

EDUCATION

Ph.D. in Statistics University College Dublin	Dublin, IRL 2020–2024
– Thesis: “Functional Data Analysis: Smooth Covariance Estimation and Principal Components Analysis”	
– Supervisor: Dr. Michelle Carey	
– External Examiner: Prof. David Ruppert, Cornell University, USA	
MSc. in Data and Computational Science (<i>First Class</i>) University College Dublin	Dublin, IRL 2019–2020
– Thesis: “Dynamic Analysis of Milk Yield Time Series: A Complex Network Approach”	
H.Dip. in Computing (<i>First Class</i>) Griffith College Dublin	Dublin, IRL 2018–2019
B.Tech. in Statistics (<i>Second Class Upper Division</i>) Federal University of Technology, Owerri	Owerri, NGA 2008–2014

RESEARCH EXPERIENCE AND EMPLOYMENT

University College Dublin Postdoctoral Researcher	Dublin, IRL Aug 2024 – Present
– Conducting research in longitudinal and sparse functional data analysis	
– Conducting research in spatial and spatio-temporal functional data analysis	
– Supervised research assistant and joint supervision of two MSc dissertations	
Occasional Lecturer	Sep 2022 – Dec 2025
– Delivered lectures across three statistics modules to third-year, fourth-year, and postgraduate students.	
Simon Fraser University Visiting Researcher	Burnaby, CAN Aug 2023 – Nov 2023
– Collaborative research on functional principal component analysis for longitudinal and sparse functional data with Prof. Jiguo Cao (Canada Research Chair in Data Science)	
Université de Lille Visiting Researcher	Lille, FRA Apr 2023
– Collaborative research on functional spatio-temporal analysis to understand the effect of air pollutants on respiratory health with Prof. Sophie Dabo (Full Professor of Applied Mathematics)	
eHealth4everyone Data Analysis Lead	Abuja, NGA Oct 2015 – Jan 2018
– Led analysis of health management information systems data for evidence-based decision making	
– Developed interactive data visualisation dashboards using R-Shiny and QGIS	
– Administered and optimised DHIS2 database system for improved data management	
Marie Stopes Nigeria Data Systems Consultant	Abuja, NGA Mar 2015 – Oct 2017
– Developed and implemented mobile data collection systems	
– Led data quality assessment initiatives and provided technical training to 50+ staff	
– Managed successful digitisation of legacy healthcare data	

TEACHING AND MENTORING

University Teaching Experience

University College Dublin
Co-Lecturer

Dublin, IRL

- Statistical Modelling for Actuarial Science | MSc Actuarial Science | Autumn 2025
 - * Designed and delivered the Time Series Analysis segment of this graduate module, including developing the syllabus and comprehensive lecture notes in line with accreditation by the Institute & Faculty of Actuaries (UK) (Contents available [here](#))
 - * Created and administered assessments (mid-term and final exam) for the segment
- Principles of Probability & Statistics | MSc Data and Computational Statistics | Autumn 2025
 - * Delivered lectures for the module as a Co-instructor

Occasional Lecturer

- Nonparametric Statistics | Fourth-year undergraduates | Spring 2023, 2024, 2025
- Advanced Predictive Analytics | Third-year undergraduates | Autumn 2022

MSc Thesis Supervision

- Interactive App on Climate and Health Indicators Related to Air Pollution and Respiratory Health in France | Spring/Summer 2025
- Investigating the Relationship Between Air Quality and Lung Cancer in Ireland: A Spatial Functional Data Analysis Approach | Spring/Summer 2025

Research Assistant Supervision

- Oversaw the translation of the FDA@UCD research team's software code from MATLAB to R, including optimisation, reproducibility, and documentation | 2025

Teaching Assistant and Demonstrator

- Modern Regression | Spring 2024
- Survival Models | Autumn 2022
- Advanced Predictive Analytics | Spring 2021, 2022, 2023
- Predictive Analytics I | Autumn 2021, Spring 2023

Professional Training

eHealth4Everyone and Marie Stopes
Healthcare Data Training Programs

Abuja, NGA
2015 – 2018

- Developed and implemented comprehensive data collection and management training programs for healthcare professionals at eHealth4Everyone and Marie Stopes
- Created user-friendly mobile data collection protocols using CSPro, emphasising data integrity and quality control
- Trained 50+ healthcare professionals, including nurses, doctors, and NGO staff in data collection and management using CSPro, Excel, and DHIS2

PUBLICATIONS

Published/Accepted

- U. Mbaka, J. Cao, and M. Carey** 2026
Estimation of Functional Principal Components from Sparse Functional Data
Journal of Computational and Graphical Statistics, Q1 (Conditionally accepted in May 2026) | <https://arxiv.org/abs/2603.18833>
- U. Mbaka and M. Carey** 2026
Estimation of Multivariate Functional Principal Components from Sparse Functional Data
Journal of Nonparametric Statistics, Q3 (Accepted in Sep 2025) | <https://arxiv.org/abs/2603.19799>

- U. Mbaka, J. Ramsay, and M. Carey 2025
Estimating a Smooth Covariance for Functional Data
Computational Statistics & Data Analysis, Q1 | <https://doi.org/10.1016/j.csda.2025.108255>
- M. Frizzarin, A. Bevilacqua, B. Dhariyal, K. Domijan, F. Ferraccioli, E. Hayes, G. Ifrim, A. Konkolewska, T. Le Nguyen, U. Mbaka, G. Ranzato, A. Singh, M. Stefanucci, and A. Casa 2021
Mid infrared spectroscopy and milk quality traits: A data analysis competition at the International Workshop on Spectroscopy and Chemometrics 2021
Chemometrics and Intelligent Laboratory Systems, Q2 | <https://doi.org/10.1016/j.chemolab.2021.104442>

In preparation

- U. Mbaka and M. Carey 2026
Trajectory Reconstruction from Sparse Longitudinal Data using a Manifold Conjugate Gradient Method
 Target: **Computational Statistics & Data Analysis, Q1** (Completed draft under final revision)
- U. Mbaka and M. Carey
Efficient Constrained Optimisation for Sparse Functional Data Analysis via QR Reparametrization
- M. Carey, J. Ramsay, and U. Mbaka
Physics-Informed Spatial Penalized Regression Models
- U. Mbaka, M. Carey, C. Feverent, T. Cardoso, C. Higgins, B. Bergu, M. Genin, and S. Dabo
A two-stage spatio-temporal model for linking pollutant exposures with health outcomes

GRANTS

Awarded

- **£38,000:** International Centre for Mathematical Sciences (ICMS), Mathematics for Humanity 2025
 – **Co-PI:** *From Data to Impact: Advancing Climate Resilience in Africa through Statistics and Mathematical Modelling*
- **€5,000:** Vistamilk Science Foundation Ireland Research Center 2023
 – *Visiting research grant, Simon Fraser University, Vancouver, Canada*
- **€2,488:** Irish Research Council 2021 Ulysses Award 2022
 – *Ireland and France Need Healthier Air for Healthier Lungs: A functional spatio-temporal analysis to estimate the effect of air pollutants on respiratory health*
- **€104,000:** Vistamilk Science Foundation Ireland Research Center 2020
 – *PhD Scholarship (EU Fees and Stipends)*
- **€27,000:** UCD School of Mathematics and Statistics 2020
 – *PhD Scholarship (non-EU Fees)*

Unsuccessful

- **€40,000:** Una Europa Seed Funding 2025
 – **Co-PI:** *Climate Impact Assessment for Vulnerable Communities and Territories*

CONFERENCE ORGANISATION

- Co-organiser – International Workshop on Statistical Modelling for Advancing Climate Resilience Nov 2026
International Centre for Mathematical Sciences, UK
 – Contributing to programme development, speaker coordination, and workshop logistics
 – Workshop supported by the ICMS Mathematics for Humanity grant (Co-PI)

SOFTWARE PACKAGES (SELECTED)

- **mGSFPCA**: An R package for Estimating Functional Principal Components from Sparse Univariate and Multivariate Data
<https://cran.r-project.org/web/packages/mGSFPCA/index.html> | 148 downloads since May 2026
- **prodMCG**: An R package for Reconstructing Full Trajectories from Sparse Longitudinal Data using a Manifold Conjugate Gradient Method. <https://github.com/uchembaka/prodMCG>
- **FDACOV**: A Matlab function for Estimating Smooth Covariance for Functional Data.
<https://github.com/uchembaka/FDACOV>

PRESENTATIONS

Sessions Chaired

- Advances in Functional Data Analysis August 2025
8th International Conference on Econometrics and Statistics (EcoStat)
Waseda University, Tokyo, Japan.
- Recent Advances in Functional Data Analysis December 2022
15th International Conference on Computational and Methodological Statistics (CMStatistics)
King's College London, UK.

Invited Talks

- Functional Principal Component Analysis for Sparse Functional Data Aug 2025
8th International Conference on Econometrics and Statistics (Tokyo, Japan)
- Covariance Function Estimation for Sparse Functional and Longitudinal data Dec 2023
The 16th International Conference on Computational and Methodological Statistics (Berlin, Germany)
- Functional Covariance Estimation for Partially Observed Functional Data Dec 2022
The 15th International Conference on Computational and Methodological Statistics (London, UK)

Contributed Talks

- Estimation of Functional Principal Components from Sparse Functional Data Aug 2025
Methods and Applications for Data Collected over Time
Joint Statistical Meetings (Nashville, USA)
- Covariance Estimation for Partially Observed Functional Data Aug 2023
Innovations in Statistical Models and Inference for Complex Data Analysis
Joint Statistical Meetings (Toronto, Canada)
- Covariance Surface Estimation from Fragmented Functional Data May 2023
Young-Irish Statistical Association session
Conference of Applied Statistics in Ireland (Co. Kerry, Ireland)
- Covariance Surface Estimation from Fragmented Functional Data Sept 2022
Functional data and flexible regression
Royal Statistical Society Conference (Aberdeen, Scotland)
- Fast R Shiny Dashboard Design with Rflexdashboard Sept 2021
Visualise That! data viz competition
Royal Statistical Society Conference (Manchester, UK)

Poster Presentation

- VistaMilk Industry Day Dec 2022
- **Conference of Applied Statistics in Ireland** (Short talk) May 2021, 2022

EDUCATION AND OUTREACH ACTIVITIES

- Youth Leader – Elevate (South Dublin Youth & Teens Ministry) Jul 2025 – Present
Facilitate weekly Friday Bible studies and coordinate engaging activities for youths & teens
- Member – UCD Staff Community Choir Oct 2025 – Present
Rehearse and perform regularly as part of the choir at UCD campus events
- Facilitator – UCD Early Career Researcher Events May 2026
ECRs Company Networking Events
ECRs Networking Across Disciplines
- Volunteer – HopeFest UCD Wellness Festival for Dublin’s Homeless Community May 2025, 2026
Contributed to event logistics, including setup, food distribution, and post-event clearance
- Volunteer – Moorepark (TEAGASC) Open Day Jul 2023
Developed an interactive Shiny application to communicate calf health assessment models to a non-specialist audience
- Volunteer – UCD Agriculture, Food Science & Human Nutrition Careers Day Mar 2023
Presented VistaMilk research projects to graduates and final-year students, promoting awareness of industry-funded research opportunities
- Volunteer – National & World Ploughing Championship (Co. Laois, Ireland) Sept 2022
Engaged farmers and the public in VistaMilk research, translating technical findings for non-specialists

SELECTED TRAINING & PROFESSIONAL DEVELOPMENT

- Facilitation Skills Training Feb 2026
- Introduction to Universal Design in UCD Oct 2025
- Dignity & Respect Training Sep 2025
- Teaching & Learning Seminar May 2025
- Pm² Essentials (The European Commission’s Project Management Methodology) - Project Management Mar 2025
- Supporting the Mental Health and Wellbeing of Employees Feb 2025
- Creative Thinking & Innovation (UCD Innovation Academy) Sep 2020
- Communicating for Impact (UCD Innovation Academy) Sep 2020

PROFESSIONAL MEMBERSHIP

- Institute of Mathematical Statistics
- Irish Statistical Association
- Young Irish Statistical Association

PROFESSIONAL SERVICE

- Reviewer - Computational Statistics & Data Analysis, Journal of the Royal Statistical Society, Series C: Applied Statistics, Journal of Statistical Software, and Journal of Computational Statistics