

Susan Vanderplas

Curriculum Vitae

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🌐 [srvanderplas](https://www.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
- 2018–2019 **Research Assistant Professor**, *Center for Statistics and Applications in Forensic Evidence*, Iowa State University
- 2018–2019 **Statistical Consultant**, *Nebraska Public Power District*
- 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 fame` where possible. Not all projects have github repositories for which this is meaningful.

Journal Publications

13. 2021 Hofmann, Heike, **Susan Vanderplas**, and Alicia Carriquiry (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%).
12. 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%).
11. 2020 **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%).
10. 2020 **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%).

9. 2020
— **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%).
8. 2019
— 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).
7. 2019
— **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).
6. 2019
— **Contribution:** Programming and analysis (60%), writing (50%).
— 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).
5. 2017
— **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).
4. 2016
— **Contribution:** Programming and analysis (90%), writing (50%).
— (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).
3. 2015
— **Contribution:** Programming and analysis (90%), writing (75%).
— (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).
2. 2010
— **Contribution:** Programming and analysis (50%), writing (60%).
— 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. 2009
— 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

4. 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* 3.3. DOI: [10.1162/99608f92.7d099fd0](https://doi.org/10.1162/99608f92.7d099fd0).
3. 2019
— 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%).
2. 2017
— 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%).

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 **Generalized Parallel Coordinate Plots: ggpcp** An R package for creation of generalized parallel coordinate plots

A Study in Reproducibility: The CMC Algorithm and cmcR package Development of the cmcR package for open-source cartridge case comparisons and what it says about reproducibility. Revision under review at the R Journal.


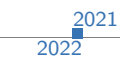
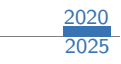
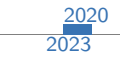



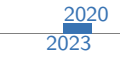




Perception of Log Scales Assessment of perception and use of log scales to display exponential growth. Several manuscripts in preparation; one under review at JCGS.

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.

Testing in Statistical Graphics A guide to human testing of the perception of statistical graphics using various experimental methods. Submitted to TestVis 2022.

Grants

-  **NIJ R&D in Forensic Science, Physical Simulation of Lower Body Biomechanics for Artificial Shoe Wear and Forensics Analysis**, Co-PI, Under Review, \$73,693 UNL budget, \$299,859 total
-  **NIJ R&D in Forensic Science, Automatic Acquisition and Identification of Footwear Class Characteristics**, PI, Funded, \$380,650 total
-  **NIST, Center for Statistics and Applications in Forensic Evidence**, PI, Funded (\$20 million total, \$456,930 sub-award)
-  **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)
-  **USDA NIFA AFRI, Corn Residue Adaptive Grazing Strategies**, Collaborator, Funded, \$300,000
-  **USDA NIFA AFRI, Practical Framework to Facilitate Adoption of In-Season N Management Technology in Commercial Fields**, Collaborator, Not funded, \$300,000
-  **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
-  **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)
-  **USDA AFRI-SAS, A Cyber-Physical System for Data-Intensive Farm Management**, PI, Not funded, \$3,000,000 total
-  **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

2021

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

2021

Pandemics, Graphics, and Perception of Log Scales, *R-Ladies DC*, Washington, DC

2020

Perception and Visual Communication in a Global Pandemic, *Data Science, Statistics, and Visualization Conference*, SAMSI, Online

2020

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

2020

Big Data, Big Experiments, and Big Problems, Plant and Animal Genome, San Diego, CA

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

2022

An Introduction to the Automatic and Objective Firearm Evidence Identification, *International Association for Identification*, Omaha, NE

2022

Local Population Footwear Class Characteristics - An End-to-End Pipeline for Automatic Data Acquisition and Analysis, *International Association for Identification*, Omaha, NE

2021

Welcome to Forensic Statistics, *Data Mishaps Night*, Online

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

Seminar Talks

2021

Pandemics, Graphics, and Perception of Log Scales, *NUMBATS Seminar*, Monash University, Melbourne, Australia

2021

Exploring Rural Quality of Life Using Data Science and Public Data, *QQPM Seminar*, University of Nebraska, Lincoln

2021

Inconclusive Conclusions: Biases and Consequences, *Law and Psychology Brown Bag Seminar*, University of Nebraska, Lincoln

2021

Visual Statistics: Communication and Graphical Testing, *Animal Science Seminar*, University of Nebraska, Lincoln

2021

How to Make Good Charts, *Biological and Systems Engineering GSA*, University of Nebraska, Lincoln

2020

Statistical Evaluation of Firearms and Toolmark Evidence, *Statistics Department Seminar*, University of Nebraska, Lincoln

Software

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

HEAD

2021

ggpcp, *Generalized parallel coordinate plots*

2020

vinference, *Analysis of visual inference experiments*

2019

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

2019

cmcR, *Automated matching of 3d cartridge case scans using the congruent matching cells algorithm*

2018

bulletxtctr, *Automated matching of 3d bullet scans*

2018

x3ptools, *Reading, manipulating, and visualizing x3p files*

2018

bulletsamplr, *Resampling of bullet signatures*

2018

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

2020

2018

ImageAlignR, *Image registration algorithms for forensics*

2020

2013

animint, *animated, interactive web graphics for R using d3.js*

2015

Teaching

2022

Stat 151 - Introduction to Statistical Computing, *University of Nebraska, Lincoln*, Hybrid, flipped classroom, synchronous, Statistical programming in R and python. Course materials: <https://srvanderplas.github.io/Stat151/>

2021

Stat 850 - Computing Tools for Statisticians, *University of Nebraska, Lincoln*, Hybrid, flipped classroom, synchronous, Course materials: <https://srvanderplas.github.io/unl-stat850/>
Mean evaluation: 4.76, Median: 5.0

2021

Stat 218 - Introduction to Statistics, *University of Nebraska, Lincoln*, Online, asynchronous
Mean evaluation: 4.0, Median: 4.0

2020

Stat 850 - Computing Tools for Statisticians, *University of Nebraska, Lincoln*, Hybrid, flipped classroom, synchronous, Course materials: <https://srvanderplas.github.io/unl-stat850/>
Mean evaluation: 4.76, Median: 5.0

2020

Stat 218 - Introduction to Statistics, *University of Nebraska, Lincoln*, In person synchronous
Mean evaluation: 4.2, Median: 4.0

2019

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

2017

Business Intelligence Embedded Agent Program, *Nebraska Public Power District*, Hybrid

2018

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

R Workshops, *Iowa State*, In person synchronous

2014

Introduction to R, ggplot2, data management and cleaning, package development, literate programming, and Shiny.

Mentoring and Advising

Graduate Students

2022

Tyler Wiederich, *Statistics*, MS, Perception of Three-Dimensional Graphics

2022

Muxin Ha, *Statistics*, MS, Automatic Recognition of Shoe Class Characteristics

2021

Jayden Stack, *Statistics*, MS, Automatic Recognition of Shoe Class Characteristics

2022

2021

Rachel Rogers, *Statistics*, Ph.D., Explainable Machine Learning for Forensics in Courtrooms

2021

Alison Kleffner, *Statistics*, Ph.D., Spatial Statistics and Visualization in Ecology and Agriculture
Co-advised with Yawen Guan

2020

Emily Robinson, *Statistics*, Ph.D, Perception and Visual Inference
Co-advised with Reka Howard

2020

Denise Bradford, *Statistics*, Ph.D, Data Science and Interactive Graphics

2020

Ved Piyush, *Statistics*, MS, Machine Learning and Computer Vision

2019

Joseph Zemmels, *Statistics*, MS, Ph.D, Analysis and Matching of Cartridge Cases
Completed MS (Spring 2020). Co-advised with Heike Hofmann.

2019

Eryn Blagg, *Statistics*, MS, Ph.D, Analysis of Wear Development in Three-Dimensional Shoe Scans.

2020

Co-advised with Heike Hofmann

2018

2019

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

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

Written Testimony, *Cook County DA*, Assessment of the Reliability of Studies of Firearms Examination in Forensics

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

Associate Editor, *Journal of Computational and Graphical Statistics*

Associate Editor, *R Journal*

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

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

Gertrude Cox Scholarship Committee Member, ASA

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

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.

Graphics Section Representative to the Council of Sections, ASA

Department and Institutional Service

R Workshop Coordinator

Develop and coordinate a week of R workshops taught in January, May, and August each year

Faculty Advisory Council, *Vice-Chair*

MS Comp Exam Committee

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

Digital Ag Minor Committee

Committee to develop a digital ag minor.

Data Science Joint Committee

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

Seminar Organizer

Arrange speakers for the department seminar.

SCIL 101 Poster Judge, *Fall Semester*

Undergraduate Program Committee

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

Training & Professional Development

Nebraska Governance and Technology Center, *Faculty Fellow*

Peer Review of Teaching Program

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

New Faculty Development Program

Summer Institute for Online Teaching

Online course structure and backwards design principles