Susan Vanderplas

Curriculum Vitae

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Education

2015 **PhD**, *Statistics*, Iowa State University.
Dissertation: The Perception of Statistical Graphics

2011 **MS**, *Statistics*, Iowa State University.

2009 **BS**, *Psychology & Applied Mathematical Sciences*, Texas A&M University.

Professional Experience

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

2018 **Statistical Consultant**, *Nebraska Public Power District*.
Provided individual mentoring and project leadership to continue the Business Intelligence Embedded Agent program and provide support for R-related projects.

2015–2018 **Statistical Analyst**, *Nebraska Public Power District*.

2015–2015 **Postdoc**, *Iowa State University Office of the Vice President for Research*.

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

Scholarship

Contribution percentages estimated from git contributions using `git fame` where possible. Not all projects have github repositories for which this is meaningful.

Journal Publications

9. 2019 Rutter, L., VanderPlas, S., Cook, D. & Graham, M. ggenealogy: An R Package for Visualizing Genealogical Data. *Journal of Statistical Software* **89,** 1–31. ISSN: 1548-7660. https://www.jstatsoft.org/v089/i13.

8. 2019 **VanderPlas, S.**, Goluch, R. & Hofmann, H. Framed! Reproducing and Revisiting 150 year old charts. *Journal of Computational and Graphical Statistics*. https://doi.org/10.1080/10618600.2018.1562937.
Contribution: Programming and analysis (60%), writing (50%).

7. 2019 Sievert, C., **VanderPlas**, **S.**, Cai, J., Ferris, K., Khan, F. U. F. & Hocking, T. D. Extending ggplot2 for linked and animated web graphics. *Journal of Computational and Graphical Statistics* **28,** 299–308. https://doi.org/10.1080/10618600.2018.1513367.

6. 2017 **Vanderplas**, **S.** & Hofmann, H. Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics. *Journal of Computational and Graphical Statistics* **26,** 231–242. https://doi.org/10.1080/10618600.2016.1209116.
Contribution: Programming and analysis (90%), writing (50%).

5. 2017 *Submitted as an invited response to Donoho's "50 years of Data Science"*. Hofmann, H. & **Vanderplas**, **S.** All of This Has Happened Before. All of This Will Happen Again: Data Science. *Journal of Computational and Graphical Statistics* **26,** 775–778. https://doi.org/10.1080/10618600.2017.1385474.
Contribution: Writing (75%).

4. 2016 **Vanderplas**, **S.** & Hofmann, H. Spatial Reasoning and Data Displays. *IEEE Transactions on Visualization and Computer Graphics*. https://doi.org/10.1109/TVCG.2015.2469125.
Contribution: Programming and analysis (90%), writing (75%).

3. 2015 **Vanderplas**, **S.** & Hofmann, H. Signs of the Sine Illusion - why we need to care. *Journal of Computational and Graphical Statistics* **24,** 1170–1190. https://doi.org/10.1080/10618600.2014.951547.
Contribution: Programming and analysis (50%), writing (60%).

2. 2010 Towfic, F., **VanderPlas**, **S.**, Oliver, C. A., Couture, O., Tuggle, C. K., Greenlee, M. H. W. & Honavar, V. Detection of gene orthology from gene co-expression and protein interaction networks. *BMC bioinformatics* **11,** S7. https://doi.org/10.1186%2F1471-2105-11-S3-S7.

1. 2009 Hull, R., Bortfeld, H. & **Koons**, **S.** Near-infrared spectroscopy and cortical responses to speech production. *The open neuroimaging journal* **3,** 26. https://doi.org/10.2174%2F1874440000903010026.

Other Publications

2. 2019 Carriquiry, A., Hofmann, H., Tai, X. H. & **VanderPlas**, **S.** Machine learning in forensic applications. *Significance* **16,** 29–35. https://doi.org/10.1111/j.1740-9713.2019.01252.x.

1. 2013 Budrus, S., Vanderplas, S. & Cook, D. In tennis, do smashes win matches? *Significance* **10,** 35–38. https://doi.org/10.1111/j.1740-9713.2013.00665.x.

In Progress

A Convolutional Neural Network for Outsole Recognition Use CNNs to automate identification of class characteristics in images of footwear outsoles. Submitted to Forensic Science International, July 2019.

Testing Statistical Charts: What makes a good graph? A review of research relating to the testing of statistical graphics across different domains and disciplines. Submitted to Annual Reviews, Accepted August 2019.

Firearms Examination (Book Chapter) An overview of statistical methods for firearms examination. Submitted July 2019; Under Review.

Bullet Test Set Validation Validate an algorithm for bullet matching on several test sets used to test forensic examiner proficiency. Submitted to Forensic Science International, August 2019.

Visual Inference for Bayesians Visual Inference analyses for Bayesians, including estimation of the selection probability of null plots.

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.

Grants

2020–2021 **NIJ R&D in Forensic Science**, *Automatic Acquisition and Identification of Footwear Class Characteristics*, PI, Funded for 2020-2021 ($386,984 total).

2019 **USDA AFRI-SAS**, *A Cyber-Physical System for Data-Intensive Farm Management*, PI, Under review (Submitted September 2019), $3,000,000.

2019 **NSF**, *Overcoming the Rural Data Deficit to Improve Quality of Life and Community Services in Smart & Connected Small Communities*, PI, Under review (Submitted September 2019), $1,500,000.

2019 **NIJ R&D in Forensic Science**, *Statistical Infrastructure for the Use of Error Rate Studies in the Interpretation of Forensic Evidence*, Collaborator, Funded for FY 2019, $197,699 total, $57,596 ISU sub-award.

2018 **NIJ R&D in Forensic Science**, *Passive Acquisition of Footwear Class Characteristics in Local Populations*, PI, Not funded, $383,104.

2018 **NIJ R&D in Forensic Science**, *Evaluating Photogrammetry for 3D Footwear Impression Recovery*, PI, Not funded, $281,755.

Invited Talks

2019 **Statistical Lineups for Bayesians**, *JSM*, Section on Statistical Graphics, Denver, CO.

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

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

2014 **The curse of three dimensions: Why your brain is lying to you**, *JSM*, Section on Statistical Graphics Student Paper Session, Boston, MA.

Contributed Talks

2018 **Framed! Reproducing 150 year old charts**, *JSM*, Vancouver, BC.

2017 **A Bayesian Approach to Visual Inference**, *JSM*, Baltimore, MD.

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

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

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

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

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

Software

2019 `LegoR`, *Acquisition of data about lego packages from Brickfinder, Lego.com, and Rebrickable.*

2019 `ShoeScrubR`, *Cleaning shoe print data for future statistical analysis.*

2019 `groovefinder`, *Identification of grooves in scans of bullet land engraved areas.*

2018 `ShoeScrapeR`, *Acquisition of Shoe Images and Metadata from Online Retailers.*

2018 `bulletxtrctr`, *Automated matching of 3d bullet scans.*

2018 `x3ptools`, *Reading, manipulating, and visualizing x3p files.*

2013–2015 `animint`, *animated, interactive web graphics for R using d3.js.*

Teaching

2019 **Stat 585 - Data Technologies for Statistical Analysis**, *Iowa State University*.
Co-taught, assisted with curriculum development. Mean evaluation: 4.92, Median: 5.0

2017–2018 **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. Class size: 16

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

2013–2014 **R Workshops**, *Iowa State*.
Introduction to R, ggplot2, data management and cleaning, package development, literate programming, and Shiny.

2011–2013 **Statistical Methods for Research**, *Iowa State*, TA.

2012–2013 **Introduction to Business Statistics II**, *Iowa State*, TA.

2011 **Empirical Methods for Computer Science**, *Iowa State*, TA.

Mentoring and Advising

Graduate Students

2018 **Miranda Tilton**, *Statistics*, Ph.D.
Footwear Class Characteristics and Computer Vision. Completed MS (Spring 2019).

2019 **Charlotte Roiger**, *Statistics*, MS.
Detection of Topological Features of Bullet Lands using Computer Vision. Estimated MS completion in Spring 2020. Co-advised with Heike Hofmann.

2019 **Joseph Zemmels**, *Statistics*, MS.
Analysis and Matching of Cartridge Cases. Estimated MS completion in Summer 2020. Co-advised with Heike Hofmann.

2019 **Eryn Blagg**, *Statistics*, MS.
Analysis of Wear Development in Three-Dimensional Shoe Scans. Estimated MS completion in Fall 2020.

Undergraduate Students

2019 **Jason Seo**, *Computer Science and Statistics*, Undergraduate Research.
R package for visualization of neural networks using the python library keras-vis.

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

Summer Research Programs

2019 **Molly McDermott and Andrew Maloney**, *Research Experience for Undergraduates*, Summer 2019.
Bullet Scan Quality and Machine Learning

2019 **Syema Ailia, Emmanuelle Hernandez Morales, Tiger Ji**, *Research Experience for Undergraduates*, Summer 2019.
Rapid Quality Control Tools for Confocal Microscopy Scans

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

Service

2020 **Graphics Section Program Chair**, *ASA*.

2019 **Uncoast Unconference Organizing Committee**, Des Moines, IA.
Organized the first R Uncoast Unconference to bring R developers in flyover country together for a 3-day event. Over 50% of the participants at the conference were women or minorities, and participants included students, academics, and industry R programmers with a variety of experience levels in R programming.

2019 **Gertrude Cox Scholarship Committee Member**, *ASA*.
Assisted with selection of the Gertrude Cox Scholarship recipients and honorable mentions.

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