

# 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








- 2020 **Assistant Professor**, *Statistics Department*, University of Nebraska, Lincoln.
- 2018–2019 **Research Assistant Professor**, *Center for Statistics and Applications in Forensic Evidence*, Iowa State University.
- 2018–2019 **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 **Postdoc**, *Iowa State University Office of the Vice President for Research*.

### Scholarship



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

#### Journal Publications

- 11. 2020 **Vanderplas, S.**, Nally, M., Klep, T., Cadevall, C. & Hofmann, H. Comparison of three similarity scores for bullet LEA matching. *Forensic Science International*.  
**Contribution:** Programming and analysis (20%), Writing (55%).
- 10. 2020 **Vanderplas, S.**, Cook, D. & Hofmann, H. Testing Statistical Charts: What Makes a Good Graph? *Annual Review of Statistics and Its Application* **7**, 13.1–13.28.  
**Contribution:** Writing (85%).
- 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%).

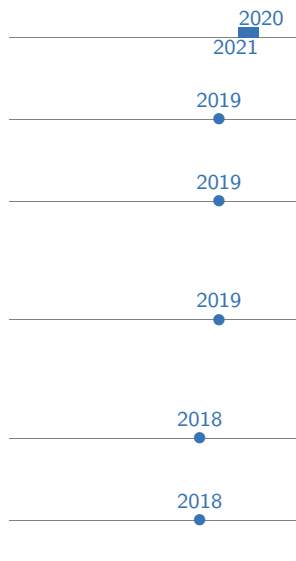
7.  Sievert, C., **VanderPlas, S.**, Cai, J., Ferris, K., Khan, F. U. F. & Hocking, T. D. Extending ggplot2 for linked and animated web graphics. *Journal of Computational and Graphical Statistics* **28**, 299–308. <https://doi.org/10.1080/10618600.2018.1513367>.
6.  **Vanderplas, S.** & Hofmann, H.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

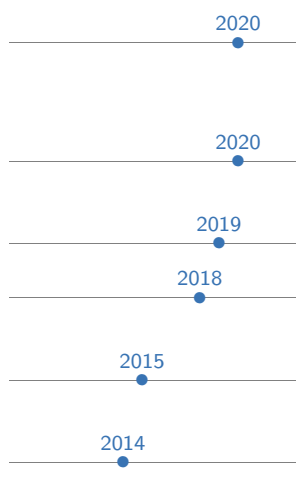
2.  Carriquiry, A., Hofmann, H., Tai, X. H. & **VanderPlas, S.** Machine learning in forensic applications. *Significance* **16**, 29–35. <https://doi.org/10.1111/j.1740-9713.2019.01252.x>.  
**Contribution:** Writing (50%).
1.  Budrus, S., Vanderplas, S. & Cook, D. In tennis, do smashes win matches? *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.
- Firearms Examination** (Book Chapter) An overview of statistical methods for firearms examination. Submitted July 2019; Under Review.
- 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

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- 2020  
2021
- 2019
- 2019
- 2019
- 2018
- 2018
- NIJ R&D in Forensic Science, Automatic Acquisition and Identification of Footwear Class Characteristics**, PI, Funded for 2020-2021 (\$386,984 total).
- USDA AFRI-SAS, A Cyber-Physical System for Data-Intensive Farm Management**, PI, Under review (Submitted September 2019), \$3,000,000.
- 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.
- 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.
- NIJ R&D in Forensic Science, Passive Acquisition of Footwear Class Characteristics in Local Populations**, PI, Not funded, \$383,104.
- NIJ R&D in Forensic Science, Evaluating Photogrammetry for 3D Footwear Impression Recovery**, PI, Not funded, \$281,755.

## Invited Talks

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- 2020
- 2020
- 2019
- 2018
- 2015
- 2014
- One of these things is not like the others: Visual Statistics and Testing in Statistical Graphics**, *Data Science Symposium*, South Dakota State University, Brookings, SD.
- Big Data, Big Experiments, and Big Problems**, Plant and Animal Genome, San Diego, CA.
- Statistical Lineups for Bayesians**, *JSM*, Section on Statistical Graphics, Denver, CO.
- Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics**, *SDSS*, Reston, VA.
- Animint: Interactive Web-Based Animations Using Ggplot2's Grammar of Graphics**, *JSM*, Seattle, WA.
- The curse of three dimensions: Why your brain is lying to you**, *JSM*, Section on Statistical Graphics Student Paper Session, Boston, MA.

## Contributed Talks

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

2017	<b>A Bayesian Approach to Visual Inference</b> , <i>JSM</i> , Baltimore, MD.
2016	<b>Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics</b> , <i>JSM</i> , Chicago, IL.
2015	<b>Visual Aptitude and Statistical Graphics</b> , <i>InfoVis</i> , Chicago, IL.
2015	<b>Animint: Interactive, Web-Ready Graphics with R</b> , <i>Great Plains R User Group</i> , Sioux Center, IA.
2014	<b>Do You See What I See? Using Shiny for User Testing</b> , <i>JSM</i> , Boston, MA.
2013	<b>Signs of the Sine Illusion – why we need to care</b> , <i>JSM</i> , Montreal, ON.

## Software

2019	<b>LegoR</b> , <i>Acquisition of data about lego packages from Brickfinder, Lego.com, and Rebrickable.</i>
2019	<b>ShoeScrubR</b> , <i>Cleaning shoe print data for future statistical analysis.</i>
2019	<b>groovefinder</b> , <i>Identification of grooves in scans of bullet land engraved areas.</i>
2018	<b>ShoeScrapeR</b> , <i>Acquisition of Shoe Images and Metadata from Online Retailers.</i>
2018	<b>bulletxtctr</b> , <i>Automated matching of 3d bullet scans.</i>
2018	<b>x3ptools</b> , <i>Reading, manipulating, and visualizing x3p files.</i>
2013 2015	<b>animint</b> , <i>animated, interactive web graphics for R using d3.js.</i>

## Teaching

2020	<b>Stat 218 - Introduction to Statistics</b> , <i>University of Nebraska, Lincoln.</i>
2019	<b>Stat 585 - Data Technologies for Statistical Analysis</b> , <i>Iowa State University.</i> Co-taught, assisted with curriculum development. Mean evaluation: 4.92, Median: 5.0
2017 2018	<b>Business Intelligence Embedded Agent Program</b> , <i>Nebraska Public Power District.</i> 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	<b>R Workshop</b> , <i>Nebraska Public Power District.</i> 3-day internal course on using R for data analysis.
2013 2014	<b>R Workshops</b> , <i>Iowa State.</i> Introduction to R, ggplot2, data management and cleaning, package development, literate programming, and Shiny.
2011 2013	<b>Statistical Methods for Research</b> , <i>Iowa State, TA.</i>
2012 2013	<b>Introduction to Business Statistics II</b> , <i>Iowa State, TA.</i>
2011	<b>Empirical Methods for Computer Science</b> , <i>Iowa State, TA.</i>

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## Mentoring and Advising

### Graduate Students

2019  
2020

**Joseph Zemmels**, *Statistics*, MS.

Analysis and Matching of Cartridge Cases. Estimated MS completion in Spring 2020. Co-advised with Heike Hofmann.

2019  
2020

**Eryn Blagg**, *Statistics*, MS.

Analysis of Wear Development in Three-Dimensional Shoe Scans. Estimated MS completion in Spring 2020. Co-advised with Heike Hofmann

2018  
2019

**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.

### 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  
2019

**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

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## Service

2020

**Graphics Section Program Chair**, ASA.

2020

**Program Committee (Graphics)**, *Symposium on Data Science and Statistics 2020*.

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.