Susan Vanderplas

Curriculum Vitae

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Education

2011–15 **Doctor of Philosophy in Statistics**, *Iowa State University*.
Dissertation: The Perception of Statistical Graphics

2009–2011 **Master of Science in Statistics**, *Iowa State University*.

2005–2009 **Bachelor of Science**, *Texas A&M University*.
Major: Psychology and Applied Mathematical Sciences (Statistics), Minor: Neuroscience

Professional Experience

2018 **Research Assistant Professor**, *Center for Statistics and Applications in Forensic Evidence*, Iowa State University.

2015–2018 **Statistical Analyst**, *Nebraska Public Power District*.
Conduct statistical analyses to improve NPPD's data-driven decision making (safety, profitability, and equipment reliability). Design and implement a program to train employees in statistical programming, data analysis, data visualization, and basic statistical modeling.

2015 **Postdoc**, *Iowa State University Office of the Vice President for Research*, Ames, IA.
Evaluate the relationship between faculty start-up packages and future productivity.

2014 **Consultant**.
Develop web applications, interactive data displays, and statistical analyses for clients including the Iowa Soybean Association, ISU Agronomy Labs, and the USDA.

Research Interests

COMPUTING & GRAPHICS

- Visual inference
- Perception of charts
- Interactive graphics
- Image analysis
- Computer vision
- Machine learning

FORENSICS

- Statistical graphics in legal settings
- Algorithmic mimicry of human perception
- Automatic footwear identification
- Firearms/toolmark analysis

Teaching

2017 **Business Intelligence Embedded Agent Program**, *Nebraska Public Power District*.
Design and implement a program to mentor employees, providing instruction in data science and opportunities to apply new skills within the company. Lead one-on-one and group mentoring sessions to create a sense of community and reinforce skills learned through online courses.

2017 **R Workshop**, *Nebraska Public Power District*.
3-day internal course on using R for data analysis.

2013-2014 **R Workshops**, *Iowa State*.

Spring 2013 **Statistical Methods for Research**, *Iowa State*, Teaching Assistant.

2012-2013 **Introduction to Business Statistics II**, *Iowa State*, Teaching Assistant.

2011 **Statistical Methods for Research**, *Iowa State*, Teaching Assistant.

2011 **Empirical Methods for Comp. Sci.**, *Iowa State*, Teaching Assistant.

Scholarship

Publications

2018 **Susan Vanderplas**, Ryan Goluch, and Heike Hofmann. Framed! Reproducing 150 year old plots. *Journal of Computational and Graphical Statistics*, 2018.

C Sievert, J Cai, **S Vanderplas**, F Khan, K Ferris, and Toby Hocking. Extending ggplot2 for linked and dynamic web graphics. *Journal of Computational and Graphical Statistics*, 2018.

2017 **Susan Vanderplas** and Heike Hofmann. Clusters beat Trend!? Testing feature hierarchy in statistical graphics. *Journal of Computational and Graphical Statistics*, 26(2):231–242, 2017.

Lindsay Rutter, **Susan Vanderplas**, Dianne Cook, and Michelle Graham. ggeanealogy: An R Package for Visualizing Genealogical Data. *Journal of Statistical Software*, 2017.

Heike Hofmann and **Susan Vanderplas**. All of this has happened before. All of this will happen again: Data Science. *Journal of Computational and Graphical Statistics*, 26(4):775–778, 2017.

2016 **Susan Vanderplas** and Heike Hofmann. Spatial reasoning and data displays. *IEEE Transactions on Visualization and Computer Graphics*, 2016.

2015 **Susan Vanderplas** and Heike Hofmann. Signs of the sine illusion - why we need to care. *Journal of Computational and Graphical Statistics*, 24(4):1170–1190, 2015.

2010 Fadi Towfic, **Susan Vanderplas**, Casey A Oliver, Oliver Couture, Christopher K Tuggle, M Heather West Greenlee, and Vasant Honavar. Detection of gene orthology from gene co-expression and protein interaction networks. *BMC bioinformatics*, 11(Suppl 3):S7, 2010.

In Progress

Visual Inference for Bayesians Examine two-target statistical lineups and the connection to Bayes Factors.

Truthiness and Statistical Charts Evaluate whether the truthiness effect (increased belief in a statement based on the presence of an accompanying picture) holds for statistical charts and maps.

Longitudinal Shoe Database Design a database for sharing longitudinal shoe wear data, including powder prints, 2D scans, 3D scans, pictures, and crime-scene style casts and prints.

Bullet Signature Resampling Method for resampling bullet signatures used to calculate match and non-match score distributions.

Bullet Test Set Validation Validate an algorithm for bullet matching on several test sets used to test forensic examiner proficiency.

Continuous Integration and Unit Testing in Forensics Software Discussion of best practices for development of forensics software (continuous integration, unit testing, version control systems, and open-source licensing).

Footwear Class Characteristic Recognition using Neural Networks Use convolutional neural networks to automate identification of class characteristics in images of footwear outsoles. These characteristics form a feature set which can be used for automating footwear identification as well as more advanced statistical modeling.

Invited Talks

2018 **Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics**, *SDSS Invited Session*.

2015 **Animint: Interactive Web-Based Animations Using Ggplot2's Grammar of Graphics**, *JSM Invited Session*.

2014 **The curse of three dimensions: Why your brain is lying to you**, *JSM Student Paper Award Session*.

Contributed Talks

2018 **Framed! Reproducing 150 year old charts**, *JSM Contributed Session*.

2017 **A Bayesian Approach to Visual Inference**, *JSM Contributed Session*.

2016 **Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics**, *JSM Contributed Session*.

2015 **Visual Aptitude and Statistical Graphics**, *InfoVis*.

2015 **Animint: Interactive, Web-Ready Graphics with R**, *Great Plains R User Group*.

2014 **Do You See What I See? Using Shiny for User Testing**, *JSM Panel*.

2013 **Signs of the Sine Illusion – why we need to care**, *JSM Contributed Session*.

Software

2018 — **`bulletsamplr`**, *Resampling of bullet signatures (active development)*.

2018 — **`ImageAlignR`**, *Image registration algorithms for forensics (active development)*.

2018 — **`bulletxtrctr`**, *automated matching of 3d bullet scans (with Heike Hofmann)*.

2018 — **`x3ptools`**, *Reading, manipulating, and visualizing x3p files (with Heike Hofmann)*.

2013–2015 — **`animint`**, *animated, interactive web graphics for R using d3.js (with Toby Hocking, Carson Sievert)*.

Mentoring and Advising

2018 — **Miranda Tilton**, *Statistics*, MS Project.
Footwear Class Characteristics and Computer Vision

2018 — **Talen Fisher**, *Computer Engineering*, Undergraduate Research.
Tools for working with x3p files, database design for storing bullet scans and intermediate analysis products.

2018 — **Ben Wonderlin and Jenny Kim**, *Young Engineers and Scientists*, Summer 2018.
Footwear Class Characteristics and Computer Vision

Service

2017–2019 — **Graphics Section Representative to the Council of Sections**, *ASA*.