

Postdoctoral Fellow, Hybrid AI/ML Functional Data Analysis Methods or  
Distributional Regression for Wearable Devices  
University of Pennsylvania

Seeking highly motivated individuals with an excellent academic track record for a postdoctoral associate position to work with Jeffrey Morris on the development of statistical methodology for complex functional data and its application to various scientific areas, including neuroimaging, climate data, spatial -omics and wearable devices including accelerometers, ambulatory blood pressure monitors, and continuous glucose monitors.

Specific areas of focus could include a combination of:

1. Building hybrid statistical-ML/AI methods for functional data analysis linking the power of modern deep learning tools with rigorous statistical frameworks, to obtain inference for complex functional data objects that cannot be effectively represented with traditional linear approaches.
2. Building modeling frameworks based on distributional regression, modeling subject-specific distributions from high-frequency data streams as functional responses and predictors, to explain population heterogeneity, and to predict risk of future patient events based on baseline or changes in the subject-specific distributions. This work can include studies involving circadian rhythm and within-day variability, longitudinal tracking of distributions changing over time, and spatio-temporal distributional modeling of global climate data, with flexible functional mixed modeling frameworks used to capture complex interfunctional structure.
3. Building modeling frameworks for causal inference involving functional data, including functional mediation analysis.

The postdoctoral researcher will be mentored by Jeffrey Morris and might also work with other faculty collaborators within the Department of Biostatistics, Epidemiology and Informatics at the Perelman School of Medicine, the Statistics and Data Science Department at the Wharton School at the University of Pennsylvania, or the Department of Biomedical and Health Informatics at the affiliated Children's Hospital of Philadelphia.

The University of Pennsylvania contains a rich, collaborative scientific environment, with the School of Medicine adjacent to the Wharton business school and Computer Science and Engineering departments enabling cross-school collaborations with top scientists in all areas of quantitative science. The Division of Biostatistics contains >30 standing faculty working at the interface of cutting-edge methods and translation of these methods into public health and clinical studies, and with potential application to clinical practice through the associated Penn Medicine Health System, the largest medical system in the Middle Atlantic USA. The division is contained within a multidisciplinary department including Epidemiology and Informatics and embedded in a rich collaborative environment that includes many cross-departmental scientific research centers enabling connection with international leading clinicians and basic scientists in research teams.

**Position Title:** Postdoctoral Fellow, Hybrid AI/ML Functional Data Analysis Methods or  
Distributional Regression for Wearable Devices

**Duties and Responsibilities:** develop new methods for functional data analysis and its interface

with biomedical and public health research; develop software; and potentially collaborate on applied projects in Biomedical, Public Health and Social Sciences.

**Position Qualifications:** Candidates should have a doctoral degree in biostatistics, statistics, or a related field. Strong computational skills in R/Python and expertise in one or more of the areas of functional data analysis, Bayesian modeling, deep learning, and/or causal inference are desired but not required. Start date and term are negotiable. An individualized development plan, mentoring, and travel support for at least two conferences per year will be provided as well as competitive salary and benefits.

**Position Instructions:** Applicants should submit a cover letter, CV, and contact information for three references to Catherine Vallejo ([vallejo@penncmedicine.upenn.edu](mailto:vallejo@penncmedicine.upenn.edu)).

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Jeffrey Morris  
Del and Dennis McCarthy Distinguished Professor  
University of Pennsylvania, Perelman School of Medicine  
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