Biology Seminars

12:30 - 2:30 pm
Monday, June 10 2024
3M Center, Room 3250

Seminar 1

Prof. Nicoletta Del Buono
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Investigating tumor pathologies through computational mathematics of multi-omics integration

The term "omics data integration" has been used in the literature to describe computational approaches and algorithms that combine information available in multiple omics data matrices into a single view, to perform joint inference, or to extract useful knowledge from different omics sources. Overall, these approaches enhance the contribution of different data sources, capture the commonalities, and extract the differences associated with a particular state, cell type or disease condition. The approaches rely on several computational strategies, based on different principles and assumptions. This talk will focus on low-rank approximation models and how they can be applied in the context of knowledge extraction from different sources of omics data (e.g. transcriptomic, proteomic, lipidomic). Emphasis will be given to low-rank approaches that are able to enforce constraints such as non-negativity, sparseness, and other conditions to better understand tumor pathologies.

Biography

Prof. Del Buono is currently associate professor at the Department of Mathematics, University of Bari Aldo Moro. She received her MPhil in Numerical Analysis from the University of Bath (U.K.) in 1999 and her degree in Mathematics from the University of Bari in 1997. She was visiting professor at North Carolina State University, Raleigh (USA) for in 2002, 2005 and 2006. Nicoletta Del Buono was co-organizers of all the editions of the Workshop SDS: Structural Dynamical Systems, of several Technical and Invited Sessions in International meetings, and she was the Chair of the three editions of the Summer School of Mathematical Methods in Data Science hold in Bari in 2018, 2019, 2021.

Her recent research activities focus on the study of low-rank approximation methods for data matrices, focusing on nonnegative matrix factorizations and their applications in real domains such microarray data analysis and environmental data analysis. She is also involved in the study of optimization algorithms for the hyperparameter tuning problem in Machine Learning contexts.

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