Connecting Sensing, Computing, and Scientific Discovery



Dr. Ștefan A. Robilă
Professor of Computer Science
School of Computing, Montclair State University

How can advances in computational sensing, algorithms, and research infrastructure transform scientific data into meaningful discoveries? This talk explores the evolution of computational research through experiences in teaching, interdisciplinary collaboration, and scientific innovation at Montclair State University. Beginning with a brief overview of the U.S. higher education and research ecosystem, it highlights the opportunities and challenges of developing computational approaches to complex scientific problems. The presentation focuses on hyperspectral imaging research, from spectral analysis and feature extraction to parallel computing and real-world applications. It also introduces an open-source platform designed to make hyperspectral satellite data more accessible through integrated tools for data discovery, visualization, and processing. Looking toward the future, the talk discusses the transition from specialized algorithms and standalone applications to integrated scientific workflows that connect sensing, computing, and data interpretation. It considers how scalable cyberinfrastructure, accessible research software, and interdisciplinary collaboration can broaden participation in computational science and accelerate scientific discovery.

Biography

Dr. Stefan A. Robila is a Professor of Computer Science in the School of Computing at Montclair State University, New Jersey, USA. He has close to three decades of experience in teaching, research, and academic leadership. From 2018 to 2021, he served as a Program Director at the U.S. National Science Foundation (NSF) in the Office of Advanced Cyberinfrastructure. His research interests include computational sensing, hyperspectral imaging, high-performance computing, scientific cyberinfrastructure, cybersecurity, and computing sustainability. His work spans the development of algorithms, computational infrastructure, and software platforms supporting interdisciplinary scientific research. He has contributed to curriculum development, mentored more than 80 master's projects and theses, and collaborated with researchers across multiple scientific disciplines. He has also held visiting academic appointments at the Universities of Cambridge, Geneva, Oxford, and Uppsala.