleicher (chair), Steven Franconeri, Bilge Mutlu, Robert Roth, and Kevin Ponto.
Minor studies in perceptual psychology and art history.
GPA: 3.82/4.00.

GPA: 3.77/4.00.

NASA Space Grant Scholar, four-time Dean’s List Member, graduated at age 20.
Minor in mathematics.
GPA: 3.60/4.00.

Publications

Journal Publications


Refereed Conference Publications


Refereed Abstracts


Invited Talks


Workshops & Colloquia


Grants & Fellowships


BACTER Research Fellowship. Department of Energy’s Institute for Bringing Computational Techniques to Energy Research (BACTER Institute) at the University of Wisconsin-Madison, 2010-2012.
Experience

Academia

2010–Present  **Graduate Researcher, Department of Computer Sciences, University of Wisconsin-Madison.**
Conducting research on data visualization under Professor Michael Gleicher, with a focus on improving the scalability and interpretability of visual analysis systems.

Collaborating with researchers across multiple disciplines to discover and apply novel findings integrating perception, cognition, and visualization to create analytics systems that help advance research in domains ranging from biology to the humanities.

2012, 2014  **Guest Lecturer, Department of Computer Sciences, University of Wisconsin-Madison.**
Lectured on perceptually-motivated visualization design with an emphasis on topics in biological sequence analysis for a graduate visualization course.

Redesigned curriculum for color in computer graphics for an undergraduate graphics course.

2009  **Teaching Assistant, Human-Computer Interaction, University of Wisconsin-Madison.**
Assisted students with concepts from the first graduate-level human-computer interaction course offered by the University.

2009  **Laboratory Instructor, Introduction to Programming, University of Wisconsin-Madison.**
Supervised four semester-long hands-on programming sessions and worked one-on-one with students in an introductory programming course (mean instructor rating: 4.58/5.00).

2008–2009  **Mathematics and English Instructor, Kumon of Redmond, Redmond, WA.**
Instructed K-12 and adult students in concepts from mathematics and English, working with small groups of students progressing through individualized curricula.

Undergraduate Research Mentorship

2014  **Andrew Hermus, Scalable Visualization for Text Analytics (w. Eric Alexander)**

2013  **Benjamin Reddersen, Rendering Techniques for Molecular Surface Visualization**

Industry

2013  **Research Intern, Tableau Software, Menlo Park, CA.**
Worked with Vidya Setlur and Maureen Stone investigating interactions of color, task, and data in information visualization, resulting in multiple publications and an on-going collaboration with Tableau Research.

2012  **Software Development Intern, Google, Madison, WI.**
Designed and prototyped a web-based bioinformatics data storage and analytics platform leveraging cutting-edge cloud technologies and computational analysis techniques to manage biological data at massive scales.

2009  **Software Development Intern, Boston Scientific, CRM, Redmond, WA.**
Designed an application to automatically derive complete parameter-based test suites for Class 3 medical devices, automating testing for over 3,000 different device parameters.

2008–2009  **Software Development Intern, Apptio, Bellevue, WA.**
Served as the first intern for the company, debugging and developing analytic dashboards for predictive business intelligence applications.
Professional Activities & Service

Outreach

2010–Present  **ACM-W Mentor, Department of Computer Sciences, University of Wisconsin-Madison.**
Mentored 15 undergraduate women in computer sciences with interests in computer graphics and visualization.

2009  **Majors Fair Representative, Department of Computer Sciences, University of Wisconsin-Madison.**
Provided information about computer science and gave demos of current undergraduate research projects to incoming freshmen.

2009  **Department Guide, Department of Computer Sciences, University of Washington.**
Guided elementary school students through a series of hands-on activities and presentations from computer science researchers.

Service

2014–Present  **Digital Humanities Research Network Coordinator, University of Wisconsin-Madison.**
Coordinating bi-weekly meetings for a Mellon-funded working group on the digital humanities, bringing together researchers from over a dozen departments at the University of Wisconsin-Madison.

2012–Present  **Visualization Reading Group Coordinator, University of Wisconsin-Madison.**
Created a weekly campus-wide discussion group for topics in visualization integrating researchers from computer science, English, journalism, environmental sciences, human ecology, and cartography.

2014  **Program Committee Member, BioVis: Symposium on Biological Data Visualization.**

2014  **Reviewer, BMC Medical Informatics and Decision Making.**

2013–2014  **Reviewer, IEEE Information Visualization.**

2013  **Reviewer, BioVis: Symposium on Biological Data Visualization.**

Professional & Academic Memberships

2010–Present  ACM Student Member

2010–Present  IEEE Student Member

2008–Present  Sigma Alpha Lambda Honor Society Member

2008–Present  Phi Theta Kappa International Honor Society

Volunteer Positions

2009–2014  **Web Manager, University of Wisconsin-Madison Women’s Hockey Club.**

2011–2012  **Assistant Practice Coach, Wisconsin Timberwolves Special Needs Hockey Team.**

2010  **GRE Tutor, University of Wisconsin-Madison.**

2007–2008  **Ice Hockey Officiating Mentor, Cascade Hockey Officiating Association.**
Honors & Awards

2014  MERL Best Student Paper Award, IS&T 22nd Color and Imaging Conference for "Adapting Color Difference for Design".


2014  Best Student Presentation Honorable Mention, McPherson Eye Research Institute Symposium.

2014  Andrew W. Mellon Workshop Grant, Digital Humanities Research Network.

2013  Best SciVis Poster Award, IEEE VIS for "Lightness Constancy in Surface Visualization".

2013  Invited Participant, IEEE VIS Doctoral Colloquium.

2010–2012  Research Fellow, BACTER Institute, University of Wisconsin-Madison.


2007–2009  Dean's List Member, University of Washington.

Professional References

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