

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
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.

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*, 2021.
- 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 *An Automated Workflow for Satellite-based Monitoring of Field Flooding*
 X. Wang, W.-C. Liao, **C. Carroll**, 2023.

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>.

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 **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, University of San Francisco.**
 Nonparametric Regression on Mt. Everest
- 2022 **Data Science 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*

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

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