

Wednesday, 24<sup>th</sup> November, 9.30am, Online

Host: Dr. Niels Reichardt

## Ancestral proteins: Evolution meets Biotechnology

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Proteins and enzymes are the workhorses of living organisms. Interestingly, their multiple functions can be also exploited by the biotech industry. However, for such purpose proteins often need to be modified and improved. Current methods for protein design are based on a limited number of mutations that often have also limited effect. In our lab we have developed a method that look at how evolution has “engineered” proteins and enzymes over a span of 4 billion years. Each single mutations that we can think of, has been already proven in nature, we only need to rescue all these modification by expanding the sequence space by adding a time component. Reconstructing sequence from extinct species offer such opportunity, not only providing valuable evolutionary information, but also providing sequences that display featured that where once essential for life. This new sequence often show hundreds of mutations that hide invisible properties and function in their modern counterpart. They also serve as a “white canvas” for protein design by combining them with sequences from other species, providing synthetic protein chimeras with usability beyond their natural peers. I will present our results on evolutionary enzyme and protein design in a journey from muscle physiology to gene editing.