

# Susan Vanderplas

## Curriculum Vitae

349a Hardin Hall North Wing  
3310 Holdrege Street  
Lincoln, NE 68483-0961  
402-472-7290  
✉ [susan.vanderplas@unl.edu](mailto:susan.vanderplas@unl.edu)  
🌐 [srvanderplas](https://srvanderplas.com)

### 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 **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 **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 fame` where possible. Not all projects have github repositories for which this is meaningful.

#### Journal Publications

- 15. 2021 Submitted as an invited response to Hullman & Gelman's "Designing for Interactive Exploratory Data Analysis Requires Theories of Graphical Inference".  
VanderPlas, Susan (July 30, 2021). "Designing Graphics Requires Useful Experimental Testing Frameworks and Graphics Derived from Empirical Results". In: *Harvard Data Science Review*. <https://hdsr.mitpress.mit.edu/pub/m7ur7k3u>. DOI: [10.1162/99608f92.7d099fd0](https://doi.org/10.1162/99608f92.7d099fd0). URL: <https://hdsr.mitpress.mit.edu/pub/m7ur7k3u>.
- 14. 2021 Hofmann, Heike, **Alicia Carriquiry**, and Susan Vanderplas (June 2021). "Treatment of inconclusives in the AFTE range of conclusions". en. In: *Law, Probability and Risk* 19.3-4, pp. 317–364. DOI: [10.1093/lpr/mgab002](https://doi.org/10.1093/lpr/mgab002). URL: <https://academic.oup.com/lpr/article/19/3-4/317/6308611> (visited on 12/20/2021).  
**Contribution:** Writing (50%).
- 13. 2021 **VanderPlas, Susan**, Christian Röttger, Dianne Cook, and Heike Hofmann (2021). "Statistical significance calculations for scenarios in visual inference". In: *Stat* 10.1, e337. DOI: <https://doi.org/10.1002/sta4.337>.  
**Contribution:** Programming and analysis (30%), Writing (65%).












12.  **Vanderplas, Susan**, Alicia Carriquiry, Heike Hofmann, James Hamby, and Xiao Hui Tai (2020). "An introduction to firearms examination for researchers in statistics". In: *Handbook of Forensic Statistics*. Ed. by Banks, D., Kafadar, K., Kaye, D., and Tackett, M. New York: Chapman and Hall/CRC 2020. DOI: [10.1201/9780367527709](https://doi.org/10.1201/9780367527709).  
**Contribution:** Writing (50%).
11.  **Vanderplas, Susan**, Melissa Nally, Tylor Klep, Cristina Cadevall, and Heike Hofmann (Jan. 2020). "Comparison of three similarity scores for bullet LEA matching". In: *Forensic Science International*. DOI: [10.1016/j.forsciint.2020.110167](https://doi.org/10.1016/j.forsciint.2020.110167).  
**Contribution:** Programming and analysis (20%), Writing (55%).
10.  **Vanderplas, Susan**, Dianne Cook, and Heike Hofmann (Mar. 2020). "Testing Statistical Charts: What Makes a Good Graph?" In: *Annual Review of Statistics and Its Application* 7.1, pp. 13.1–13.28. DOI: [10.1146/annurev-statistics-031219-041252](https://doi.org/10.1146/annurev-statistics-031219-041252).  
**Contribution:** Writing (85%).
9.  Rutter, Lindsay, **Susan VanderPlas**, Dianne Cook, and Michelle Graham (2019). "ggenealogy: An R Package for Visualizing Genealogical Data". In: *Journal of Statistical Software* 89.13, pp. 1–31. ISSN: 1548-7660. DOI: [10.18637/jss.v089.i13](https://doi.org/10.18637/jss.v089.i13).
8.  **VanderPlas, Susan**, Ryan Goluch, and Heike Hofmann (2019). "Framed! Reproducing and Revisiting 150 year old charts". In: *Journal of Computational and Graphical Statistics*. DOI: [10.1080/10618600.2018.1562937](https://doi.org/10.1080/10618600.2018.1562937).  
**Contribution:** Programming and analysis (60%), writing (50%).
7.  Sievert, Carson, **Susan VanderPlas**, Jun Cai, Kevin Ferris, Faizan Uddin Fahad Khan, and Toby Dylan Hocking (2019). "Extending ggplot2 for linked and animated web graphics". In: *Journal of Computational and Graphical Statistics* 28.2, pp. 299–308. DOI: [10.1080/10618600.2018.1513367](https://doi.org/10.1080/10618600.2018.1513367).
6.  **Vanderplas, Susan** and Heike Hofmann (2017). "Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics". In: *Journal of Computational and Graphical Statistics* 26.2, pp. 231–242. DOI: [10.1080/10618600.2016.1209116](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, Heike and **Susan Vanderplas** (2017). "All of This Has Happened Before. All of This Will Happen Again: Data Science". In: *Journal of Computational and Graphical Statistics* 26.4, pp. 775–778. DOI: [10.1080/10618600.2017.1385474](https://doi.org/10.1080/10618600.2017.1385474).  
**Contribution:** Writing (75%).
4.  **Vanderplas, Susan** and Heike Hofmann (2016). "Spatial Reasoning and Data Displays". In: *IEEE Transactions on Visualization and Computer Graphics*. DOI: [10.1109/TVCG.2015.2469125](https://doi.org/10.1109/TVCG.2015.2469125).  
**Contribution:** Programming and analysis (90%), writing (75%).
3.  — (2015). "Signs of the Sine Illusion - why we need to care". In: *Journal of Computational and Graphical Statistics* 24.4, pp. 1170–1190. DOI: [10.1080/10618600.2014.951547](https://doi.org/10.1080/10618600.2014.951547).  
**Contribution:** Programming and analysis (50%), writing (60%).
2.  Towfic, Fadi, **Susan VanderPlas**, Casey A Oliver, Oliver Couture, Christopher K Tuggle, M Heather West Greenlee, and Vasant Honavar (2010). "Detection of gene orthology from gene co-expression and protein interaction networks". In: *BMC bioinformatics* 11.Suppl 3, S7. DOI: [10.1186%2F1471-2105-11-S3-S7](https://doi.org/10.1186%2F1471-2105-11-S3-S7).
1.  Hull, Rachel, Heather Bortfeld, and **Susan Koons** (2009). "Near-infrared spectroscopy and cortical responses to speech production". In: *The open neuroimaging journal* 3, p. 26. DOI: [10.2174%2F1874440000903010026](https://doi.org/10.2174%2F1874440000903010026).

## Other Publications


2.  Carriquiry, Alicia, Heike Hofmann, Xiao Hui Tai, and **Susan VanderPlas** (2019). "Machine learning in forensic applications". In: *Significance* 16.2, pp. 29–35. DOI: [10.1111/j.1740-9713.2019.01252.x](https://doi.org/10.1111/j.1740-9713.2019.01252.x).  
**Contribution:** Writing (50%).
1.  Budrus, Sarah, Susan Vanderplas, and Dianne Cook (2013). "In tennis, do smashes win matches?" In: *Significance* 10.3, pp. 35–38. DOI: [10.1111/j.1740-9713.2013.00665.x](https://doi.org/10.1111/j.1740-9713.2013.00665.x).

**In Progress** **Perception of Log Scales** Assessment of perception and use of log scales to display exponential growth. Data collection stage.  
**A Convolutional Neural Network for Outsole Recognition** Use CNNs to automate identification of class characteristics in images of footwear outsoles. Revision stage.  
**Bullet Signature Resampling** Method for resampling bullet signatures used to calculate match and non-match score distributions.

## Grants

- 
- NIJ R&D in Forensic Science**
- ,
- Automatic Acquisition and Identification of Footwear Class Characteristics*
- , PI, Funded, \$380,650 total
- 
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- NIST**
- ,
- Center for Statistics and Applications in Forensic Evidence*
- , PI, Funded (\$20 million total, \$456,930 sub-award)
- 
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- USDA CIGOFF**
- ,
- Improving the Economic and Ecological Sustainability of US Crop Production through On-Farm Precision Experimentation*
- , PI, Funded (\$4,000,000 total, \$400,000 UNL subcontract split between 3 UNL PIs)
- 
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- USDA NIFA AFRI**
- ,
- Corn Residue Adaptive Grazing Strategies*
- , Collaborator, Funded, \$300,000
- 
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- USDA NIFA AFRI**
- ,
- Practical Framework to Facilitate Adoption of In-Season N Management Technology in Commercial Fields*
- , Collaborator, Not funded, \$300,000
- 
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- NSF**
- ,
- AI Institute: AgroAI: The Institute for Advancing Agriculture and Food in a Changing World Using AI*
- , Collaborator, Not Funded, Total grant \$20 million, UNL subcontract request \$3,555,327
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- NSF**
- ,
- Overcoming the Rural Data Deficit to Improve Quality of Life and Community Services in Smart & Connected Small Communities*
- , PI, Funded (\$1,500,000 total, \$123,445 subcontract)
- 
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- USDA AFRI-SAS**
- ,
- A Cyber-Physical System for Data-Intensive Farm Management*
- , PI, Not funded, \$3,000,000 total
- 
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- 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
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- NIJ R&D in Forensic Science**
- ,
- Passive Acquisition of Footwear Class Characteristics in Local Populations*
- , PI, Not funded, \$383,104
- 
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- NIJ R&D in Forensic Science**
- ,
- Evaluating Photogrammetry for 3D Footwear Impression Recovery*
- , PI, Not funded, \$281,755

## Invited Talks

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- How do you define a circle? Perception and Computer Vision Diagnostics**
- ,
- JSM*
- , Section on Statistical Graphics, Seattle, WA

2020	<del>Do You See What I See? Leveraging Human Perception in Computer Vision Tasks</del> , <i>JSM</i> , Section on Statistical Graphics, Online, Session Cancelled due to COVID
2020	<b>Perception and Visual Communication in a Global Pandemic</b> , <i>Data Science, Statistics, and Visualization Conference</i> , SAMSI, Online
2020	<b>One of these things is not like the others: Visual Statistics and Testing in Statistical Graphics</b> , <i>Data Science Symposium</i> , South Dakota State University, Brookings, SD
2020	<b>Big Data, Big Experiments, and Big Problems</b> , Plant and Animal Genome, San Diego, CA
2019	<b>Statistical Lineups for Bayesians</b> , <i>JSM</i> , Section on Statistical Graphics, Denver, CO
2018	<b>Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics</b> , <i>SDSS</i> , Reston, VA
2015	<b>Animint: Interactive Web-Based Animations Using Ggplot2's Grammar of Graphics</b> , <i>JSM</i> , Seattle, WA
2014	<b>The curse of three dimensions: Why your brain is lying to you</b> , <i>JSM</i> , Section on Statistical Graphics Student Paper Session, Boston, MA

### Contributed Talks

2021	<b>Welcome to Forensic Statistics</b> , <i>Data Mishaps Night</i> , Online
2018	<b>Framed! Reproducing 150 year old charts</b> , <i>JSM</i> , 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

### Internal Talks

2021	<b>Exploring Rural Quality of Life Using Data Science and Public Data</b> , <i>QQPM Seminar</i>
2021	<b>Inconclusive Conclusions: Biases and Consequences</b> , <i>Law and Psychology Brown Bag Seminar</i>
2021	<b>Visual Statistics: Communication and Graphical Testing</b> , <i>Animal Science Seminar</i>
2021	<b>How to Make Good Charts</b> , <i>Biological and Systems Engineering GSA</i>
2020	<b>Statistical Evaluation of Firearms and Toolmark Evidence</b> , <i>Statistics Department Seminar</i>

### Software

Dates show initial involvement; only packages which are no longer maintained have end dates.

2020	<b>vinference</b> , <i>Analysis of visual inference experiments</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>ShoeScraperR</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>
2018	<b>bulletsamplr</b> , <i>Resampling of bullet signatures</i>
2018	<b>ImageAlignR</b> , <i>Image registration algorithms for forensics</i>
2013 2015	<b>animint</b> , <i>animated, interactive web graphics for R using d3.js</i>

## Teaching

2021	<b>Stat 218 - Introduction to Statistics</b> , <i>University of Nebraska, Lincoln</i> , Online, asynchronous
2020	<b>Stat 850 - Computing Tools for Statisticians</b> , <i>University of Nebraska, Lincoln</i> , Hybrid, flipped classroom, synchronous, Course materials: <a href="https://srvanderplas.github.io/unl-stat850/">https://srvanderplas.github.io/unl-stat850/</a> Mean evaluation: 4.76, Median: 5.0
2020	<b>Stat 218 - Introduction to Statistics</b> , <i>University of Nebraska, Lincoln</i> , In person synchronous Mean evaluation: 4.2, Median: 4.0
2019	<b>Stat 585 - Data Technologies for Statistical Analysis</b> , <i>Iowa State University</i> , In person synchronous 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> , Hybrid 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. 16 students.
2013 2014	<b>R Workshops</b> , <i>Iowa State</i> , In person synchronous Introduction to R, ggplot2, data management and cleaning, package development, literate programming, and Shiny.

## Mentoring and Advising

### Graduate Students

2021	<b>Jayden Stack</b> , <i>Statistics</i> , MS, Automatic Recognition of Shoe Class Characteristics
2020 2021	<b>Emily Robinson</b> , <i>Statistics</i> , Ph.D, Perception and Visual Inference Co-advised with Reka Howard
2020 2021 2020	<b>Denise Bradford</b> , <i>Statistics</i> , Ph.D, Data Science and Interactive Graphics
2019 2021	<b>Ved Piyush</b> , <i>Statistics</i> , MS, Machine Learning and Computer Vision
2019 2021	<b>Joseph Zemmels</b> , <i>Statistics</i> , MS, Ph.D, Analysis and Matching of Cartridge Cases Completed MS (Spring 2020). Co-advised with Heike Hofmann.
2019 2020	<b>Eryn Blagg</b> , <i>Statistics</i> , MS, Ph.D, Analysis of Wear Development in Three-Dimensional Shoe Scans. Completed MS (Spring 2020). Co-advised with Heike Hofmann

2018  
2019

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

### Undergraduate Students

2021

**Xinyu Liu**, *Actuarial Science and Computer Science*, UNL FYRE Program, Machine learning for shoe sole images

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

## Outreach

### Forensic Practitioners

2021

**Blog Post**, *CSAFE*, Q&A - Treatment of Inconclusive Results in Error Rates of Firearm Studies ([Link](#))

2021

**Webinar**, *CSAFE*, Treatment of Inconclusive Results in Error Rates of Firearm Studies

2020

**CSAFE Firearms Workshop**, Invited Talk: Open Source Software in Forensics

## Service

### Service to the Discipline

2021

2024

**Associate Editor**, *Journal of Computational and Graphical Statistics*

2020

**Associate Editor**, *R Journal*

2023

2020

2022

**Graphics Section Program Chair (2021)**, ASA, Official duties include planning JSM sessions in 2020 and running the Data Expo in 2022

2020

**Program Committee (Graphics)**, *Symposium on Data Science and Statistics 2020*, Visualization Track co-chair

2019

2021

**Gertrude Cox Scholarship Committee Member**, ASA

Assisted with selection of the Gertrude Cox Scholarship recipients and honorable mentions

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.

2017  
2019

**Graphics Section Representative to the Council of Sections**, ASA

## Department and Institutional Service

2021  
2022

### **MS Comp Exam Committee**

Committee to evaluate the current MS Stat Day presentation component and consider other options for the MS program

2021

### **Data Science Joint Committee**

Committee of Math, Computer Science, and Statistics departments to develop a comprehensive undergraduate data science program.

2021

### **Data Science Joint Committee**

Committee of Math, Computer Science, and Statistics departments to develop a comprehensive undergraduate data science program.

2020  
2021

### **Seminar Organizer**

Arrange speakers for the department seminar.

2020

### **SCIL 101 Poster Judge, Fall Semester**

2019  
2020

### **Undergraduate Program Committee**

Design an undergraduate statistics major and submit the proposal to the university.

## Training & Professional Development

2021  
2022

### **Peer Review of Teaching Program**

Create a course portfolio for Stat 850 in order to assess course design and analyze student engagement and learning

2020

### **New Faculty Development Program**

2020

### **Summer Institute for Online Teaching**

Online course structure and backwards design principles