



University
of Basel

Department
Biozentrum



Swiss Institute of
Bioinformatics

BIOZENTRUM

The Center for
Molecular Life Sciences

Basel Computational Biology Seminar:
22830-01 Current Research in Bioinformatics I

Bruno Correia

EPFL

Lausanne, Switzerland

Expanding the Universe of Functional Proteins by Computational Design

Finely orchestrated protein activities are at the heart of the most fundamental cellular processes. The rational and structure-based design of novel functional proteins holds the promise to revolutionize many important aspects in biology, medicine and biotechnology. Computational protein design has led the way in rational protein engineering, however many of the designed proteins have been solely focused on structural accuracy and are completely impaired of function.

I will present my group's efforts on the development of novel computational approaches to predict and design protein function. Specifically, I will describe a new methodological framework to learn surface patterns displayed in protein structures that can be used to decipher their interactions with other molecules. I will also present a computational strategy to explore de novo protein topologies, aiming to solve prevalent problems in protein design that relate to the lack of optimal structural templates for the design of function. By expanding beyond the known protein structural space, our approaches present new paradigms for the rational design of functional proteins. I will showcase important applications for our computationally designed proteins in the domains of vaccine design, T cell-based therapies, biosensors and synthetic biology. Ultimately, I anticipate that our research will lead to further improvements in the understanding of protein function and design.

Date: **Monday, November 25, 2024**

Time: **16:15 h – 17:15h**

Location: **Biozentrum, Seminarraum 02.073**

Contact: **Océane Follonier (oceane.follonier@unibas.ch)**