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