Stanford



Emily Fox

Professor of Statistics and of Computer Science

Curriculum Vitae available Online

Bio

BIO

Emily Fox is a Professor in the Departments of Statistics and Computer Science at Stanford University. Prior to Stanford, she was the Amazon Professor of Machine Learning in the Paul G. Allen School of Computer Science & Engineering and Department of Statistics at the University of Washington. From 2018-2021, Emily led the Health AI team at Apple, where she was a Distinguished Engineer. Before joining UW, Emily was an Assistant Professor at the Wharton School Department of Statistics at the University of Pennsylvania. She earned her doctorate from Electrical Engineering and Computer Science (EECS) at MIT where her thesis was recognized with EECS' Jin-Au Kong Outstanding Doctoral Thesis Prize and the Leonard J. Savage Award for Best Thesis in Applied Methodology.

Emily has been awarded a CZ Biohub Investigator Award, Presidential Early Career Award for Scientists and Engineers (PECASE), a Sloan Research Fellowship, ONR Young Investigator Award, and NSF CAREER Award. Her research interests are in modeling complex time series arising in health, particularly from health wearables and neuroimaging modalities.

ACADEMIC APPOINTMENTS

- Professor, Statistics
- Professor, Computer Science
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Member, Institute for Computational and Mathematical Engineering (ICME)
- Member, Wu Tsai Neurosciences Institute

HONORS AND AWARDS

- Investigator Award, CZ Biohub (2022)
- AWS Machine Learning Research Award, Amazon (2018)
- Presidential Early Career Award in Science & Engineering, National Science Foundation (2017)
- Sloan Research Fellowship, Alfred P. Sloan Foundation (2015)
- Young Investigator Award, Office of Naval Research (2015)
- CAREER Award, National Science Foundation (2014)
- Jin-Au Kong Outstanding Doctoral Thesis Prize, MIT EECS (2009)
- Leonard J. Savage Award for Best Thesis in Applied Methodology, International Society for Bayesian Analysis (2009)

PROFESSIONAL EDUCATION

- Ph.D., Massachusetts Institute of Technology (MIT) , Electrical Engineering and Computer Science (2009)
- E.E., Massachusetts Institute of Technology (MIT) , Electrical Engineering and Computer Science (2008)
- M.Eng., Massachusetts Institute of Technology (MIT) , Electrical Engineering and Computer Science (2005)
- S.B., Massachusetts Institute of Technology (MIT) , Electrical Science and Engineering (2004)

LINKS

- https://emilybfox.su.domains: https://emilybfox.su.domains

Teaching

COURSES

2026-27

- Generalization and Causality in Biohealth: CS 273D, STATS 354 (Spr)
- Machine Learning: CS 229, STATS 229 (Win)

2025-26

- Generalization and Causality in Biohealth: CS 273D, STATS 354 (Spr)

2023-24

- Machine Learning: CS 229, STATS 229 (Win)
- Machine Learning for Sequence Modeling: CS 229B, STATS 232 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Noah Cowan, Parker Ruth, Henry Smith, Ian Christopher Tanoh

Postdoctoral Faculty Sponsor

Renato Berlinghieri, Mars Gao

Doctoral Dissertation Advisor (AC)

You He

Master's Program Advisor

Sudhanshu Agrawal, Eban Ebssa, Anantharaman Iyer, Swetha Rajkumar, Emily Wang

Doctoral Dissertation Co-Advisor (AC)

Aymen Echarghaoui, Hyun Dong Lee, Michael Li, Elaine Sui

Undergraduate Major Advisor

Sanjay Palta-Hill

Publications

PUBLICATIONS

- **Biobank Scale Drusen Segmentation of 156k Eyes Spanning 80k Patients**
  Grosjean, P., Huang, D., Ouyang, J., Soare, T., Darnell, G., Shi, J., Eijsbouts, C., Lee, S., Czirr, E., Narayanaswamy, V., Koller, D., Fox, E., O'Dushlaine, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2026

- **Vascular waveform analysis using Bayesian pulse deconvolution.** *bioRxiv : the preprint server for biology*
  Ruth, P. S., DeBenedetti, T., O'Brien, L., Landay, J. A., Coleman, T. P., Fox, E. B.
  2026

- **CellFluxRL: Biologically-Constrained Virtual Cell Modeling via Reinforcement Learning**
  Wu, D., Su, S., Zhang, Y., Sui, E., Lundberg, E., Fox, E. B., Yeung-Levy, S.
  edited by Favaro, P., Kukelova, Z., Maki, A., Rohrbach, A., Schindler, K., Tombari, F.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 484-501

- **Physical Activity Is Associated With Improved Glycemic Outcomes in Newly Diagnosed Youth With Type 1 Diabetes: 4T Exercise Program.** *Diabetes care*
  Zaharieva, D. P., Ritter, V., Bishop, F. K., Desai, M., Addala, A., Prahalad, P., Riddell, M. C., Maahs, D. M.
  2025

- **Stochastic Gradient MCMC for Nonlinear State Space Models** *BAYESIAN ANALYSIS*
  Aicher, C., Putcha, S., Nemeth, C., Fearnhead, P., Fox, E.
  2025; 20 (1): 1385-1407

- **HDP-Flow: Generalizable Bayesian Nonparametric Model for Time Series State Discovery**
  Tonekaboni, S., Behrouzi, T., Weatherhead, A., Fox, E. B., Blei, D., Goldenberg, A.
  edited by Chiappa, S., Magliacane, S.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2025: 4227-4250

- **How to build the virtual cell with artificial intelligence: Priorities and opportunities.** *Cell*
  Bunne, C., Roohani, Y., Rosen, Y., Gupta, A., Zhang, X., Roed, M., Alexandrov, T., AlQuraishi, M., Brennan, P., Burkhardt, D. B., Califano, A., Cool, J., Dernburg, et al
  2024; 187 (25): 7045-7063

- **How to Build the Virtual Cell with Artificial Intelligence: Priorities and Opportunities.** *ArXiv*
  Bunne, C., Roohani, Y., Rosen, Y., Gupta, A., Zhang, X., Roed, M., Alexandrov, T., AlQuraishi, M., Brennan, P., Burkhardt, D. B., Califano, A., Cool, J., Dernburg, et al
  2024

- **Using a linear dynamic system to measure functional connectivity from M/EEG.** *Journal of neural engineering*
  Drew, J. A., Foti, N., Nadkarni, R., Larson, E., Fox, E., Lee, A. K.
  2024

- **Smart Start - Designing Powerful Clinical Trials Using Pilot Study Data.** *NEJM evidence*
  Ferstad, J. O., Prahalad, P., Maahs, D. M., Zaharieva, D. P., Fox, E., Desai, M., Johari, R., Scheinker, D.
  2024; 3 (2): EVIDoa2300164

- **SMART START: LEVERAGING PILOT STUDY DATA TO DESIGN MORE POWERFUL CLINICAL TRIALS OF REMOTE PATIENT MONITORING**
  Ferstad, J., Prahalad, P., Maahs, D., Zaharieva, D., Fox, E., Desai, M., Johari, R., Scheinker, D.
  MARY ANN LIEBERT, INC.2024: A133

- **Learning Explainable Treatment Policies with Clinician-Informed Representations: A Practical Approach**
  Ferstad, J. O., Fox, E. B., Scheinker, D., Johari, R.
  edited by Hegselmann, S., Zhou, H., Healey, E., Chang, T., Ellington, C., Mhasawade, Tonekaboni, S., Argaw, P., Zhang, H.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2024: 325-349

- **The evolving role of data & safety monitoring boards for real-world clinical trials.** *Journal of clinical and translational science*
  Bunning, B. J., Hedlin, H., Chen, J. H., Ciolino, J. D., Ferstad, J. O., Fox, E., Garcia, A., Go, A., Johari, R., Lee, J., Maahs, D. M., Mahaffey, K. W., Opsahl-Ong, et al
  2023; 7 (1): e179

- **A pharmacokinetic model of anti-seizure medication load to guide care in the Epilepsy Monitoring Unit.** *Epilepsia*
  Ghosn, N. J., Xie, K., Pattnaik, A. R., Gugger, J. J., Ellis, C. A., Sweeney, E., Fox, E., Bernabei, J. M., Johnson, J., Boccanfuso, J., Litt, B., Conrad, E. C.
  2023

- **Interpretable Mechanistic Representations for Meal-level Glycemic Control in the Wild**
  Wang, K., Fox, E. B.
  edited by Hegselmann, S., Parziale, A., Shanmugam, D., Tang, S., Asiedu, M. N., Chang, S., Hartvigsen, T., Singh, H.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023: 607-622

- **Sequence Modeling with Multiresolution Convolutional Memory**
  Shi, J., Wang, K., Fox, E. B.
  edited by Krause, A., Brunskill, E., Cho, K., Engelhardt, B., Sabato, S., Scarlett, J.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023

- **A Platform for the Personalized Management of Diabetes and Cardiovascular Disease at Population Scale With Data From Multiple Sensors**
  Senanayake, R., Ferstad, J. O., Thapa, I., Giammarino, F., Vasu, M., Zaharieva, D., Prahalad, P., Maahs, D. M., Rosenthal, D. N., Rodriguez, F., Bambos, N., Miller, D., Shin, et al
  LIPPINCOTT WILLIAMS & WILKINS.2022

- **Statistical Deconvolution for Inference of Infection Time Series** *EPIDEMIOLOGY*
  Miller, A. C., Hannah, L. A., Futoma, J., Foti, N. J., Fox, E. B., D'Amour, A., Sandler, M., Saurous, R. A., Lewnard, J. A.
  2022; 33 (4): 470-479

- **The Association between Patient Characteristics and the Efficacy of Remote Patient Monitoring and Messaging**
  Ferstad, J., Prahalad, P., Maahs, D. M., Fox, E., Johari, R., Scheinker, D.
  AMER DIABETES ASSOC.2022

- **Granger Causality: A Review and Recent Advances.** *Annual review of statistics and its application*
  Shojaie, A., Fox, E. B.
  2022; 9 (1): 289-319

- **Granger Causality: A Review and Recent Advances** *ANNUAL REVIEW OF STATISTICS AND ITS APPLICATION*
  Shojaie, A., Fox, E. B.
  2022; 9: 289-319

- **A Platform for the Personalized Management of Diabetes and Cardiovascular Disease at Population Scale With Data From Multiple Sensors** *AHA*
  Senanayake, R., Ferstad, J. O., Thapa, I., Giammarino, F., Vasu, M., Zaharieva, D., Prahalad, P., Maahs, D. M., Rosenthal, D. N., Rodriguez, F., Bambos, N., Miller, D., Shin, et al
  2022

- **Adding glycemic and physical activity metrics to a multimodal algorithm-enabled decision-support tool for type 1 diabetes care: Keys to implementation and opportunities.** *Frontiers in endocrinology*
  Zaharieva, D. P., Senanayake, R., Brown, C., Watkins, B., Loving, G., Prahalad, P., Ferstad, J. O., Guestrin, C., Fox, E. B., Maahs, D. M., Scheinker, D.
  2022; 13: 1096325

- **Neural Granger Causality** *IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE*
  Tank, A., Covert, I., Foti, N., Shojaie, A., Fox, E. B.
  2021; 44 (8): 4267-4279

- **Improving Reproducibility in Machine Learning Research (A Report from the NeurIPS 2019 Reproducibility Program)** *JOURNAL OF MACHINE LEARNING RESEARCH*
  Pineau, J., Vincent-Lamarre, P., Sinha, K., Lariviere, V., Beygelzimer, A., d'Alche-Buc, F., Fox, E., Larochelle, H.
  2021; 22

- **Model-based metrics: Sample-efficient estimates of predictive model subpopulation performance**
  Miller, A. C., Gatys, L. A., Futoma, J., Fox, E.
  edited by Jung, K., Yeung, S., Sendak, M., Sjoding, M., Ranganath, R.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2021: 308-335

- **The Convex Mixture Distribution: Granger Causality for Categorical Time Series.** *SIAM journal on mathematics of data science*
  Tank, A., Li, X., Fox, E. B., Shojaie, A.

2021; 3 (1): 83-112

- **The Convex Mixture Distribution: Granger Causality for Categorical Time Series** *SIAM JOURNAL ON MATHEMATICS OF DATA SCIENCE*
  Tank, A., Li, X., Fox, E. B., Shojaie, A.
  2021; 3 (1): 83-112
- **Adaptively Truncating Backpropagation Through Time to Control Gradient Bias**
  Aicher, C., Foti, N. J., Fox, E. B.
  edited by Adams, R. P., Gogate
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2020: 799-808
- **Learning Insulin-Glucose Dynamics in the Wild**
  Miller, A. C., Foti, N. J., Fox, E.
  edited by Doshi-Velez, F., Fackler, J., Jung, K., Kale, D., Ranganath, R., Wallace, B., Wiens, J.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2020: 172-196
- **sgmcmc: An R Package for Stochastic Gradient Markov Chain Monte Carlo** *JOURNAL OF STATISTICAL SOFTWARE*
  Baker, J., Fearnhead, P., Fox, E. B., Nemeth, C.
  2019; 91 (3): 1-27
- **Control variates for stochastic gradient MCMC** *STATISTICS AND COMPUTING*
  Baker, J., Fearnhead, P., Fox, E. B., Nemeth, C.
  2019; 29 (3): 599-615
- **Statistical model-based approaches for functional connectivity analysis of neuroimaging data** *CURRENT OPINION IN NEUROBIOLOGY*
  Foti, N. J., Fox, E. B.
  2019; 55: 48-54
- **DYNAMICS OF HOMELESSNESS IN URBAN AMERICA** *ANNALS OF APPLIED STATISTICS*
  Glynn, C., Fox, E. B.
  2019; 13 (1): 573-605
- **Stochastic Gradient MCMC for State Space Models** *SIAM JOURNAL ON MATHEMATICS OF DATA SCIENCE*
  Aicher, C., Ma, Y., Foti, N. J., Fox, E. B.
  2019; 1 (3): 555-587
- **Adaptively Truncating Backpropagation Through Time to Control Gradient Bias**
  Aicher, C., Foti, N. J., Fox, E. B.
  edited by Adams, R. P., Gogate
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2019: 799-808
- **Irreversible samplers from jump and continuous Markov processes** *STATISTICS AND COMPUTING*
  Ma, Y., Fox, E. B., Chen, T., Wu, L.
  2019; 29 (1): 177-202
- **A Simple Adaptive Tracker with Reminiscences**
  Xie, C., Fox, E., Harchaoui, Z., IEEE
  edited by Howard, A., Althoefer, K., Arai, F., Arrichiello, F., Caputo, B., Castellanos, J., Hauser, K., Isler, Kim, J., Liu, H., Oh, P., Santos, Scaramuzza, D., Ude, A., Voyles, R., Yamane, K., Okamura, A.
  IEEE.2019: 6596-6603
- **oi-VAE: Output Interpretable VAEs for Nonlinear Group Factor Analysis**
  Ainsworth, S. K., Foti, N. J., Lee, A. K. C., Fox, E. B.
  edited by Dy, J., Krause, A.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2018
- **Large-Scale Stochastic Sampling from the Probability Simplex**
  Baker, J., Fearnhead, P., Fox, E. B., Nemeth, C.
  edited by Bengio, S., Wallach, H., Larochelle, H., Grauman, K., CesaBianchi, N., Garnett, R.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2018

- **Sparse graphs using exchangeable random measures** *JOURNAL OF THE ROYAL STATISTICAL SOCIETY SERIES B-STATISTICAL METHODOLOGY*
  Caron, F., Fox, E. B.
  2017; 79 (5): 1295-1366
- **CLUSTERING CORRELATED, SPARSE DATA STREAMS TO ESTIMATE A LOCALIZED HOUSING PRICE INDEX** *ANNALS OF APPLIED STATISTICS*
  Ren, Y., Fox, E. B., Bruce, A.
  2017; 11 (2): 808-839
- **Stochastic Gradient MCMC Methods for Hidden Markov Models**
  Ma, Y., Foti, N. J., Fox, E. B.
  edited by Precup, D., Teh, Y. W.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2017
- **Comment: Nonparametric Bayes Modeling of Populations of Networks** *JOURNAL OF THE AMERICAN STATISTICAL ASSOCIATION*
  Foti, N. J., Fox, E. B.
  2017; 112 (520): 1539-1543
- **Temporal behavior of seizures and interictal bursts in prolonged intracranial recordings from epileptic canines** *EPILEPSIA*
  Ung, H., Davis, K. A., Wulsin, D., Wagenaar, J., Fox, E., McDonnell, J. J., Patterson, N., Vite, C. H., Worrell, G., Litt, B.
  2016; 57 (12): 1949-1957
- **SPATIO-TEMPORAL LOW COUNT PROCESSES WITH APPLICATION TO VIOLENT CRIME EVENTS**
  Aldor-Noiman, S., Brown, L. D., Fox, E. B., Stine, R. A.
  STATISTICA SINICA.2016: 1587-1610
- **A novel seizure detection algorithm informed by hidden Markov model event states** *JOURNAL OF NEURAL ENGINEERING*
  Baldassano, S., Wulsin, D., Ung, H., Blevins, T., Brown, M., Fox, E., Litt, B.
  2016; 13 (3): 036011
- **Mining continuous intracranial EEG in focal canine epilepsy: Relating interictal bursts to seizure onsets** *EPILEPSIA*
  Davis, K. A., Ung, H., Wulsin, D., Wagenaar, J., Fox, E., Patterson, N., Vite, C., Worrell, G., Litt, B.
  2016; 57 (1): 89-98
- **Bayesian Nonparametric Covariance Regression** *JOURNAL OF MACHINE LEARNING RESEARCH*
  Fox, E. B., Dunson, D. B.
  2015; 16: 2501-2542
- **Guest Editors' Introduction to the Special Issue on Bayesian Nonparametrics** *IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE*
  Adams, R. P., Fox, E. B., Sudderth, E. B., Teh, Y.
  2015; 37 (2): 209-211
- **A Complete Recipe for Stochastic Gradient MCMC**
  Ma, Y., Chen, T., Fox, E. B.
  edited by Cortes, C., Lawrence, N. D., Lee, D. D., Sugiyama, M., Garnett, R.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2015
- **Streaming Variational Inference for Bayesian Nonparametric Mixture Models**
  Tank, A., Foti, N. J., Fox, E. B.
  edited by Lebanon, G., Vishwanathan, S. V.
  MICROTOME PUBLISHING.2015: 968-976
- **Bayesian Structure Learning for Stationary Time Series**
  Tank, A., Foti, N. J., Fox, E. B.
  edited by Meila, M., Heskes, T.
  AUAI PRESS.2015: 872-881
- **Modeling the complex dynamics and changing correlations of epileptic events** *ARTIFICIAL INTELLIGENCE*

Wulsin, D. F., Fox, E. B., Litt, B.
2014; 216: 55-75

- **A BAYESIAN APPROACH FOR PREDICTING THE POPULARITY OF TWEETS** *ANNALS OF APPLIED STATISTICS*
  Zaman, T., Fox, E. B., Bradlow, E. T.
  2014; 8 (3): 1583-1611
- **JOINT MODELING OF MULTIPLE TIME SERIES VIA THE BETA PROCESS WITH APPLICATION TO MOTION CAPTURE SEGMENTATION** *ANNALS OF APPLIED STATISTICS*
  Fox, E. B., Hughes, M. C., Sudderth, E. B., Jordan, M. I.
  2014; 8 (3): 1281-1313
- **Expectation-Maximization for Learning Determinantal Point Processes**
  Gillenwater, J., Kulesza, A., Fox, E., Taskar, B.
  edited by Ghahramani, Z., Welling, M., Cortes, C., Lawrence, N. D., Weinberger, K. Q.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2014
- **Stochastic Variational Inference for Hidden Markov Models**
  Foti, N. J., Xu, J., Laird, D., Fox, E. B.
  edited by Ghahramani, Z., Welling, M., Cortes, C., Lawrence, N. D., Weinberger, K. Q.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2014
- **Learning the Parameters of Determinantal Point Process Kernels**
  Affandi, R., Fox, E. B., Adams, R. P., Taskar, B.
  edited by Xing, E. P., Jebara, T.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2014: 1224-1232
- **Stochastic Gradient Hamiltonian Monte Carlo**
  Chen, T., Fox, E. B., Guestrin, C.
  edited by Xing, E. P., Jebara, T.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2014: 1683-1691
- **Representing Documents Through Their Readers**
  El-Arini, K., Xu, M., Fox, E. B., Guestrin, C., ACM
  ASSOC COMPUTING MACHINERY.2013: 14-22
- **A STICKY HDP-HMM WITH APPLICATION TO SPEAKER DIARIZATION** *ANNALS OF APPLIED STATISTICS*
  Fox, E. B., Sudderth, E. B., Jordan, M. I., Willsky, A. S.
  2011; 5 (2A): 1020-1056
- **Bayesian Nonparametric Inference of Switching Dynamic Linear Models** *IEEE TRANSACTIONS ON SIGNAL PROCESSING*
  Fox, E., Sudderth, E. B., Jordan, M. I., Willsky, A. S.
  2011; 59 (4): 1569-1585
- **Bayesian Nonparametric Methods for Learning Markov Switching Processes** *IEEE SIGNAL PROCESSING MAGAZINE*
  Fox, E. B., Sudderth, E. B., Jordan, M. I., Willsky, A. S.
  2010; 27 (6): 43-54