

Jean Feng

Position

July 2020– **Assistant Professor In-Residence**, Department of Epidemiology and Biostatistics,
Present *University of California, San Francisco*
Nov 2022– **Assistant Professor**, UCSF-UC Berkeley Joint Program in Computational Precision
Present Health

Education

Sept 2015– **PhD, Biostatistics**, *University of Washington*, Seattle, WA.
June 2020 Advisors: Noah Simon, Frederick Albert Matsen IV
2012–2013 **MS, Computer Science**, *Stanford University*, Stanford, CA.
2009–2013 **BS, Computer Science**, *Stanford University*, Stanford, CA.

Publications

Jean Feng and Noah Simon. Ensembled sparse-input hierarchical networks for high-dimensional datasets. *Statistical Analysis and Data Mining*, 2022.

Jean Feng, Rachael V Phillips, Ivana Malenica, Andrew Bishara, Alan E Hubbard, Leo A Celi, and Romain Pirracchio. Clinical artificial intelligence quality improvement: towards continual monitoring and updating of AI algorithms in healthcare. *npj Digital Medicine*, 2022.

Jean Feng, Gene Pennello, Nicholas Petrick, Berkman Sahiner, Romain Pirracchio, and Alexej Gossmann. Sequential algorithmic modification with test data reuse. *Proceedings of the Thirty-Seventh Conference on Uncertainty in Artificial Intelligence*, 2022.

Jean Feng, Alexej Gossmann, Berkman Sahiner, and Romain Pirracchio. Bayesian logistic regression for online recalibration and revision of risk prediction models with performance guarantees. *Journal of the American Medical Informatics Association*, 2022.

Daniel Lazzareschi, Ravindra L Mehta, Laura M Dember, Juliane Bernholz, Alparslan Turan, Amit Sharma, Sachin Kheterpal, Chirag R Parikh, Omar Ali, Ivonne H Schulman, Abigail Ryan, Jean Feng, Noah Simon, Romain Pirracchio, Patrick Rossignol, and Matthieu Legrand. Overcoming barriers in the design and implementation of clinical trials for acute kidney injury: a report from the 2020 kidney disease clinical trialists meeting. *Nephrol. Dial. Transplant*, 2022.

Andre Esteve, Jean Feng, Douwe van der Wal, Shih-Cheng Huang, Jeffry P Simko, Sandy DeVries, Emmalyn Chen, Edward M Schaeffer, Todd M Morgan, Yilun Sun, Amirata Ghorbani, Nikhil Naik, Dhruv Nathawani, Richard Socher, Jeff M Michalski, Mack Roach, Thomas M Pisansky, Jedidiah M Monson, Farah Naz, James Wallace, Michelle J Ferguson, Jean-Paul Bahary, James Zou, Matthew Lungren, Serena Yeung, Ashley E Ross, Howard M Sandler, Phuoc T Tran, Daniel E Spratt, Stephanie Pugh, Felix Y Feng, and Osama Mohamad. Prostate cancer therapy personalization via multi-modal deep learning on randomized phase III clinical trials. *npj Digital Medicine*, 2022.

Jean Feng, Arjun Sondhi, Jessica Perry, and Noah Simon. Selective prediction-set models with coverage guarantees. *Biometrics*, 2021.

Jean Feng, Scott Emerson, and Noah Simon. Approval policies for modifications to Machine Learning-Based software as a medical device: A study of bio-creep. *Biometrics*, 2021.

Jean Feng, William S DeWitt, Aaron McKenna, Noah Simon, Amy Willis, and Frederick A Matsen. Estimation of cell lineage trees by maximum-likelihood phylogenetics. *Annals of Applied Statistics*, 2021.

Jean Feng. Learning to safely approve updates to machine learning algorithms. *Proceedings of the Conference on Health, Inference, and Learning*, 2021.

Brian D Williamson and Jean Feng. Efficient nonparametric statistical inference on population feature importance using shapley values. *International Conference on Machine Learning*, 2020.

Jean Feng and Noah Simon. An analysis of the cost of hyper-parameter selection via split-sample validation, with applications to penalized regression. *Statistica Sinica*, 2020.

Jean Feng, David A Shaw, Vladimir N Minin, Noah Simon, and Frederick A Matsen, IV. Survival analysis of DNA mutation motifs with penalized proportional hazards. *Ann. Appl. Stat.*, 2019.

Kristian Davidsen, Branden J Olson, William S DeWitt, 3rd, Jean Feng, Elias Harkins, Philip Bradley, and Frederick A Matsen, 4th. Deep generative models for T cell receptor protein sequences. *Elife*, 2019.

Jean Feng, Brian Williamson, Noah Simon, and Marco Carone. Nonparametric variable importance using an augmented neural network with multi-task learning. *International Conference on Machine Learning*, 2018.

Jean Feng and Noah Simon. Gradient-based regularization parameter selection for problems with nonsmooth penalty functions. *J. Comput. Graph. Stat.*, 2018.

Pre-prints

Jean Feng, Alexej Gossmann, Gene Pennello, Nicholas Petrick, Berkman Sahiner, and Romain Pirracchio. Monitoring machine learning (ML)-based risk prediction algorithms in the presence of confounding medical interventions. 2211.09781.

Jean Feng and Noah Simon. Sparse-Input neural networks for high-dimensional nonparametric regression and classification. *arXiv*, 2019.

Abstracts

A Sabbagh, D Tilki, J Feng, J C Hong, M H Chen, J Wu, H Huland, M Graefen, T Wiegel, D Böhmer, S Washington, III, J Cowan, M R Cooperberg, F Y Feng, P Carroll, B Trock, A W Partin, A V DAmico, and O Mohamad. Machine learning for the prediction of distant metastases following postprostatectomy salvage radiation therapy. *Int. J. Radiat. Oncol. Biol. Phys.*, 2022.

A Sabbagh, S Washington Iii, D Tilki, J C Hong, J Feng, M H Chen, J Wu, H Huland, M Graefen, T Wiegel, D Böhmer, J Cowan, M R Cooperberg, F Y Feng, B Trock, A W Partin, A V DAmico, P Carroll, and O Mohamad. Machine learning for the prediction of lymph node metastasis in patients with prostate cancer. *Int. J. Radiat. Oncol. Biol. Phys.*, 2022.

I Friesner, J Feng, S Kalnicki, M K Garg, N Ohri, and J C Hong. Machine Learning-Based prediction of hospitalization using daily step counts for patients undergoing chemoradiation. *Int. J. Radiat. Oncol. Biol. Phys.*, 2022.

Denise Cecil, Jean Feng, Alex Paynter, Jessica Perry, Noah Simon, Nicholas Drovetto, Lauren Corulli, Erin Rodmaker, Susan Strenk, David Fredricks, and Mary Disis. 1308 bacteria specific IL-10 secreting t-cells derived from the gut are cross-reactive with tumor antigens and accelerate tumor growth in mouse models. *J Immunother Cancer*, 2022.

Presentations

Invited Oral Presentations and Seminars

- 2022 *Efficient nonparametric statistical inference for population variable importance*, IMS International Conference on Statistics and Data Science (ICSDS)
- 2022 *Opportunities at the intersection of Machine Learning and Epidemiology*, Society for Epidemiologic Research (SER) Digital
- 2022 *Quality assurance and improvement for Machine Learning-based clinical decision support systems*, Colorado School of Public Health
- 2022 *Statistical Methods for Monitoring and Updating AI/ML-Based Software as a Medical Device*, ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop
- 2022 *Sequential algorithmic modification with test data reuse*, Uncertainty in Artificial Intelligence
- 2022 *Approval policies for modifications to Machine Learning-Based Software as a Medical Device: A study of bio-creep*, International Biometrics Society Journal Club
- 2021 *Safe approval policies for continual learning systems in healthcare*, Brown University
- 2021 *Bayesian logistic regression for online recalibration and revision of risk prediction models with guarantees*, ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop
- 2021 *Variable Selection and Architecture Search for Neural Networks*, ASA Statistical Learning and Data Science Webinar
- 2021 *Bayesian logistic regression for online recalibration and revision of risk prediction models with guarantees*, Western North American Region (WNAR) Annual Meeting

- 2021 *Learning to safely approve updates to machine learning algorithms*, ACM Conference on Health, Inference, and Learning
- 2021 *Safe approval policies for continual learning systems in healthcare*, University of Waterloo
- 2020 *Efficient nonparametric statistical inference on population feature importance using Shapley values*, International Conference on Machine Learning
- 2020 *Training Procedures and Regulatory Policies for Safe Machine Learning Models in Healthcare*, University of California, San Francisco
- 2020 *Training Procedures and Regulatory Policies for Safe Machine Learning Models in Healthcare*, The University of Texas, MD Anderson Cancer Center
- 2020 *Training Procedures and Regulatory Policies for Safe Machine Learning Models in Healthcare*, University of California, Irvine
- 2020 *Approval policies for modifications to Machine Learning-Based Software as a Medical Device: A study of Bio-creep*, International Conference on Health Policy Statistics
- 2019 *Sparse-Input Neural Networks for High-dimensional Nonparametric Regression and Classification*, Western North American Region (WNAR) Annual Meeting
- 2018 *Nonparametric variable importance using an augmented neural network with multi-task learning*, International Conference on Machine Learning
- 2018 *Sparse-Input Neural Networks for High-dimensional Nonparametric Regression and Classification*, University of Washington Biostatistics Colloquium
- 2018 *Sparse-Input Neural Networks for High-dimensional Nonparametric Regression and Classification*, Joint Statistical Meetings
- 2017 *Sparse-Input Neural Networks for High-dimensional Nonparametric Regression*, ICML Workshop on Principled Approaches to Deep Learning
- 2011 *Haptic Belt with Pedestrian Detection*, Neural Information Processing Systems

Contributed Oral Presentations

- 2023 *Monitoring machine learning (ML)-based risk prediction algorithms: Addressing the challenge of confounding medical interventions*, 2023 Innovations in Regulatory Science Summit
- 2019 *Uncertainty-Aware Black-Box Predictors with Coverage Guarantees*, Joint Statistical Meetings

Funding History

- 2020-2023 UCSF-Stanford CERSI Program; Role: PI
 “Safe algorithmic change protocols for modifications to AI/ML-based Software as a Medical Device.”
 \$170,000 in direct costs
- 2023-2026 Patient-Centered Outcomes Research Institute; Role: PI
 “Diagnostic tools for quality improvement of machine learning-based clinical decision support systems.”
 \$750,000 in direct costs

Awards

- 2020 University of Washington Thomas R. Fleming Excellence in Biostatistics Award
- 2020 International Conference on Health Policy Statistics, Student Travel Award
For manuscript: *Approval policies for modifications to Machine Learning-Based Software as a Medical Device*
- 2018 Joint Statistical Meetings Section on Statistical Learning and Data Science, Student Paper Award
For manuscript: *Sparse-input neural networks for high-dimensional nonparametric regression and classification*
- 2018 University of Washington Biostatistics Donovan J. Thompson Award for Best Combined Performance on Ph.D. Theory and Applied Qualifying Examinations
- 2015–2017 Big Data for Genomics and Neuroscience Training Grant

Software

- EASIER-Net Python and R packages for fitting neural networks for high-dimensional data
https://github.com/jjfeng/easier_net
https://github.com/jjfeng/easier_net_R
- GapML Python package for analyzing cell-lineage tracing data from GESTALT
<https://github.com/matsengrp/gestaltamania>
- SPINN Python package for estimating sparse-input neural networks
<http://github.com/jjfeng/spinn>
- samm Python package for estimating somatic hypermutation rates of nucleotide motifs
<http://github.com/matsengrp/samm>

Teaching

- 2022 Lecturer, Epidemiology, Biostatistics and Population Science (EBPS), UCSF School of Medicine Bridges Curriculum
- 2021-Present Instructor, Biostat 216: Machine Learning in R for the Biomedical Sciences, UCSF
- 2020-Present Instructor, Machine Learning Boot Camp: Analyzing Biomedical and Health Data, Columbia University
- 2020 Instructor, Supervised statistical learning, 6th Seattle Symposium in Biostatistics

Student Advising

- Spring 2022 Margaret Tsui (Biomedical Informatics PhD program), Qualifying Exam Committee
- Summer 2022 Amanda Everitt (Biomedical Informatics PhD program), Qualifying Exam Committee

Service

Conferences and workshops

- Track Chair, Conference on Health, Inference, and Learning (CHIL) 2023

Referee Service

- NeurIPS 2021 Workshop on Distribution Shifts

- Frontiers in Digital Health
- Lancet Digital Health
- Nature Medicine
- International Conference on Machine Learning
- International Conference on Learning Representations
- Journal of Computational and Graphical Statistics
- Statistics in Biopharmaceutical Research
- Annals of Applied Statistics
- Annals of Statistics
- Statistics in Medicine
- Neural Networks
- ASA Section on Statistical Learning and Data Science Student Paper Committee

Conferences

- Joint Statistical Meetings, Session Chair
- Western North American Region (WNAR) Annual Meeting, Session Chair
- Eastern North American Region (ENAR) Annual Meeting, Roundtable leader

University Service

- UCSF Artificial Intelligence/Machine Learning Demonstration Projects Steering Committee, Winter-Spring 2022
- UCSF Initiative for Digital Transformation in Computational Biology & Health Grant Review Committee, September 2021
- Department of Epidemiology and Biostatistics, Digital Health Initiative Steering Committee, 2020–Present
- Department of Epidemiology and Biostatistics, Admissions Committee for the Master's Degree in Health Data Science, 2022–Present

Work Experience

2019 **Research Intern**, *Insitro*, South San Francisco, CA.
Developed statistical models of genomic data.

2012–2015 **Software engineer**, *Coursera*, Mountain View, CA.
Built the professional certificate program and payment system. Technical lead on projects with 3-5 people. Mentored interns and junior engineers.

Other

2022 Guest lecturer for UCSF AI4ALL Summer program