

# Kris Sankaran

## Department of Statistics

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Homepage: <https://measurement-and-microbes.org>  
Code: <http://github.com/krisrs1128/>

## Training

**Quebec AI Institute (Mila)** — Postdoctoral Fellow 2018–2020  
Advisor: [Yoshua Bengio](#)

**Stanford University** — PhD in Statistics 2013–2018  
Thesis: [Discovery and Visualization of Latent Structure with Applications to the Microbiome](#)  
Advisor: [Susan Holmes](#)

**Stanford University** — MS in Statistics 2012–2013

**Stanford University** — BS in Mathematics 2009–2013

## Appointments

*Assistant Professor*  
08/2020 - Present  
Department of Statistics  
University of Wisconsin - Madison

*Discovery Fellow*  
07/2022 - Present  
Wisconsin Institute for Discovery  
University of Wisconsin - Madison

*Department Affiliate*  
04/2023 - Present  
Department of Biomedical Engineering  
University of Wisconsin - Madison

## Areas of Expertise

Statistical methods for multi-omics  
Interactive computing and data visualization  
Simulation and generative modeling

## Peer-Reviewed Publications

Lab members are underlined.

### Under Review

*phylobar: an R package for multiresolution compositional barplots in omics studies.* Megan Kuo, Kim-Anh Lê Cao, Saritha Kodikara, Jiadong Mao, and Kris Sankaran.

*Interactive Visualization of Metric Distortion in Nonlinear Data Embeddings using the distortions Package.* Kris Sankaran, Shuzhen Zhang, Chenab, Marina Meilă.

*Joint Adaptive Penalty for Unbalanced Mediation Pathways.* Hanying Jiang, Kris Sankaran, Yinqiu He.

*Prevalence aware feature selection improves biomarker identification in microbiome studies.* Ruoxi Yang, Yingjie Li, Kris Sankaran, Thomas A Mace, Phil A Hart, Qin Ma, Xu-Wen Wang, Shanlin Ke.

*Caenorhabditis elegans populations shape their microbial environment.* Rahul Bodkhe, Kris Sankaran, Michael Shapira.

*Translating Machine Learning into Manufacturing Expertise - Actionable Interpretability and Stability for Precision Injection Molding.* Chung-Yin Lin, Jinsu Gim, Andrea Pieressa, Demitri Shotwell, Kris Sankaran, Giovanni Lucchetta, Lih-Sheng Turng.

*Bringing the lab into the field: Feasibility of incorporating objective behavioral and biological measures in a large-scale decentralized mobile health trial for depression.* Wendy S.-Y. Lau, Caroline M. Swords, Margaret W. Thairu, Nelson Hidalgo, Raquel Tatar, Christine D. Wilson-Mendenhall, Daniel W. Grupe, Robin I. Goldman, Nathaniel J. Vack, Craig Ferguson, Gabriela Valdivia, Kris Sankaran, Corrina Frye, Cortland J. Dahl, Hadley Rahrig, Robert Lewis, Estelle T. Higgins, Mason Garza, Zishan Jiwani, Matthew J. Hirshberg, Amit Berstein, Ellen Converse, Sona Dimidjian, Earlise C. Ward, Greg E. Miller, Thomas W. McDade, Rosalind W. Picard, Jo Handelsman, Melissa A. Rosenkranz, Heather C. Abercrombie, Richard J. Davidson, Simon B. Goldberg.

## Published

*Semisynthetic Simulation for Microbiome Data Analysis.* Kris Sankaran, Saritha Kodikara, Jingyi Jessica Li, and Kim-Anh Lê Cao. Briefings in Bioinformatics 26, no. 1 (2025).

*Multimedia: Multimodal Mediation Analysis of Microbiome Data.* Hanying Jiang, Xinran Miao, Margaret W. Thairu, Mara Beebe, Dan W. Grupe, Richard J. Davidson, Jo Handelsman, and Kris Sankaran. Microbiology Spectrum 13, no. 2 (2025). American Society for Microbiology.

*Data Science Principles for Interpretable and Explainable AI.* Kris Sankaran. Journal of Data Science, no. 1387 (2024). School of Statistics, Renmin University of China.

*mbtransfer: Microbiome Intervention Analysis Using Transfer Functions and Mirror Statistics.* Kris Sankaran and Pratheepa Jeganathan. PLOS Computational Biology 20, no. 6 (2024). Public Library of Science (PLOS).

*Bootstrap Confidence Regions for Learned Feature Embeddings.* Kris Sankaran. Journal of Computational and Graphical Statistics 32, no. 4 (2023).

*Generative Models: An Interdisciplinary Perspective.* Kris Sankaran and Susan P. Holmes. Annual Review of Statistics and its Application 10, no. 1 (2023).

*Estimating Glacial Lake Trends using Historically Guided Segmentation Models.* Weiyushi Tian, Anthony Ortiz, Tenzing C. Sherpa, Finu Shrestha, Mir Matin, Rahul Dodhia, Juan M. Lavista Ferres, Kris Sankaran. IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing 15 (2023).

*Student satisfaction with R vs. Excel in Data Mining and Business Analytics: A Herzberg's motivation-hygiene theory perspective.* Siva Sankaran, Kris Sankaran, and Tung X. Bui. Decision Sciences Journal of Innovative Education (2023). Runner-Up for [DSJIE Best Research Paper](#) of 2023.

*Societal Impacts.* Kris Sankaran. In *Tackling Climate Change with Machine Learning*, with David Rolnick, Priya Donti, Lynn Kaack, Kelly Kochanski, Alexandre Lacoste, Andrew Slavin Ross, Nikola Milojevic-Dupont, Natasha Jaques, Anna Waldman-Brown, Alexandra Sasha Luccioni, Tegan Maharaj, Evan D. Sherwin, S. Karthik Mukkavilli, Konrad P. Kording, Carla P. Gomes, Andrew Y. Ng, Demis Hassabis, John C. Platt, Felix Creutzig, Jennifer Chayes, Yoshua Bengio. ACM Computing Surveys 55, no. 2 (2023).

*Microbiome composition modulates secondary metabolism in a multispecies bacterial community.* Marc Chevrete, Chris Thomas, Amanda Hurley, Natalia Rosario-Meléndez, Kris Sankaran, Yixing Tu, Austin Hall, Shruti Magesh, and Jo Handelsman. Proceedings of the National Academy of Sciences 119, no. 42 (2022).

*Interactive Visualization and Representation Analysis Applied to Glacier Segmentation.* Minxing Zheng, Xinran Miao, and Kris Sankaran. ISPRS International Journal of Geo-Information 11, no. 8 (2022): 415.

*Multiscale analysis of count data through topic alignment.* Julia Fukuyama, Kris Sankaran, Laura Symul. Biostatistics 24, no. 4 (2022).

*Artificial intelligence for climate change adaptation.* So-Min Cheong, Kris Sankaran, and Hamsa Bastani. Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery 12, no. 5 (2022).

*Community-wide hackathons to identify central themes in single-cell multi-omics.* Kim Anh Lê Cao, Aedin Culhane, Elana Fertig, Vincent Carey, Ricard Argelaguet, Susan Holmes, Michael Love, Guo-Cheng Yuan, Al Abadi, Casey Greene, Ayshwarya Subramanian, Amrit Singh, Alexis Coullomb, Vera Pancaldi, Arshi Arora, Joshua Sodicoff, Joshua Welch, Emily Davis-Marcisak, Matthew Ritchie, Yue You, Genevieve Stein-O'Brien, Kris Sankaran, Ruben Dries, Atul Deshpande. Genome Biology 22, no. 1 (2021): 1-21.

*FloW: A Dataset and Benchmark for Floating Waste Detection in Inland Waters.* Yuwei Cheng, Jiannan Zhu, Mengxin Jiang, Jie Fu, Changsong Pang, Peidong Wang, Kris Sankaran, Olawale Onabola, Yimin Liu, Dianbo Liu, Yoshua Bengio. Proceedings of the IEEE/CVF International Conference on Computer Vision (2021).

*Interpretability of a deep learning model in the application of cardiac MRI segmentation with an ACDC challenge dataset.* Adrianna Janik, Jonathan Dodd, Georgiana Ifrim, Kris Sankaran, Kathleen Curran. SPIE Medical Imaging Conference (Image Processing Track) (2021).

*Machine Learning for Glacier Monitoring in the Hindu Kush Himalaya.* Shimaa Baraka, Benjamin Akera, Bibek Aryal, Tenzing Sherpa, Finu Shresta, Anthony Ortiz, Kris Sankaran, Juan Lavista Ferris, Mir Martin, and Yoshua Bengio. Climate Change AI Workshop at NeurIPS 2020. [Spotlight Talk].

*Application of Semantic Segmentation with Few Labels in the Detection of Water Bodies from Perusat-1 Satellite's Images.* Jessenia Gonzalez Villareal, Kris Sankaran, Victor Ayma, and Cesar Beltran. IEEE Latin American GRSS & ISPRS Remote Sensing Conference (LAGIRS) (2020).

*Segmentation of water bodies in Peru using knowledge-transfer based convolutional neural networks.* Jessenia Gonzalez Villareal, Debjani Bhowmick, and Kris Sankaran. Workshop on ML for the Developing World at NeurIPS (2019).

*Forecasting Maxima in Climate Time Series.* Israel Goytom and Kris Sankaran. 9th International Workshop on Climate Informatics (2019).

*Artificial intelligence based cloud distributor (AI-CD): probing clouds with generative adversarial networks.* Tianle Yuan, Hua Song, David Hall, Victor Schmidt, Kris Sankaran and Yoshua Bengio. 9th International Workshop on Climate Informatics (2019).

*Discovering Concepts in Learned Representations using Statistical Inference and Interactive Visualization.* Adrianna Janik and Kris Sankaran. Workshop on Explainable AI/ML (XAI) for Accountability, Fairness, and Transparency at KDD (2019).

*Interactive Segmentation for Disaster Relief Mapping.* Muhammed Razzak and Kris Sankaran. AI for Good Workshop at IJCAI (2019). [Oral presentation]

*Interpreting Black-Box Semantic Segmentation Models in Remote Sensing Applications.* Adrianna Janik, Kris Sankaran, and Anthony Ortiz. In *Machine Learning Methods in Visualisation for Big Data* edited by Archambault, Daniel and Nabney, Ian and Peltonen, Jaakko (2019). DOI 10.2312/mlvis.20191158.

*Machine Learning based Predictive Maintenance for Renewable Energy: The Case of Power Plants in Morocco.* Loubna Benabbou, Zouheir Malki, Kris Sankaran, and Hicham Bouzeckri. Climate Change AI workshop at ICML (2019).

*Visualizing the consequences of climate change using cycle-consistent adversarial networks.* Victor Schmidt, Alexandra Luccioni, Surya Mukkavilli, Narmada Balasooriya, Kris Sankaran, Jennifer Chayes, and Yoshua Bengio. AI for Social Good Workshop at ICLR (2019).

*Sex-specific association between gut microbiome and fat distribution.* Yan Min, Xiaoguang Ma, Kris Sankaran, Yuan Ru, Lijin Chen, Mike Baiocchi, and Shankuan Zhu. Nature Communications 10, no. 1 (2019): 2408.

*Remembrances of States Past.* Kris Sankaran. 2nd Workshop on Visualization for AI Explainability at IEEE VIS (2019). [Oral presentation]

*Stratification of amyotrophic lateral sclerosis patients: a crowdsourcing approach.* R. Kueffner, N. Zach, M. Bronfeld, et al. Scientific Reports 9, 690 (2019).

*Multitable Methods for Microbiome Data Integration.* Kris Sankaran and Susan P. Holmes. Frontiers in Genetics 10 (2019).

*Hierarchical Importance Weighted Autoencoders.* Chin-Wei Huang, Kris Sankaran, Eeshan Dhekane, Alexandre Lacoste, Aaron Courville. Proceedings of the 36th International Conference on Machine Learning, PMLR 97:2869-2878 (2019).

*Latent Variable Modeling for the Microbiome.* Kris Sankaran and Susan P. Holmes. Biostatistics (2018).

*Interactive Visualization of Hierarchically Structured Data.* Kris Sankaran and Susan P. Holmes. Journal of Computational and Graphical Statistics (2017).

*Foundational mapping of Uganda to assist American Red Cross disaster response to floods and pandemics.* Alexei Bastidas, Matthew Beale, Yoshua Bengio, Anna Bethke, Pablo Fonseca, Jason Jo, Dale Kunce, Sean McPherson, Vincent Michalski, Anthony Ortiz, Kris Sankaran, and Hanlin Tang. AI for Social Good Workshop at NeurIPS (2018).

*Multidomain analyses of a longitudinal human microbiome intestinal cleanout perturbation experiment.* Julia Fukuyama, Laurie Rumker, Kris Sankaran, Pratheepa Jeganathan, Les Dethlefsen, David A. Relman, and Susan P. Holmes. PLOS Computational Biology 13, no. 8 (2017): e1005706.

*Bioconductor workflow for microbiome data analysis: from raw reads to community analyses.* Ben J. Callahan, Kris Sankaran, Julia A. Fukuyama, Paul J. McMurdie, and Susan P. Holmes. F1000Research 5 (2016).

*HIV-1 Protease, Reverse Transcriptase, and Integrase Variation.* Soo-Yon Rhee, Kris Sankaran, Vici Varghese, Mark Winters, Christopher B. Hurt, Joseph J. Eron, Neil Parkin, Susan P. Holmes, Mark Holodniy, and Robert W. Shafer. Journal of Virology (2016): JVI-00495.

*Improving Online Course Performance Through Customization: An Empirical Study Using Business Analytics.* Siva Sankaran and Kris Sankaran. International Journal of Business Analytics (IJBAN) 3, no. 4 (2016): 1-20.

*structSSI: Simultaneous and Selective Inference for Grouped or Hierarchically Structured Data.* Kris Sankaran and Susan P. Holmes. Journal of Statistical Software 59, no. 13 (2014).

## Advising

### Postdocs

Current — [Margaret Thairu](#) (with Jo Handelsman)

### PhD Students

Current — [Cameron Jones](#), [Yuliang Peng](#) (Winner of the Trewartha Award), [Jiaxin Ye](#), [Langtian Ma](#)

Alumni — [Hanying Jiang](#) (PhD 10/2024 → Google)

### PhD Rotations

Alumni — [Xinran Miao](#), [Zhuoyan Xu](#), [Shuchen Yan](#), Mason Garza (with Jo Handelsman)

### MS Students

Alumni — [Kaiyan Ma](#) (→ Assistant Engineer at Changping National Laboratory), [Margaret Turner](#) (→ Data scientist at John Deere), [Tinghui Xu](#) (→ PhD student at UW-Madison), [Minxing Zheng](#) (→ PhD student at CMU), Kai Cui

**Undergraduates**

Current — [Helena Huang](#) (WISCERS), [Megan Kuo](#)

Alumni — [Zhi Zheng](#) (→ PhD student at UW–Madison), [Harshita Narayanan](#) (WISCERS → Data scientist at Discover), [Zhuoxin Shi](#) (→ PhD student at UW–Madison), [Zhihao Lyu](#) (VISP → MS student at University of Washington), [Weiyushi Tian](#) (→ PhD student at University of Michigan), [Yixing Tu](#) (→ MS student at Columbia University)

**GSTP Secondary Advisor:** Delaney Miller, Alex Cheong

**Thesis Committee Member:** Dinesh Kumar Kuppa Baskaran, Shuyang Chen, Albert Dorador Chalar, Jitian Zhao, Jingqi Duan, Siyu Zhang, Emily Diaz Vallejo, Shan Lu, Jinyi Wang, Shana Ederer

**Preliminary Exam Committee Member:** Tinghui Xu, Zhongxuan Sun

**Interns supervised (Mila):** Anthony Ortiz, Md. Rifat Arefin, Pablo Fonseca, Muhammed Razzak, Israel Goytom, Adrianna Janik, Yasser Salah Eddine Bouchareb, Sara Ebrahim, Mustafa Alghali, Jessenia Gonzalez Villareal, Shimaa Baraka, Debjani Bhowmick, Joseph Baafi, James Assiene, Benjamin Akera, and Olawale Onabola

**Interns co-supervised (Mila):** The [biasly AI](#) team, Wisdom d’Almeida.

**Funding**

Dollar amounts are direct costs to my lab.

**NIH R01HG014687** — \$106K 07/2025-06/2029

*Experimental-data-based in silico data generation platform to improve the trustworthiness and power of single-cell and spatial omics data analysis*

Co-I with Jingyi Jessica Li (PI) and Andres Colubri

**NIH R01AI184095** — \$226K 08/2024-06/2029

*Identifying drivers of genital inflammation and HIV acquisition in women living in sub-Saharan Africa*

Co-I with Caroline Mitchell (Co-PI), Douglas Kwon (Co-PI), Scott Handley, and Laura Symul

**PRECISE AGR00009372** — \$514K 08/2025-08/2028

*Lucida Project*

Co-I with Jo Handelsman (Co-PI), John Chambers (Co-PI), and collaborators at UW–Madison, MIT, and NUS

**Gates INV-072185** — \$250K 01/2025-12/2027

*MOTIF@FRESH: Modifying Organisms Transvaginally in Females*

Co-I with Doug Kwon (Co-PI), Caroline Mitchell (Co-PI), Leatitia Kampiire (Co-PI), Thumbi Ndung’u (Co-PI) and collaborators at CAPRISA and HPP.

**NIGMS/NIH R01GM152744** — \$398K 09/2023-07/2026

*Modeling Microbial Community Response to Invasion: A Multi-omics and Multifactorial Approach*

Co-PI with Jo Handelsman

**Fall Research Competition** — \$48K (conditional) 12/2022

*Differential Interactome Analysis for Multifactorial and Multi-Omics Experiments*

**AI for Earth Microsoft Azure Compute Grant** — \$18K 10/2019

*Glacier Monitoring for Adaptation to Climate Change*

**AI for Earth Microsoft Azure Compute Grant** — \$10K 10/2019

*Automated River Plastic Debris Removal*

## Pending

**NIAID PA-25-305** — \$232K requested

*Identifying mechanisms for bacterial vaginosis treatment failure and recurrence*

Co-I with Caroline Mitchell (PI), Krista Dong, and Jacques Ravel

**GRANT14422980** — \$443K requested

*Personalized Evaluation of engRaftment of Lactobacillus crispatus (PEARL): Identifying multi-omics mechanisms driving vaginal probiotic colonization*

Co-I with Doug Kwon (PI) and Caroline Mitchell

## Talks

### Community

[Microbiome Intervention Analysis with mbtransfer](#). EcoSta 2025 (08/2025).

[Multimedia: An R package for multimodal mediation analysis](#) ([recording](#)). useR! 2025 (08/2025).

[Modular Software for Mediation Analysis of Microbiome Data](#). ICIBM (08/2025).

[Managing Batch Effects in Biological Data](#) ([recording](#)). Computational Genomics Summer Institute (07/2025).

[Interpretable and Interactive Machine Learning](#). USC Data Science and Operations. (07/2025).

[Modular Software for Mediation Analysis of Microbiome Data](#) ([recording](#)). Computational Genomics Summer Institute (07/2025).

[Modular Software for Mediation Analysis of Microbiome Data](#). BIRS Workshop - Novel Statistical Approaches for Studying Multi-omics Data (07/2025).

[Towards Veridical Microbiome Analysis through Semisynthetic Data](#). Veridical Data Science for Biology (07/2025).

[Semisynthetic Controls and Cancer Microbiome Analysis](#). ICSA 2025. (06/2025).

[Interactively Resolving Distortion in Nonlinear Dimensionality Reduction](#). IISA 2025 (06/2025).

[Enhancing Microbiome Analysis with Semisynthetic Data](#). STATGEN 2025 (05/2025).

[Multiscale Topic Modeling with the Alto Package](#). Symposium on Data Science and Statistics (04/2025).

[Multiscale Topic Modeling with Alto](#). CGSI Virtual Class (04/2025).

[Enhancing Microbiome Analysis with Semisynthetic Data](#). Machine Learning Lunch Meetings (04/2025).

[Enhancing Microbiome Analysis with Semisynthetic Data](#). MCBIOS Orchestrating the Microbiome Symphony (03/2025).

[Topic Models for Microbiome Analysis](#). VUMC Biostatistics Seminar (02/2025).

[Enhancing Microbiome Analysis with Semisynthetic Data](#). UW-Madison Plant Pathology Seminar (02/2025).

[Visualizing Microbiome Data](#). African Health Research Institute Seminar (01/2025)

[Topic Models for Multiscale Analysis](#). International Indian Statistical Association Conference (12/2024)

[Microbiome Intervention Analysis with mbtransfer](#). Joint Statistical Meetings (08/2024)

[Topic Models for Multiscale Analysis](#). Computational Genomics Summer Institute ([recording](#)) (07/2024)

[Interactivity for Interpretable Machine Learning](#). Computational Genomics Summer Institute (07/2024)

[Trustworthy and Adaptable Biological Data Integration](#). IMS-NUS Workshop Proposal Meeting (07/2024)



[Interactivity, Interpretability, and Generative Models \(recording\)](#). INFORMS ALIO-ASOCIO (06/2024)

[Semisynthetic Simulation for Biological Data Analysis: Integrative Analysis \(notebooks\)](#). Melbourne Integrative Genomics Workshop (06/2024)

[Semisynthetic Simulation for Biological Data Analysis: Multivariate Analysis \(notebooks\)](#). Melbourne Integrative Genomics Workshop (06/2024)

[Semisynthetic Simulation for Biological Data Analysis: Marginal Modeling \(notebooks\)](#). Melbourne Integrative Genomics Workshop (06/2024)

[Expressive Interfaces for Multi-omics Simulation](#). Melbourne Integrative Genomics Seminar (05/2024)

[Multiscale Analysis of Microbiome Data with Alto](#). STATGEN 2024 (05/2024)

[Interpretability: What's Possible? What's Next? \(recording\)](#). BIRS Workshop on Statistical Aspects of Trustworthy Machine Learning (02/2024)

[Simulation in Omics](#). UW Methods for Biological Data Workshop (02/2024)

[Statistical and Computational Challenges in Phylogenetic Inference \(Faculty Introduction\)](#). Wisconsin Institute for Discovery Seminar Series (01/2024)

[Expressive Interfaces for Multi-omics Simulation](#). UW-Madison Statistics Seminar (12/2023)

[Student Satisfaction with R vs. Excel in Data Mining and Business Analytics](#). Decision Sciences Institute (11/2023)

[Visualization in Deep Learning: Theme and Variations](#). UW Machine Learning Lunch Meetings (11/2023)

[Interactive Multiview Data Science](#). Wisconsin Institute for Discovery Symposium (11/2023)

[Beyond Black Box Simulation](#). ASA Section on Statistical Computing Mini-Symposium (11/2023)

[Generative Models for Microbiome Mediation Analysis](#). Joint Statistical Meetings (08/2023)

[Generative Models for Microbiome Mediation Analysis](#). EcoSta (08/2023)

[Selective Inference for Computational Genomics](#). Computational Genomics Summer Institute (07/2023)

[Ecosystem Modeling using Multimodal Data](#). Microsoft AI for Good Lab (07/2023)

[Generative Models for Microbiome Mediation Analysis](#). CMStatistics (12/2022)

[Visualization and Simulation in Microbial Community Analysis](#). Indiana University Bloomington Statistics Department Colloquium (10/2022)

[Revisiting Iterative Data Structuration](#). University of Pittsburgh Department of Statistics Seminar (04/2022)

[Multiscale Topic Visualization in the Microbiome](#). ML + X Talks, UW-Madison Data Science Hub (11/2021)

[Multiscale Analysis of Count Data through Topic Alignment](#). McMaster University Mathematics and Statistics Department Seminar (11/2021)

[Latent Structure Laboratory](#). UW-Madison Statistics Department Seminar (09/2021)

[Discovery and Visualization](#). UW-Madison Statistics Department Lightning Talks (03/2021)

[Visualizing Mapping Models](#). UW-Madison Data Science Bazaar (02/2021)

[Climate Change AI Team Intro](#). TEDx Climate Countdown (10/2020)

[Invitation to Research](#). UW-Madison Statistics Department Seminar (09/2020)

[Measuring Feature Stability](#). Bernoulli IMS One World Symposium (08/2020)

[Formalization of Complex Workflows](#). Stanford University Data Science Scholars (08/2020)

Navigation and Evaluation in High-Dimensional Data - San Francisco State Mathematics Department Seminar (02/2020)

Navigation and Evaluation in High-Dimensional Data - UC Davis Statistics Department Seminar (02/2020)

Navigation and Evaluation in High-Dimensional Data - UW-Madison Statistics Department Seminar (01/2020)

Navigation and Evaluation in High-Dimensional Data - Penn State Statistics Department Seminar (01/2020)

Navigation and Evaluation in High-Dimensional Data - Waterloo Statistics Department Seminar (01/2020)

Latent Structure in the Microbiome - University of Chicago, Department of Statistics Colloquium (01/2018)

## Internal

[Microbiome Data Science](#). UW-Madison Statistics Department Lightning Talks (09/2025)

[Enhancing Microbiome Analysis with Semisynthetic Data](#) Genomic Sciences Training Program Retreat (08/2025)

[Microbiome Data Science](#) UW-Madison Statistics Department Lightning Talks (09/2024)

[Transparent Synthetic Data Generation](#) Machine Learning Lunch Meetings (04/2024)

[Integrated Views of HIV Acquisition Risk](#) Susan Holmes Group Meeting (04/2024)

[Multiview Data Science](#) UW-Madison Statistics Department Lightning Talks (03/2024)

[Simulation in Omics \(quarto, colab\)](#) [UW Methods for Biological Data Workshop](#) (02/2024)

[Interpretability: Beyond Black and White](#) (01/2024)

[Microbiome Data Science](#). UW-Madison Statistics Department Lightning Talks (09/2023)

[Transfer Function Modeling of Microbial Community Shifts](#) (04/2023)

[Evaluating Causal Microbiome Models](#) (01/2023)

[Notes: A Simple Measure of Conditional Independence](#) (09/2022)

[Generative Approaches to Microbiome Mediation Analysis](#) (07/2022)

[Mediation and the Microbiome](#) (04/2022)

[Generative Models and Experimental Design](#) (01/2022)

[Recent Multi-Omics Methods and their Ancestors](#) (10/2021)

[Multiresolution Analysis of Count Data through Topic Alignment](#) (08/2021)

## Workshop Organizing

*Trustworthy and Adaptable Biological Data Integration*

Co-organizers: Wei-Yin Loh, Wanjie Wang, Bibhas Chakraborty  
IMS-NUS Workshop Series [May 3 - 21, 2027]

*Bridging Biology and Statistics: Insights and Innovations for Modern Biology*

Co-organizers: Claire Donnat, Laura Symul  
Stanford University [June 3, 2025]

*Tackling Climate Change with Machine Learning*

ICLR 2020. [April 26 - 30, 2020]



*Computer Vision for Global Challenges*

Lead Organizers: Laura Sevilla-Lara, Yannis Kalantidis

CVPR 2019 [June 16, 2019]

*AI for Social Good*

ICML 2019 [June 15, 2019]

ICLR 2019 [May 6, 2019]

## Book Chapters and Reviews

Anthony Ortiz, Kris Sankaran, Finu Shrestha, Tenzing Choygal Sherpa, and Mir Martin. “Chapter 12: Mapping Glacier Lakes” in *AI for Good: Applications in Sustainability, Humanitarian Action, and Health*, edited by Juan Lavista Ferres and William Weeks. Wiley, 2024. 113-123.

Kris Sankaran. [Review](#) of *Applied microbiome statistics: correlation, association, interaction and composition* by Yinglin Xia and Jun Sun. Chapman & Hall/CRC (2024). Book DOI: [10.1201/9781003121572](#). Review published in *Biometrics* (2025), article id ujaf136.

## Software

**phylobar**: An R package for constructing stacked barplots by interactively “painting” an associated tree.

**distortions**: A python package for interacting with the distortion introduced by nonlinear dimensionality reduction algorithms.

**multimedia**: An R package for modular mediation analysis in high-dimensional data, with an emphasis on microbiome and metabolome applications.

**miniLNM**: An R package for estimation of logistic normal multinomial models.

**mbtransfer**: An R package for modeling microbiome dynamics which provides functions for fitting transfer function models, simulating counterfactual trajectories, and selecting significantly perturbed taxa using mirror statistics.

**alto**: An R package that aligns topics from different LDA models, computes metrics for quantifying the goodness of alignment, and provides visualization functions to explore the alignment and robustness of topics across environments or LDA hyperparameters.

**NBFvis**: An R package for neighborhood-based featurization and visualization for spatial genomics data.

**MolPad**: An R-Shiny Package for Cluster Co-Expression Analysis in Longitudinal Microbiomics.

**waveST**: An R package for wavelet-guided dimensionality reduction for spatial transcriptomics data.

**treelapse**: An R package for interactive visualization of hierarchically structured time series. Suitable for multiscale analysis of longitudinal microbiome data.

**structSSI**: An R package implementing hierarchically structured and grouped multiple hypothesis testing procedures.

**GFLasso**: An R package for the graph-fused lasso.

## Teaching

### Long Courses

STAT 479 (Interpretable Machine Learning). UW-Madison. Spring 2026.

STAT 436 (Statistical Data Visualization). UW-Madison. Fall 2025.

STAT 436 (Statistical Data Visualization). UW-Madison. Spring 2025.

STAT 992 (Interpretable and Explainable Machine Learning). UW-Madison. Spring 2025.

STAT 436 (Statistical Data Visualization). UW-Madison. Fall 2024.

STAT 436 (Statistical Data Visualization). UW-Madison. Spring 2024.

STAT 992 (Selective Inference in Multi-Omics). UW-Madison. Spring 2024.

STAT 679/992 (Advanced Statistical Data Visualization). UW-Madison. Fall 2023.

STAT 992 (Multi-Omics Data Analysis). UW-Madison. Spring 2023.

STAT 436 (Statistical Data Visualization). UW-Madison. Spring 2023.

STAT 679 (Advanced Statistical Data Visualization). UW-Madison. Fall 2022.

STAT 479 (Statistical Data Visualization). UW-Madison. Spring 2022.

STAT 424 (Statistical Experimental Design). UW-Madison. Fall 2021.

STAT 479 (Statistical Data Visualization). UW-Madison. Spring 2021.

STAT 424 (Statistical Experimental Design). UW-Madison. Fall 2020

IFT6758 (Introduction to Data Science) co-instructor Université de Montréal. Fall 2019.

STATS 390 (Statistical Consulting Workshop). Stanford University. Summer 2017.

## Guest Lectures and Short Courses

BME 780 Guest Lecture. [Managing Batch Effects in Biological Data](#) (10/2025).

DS BMED 208 Guest Lecture. [Supporting Diabetic Retinopathy Screening with Machine Learning](#) (10/2025).

International Indian Statistical Association Conference. [Interpretable and Interactive Machine Learning](#). (12/2024).

BME 780 Guest Lecture. [Managing Batch Effects in Biological Data](#) (10/2024).

BME 780 Guest Lecture. [Multiple Testing in Quantitative Biology](#) (10/2023).

Data Science Nigeria AI Bootcamp. [Foundations of Machine Learning](#) (08/2023).

Annual Nepal AI School 2023. [Foundations of Machine Learning](#). (06/2023)

UW-Madison MSTP M2 Journal Club. [Microbiome Studies: Design, Infrastructure, and Inference](#) (11/2022).

UW-Madison STAT 627. [Is a PhD right for me?](#) (02/2022).

Third Nepal Winter School in AI. [Foundations of Machine Learning](#) (12/2021).

Data Science Nigeria AI Bootcamp. [Understanding Machine Learning](#) (10/2021).

Data Science Nigeria AI Bootcamp. [AI for Social Good](#) and [Statistics and Machine Learning](#) (11/2021)

McMaster Innovate 1Z03 [AI, Sustainability, and Climate Change](#).

Deep Learning Indaba instructor. [Memory and Attention](#). Nairobi, Kenya. (08/2019).

First Nepal Winter School in AI instructor. [Deep Learning Foundations](#), [Advanced Deep Learning](#), and [Humanitarian AI](#). Kathmandu, Nepal (12/2018).

Strategies and Techniques for Analyzing Microbial Population Structures TA. Marine Biological Laboratory, Woods Hole. (08/2017).

## Service

### Departmental

Graduate studies committee [2020 - present]

Undergraduate studies committee [2020 - present]

Ad-hoc chair selection committee [2024 - 2025]

Ad-hoc PhD curriculum committee [2024 - 2025]

Climate and diversity committee [2023 - 2024]

### Community

Journal reviewer for *Cell Patterns*, *Bioinformatics Advances*, *Biostatistics*, *mBio*, *Journal of Data Science*, *Statistics in Medicine*, *BioData Mining*, *Briefings in Bioinformatics*, *Computational and Structural Biotechnology Journal*, *mSystems*, *BMC Microbiology*, *Genome Biology*, *Bioinformatics*, *Entropy*, *Nature Scientific Reports*, *Journal of Computational and Graphical Statistics*, *BMC Bioinformatics*, *PLOS Computational Biology*, *The Journal of Machine Learning Research*, *Annals of Applied Statistics*, *eLife*, *BMJ Open*, *Environmental Data Science*, *The R Journal*, *Biometrics*, *Frontiers of Computer Science*, *The Journal of the American Statistical Association*, *Microbiome*, *F1000 Research*.

Conference reviewer for *NEURIPS* [2025], *ICML* [2025], *ACM BCB* [2025], *RECOMB* [2023, 2024, 2025], *Climate Change AI* [ICML 2019, NeurIPS 2019, ICLR 2020, NeurIPS 2020, ICML 2021, ICLR 2023, ICLR 2024], *Practical Machine Learning for Developing Countries* [ICLR 2021], AAAI 2021, *AI for Social Impact* [AAAI 2020], *Harvard CRCS Workshop on AI for Social Good* 2020, *AI for Social Good* [NeurIPS 2018, ICLR 2019, ICML 2019], *AI for Good* [IJCAI 2019], *ML for the Developing World* [NeurIPS 2019, NeurIPS 2020], *Montreal AI Symposium* [2019]

Grant reviewer for the Israel Science Foundation (02/2025).

PhD application mentor for the Deep Learning Indaba Mentorship Program, (2023).

Co-Organizer (with Claudia Solis-Lemus) of [Data Science Meets Art](#) exhibition in the Illuminating Discovery Hub (2023).

Judge for UW-Madison Statistics Club Data Challenge. (10/2021, 10/2022, 10/2023).

Judge for UW-Madison Data Science Club Datathon. (10/2021).

Steering committee member for [Climate Change AI](#). (04/2019 - 12/2020).

Project scoper for Data Science for Social Good - Solve. (07/2020 - 10/2020).

Writing Mentor, Deep Learning Indaba. (2020).

Graduate School Application Mentor, Black in AI. (2018 - 2019).

Humanitarian AI [reading group](#) organizer. (2018 - 2019).

Red Judge for IBM Watson AI XPRIZE. (05/2019 - 10/2019).

DataKind SF Chapter Core Volunteer. (2016 - 2017).

Stanford Statistics for Social Good. (2013 - 2017).

STATS 390 (Statistical Consulting Workshop) participant. 13 quarters, (2012 - 2017).

## Recognition

[Distinguished Honors Faculty Award](#), UW-Madison College of Letters & Sciences 2025.

Best reviewer award. AI for Social Good Workshop, NeurIPS 2018.

Jerome H. Friedman Applied Statistics Dissertation Award 2018

Ric Weiland Graduate Fellowship, 2016 - 2018

[Boothe Prize](#) for Excellence in Writing (Top 6 freshman papers), 2010

## Unpublished Reports

Xu, Tinghui and Kris Sankaran. Interactive Visualization of Spatial Omics Neighborhoods [version 1; peer review: awaiting peer review]. F1000Research 11:799. 2022 <https://doi.org/10.12688/f1000research.122113.1>.

Xu, Zhuoyan, and Kris Sankaran. Spatial Transcriptomics Dimensionality Reduction using Wavelet Bases. [arXiv:2202.00180](#).

Miao, Xinran and Kris Sankaran. Source Data Selection for Out-of-Domain Generalization. [arXiv:2202.02155](#).

Sankaran, Kris. Measuring the Stability of Learned Features. 2021. [arXiv:2102.10388](#)

Ortiz, Anthony, Kris Sankaran, Olac Fuentes, Christopher Kiekintveld, Pascal Vincent, Yoshua Bengio, Doina Precup. Conditional Networks. (Rejected from ICLR 2021, [submission available](#)).

Deudon, Michel, Alfredo Kalaitzis, Israel Goytom, Md. Rifat Arefin, Zichao Lin, Kris Sankaran, Vincent Michalski, Samira E. Kahou, Julien Cornebise, and Yoshua Bengio. (2020). Highres-net: Recursive fusion for multi-frame super-resolution of satellite imagery. [arXiv preprint arXiv:2002.06460](#).

Casavant, Ellen, Les Dethlefsen, Kris Sankaran, Dan Sprockett, Susan P. Holmes, David Relman, and Joshua Elias. (2019). Strategies for understanding dynamic, personalized profiles of host-derived proteins and microbes from human stool. [bioRxiv, 551143](#).

Sankaran, Kris, and Susan P. Holmes. Inference of Dynamic Regimes in the Microbiome. [arXiv preprint arXiv:1712.00067](#) (2017).

Sankaran, Kris, Diego Garcia-Olano, Mobin Javed, Maria Fernanda Alcala-Durand, Adolfo De Unánue, Paul van der Boor, Eric Potash, Roberto Sánchez Avalos, Luis Inaki Alberro Encinas, and Rayid Ghani. Applying Machine Learning Methods to Enhance the Distribution of Social Services in Mexico. [arXiv preprint arXiv:1709.05551](#) (2017).

Sankaran, Kris, Suzanne Tamang, and Ami Bhatt. Opioid Atlas: Mapping Access to Pain Medication. [arXiv preprint arXiv:1612.00497](#) (2016).

Hwang, Jessica, and Kris Sankaran. [SparkPoint Bundled Services Analysis](#). San Francisco, CA: United Way Bay Area (2014).