Danielle Albers Szafir

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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.

Professional Experience

2015–Present **Founding Assistant Professor**
Department of Information Science, University of Colorado Boulder
Affliate Appointment: Department of Computer Science.

2010–2015 **Research Assistant**
Department of Computer Sciences, University of Wisconsin-Madison

2013 **Research Intern**
Tableau Software, Menlo Park, CA

2012 **Software Development Intern**
Google, Madison, WI

2009 **Software Development Intern**
Boston Scientific, CRM, Redmond, WA

2008–2009 **Software Development Intern**
Apptio, Bellevue, WA

Education

2009–2015 **Ph.D. in Computer Sciences**
University of Wisconsin-Madison
Dissertation: "Utilizing Color for Perceptually-Driven Data Visualization."
Thesis Committee: Michael Gleicher, Steven Franconeri, Bilge Mutlu, Robert Roth, & Kevin Ponto.
Minor studies in perceptual psychology and art history.

2009–2011 **Master of Science in Computer Sciences**
University of Wisconsin-Madison

2007–2009 **Bachelor of Science in Computer Science**
University of Washington
NASA Space Grant Scholar, four-time Dean's List Member, graduated at age 20.
Minor in mathematics.

Honors & Awards

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

2014 **Invited Participant**
Genres of Scholarly Knowledge Production 2014

2014 **Honorable Mention for Best Presentation**
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 **NASA Space Grant Scholar**
NASA Space Grant, University of Washington Chapter

2007–2009 **Dean's List Member**
University of Washington

Publications

Journal Publications

Danielle Albers Szafir, Steve Haroz, Michael Gleicher, and Steven Franconeri. "Four Types of Ensemble Coding for Data Visualizations." *Journal of Vision*, 2016 (to appear).

Danielle Albers Szafir, Alper Sarikaya, and Michael Gleicher. "Lightness Constancy in Surface Visualization." *Transactions on Visualization and Computer Graphics*, 2016 (to appear).

Alper Sarikaya, **Danielle Albers**, Julie Mitchell, and Michael Gleicher. "Visualizing Validation of Protein Surface Classifiers." *Computer Graphics Forum*, 33(3), 2014. In the Proceedings of the Eurographics Conference on Visualization.

Danielle Albers, Colin Dewey, and Michael Gleicher. "Sequence Surveyor: Leveraging Overview for Scalable Genomic Alignment Visualization." *IEEE Transactions of Visualization and Computer Graphics*, 17(5), 2011. In the Proceedings of the IEEE Information Visualization Conference.

Michael Gleicher, **Danielle Albers**, Rick Walker, Ilir Jusufi, Charles Hansen, and Jonathan Roberts. "Visual Comparison for Information Visualization." *Information Visualization*, 10(4), 2011.

Refereed Conference Publications

Danielle Albers Szafir, Deidre Stuffer, Yusef Sohail, and Michael Gleicher. "TextDNA: Visualizing Word Usage Patterns with Configurable Colorfields." *Proceedings of the Eurographics Conference on Visualization* (under review).

Danielle Albers Szafir, Maureen Stone, and Michael Gleicher. "Adapting Color Difference for Design." *IS&T 22nd Color and Imaging Conference*, 2014. **[Best Paper Award]**

Maureen Stone, **Danielle Albers Szafir**, and Vidya Setlur. "An Engineering Model for Color Discriminability as a Function of Size." *IS&T 22nd Color and Imaging Conference*, 2014.

Danielle Albers, Michael Correll, and Michael Gleicher. "Task-Driven Evaluation of Aggregation in Time Series Visualization." *Proceedings of the 2014 Annual Conference on Human Factors in Computing Systems (CHI)*, 2014.

Michael Correll, **Danielle Albers**, Steve Franconeri, and Michael Gleicher. "Comparing Averages in Time Series Data." *Proceedings of the 2012 Annual Conference on Human Factors in Computing Systems (CHI)*, 2012.

Refereed Abstracts

Danielle Albers, Michael Correll, Michael Gleicher, and Steve Franconeri. "Ensemble Processing of Color and Shape: Beyond Mean Judgments." *Journal of Vision*, 14(9), 2014.

Danielle Albers, Alper Sarikaya, and Michael Gleicher. "Lightness Constancy in Surface Visualization." *Poster Abstracts of IEEE VIS*, 2013. **[Best Poster Award]**

Alper Sarikaya, **Danielle Albers**, and Michael Gleicher. "Understanding Performance of Protein Structural Classifiers." *Poster Abstracts of IEEE VIS*, 2013.

Danielle Albers, Colin Dewey, and Michael Gleicher. "Sequence Surveyor: Leveraging Overview for Large-Scale Genomic Alignment Visualization." *Proceedings of VizBi 2011: Visualizing Biological Data*, 2011.

Danielle Albers and Michael Gleicher. "Poster: Perceptual Principles for Scalable Sequence Alignment Visualization." *2010 IEEE Information Visualization Poster Proceedings*, 2010.

Danielle Albers and Michael Gleicher. "Perceptual Principles for Scalable Sequence Alignment Visualization." *Proceedings of the 7th Symposium on Applied Perception in Graphics and Visualization*, 2010.

Workshops & Colloquia

Eric Alexander and **Danielle Albers Szafir**. "D3.js: Javascript for Data Visualization." *Second Annual Digital Humanities+Art Symposium: Going Public.* 2015.

Michael Correll, Eric Alexander, **Danielle Albers Szafir**, Alper Sarikaya, and Michael Gleicher. "Navigating Reductionism and Holism in Evaluation." *BELIV '14: Beyond Time and Errors—Novel Evaluation Methods for Visualization*, 2014.

Danielle Albers Szafir. "Thinking with Data." *Digital Humanities Research Network*, 2014.

Danielle Albers. "Perceptually Informed Scalable Sequence Comparison." *IEEE VIS Doctoral Colloquium*, 2013.

Danielle Albers and Michael Gleicher. "Seeing Double: Crowdsourced Models of Color Discrimination." *Midgraph: Midwest Graphics Workshop*, 2012.

Invited Talks

"Perceptually-Driven Visualization of Complex Data." Rochester Institute of Technology, Rochester, New York, 2015.

"Perceptually-Driven Visualization of Complex Data." *Digital Arts Colloquium*, University of Iowa, Iowa City, Iowa, 2015.

"Perceptually-Driven Visualization of Complex Data." *Data @ ASU*, Arizona State University, Tempe, Arizona, 2015.

"Perceptually-Driven Visualization of Complex Data." *Information Science Seminar*, University of Colorado Boulder, Boulder, Colorado, 2015.

"Informing Visualization in the Humanities through Perception and Genomics." *Genres of Scholarly Knowledge Production*, Umeå University, Umeå, Sweden, 2014.

Intramural Talks & Lectures

"Driving Scalable Visualization with Perception." *Guest Lecture, CSCI 4830: Big Data & HCI*, University of Colorado Boulder, 2015.

"Perceptually-Driven Information Visualization." *CU Libraries Research Seminar*, University of Colorado Boulder, 2015.

"The Graphics Pipeline." *Guest Lecture, ATLS 5419: Introduction to Virtual Reality*, University of Colorado Boulder, 2015.

"Introduction to Three.js." *Guest Lecture, ATLS 5419: Introduction to Virtual Reality*, University of Colorado Boulder, 2015.

"Perceptually-Driven Information Visualization." *Institute of Cognitive Science Seminar*, University of Colorado Boulder, 2015.

"Perceptually-Driven Information Visualization." *Human-Centered Computing Seminar*, University of Colorado Boulder, 2015.

"Interaction in Visualization." *Guest Lecture, CS 838: Visualization*, University of Wisconsin-Madison, Madison, Wisconsin, 2015.

"Insights at a Glance: Visualization at UW-Madison." *MERI at a Glance*, McPherson Eye Research Institute, Madison, Wisconsin, 2014.

"Color for Computer Graphics." *Guest Lecture, CS 559: Computer Graphics*, University of Wisconsin-Madison, Madison, Wisconsin, 2014.

"Image Compression." *Guest Lecture, CS 559: Computer Graphics*, University of Wisconsin-Madison, Madison, Wisconsin, 2014.

"Perceptually-Driven Sequence Visualization." *Guest Lecture, CS 838: Visualization*, University of Wisconsin-Madison, Madison, Wisconsin, 2012.

Funding

Grants

$7,500: Andrew W. Mellon Workshop Grant. "Digital Humanities Research Network," 2014.

Pending Grants

$69,146: Bloomberg Data Science Research Grant. "Increasing Machine Learning Comprehensibility via Visualization." (PI)

$53,089: Google Faculty Research Awards. "Using Visual Analytics for Improved Machine Classification." (PI)

$153,676: National Science Foundation Computer and Information Science and Engineering Research Initiation Initiative. "CRII: III: Supporting Observation-Driven Sensemaking for Multiscale Text Analysis." (PI)

Fellowships

IEEE VIS Doctoral Colloquium, 2013.

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.

NASA Space Grant Fellowship, 2007-2009.

Teaching

2009 **Teaching Assistant**
Human-Computer Interaction, University of Wisconsin-Madison

2009 **Laboratory Instructor**
Introduction to Programming, University of Wisconsin-Madison
Mean Instructor Rating: 4.58/5.00

2008–2009 **Mathematics and English Instructor**
Kumon of Redmond, Redmond, WA

Mentorship & Advising

Thesis Committee Membership

2015 **Khalid Alharbi**, Ph.D. Thesis, Advisor: Tom Yeh
Title: *A Deep and Longitudinal Approach to Mining Mobile Applications*
Department of Computer Science, University of Colorado Boulder

Undergraduate Research Mentorship

2015 **Yusef Suhail**
Web-based N-Grams Visualization with TextDNA
University of Wisconsin-Madison

2014 **Andrew Hermus**
Scalable Visualization for Text Analytics (w. Eric Alexander)
University of Wisconsin-Madison

2013 **Benjamin Reddersen**
Rendering Techniques for Molecular Surface Visualization
University of Wisconsin-Madison

Professional Activities & Service

Professional Outreach

2016 **Aspirations in Computing Colorado Affiliate Committee**
National Center for Women in Technology

2010–2015 **ACM-W Mentor**
Department of Computer Sciences, University of Wisconsin-Madison

2009 **Majors Fair Representative**
Department of Computer Sciences, University of Wisconsin-Madison

2009 **Department Guide**
Department of Computer Sciences, University of Washington

University Service

2016 **Co-Chair, Digital Humanities Certificate Committee**
University of Colorado Boulder

2015 **Community and Diversity Committee**
College of Media, Communication, and Information, University of Colorado Boulder

2015 **Research Data Advisory Committee**
University of Colorado Boulder

2015 **Curriculum Committee**
Department of Information Science, University of Colorado Boulder

2015 **Faculty Search Committee**
Department of Information Science, University of Colorado Boulder

2015 **Graduate Program Committee**
Department of Computer Science, University of Colorado Boulder

2014–2015 **Digital Humanities Research Network Founding Member & Coordinator**
University of Wisconsin-Madison

2012–2015 **Visualization Reading Group Founder & Coordinator**
University of Wisconsin-Madison

2015 **Organizing Committee Member**
University of Wisconsin-Madison Digital Humanities+Art Symposium

Program Committees & Referee Service

2014–2016 **Program Committee Member**
BioVis: Symposium on Biological Data Visualization

2016 **Reviewer**
Eurographics Conference on Visualization

2013–2015 **Reviewer**
IEEE Information Visualization

2015 **Reviewer Ad Hoc**
National Science Foundation Information Integration and Informatics (III)

2015 **Reviewer**
ACM Conference on Human Factors in Computing Systems (CHI)

2015 **Reviewer**
Informatics

2015 **Reviewer**
Transactions on Cartography and Geographic Information Science

2015 **Reviewer**
IEEE Visual Analytics Science and Technology (VAST)

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

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

Professional & Academic Memberships

2010–Present ACM Member

2014–2015 IS&T Student Member

2012–2015 WHCI+D Member

2010–2015 IEEE Student Member

2008–Present Sigma Alpha Lambda Honor Society Member

2008–Present Phi Theta Kappa International Honor Society Member

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

Professional References

Michael Gleicher, Professor
Department of Computer Sciences
University of Wisconsin-Madison
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Madison, WI 53706
gleicher@cs.wisc.edu

Steven Franconeri, Associate Professor
Department of Psychology
Northwestern University
Swift Hall 102, 2029 Sheridan Road
Evanston, IL 60208
franconeri@northwestern.edu

Maureen Stone, Research Scientist
Tableau Software
837 N. 34th Street, Suite 200
Seattle, WA 98103
mstone@tableausoftware.com

Kevin Ponto, Assistant Professor
Design Studies Department
University of Wisconsin-Madison
330 N. Orchard Street
Madison, WI 53715
kbponto@wisc.edu