

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

Imaging, computer vision, and deep learning— 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 Fisheries and Wildlife, 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/ *fdapace: Functional Data Analysis and Empirical Dynamics. R package.*
 Former **C. Carroll**, A. Gajardo, Y. Chen, X. Dai, J. Fan, P. Z. Hadjipantelis, K. Han, et al.
 Maintainer <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 Joint Statistical Meetings
Latent Deformation Models for Multivariate Functional Data and Time-Warping Separability
 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 Halicioğlu Data Science Institute, *UC San Diego*
Latent Transport Models for Multivariate Functional Data
 2022 Halicioğlu 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, SQL, Julia, git, \LaTeX