University of Puerto Rico
Mayagüez Campus
Faculty of Arts and Sciences

Department of Mathematical Sciences

THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

COLLOQUIUM

Developing statistical methods and scalable computational tools to uncover structure

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University of Puerto Rico-Mayagüez Campus

November 3
10:45 a. m. – 12:00 m.
Monzón 201

Modern scientific research generates increasingly complex, high-dimensional datasets that demand innovative statistical methods and efficient computational tools. This presentation showcases our research group's efforts to develop statistical methods and scalable computational tools that help researchers uncover meaningful patterns, explore hidden data structures, and extract scientific insight. By integrating statistics, machine learning (ML), artificial intelligence (AI), and data science (DS), with particular emphasis on unsupervised learning methods, we discover structure in high-dimensional data. A central research focus of our work is directional and circular statistics, which address data represented as points on circles and spheres. Because these observations follow geometric constraints that conventional Euclidean methods may overlook, they require a specialized statistical approach. Our group follows an open-science policy; we develop open-source statistical software that supports implementing, evaluating, and reproducing methodological advances. Our work also connects statistical methods to biomedical data science applications, including functional magnetic resonance imaging (fMRI) and biomedical datasets. By bringing together theory, research, software development, and interdisciplinary collaboration, the Almodovar-Rivera Lab seeks to translate data-driven discoveries meaningful for the scientific and general public.