Cody Carroll

Curriculum Vitae

✉ cjcarroll@usfca.edu
codycarroll.github.io

Education

2021	**PhD in Statistics**, *University of California, Davis*.
	Dissertation Title: Intercomponent Time Dynamics for Multivariate Functional Data
	Advisor: Hans-Georg Müller
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 (joint appointment). University of San Francisco*.
2022	**Lecturer**, *Department of Statistics, University of California, Davis*.

Professional Experience

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

- Automate processes in Python for documenting credit decisioning ML models
- Present automation workflow and model development documents to fellow quants and management in the Risk Modeling Group

Research Interests

Functional and longitudinal data analysis– time dynamics of multivariate functional data; constrained functional data analysis; imputation; analysis of random objects

Applications– longitudinal studies; growth and development; aging and longevity

Teaching

Instructor of Record

Fall 2023	**Linear Regression**.
	University of San Francisco, Department of Mathematics and Statistics
Fall 2023	**Elementary Linear Algebra**.
	University of San Francisco, Department of Mathematics and Statistics
Spring 2023	**Linear Algebra for Data Science**.
	University of San Francisco, Master's in Data Science Program
Spring 2023	**Advanced Machine Learning**.
	University of San Francisco, Master's in Data Science Program
Fall 2022	**Machine Learning Laboratory**.
	University of San Francisco, Master's in Data Science Program
Fall 2022	**Communications for Analytics**.
	University of San Francisco, Master's in Data Science Program

Spring 2022	**Applied Statistics for Business and Economics**.
	UC Davis, Dept. of Statistics/Dept. of Economics
Summer 2019	**Brief Course in Mathematical Statistics II**.
	UC Davis, Dept. of Statistics
Spring 2019	**Applied Statistics for Biological Sciences**.
	UC Davis, Dept. of Statistics
Summer 2018	**Applied Statistics for Business and Economics**.
	UC Davis, Dept. of Statistics/Dept. of Economics

Teaching Assistant

- *Applied Statistics for Biological Sciences* (Su17) UCD, Statistics
- *Applied Statistics for Business and Economics* (F19) UCD, Statistics/Economics
- *Applied Statistical Methods Regression Analysis* (F17) UCD, Statistics
- *Introduction to Probability Theory* (S18) UCD, Statistics
- *Mathematical Statistics* (W21) UCD, Statistics
- *Survival Analysis* (F18) UCD, Statistics/Biostatistics, *Grad. Level*
- *Statistical Consulting* (W18, W19, W20) UCD, Statistics/Biostatistics, *Grad. Level*

International Teaching

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

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`.

Publications and Preprints

* *indicates co-first authorship*

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, and 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, and 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, and 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.
  ○ received media coverage from *The Economist*, *Reuters*, & *The London Times*

Ongoing Projects

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

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

Mentoring Experience

2022-2023 **Practicum Mentor**, *Data Institute, USF*.
Advising Master's Practicums and Research
  ○ Devendra Govil and Vichitra Kumar, **Dept. of Ophthalmology, Stanford University**, with Dr. 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**, with Dr. Uri Manor
  ○ Xin Ai and Sharon Dodda, **CA Dept. of Wildlife and Fisheries**, with Dr. Alex Heeren

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

Presentations

Invited Talks

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**, *University of San Francisco*.
Nonparametric Regression on Mt. Everest

2022 **Data Institute**, *University of San Francisco*.
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, USF*.

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

Awards and Fellowships

2021 **Peter Hall Graduate Research Award**.
Awarded once yearly to a graduating PhD student for excellence in statistical research during degree, *Dept. of Statistics, UC Davis*

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

2020 **Outstanding Graduate Teaching Award**.
Awarded to 10 graduate students university-wide, *Grad. Studies, UC Davis*

2020 **Excellence in Teaching Award**.
Awarded to one student instructor in the department on special occasion, *Dept. of Statistics, UC Davis*

2015-2020 **NSF Research Training Grant Recipient**.

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

2017-2019 **TA Recognition Award**.
Dept. of Statistics, UC Davis

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

Technical skills

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

Professional Service

Editorial Review
- Annals of Statistics
- Journal of the American Statistical Association
- Biometrika
- Computational Statistics and Data Analysis
- Computer Methods and Programs in Biomedicine

UC Davis
- Graduate Student Representative, Dept. of Statistics
- Coordinator, Guerilla Queer Bar, Davis