

Biocompatible Peptide and Protein Engineering: From Conjugation to Metal Binding

Abstract: Peptides and proteins are increasingly important therapeutic and diagnostic agents. Our research focuses on the development of biocompatible chemical strategies that expand the structural and functional diversity of peptides and proteins and enable their rapid discovery from genetically encoded libraries. This seminar will present recent advances in peptide and protein engineering based on the unique properties of cysteine and selenocysteine residues, ranging from selective conjugation and macrocyclisation methods enabled by the nitrile-aminothiol click reaction to the design of metal-binding peptides and proteins using bismuth. Examples will highlight applications in anti-infective drug discovery and radiopharmaceutical development.

Biography: Christoph Nitsche is a Professor at the Australian National University (ANU) in Canberra. He completed his PhD at Heidelberg University in 2014 and subsequently relocated to ANU, supported by Feodor Lynen (2015), ARC DECRA (2019), ARC Future (2022) and NHMRC EL2 (2026) Fellowships. He is the recipient of the RSC Medicinal Chemistry Emerging Investigator Lectureship (2023), the Rennie Memorial Medal (2023), the Peter Andrews Award for Innovation in Medicinal Chemistry and Chemical Biology (2024) and the Tregear Award for Outstanding Achievements in Peptide Science (2025). He was named the top Australian researcher in Medicinal Chemistry by The Australian in 2023, 2024, 2025 and 2026. His research program focuses on the biocompatible modification of peptides and proteins to advance drug discovery for infectious diseases and the development of theranostic agents.