Cody Carroll

Curriculum Vitae

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Education

2021 **PhD in Statistics**, *University of California, Davis*
Dissertation Title: Intercomponent Time Dynamics for Multivariate Functional Data

2017 **MS in Statistics**, *University of California, Davis*

2014 **BS in Mathematics**, *University of Texas at Austin*

Academic Appointments

2022 - present **Assistant Professor**, *Department of Mathematics and Statistics / Master's in Data Science Program, University of San Francisco*

2022 **Lecturer**, *Department of Statistics, University of California, Davis*

Professional Experience

2021 - 2022 **Data Scientist**, *Wells Fargo*, Charlotte, NC.

Research Interests

Functional and longitudinal data analysis– time dynamics of multivariate functional data; constrained functional data analysis; analysis of random objects; longitudinal studies; growth and development

Citizen science and California wildlife– bird migration; bear encounters; conservation technology

Deep learning and computer vision– mitochondria segmentation; glaucoma diagnosis prediction; multimodal modeling

Teaching

University of San Francisco

Fall '23 Linear Regression
Intro to Data Science with R
Spring '23 Linear Algebra for Data Science
Advanced Machine Learning
Fall '22 Machine Learning Laboratory
Communications for Analytics

University of California, Davis

Spring '22 Applied Statistics for Business and Economics
Summer '19 Brief Course in Mathematical Statistics II
Spring '19 Applied Statistics for Biological Sciences
Summer '18 Applied Statistics for Business and Economics

Mentorship

2022-2023 Data Science Practicum, *Data Institute, USF*
Advising Master's Practicums and Research

- Devendra Govil and Vichitra Kumar, *Dept. of Ophthalmology, Stanford University, with Sophia Ying Wang*
- Xinyi Jessica Wang and Wan-Chun Elena Liao, *The Nature Conservancy, with Kirk Klausmeyer*
- Mohana Medisetty and Yu-Hsin Wang, *Salk Institute for Biological Studies, with Uri Manor*
- Xin Ai and Sharon Dodda, *CA Dept. of Wildlife and Fisheries, with Alex Heeren and Brett Furnas*

2017-2020 NSF Research Training Group, *Dept. of Statistics, UC Davis*
Advising Undergraduate Research

- *Warping methods for wearable device data*, with Hainiu Xu
- *Functional regression for wearable device data*, with Phoebe Biying Li
- *Functional clustering for wearable device data*, with Weiyi Chen
- *Geographic trends for functional housing price data*, with Yunbai Zhang
- *Functional data analysis of global temperature extrema*, with Cynthia Lai

2020 Mentor for Undergraduate Honors Thesis
Warping methods for wearable device data, by Hainiu Xu

International Experience

2014-2015 ESL Teacher, *Nishinomiya Imazu Senior High School*, Nishinomiya, Japan

Publications, Preprints, and other Creative Works

Theory and Methodology

2023 *Latent Deformation Models for Multivariate Functional Data and Time Warping Separability*
C. Carroll and H.-G. Müller. *Biometrics* 2023.

2022 *Learning Delay Dynamics for Multivariate Stochastic Processes, With Application to Predicting COVID-19 Case Trajectories in the United States*
P. Dubey, Y. Chen, A. Gajardo, S. Bhattacharjee, **C. Carroll**, H. Chen, Y. Zhou, H.-G. Müller. *Journal of Mathematical Analysis and Applications*, 2022.

2020 *Cross-component Registration for Multivariate Functional Data, with Application to Growth Curves*
C. Carroll, H.-G. Müller, A. Kneip, *Biometrics* 2020.

Interdisciplinary Applications

2022 *Comparison of Diagnostic Predictors of Neonatal Survivability in Non-Domestic Caprinae*
T. N. Bliss, M. J. Marinkovich, R. E. Burns, **C. Carroll**, M. M. Clancy, L. L. Howard. *Journal of Zoo and Wildlife Medicine*, 2022.

2021 *A Practical Method to Quantify Knowledge-Based Dose Volume Histogram Prediction Accuracy and Uncertainty with Reference Cohorts*
B. Covele, **C. Carroll**, K. Moore, *Journal of Applied Clinical Medical Physics*, 2022.

2020 *Time Dynamics of COVID-19*
C. Carroll, S. Bhattacharjee, Y. Chen, P. Dubey, J. Fan, A. Gajardo, X. Zhou, H.-G. Müller, J.-L. Wang, *Scientific Reports* 2020.

2020 *Mountaineers on Mount Everest: effects of age, sex, experience, and crowding on rates of success and death*
R. B. Huey*, **C. Carroll***, R. Salisbury, J.-L. Wang, *PLoS One* 2020.

* *indicates co-first authorship*

Podcasts and Media

2022 - present *Data Science Beginnings,* with Robert Clements.
- Season 1 (6 episodes)
- Season 2 (ongoing)

Software

Contributor/ Former Maintainer *fdapace: Functional Data Analysis and Empirical Dynamics. R package.*
C. Carroll, A. Gajardo, Y. Chen, X. Dai, J. Fan, P. Z. Hadjipantelis, K. Han, et al.
`https://CRAN.R-project.org/package=fdapace`.

Ongoing Projects and Whitepapers

2023+ *Seasonality Patterns of Northern Californian Birds through Citizen Science and Functional Data Analysis*
C. Carroll and D. Govil.

2023+ *An Automated Workflow for Satellite-based Monitoring of Field Flooding*
X. Wang, W.-C. Liao, **C. Carroll**.

2023+ *Multimodal Deep Learning Models for Glaucoma Progression*
D. Govil, V. Kumar, S. Y. Wang, **C. Carroll**.

Presentations

Invited Talks

2023 Math Colloquium, *USF*
Time Warping and Functional Data

2022 Department of Mathematics and Computer Science, *Cal Poly Humboldt*
Mixed-Effect Warping Models for Multivariate Human Growth Curves

2022 Department of Mathematics and Computer Science, *Cal Poly Humboldt*
Case Study in Data Science Pedagogy: k-Nearest Neighbors Regression

2022 Halıcıoğlu Data Science Institute, *UC San Diego*
Latent Transport Models for Multivariate Functional Data

2022 Halıcıoğlu Data Science Institute, *UC San Diego*
Case Study in Data Science Pedagogy: k-Nearest Neighbors Regression

2022 Department of Mathematics and Statistics, *San Diego State University*
Intercomponent Time Dynamics for Multivariate Functional Data

2022 Department of Mathematics and Statistics, *USF*
Nonparametric Regression on Mt. Everest

2022 Data Institute, *USF*
Intercomponent Time Dynamics for Multivariate Functional Data

2022 Department of Probability and Applied Statistics, *UC Santa Barbara*
Teaching Statistics Here and Now

2022 Department of Statistics, *UC Berkeley*
Case Study in Data Science Pedagogy: Linear Association and Correlation

2021 Department of Applied Statistics, *Lawrence Livermore National Lab*
Latent Transport Models for Multivariate Functional Data

2020 ECHO Lab, *Bill and Melinda Gates Foundation*
Longitudinal Data Analysis with fdapace

2020 Department of Statistics, *UC Davis*
Shift-Warping for Multivariate Functional Data

2019 NSF RTG Statistics Workshop Series, *UC Davis*
Deception and Coin Flips: Statistical Intuition through Lies and Games

2018 NSF RTG Symposium: Modern Tools for Statistics, *UC Davis*
A Practical Introduction to Functional Data Analysis

2018 Department of Statistics, *UC Davis*
Time Warping for Human Growth Curves

Posters

2023 *An Automated Workflow for Satellite-based Monitoring of Field Flooding, Creative Activity and Research Day 2023, USF*.

2020 *Benchmarking Dose-Volume Histogram Prediction Accuracy Between Different Knowledge-Based Models*, Vancouver, BC, Canada, *Joint AAPM/COMP Meeting*

Professional Service

University and Departmental

- Hiring committee member for the Assistant Director of the Data Institute search
- Major/Minor Fair representative for Math dept.
- AWM Integration Bee judge
- Machine learning consultant for the open-source KNIME platform
- Interviewed new MSDS faculty.
- Interviewed prospective MSDS students (50+ candidates).
- Organized and hosted weekly Job Hunt Seminar for MSDS advisees.

Editorial Review

- Annals of Statistics
- Journal of the American Statistical Association
- Biometrika
- Computational Statistics and Data Analysis
- Multivariate Behavioral Research
- Computer Methods and Programs in Biomedicine
- Statistics in Medicine

Awards and Fellowships

2023 Travel Award for Joint Statistical Meetings
Faculty Development Fund, USF

2022 Functional Data for Citizen Science
Faculty Development Fund, USF

2021 Peter Hall Graduate Research Award
Dept. of Statistics, UC Davis

2021 Alan Fenech Service Award
Dept. of Statistics, UC Davis

2020 Outstanding Graduate Teaching Award
Dept. of Statistics, UC Davis

2020 Excellence in Teaching Award
Dept. of Statistics, UC Davis

2015-2020 NSF Research Training Grant Recipient
UC Davis

2016-2019 Summer Statistics Research Fellowship Award
Dept. of Statistics, UC Davis

2015-2018 UC Davis Graduate Scholars Fellowship
Grad. Studies, UC Davis

Languages

R, Python, git, SQL, Julia, Travis-CI, LaTeX