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Objectives

You can watch the seminar in this [link](#).

Abstract: The technological advances and accumulation of biomedical datasets are yielding unprecedented opportunities to better understand genetic diseases, but necessitate proper exploration and integration methods to unravel a complete picture of biological systems. I will discuss about the computational strategies we recently developed, using i) multilayer networks to integrate a large range of interactions, and associated exploration algorithms and ii) dimensionality reduction to extract biological knowledge simultaneously from multiple omics. On the application side, I will discuss about the analysis of rare genetic diseases, which raise various challenges: many patients are undiagnosed, phenotypes can be highly heterogeneous, and only a few treatments exist.

Selected associated publications & preprints

Cantini, L., Zakeri, P., Hernandez, C., Naldi, A., Thieffry, D., Remy, E., Baudot, A., 2021. Benchmarking joint multi-omics dimensionality reduction approaches for the study of cancer. *Nature Communications* 12. <https://doi.org/10.1038/s41467-020-20430-7>

Novoa-del-Toro, E.-M., Mezura-Montes, E., Vignes, M., Magdinier, F., Tichit, L., Baudot, A., 2020. A Multi-Objective Genetic Algorithm to Find Active Modules in Multiplex Biological Networks. *bioRxiv* 2020.05.25.114215. <https://doi.org/10.1101/2020.05.25.114215>

Pio-Lopez, L., Valdeolivas, A., Tichit, L., Remy, É., Baudot, A., 2020. MultiVERSE: a multiplex and multiplex-heterogeneous network embedding approach. *arXiv:2008.10085*.



Anaïs Baudot completed her PhD in Bioinformatics in 2007, in the Developmental Biology Institute from the Aix-Marseille University. She made a postdoc in the laboratory of Prof. Alfonso Valencia in the Spanish National Cancer Research Centre (CNIO, Madrid, Spain), and was recruited by the CNRS in 2010. After 8 years in the Marseille Mathematics Institute, she joined in 2018 the Marseille Medical Genetics Unit to create the team "Networks and Systems Biology for Diseases". Her main interests are to develop computational approaches to study human diseases, with a particular emphasis on data integration, rare diseases and disease comorbidities.

Speakers

Anaïs Baudot is the creator of the "Networks and Systems Biology for Diseases" team in the Marseille Medical Genetic Unit in 2018.

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