

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
- 2015-2019 • **Statistical Analyst/Consultant**, Nebraska Public Power District
- 2015 • **Postdoc**, Iowa State University Office of the Vice President for Research

Publications

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

Peer Reviewed Publications


15. 2022 • Zemmels, Joseph*, **Vanderplas, Susan**, and Hofmann, Heike (Oct. 1, 2022). "A Study in Reproducibility: The Congruent Matching Cells Algorithm and cmcR package". In: *R Journal*. Accepted October 2022.
Contribution: Programming and analysis (10%), Writing (20%), Advising (40%).
14. 2022 • Robinson, Emily A.*, Howard, Reka, and **Vanderplas, Susan** (Nov. 1, 2022). "Eye Fitting Straight Lines in the Modern Era". In: *Journal of Computational and Graphical Statistics* 0.ja, pp. 1–19. DOI: <https://doi.org/10.1080/10618600.2022.2140668>.
Contribution: Programming and analysis (10%), Writing (10%), Advising (60%).
13. 2021 • Hofmann, Heike, Carriquiry, Alicia, and **Vanderplas, Susan** (May 5, 2021). "Treatment of inconclusives in the AFTE range of conclusions". In: *Law, Probability and Risk* 19.3-4, pp. 317–364. ISSN: 1470-8396. DOI: <https://doi.org/10.1093/lpr/mgab002>.
Contribution: Writing (50%).
12. 2021 • **Vanderplas, Susan**, Röttger, Christian, Cook, Dianne, and Hofmann, Heike (Dec. 1, 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**, Carriquiry, Alicia, Hofmann, Heike, Hamby, James, and Tai, Xiao Hui (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: <https://doi.org/10.1201/9780367527709>.

Contribution: Writing (50%).

10.  **Vanderplas, Susan**, Nally, Melissa, Klep, Tylor, Cadevall, Cristina, and Hofmann, Heike (Mar. 1, 2020). "Comparison of three similarity scores for bullet LEA matching". In: *Forensic Science International* 308, p. 110167. ISSN: 0379-0738. DOI: <https://doi.org/10.1016/j.forsciint.2020.110167>. URL: <https://www.sciencedirect.com/science/article/pii/S0379073820300293>.
9.  **Vanderplas, Susan**, Cook, Dianne, and Hofmann, Heike (Mar. 1, 2020). "Testing Statistical Charts: What Makes a Good Graph?" In: *Annual Review of Statistics and Its Application* 7.1, pp. 61–88. DOI: <https://doi.org/10.1146/annurev-statistics-031219-041252>.
8.  Rutter, Lindsay, **Vanderplas, Susan**, Cook, Dianne, and Graham, Michelle (May 29, 2019). "ggenealogy: An R Package for Visualizing Genealogical Data". In: *Journal of Statistical Software* 89.13, pp. 1–31. DOI: <https://doi.org/10.18637/jss.v089.i13>.
7.  **Vanderplas, Susan**, Goluch, Ryan C, and Hofmann, Heike (Apr. 1, 2019). "Framed! Reproducing and Revisiting 150-Year-Old Charts". In: *Journal of Computational and Graphical Statistics* 28.3, pp. 620–634. DOI: <https://doi.org/10.1080/10618600.2018.1562937>.
6.  **Contribution:** Programming and analysis (60%), writing (50%).
Sievert, Carson, **Vanderplas, Susan**, Cai, Jun, Ferris, Kevin, Khan, Faizan Uddin Fahad, and Hocking, Toby Dylan (Nov. 14, 2018). "Extending ggplot2 for Linked and Animated Web Graphics". In: *Journal of Computational and Graphical Statistics* 28.2, pp. 299–308. DOI: <https://doi.org/10.1080/10618600.2018.1513367>.
5.  **Vanderplas, Susan** and Hofmann, Heike (Apr. 24, 2017). "Clusters Beat Trend!? Testing Feature Hierarchy in Statistical Graphics". In: *Journal of Computational and Graphical Statistics* 26.2, pp. 231–242. DOI: <https://doi.org/10.1080/10618600.2016.1209116>.
4.  **Contribution:** Programming and analysis (90%), writing (50%).
VanderPlas, Susan and Hofmann, Heike (Dec. 31, 2016). "Spatial Reasoning and Data Displays". In: *IEEE Transactions on Visualization and Computer Graphics* 22.1, pp. 459–468. DOI: <https://doi.org/10.1109/TVCG.2015.2469125>.
3.  **Contribution:** Programming and analysis (90%), writing (75%).
Vanderplas, Susan and Hofmann, Heike (Dec. 10, 2015). "Signs of the Sine Illusion - why we need to care". In: *Journal of Computational and Graphical Statistics* 24.4, pp. 1170–1190. DOI: <https://doi.org/10.1080/10618600.2014.951547>.
2.  **Contribution:** Programming and analysis (50%), writing (60%).
Towfic, Fadi, **Vanderplas, Susan**, Oliver, Casey A, Couture, Oliver, Tuggle, Christopher K, Greenlee, M Heather West, and Honavar, Vasant (2010). "Detection of gene orthology from gene co-expression and protein interaction networks". In: *BMC bioinformatics* 11.Suppl 3, S7. DOI: <https://doi.org/10.1186/1471-2105-11-S3-S7>.
1.  Hull, Rachel, Bortfeld, Heather, and **Koons, Susan** (2009). "Near-infrared spectroscopy and cortical responses to speech production". In: *The open neuroimaging journal* 3, p. 26. DOI: <https://doi.org/10.2174/1874440000903010026>.

Other Publications

4.  *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: <https://doi.org/10.1162/99608f92.7d099fd0>.

3.  Carriquiry, Alicia, Hofmann, Heike, Tai, Xiao Hui, and **Vanderplas, Susan** (Apr. 1, 2019). "Machine learning in forensic applications". In: *Significance* 16.2, pp. 29–35. DOI: <https://doi.org/10.1111/j.1740-9713.2019.01252.x>.
Contribution: Writing (50%).
2.  Submitted as an invited response to Donoho's "50 years of Data Science".
Hofmann, Heike and **Vanderplas, Susan** (Dec. 19, 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: <https://doi.org/10.1080/10618600.2017.1385474>.
Contribution: Writing (75%).
1.  Budrus, Sarah, **Plas, Susan Vander**, and Cook, Dianne (2013). "In tennis, do smashes win matches?" In: *Significance* 10.3, pp. 35–38. DOI: <https://doi.org/10.1111/j.1740-9713.2013.00665.x>.

In Progress **Visual narratives of the COVID-19 pandemic** A discussion of how graphics were used during the first two years of COVID-19. In press at JDSSV.

Exploring Rural Shrink Smart Through Guided Discovery Dashboards with Denise Bradford. Revision submitted to Journal of Data Science, Sept 2022.

'You Draw It': Implementation of visually fitted trends with r2d3 with Emily Robinson and Reka Howard. Revision submitted to Journal of Data Science, Sept 2022.

Perception of Log Scales Assessment of perception and use of log scales to display exponential growth. Several manuscripts in preparation.

Generalized Parallel Coordinate Plots: ggpcp with Heike Hofmann and Antony Unwin. An R package for creation of generalized parallel coordinate plots. Paper in preparation for submission to JCGS.

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

Grants

Under Review

2022

NIJ: R&D In Forensic Science, Physical Simulation of Lower Body Biomechanics for Artificial Shoe Wear and Forensics Analysis, Co-PI, Total: \$299,859, Sub: \$73,693

Funded

2021

2023

NIJ: R&D In Forensic Science, Automatic Acquisition and Identification of Footwear Class Characteristics, PI, Total: \$380,650

2021

2022

USDA-NIFA: Agriculture and Food Research Initiative, Corn Residue Adaptive Grazing Strategies, Collaborator, Total: \$300,000

2020

2025

NIST: Center for Statistics and Applications in Forensic Evidence, Footwear Class Characteristics and Human Factors, PI, Total: \$20,000,000, Sub: \$456,930

2021

2023

USDA-NRCS: Conservation Innovation Grant On-Farm Trials, Improving the Economic and Ecological Sustainability of US Crop Production through On-Farm Precision Experimentation, PI, Total: \$4,000,000, Sub: \$400,000 (Split between 3 UNL co-PIs)

2020

2023

NSF: Smart and Connected Communities, Overcoming the Rural Data Deficit to Improve Quality of Life and Community Services in Smart & Connected Small Communities, PI, Total: \$1,500,000, Sub: \$123,445

2019

2020

NIJ: R&D In Forensic Science, Statistical Infrastructure for the Use of Error Rate Studies in the Interpretation of Forensic Evidence, Collaborator, Total: \$197,699, Sub: \$57,596

Not Funded

2020

USDA-NIFA: Agriculture and Food Research Initiative, *Practical Framework to Facilitate Adoption of In-Season N Management Technology in Commercial Fields*, Collaborator, Total: \$300,000

2020

NSF: National Artificial Intelligence Research Institutes, *AI Institute: AgroAI: The Institute for Advancing Agriculture and Food in a Changing World Using AI*, Collaborator, Total: \$20,000,000

2019

USDA-AFRI: Sustainable Agricultural Systems, *A Cyber-Physical System for Data-Intensive Farm Management*, PI, Total: \$3,000,000

2018

NIJ: R&D In Forensic Science, *Evaluating Photogrammetry for 3D Footwear Impression Recovery*, PI, Total: \$281,755

Talks

Invited

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*, 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*, Section on Statistical Graphics, Seattle, WA

2014

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

Contributed

2022

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

2022

From Scans to Scores, *IAI*, Omaha, NE

2021

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

2018

Framed Charts in the 1870 Statistical Atlas, *JSM*, Section on Statistical Graphics, Vancouver, BC, CA

2017

A Bayesian Approach to Visual Inference, *JSM*, Section on Statistical Graphics, Baltimore, MD

2016

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

2015

Visual Aptitude and Statistical Graphics, *InfoVis*, IEEE, Chicago, IL

2014

Do You See What I See? Using Shiny for User Testing, *JSM*, Section on Statistical Graphics, Boston, MA

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| 2014 | Animint: Interactive, Web-Ready Graphics with R , <i>Great Plains R User Group</i> , Sioux Center, IA |
| 2013 | Signs of the Sine Illusion – why we need to care , <i>JSM</i> , Section on Statistical Graphics, Montreal, ON, CA |
| Seminars | |
| 2022 | Reproducible Science: Statistics, Forensics, and the Law , <i>Statistics</i> , University of Nebraska, Lincoln, Lincoln, NE |
| 2022 | How to make good charts , <i>Complex Biosystems</i> , University of Nebraska Lincoln, Lincoln, NE |
| 2022 | Pandemics, Graphics, and Perception of Log Scales , <i>Math</i> , University of Nebraska Omaha, Omaha, NE |
| 2022 | Automatic Acquisition of Footwear Class Characteristics , <i>Center for Statistical Applications in Forensic Evidence</i> , Online |
| 2021 | Pandemics, Graphics, and Perception of Log Scales , <i>NUMBATS</i> , Monash University, Melbourne, Vic, AUS |
| 2021 | Exploring Rural Quality of Life Using Data Science and Public Data , <i>QQPM</i> , University of Nebraska Lincoln, Lincoln, NE |
| 2021 | Inconclusive Conclusions: Biases and Consequences , <i>Law and Psychology Brown Bag</i> , University of Nebraska Lincoln, Lincoln, NE |
| 2021 | Visual Statistics: Communication and Graphical Testing , <i>Animal Science</i> , University of Nebraska Lincoln, Lincoln, NE |
| 2021 | How to Make Good Charts , <i>Biological and Systems Engineering GSA</i> , University of Nebraska Lincoln, Lincoln, NE |
| 2020 | Statistical Evaluation of Firearms and Toolmark Evidence , <i>Statistics</i> , University of Nebraska Lincoln, Lincoln, NE |

Software

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

| | |
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| 2021 | ggpcp , <i>Generalized parallel coordinate plots</i> , Repository |
| 2020 | vinference , <i>Analysis of visual inference experiments</i> , Repository |
| 2019 | groovefinder , <i>Identification of grooves in scans of bullet land engraved areas</i> , Repository |
| 2021 | cmcR , <i>Automated matching of 3d cartridge case scans using the congruent matching cells algorithm</i> , Repository |
| 2019 | |
| 2018 | bulletxtctr , <i>Automated matching of 3d bullet scans</i> , Repository |
| 2018 | x3ptools , <i>Reading, manipulating, and visualizing x3p files</i> , Repository |
| 2018 | bulletsamplr , <i>Resampling of bullet signatures</i> , Repository |
| 2018 | ShoeScrapeR , <i>Acquisition of shoe images and metadata from online retailers</i> , Repository |
| 2020 | |
| 2018 | ImageAlignR , <i>Image registration algorithms for forensics</i> , Repository |
| 2021 | |
| 2013 | animint , <i>Animated, interactive web graphics for R using ggplot2 and d3.js</i> , Repository |
| 2015 | |

Teaching

2022

STAT 151, *Introduction to Statistical Computing*, University of Nebraska Lincoln, Flipped synchronous. Evals: 4.95 (mean), 5 (median)

2022

STAT 218, *Introduction to Statistics*, University of Nebraska Lincoln, Online asynchronous. Evals: 3.72 (mean), 4 (median)

2022

STAT 850, *Computing Tools for Statisticians*, University of Nebraska Lincoln, Flipped synchronous

2022

STAT 892, *Writing in Statistics/TA Prep*, University of Nebraska Lincoln, In person synchronous

2022

STAT 982, *Advanced Inference*, University of Nebraska Lincoln, Co-taught with Bertrand Clarke

2021

STAT 218, *Introduction to Statistics*, University of Nebraska Lincoln, Online asynchronous.. Evals: 4.01 (mean), 4 (median)

2021

STAT 850, *Computing Tools for Statisticians*, University of Nebraska Lincoln, Hybrid, flipped, synchronous. Evals: 4.79 (mean), 5 (median)

2020

STAT 218, *Introduction to Statistics*, University of Nebraska Lincoln, Initially in person synchronous, then online asynchronous. Evals: 4.20 (mean), 4 (median)

2020

STAT 850, *Computing Tools for Statisticians*, University of Nebraska Lincoln, Hybrid, flipped, synchronous. Evals: 4.76 (mean), 5 (median)

2019

STAT 585, *Data Technologies for Statistical Analysis*, Iowa State, Co-taught with Heike Hofmann. Evals: 4.92 (mean), 5 (median)

Mentoring and Advising

Ph.D.

2022

Weihao (Patrick) Li, *Monash University*, Advances in Artificial Intelligence for Data Visualization: Developing Computer Vision Models to Automate Reading of Data Plots, with Application to Predictive Model Diagnostics, co-advised with Dianne Cook and Emi Tanaka

2021

Rachel Rogers, *University of Nebraska Lincoln*, Explainable Machine Learning for Forensics in Courtrooms

2021

Denise Bradford, *University of Nebraska Lincoln*, Dashboards for Exploratory Multivariate Data Analysis

2020

Alison Kleffner, *University of Nebraska Lincoln*, Spatial Statistics and Visualization in Ecology and Agriculture, co-advised with Yawen Guan

2020

Joseph Zemmels, *Iowa State University*, Analysis and Matching of Cartridge Cases, co-advised with Heike Hofmann

2020

2022

Emily Robinson, *University of Nebraska Lincoln*, Perception of Log Scales, co-advised with Reka Howard

MS

2023

Charles Bonk, *University of Nebraska Lincoln*, Reproducibility in Firearms and Toolmark Algorithms

2022

Tyler Wiederich, *University of Nebraska Lincoln*, Perception of Three Dimensional Graphics

2022

Muxin Ha, *University of Nebraska Lincoln*, Automatic Recognition of Shoe Class Characteristics

2021

Jayden Stack, *University of Nebraska Lincoln*, Automatic Recognition of Shoe Class Characteristics

2022

2020

Ved Piyush, *University of Nebraska Lincoln*, Machine Learning and Computer Vision

2019

2020

Joseph Zemmels, *Iowa State University*, Analysis and Matching of Cartridge Cases, co-advised with Heike Hofmann

2019
2020

Eryn Blagg, *Iowa State University*, Analysis of Wear Development in Three-Dimensional Shoe Scans, co-advised with Heike Hofmann

2018
2019

Miranda Tilton, *Iowa State University*, Footwear Class Characteristics and Computer Vision

Undergraduate

2021

Xinyu Liu, *University of Nebraska Lincoln*, Machine Learning for Shoe Sole Images, UNL FYRE Program

2019

Jason Seo, *Iowa State University*, R package for visualization of neural networks using the python library keras-vis

2018
2019

Talen Fisher, *Iowa State University*, Database engineering and tools for working with x3p files

Summer

2019

Molly McDermott and Andrew Maloney, *Iowa State University*, Bullet Scan Quality and Machine Learning

2019

Syema Ailia, Emmanuelle Hernandez Morales, Tiger Ji, *Iowa State University*, Rapid quality control tools for confocal microscopy scans

2018

Ben Wonderlin, Jenny Kim, *Iowa State University*, Footwear Class Characteristics and Computer Vision, Young Engineers and Scientists Program

Outreach

Legal Briefs and Testimony

2022

Amicus Curiae Brief, *Supreme Court of New Jersey*, A-56-18 State v. Michael Olenowski (082253)

2022

Amicus Curiae Brief, *Supreme Court of Maryland*, In Support of Appellant Kobina Ebo Abruquah

2022

Written Testimony, *Cook County Circuit Court*, Reply to Response by FBI Laboratory filed in Illinois v. Winfield and Affidavit by Biederman et al. (2022) filed in US v. Kaevon Sutton (2018 CF1 009709)

2021

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

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

2023

Advisory Committee on Forensic Science, ASA

2025

2023

Graphics Section Chair, ASA

2024

2022

Graphics Section Chair-Elect, ASA

2023

2021

Associate Editor, *Journal of Computational and Graphical Statistics*

2024

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|---|---|
| 2020 2023 | Associate Editor, <i>R Journal</i> |
| 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), <i>Symposium on Data Science and Statistics 2020</i> , 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 | R Workshop Coordinator Develop and coordinate a week of R workshops taught in January, May, and August each year |
| 2021 2022 | Faculty Senate, <i>Statistics Department Representative</i> |
| 2021 2022 | Faculty Advisory Council, <i>Vice-Chair</i> |
| 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 | Digital Ag Minor Committee Committee to develop a digital ag minor. |
| 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, <i>Fall Semester</i> |
| 2019 2020 | Undergraduate Program Committee Design an undergraduate statistics major and submit the proposal to the university. |

Training & Professional Development

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|--------------|---|
| 2022 2023 | Nebraska Governance and Technology Center, <i>Faculty Fellow</i> |
| 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 |