Cody Carroll

Curriculum Vitae

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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*

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*

Professional Experience

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

Research Interests

Functional and longitudinal data analysis– longitudinal studies; growth and development

Conservation, citizen science, and wildlife– bird migration; data validity; conservation technology; remote sensing

Statistical modeling of healthcare data– progression of glaucoma-caused vision loss; computational tools and models for auditory research

Teaching

University of San Francisco

Term	Courses	
Spring '26	Advanced Machine Learning	Linear Algebra for Data Science
Fall '25	Linear Regression Analysis	
Spring '25	Advanced Machine Learning	Linear Algebra for Data Science
Fall '24	Linear Regression Analysis	
Spring '24	Statistics with Applications	Intro to Data Science with R
	Linear Algebra for Data Science	
Fall '23	Linear Regression	Intro to Data Science with R
Spring '23	Advanced Machine Learning	Linear Algebra for Data Science
Fall '22	Machine Learning Laboratory	Communications for Analytics

University of California, Davis

Term	Course
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

International Experience

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

Publications and other Creative Works

2026 *An Open-Source Deep Learning-Based Toolbox for Auditory Brainstem Response Analysis (ABRA)*
A. Erra[†], C. Miller, J. Chen[†], E. Chrysostomou, S. Barret, Y. M. Kassim, R. A. Friedman, A. Lauer, F. Ceriani, W. Marcotti, **C. Carroll**, U. Manor, *Scientific Reports*, in press.

2026 *The Token Tax: Systematic Bias in Multilingual Tokenization*
J.M. Lundin, A. Zhang[†], N. Karim[†], H. Louzan[†], V. Wei[†], D. Adelani, **C. Carroll**, *European Chapter of Association for Computational Linguistics, AfricaNLP 2026 Workshop*, in press.

2025 *Predicting Progressive Vision Loss in Glaucoma Patients Using Functional Principal Component Analysis and Electronic Health Records*
R. Donnipadu[†], Maxim Sivolella[†], **C. Carroll**, S. Y. Wang. Frontiers in Opthalmology.

2025 *Comparative Embryology and Transcriptomics of Asellus infernus, an Isopod Crustacean From Sulfidic Groundwater*
H. Lomheim, L. Reyes Rodas, D. Price, S. M. Sarbu, R. I. Băncilă, **C. Carroll**, L. Freeborn, S. Sanders, M. E. Protas. *Evolution and Development*.

2025 *Consistency and Validity of Participatory Science Data: A Comparison of Seasonality Patterns of Northern California & Nevada Birds across eBird and iNaturalist*
C. Carroll, R. E. Furrow, L. M. Gerhart, *Citizen Science: Theory and Practice*.

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

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 *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*.

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*.

2021 *Cross-component Registration for Multivariate Functional Data with Application to Growth Curves*
C. Carroll, H.-G. Müller, A. Kneip, *Biometrics*.

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 *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.*

Under Review

2025+ *Improving Conservation Efficiency with Large Language Models*
R. Bernstein[†], S. Waterman[†], N. Murphy, K. Klausmeyer, **C. Carroll**, *Journal of Environmental Management.*

Whitepapers & Preprints

2023 *An Automated Workflow for Satellite-based Monitoring of Field Flooding*
X. Wang[†], W.-C. Liao[†], K. Klausmeyer, N. Rindlaub, **C. Carroll**. The Nature Conservancy.

2025 *No Translation Needed: Forecasting Quality from Fertility and Metadata*
J.M. Lundin, A. Zhang[†], D. Adelani, **C. Carroll**

Podcasts and Media

2022 - present *The USF Data Science Podcast,* co-host with Robert Clements.
`https://open.spotify.com/show/5SY1TPw3FubdSxCqrxUKZv?si=71427ced6f9a434f`.

Software

Maintainer *NorCal Bird Dash.*
C. Carroll, A. Zhang, S. Waterman.
`https://birds-dash-547zxcr6ea-uc.a.run.app`.

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`.

Contributor *Automatic Auditory Brainstem Response Analyzer (ABRA).*
A. Erra[†], J. Chen[†], E. Chrysostomou, S. Barret, C. Miller, Y. M. Kassim, **C. Carroll**, U. Manor
Website: `https://abra.ucsd.com/`.
Github: `https://github.com/ucsdmanorlab/abranalysis`.

* indicates co-first authorship
[†]indicates a student under mentorship

Student Mentorship and Advising

2024-2025 Data Science Practicum, *Data Institute, USF*
Advising Master's Practicums and Research

- Amit Chaubey and Emma Casal, *Dept. of Ophthalmology, Stanford University, with Sophia Ying Wang*
- Kd Bartholomew and Aman Singh, *The Nature Conservancy, with Kirk Klausmeyer*
- Leah Ashebir and Peeyush Patel, *Manor Lab at UC San Diego, with Uri Manor*
- Ada Zhang, Hamza Louzan, Victor Wei, and Nihal Karim, *Gates Foundation with Jessica Lundin*
- Helen Lin and Kavin Indirajith, *California Office of Environmental Health Hazard Assessment, with Scott Coffin*
- Andrea Quiroz and Jose Fuentes, *UCSF Clinical Informatics, with Hui Lin*

2023-2024 Data Science Practicum, *Data Institute, USF*
Advising Master's Practicums and Research

- Rithvik Donnipadu and Maxim Sivolella, *Dept. of Ophthalmology, Stanford University, with Sophia Ying Wang*

- Seneth Waterman and Ryan Bernstein, *The Nature Conservancy,*
  with Kirk Klausmeyer
- Abhijeeth Erra and Jeffrey Chen, *Manor Lab at UC San Diego, with Uri Manor*

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

Presentations

Invited Talks and Panels

2025 Quantitative Seminar, *UC Davis, Dept. of Psychology*
When and How Functional Data Analysis Can Help in Quantitative Psychology

2025 Math Colloquium, *USF*
To Merge or Not to Merge? A Comparison of Seasonality Patterns of Northern California and Nevada Birds across eBird and iNaturalist

2025 Department of Mathematics and Statistics, *Sonoma State University*
To Merge or Not to Merge? A Comparison of Seasonality Patterns of Northern California and Nevada Birds across eBird and iNaturalist

2025 STEM Teaching Symposium, *USF*
Data Science Here and Now

2025 Fully Connected Conference, *Weights and Biases, San Francisco, CA*

2024 USF STEM Teaching Symposium, *San Francisco, CA*
Data Science Here and Now

2024 Data + AI Summit, *San Francisco, CA*
Databricks' University Alliance Faculty Advice Panel

2023 Joint Statistical Meetings, *Toronto, ON, CA*
Latent Transport Models for Multivariate Functional Data

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

2025 *To merge or not to merge? A circular optimal transport-based framework for comparing and fusing seasonality pattern data across participatory science platforms, with application to eBird and iNaturalist*
International Society for Ecological Modeling Global Conference, Tokyo, JP

2025 *Long-Term Spatial Prediction of Glaucomatous Visual Field Loss*
Creative Activity and Research Day, USF, 2025.

2025 *Low Resource Languages Pay Twice Quantifying the High- vs. Low-Resource Language Gap: Predicting Large Language Model Accuracy through Tokenization Fertility and Parity*
Creative Activity and Research Day, USF, 2025.

2025 *FlowZero: Leveraging Satellite Imagery for Proactive Water Management*
Creative Activity and Research Day, USF, 2025.

2024 *Predicting Progressive Vision Loss in Glaucoma Patients Using Functional Principal Component Analysis and Electronic Health Records*
American Medical Informatics Association Symposium, 2024.

2024 *Automated Analysis for Auditory Brainstem Responses (ABRs) in Mice*
Creative Activity and Research Day, USF, 2024.

2024	*Chat GDE: Can Large Language Models Evaluate Sustainability Plans for Groundwater Dependent Ecosystems?*

2024   *Chat GDE: Can Large Language Models Evaluate Sustainability Plans for Groundwater Dependent Ecosystems?*
Creative Activity and Research Day, USF, 2024.

2024   *Predicting Progressive Vision Loss in Glaucoma Patients Using Functional Principal Component Analysis and Electronic Health Records*
Creative Activity and Research Day, USF, 2024.

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

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

▬▬▬▬ Professional Service

University and Departmental

<u>2025-2026</u>
- Co-Lead, Data Instutite + Center for Research, Artistic and Scholarly Excellence Support
- Student Research and Creative Activity Advisory Council, College of Arts and Sciences, USF
- Math/MSDSAI liaison for SEM events
- BSDS/MSDS and Math/MSDS 3+1 program development and proposal
- Reviewed and interviewed prospective MSDS students
- Mock interview MSDS students for job hunting

<u>2024-2025</u>
- Co-Lead, Data Instutite + Center for Research, Artistic and Scholarly Excellence Support
- Wrote and led BSDS Minor proposal to successful adoption
- Math/MSDSAI liaison for SEM events
- Co-Lead Peer2Peer Presentation - Gradescope: An Assessment Tool to Help Streamline and Automate the Grading Process
- Presenter at USF CAS' STEM Teaching Symposium
- Reviewed and interviewed prospective MSDS students
- Mock interview MSDS students for job hunting
- Invited and hosted speakers for Math Colloquium Series

<u>2023-2024</u>
- Co-Lead, Data Instutite + Center for Research, Artistic and Scholarly Excellence Support
- New faculty orientation panel
- Math/MSDS representative at the Meet USF recruitment event
- Math/MSDS representative for USF visit to NASA Ames Facility
- Major/Minor Fair representative for Math dept
- Transfer Student Meet and Greet representative for Math dept
- Reviewed and interviewed prospective MSDS students

<u>2022-2023</u>
- Major/Minor Fair representative for Math dept
- Association for Women in Mathematics Integration Bee judge
- Machine learning consultant for KNIME platform
- MSDS faculty search interview panel
- Reviewed and interviewed prospective MSDS students
- Organized and hosted weekly Job Hunt Seminar for MSDS advisees

Editorial Review

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

Awards and Fellowships

2025 Centennial Innovation Fund Award, *Preparing our Next Generation of Data Science Students*
with James Wilson, Daniel Jerison, Stephen Devlin, *USF*

2025 Early Career Researcher Award, *Best Poster*
International Society for Ecological Modeling Global Conference

2025 Functional Data for Citizen Science: Analysis of Northern CA Bird Seasonality Patterns
Faculty Development Fund Award, USF

2025 Google Cloud Platform for Hosting NorCal Birds Dash
Faculty Development Fund Award, USF

2024 CARD Outstanding Poster Award
with Ryan Bernstein and Seneth Waterman, *USF*

2024 Travel Award for Mid-Winter Meeting of the Association for Research in Otolaryngology
Faculty Development Fund, USF

2023 Large Language Models for Conservation of California Wildlife
Faculty Development Fund Award, USF

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

2022 Functional Data for Citizen Science
Faculty Development Fund Award, 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
Graduate Studies, UC Davis

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

2015-2020 NSF Research Training Grant Recipient
UC Davis

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

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

2015 *Kizuna* Ambassador Award
Japanese Ministry of Internal Affairs and Communications

Languages

Programming	R, Python, SQL, LaTeX
Spoken	English (native), Japanese (proficient), Spanish (conversational), French (basic)