



## CHEMISTRY/PHYSICS SEMINAR SERIES

**Dr. Dustin Duncan**

**Assistant Professor, Department of Chemistry, Brock University**

**Wednesday, March 18<sup>th</sup>, 2026**

**11:00 a.m. to 11:50 a.m. in ENW 115**

# Covalent Warheads: Discovery, Development, and Deployment

## ABSTRACT

In recent years, there has been a resurgence in covalent inhibition as a drug-modality. Although covalent drugs have been used extensively as pharmaceuticals (e.g. aspirin, penicillin, omeprazole), these drugs were found to be effective with the covalent mechanism of action discovered later. Although concerns about off-target effects are warranted, the field of drug design has matured greatly in recent decades allowing for improved targeting and precision as evidenced by recently approved drugs such as sotorasib (targeting KRAS G12C mutant for the treatment of non-small cell lung cancer) and nirmatrelvir (targeting 3CLpro of SARS-CoV-2 virus for the treatment of Covid). With the increase in interest for covalent drugs, there has been a concordant increase in the development of new electrophilic warheads to improve selectivity based on intrinsic warhead reactivity. This seminar will cover the recent work of my research group in the discovery, development, and utilization of novel warheads, particularly for use as antifungals.

## BIOGRAPHY

Originally from the west coast, just outside of Vancouver, Professor Duncan received concurrent BSc degrees (2013) at University of Victoria in Chemistry and Biochemistry studying chemical-genetic interactions in yeast under the supervision of Prof. Tom Fyles and Prof. Chris Nelson. He then went to do a MSc in Chemistry (2016) at Simon Fraser University under the supervision of Prof. Tim Storr developing chelators for the treatment of Wilson's Disease – a disease caused by excess copper in the liver. Subsequently, he left for Montreal to do his PhD (2021) in Chemistry at McGill University under the supervision of Prof. Karine Auclair developing novel antibiotics that sensitize bacteria to the immune system. He did his postdoctoral research at the University of Toronto in the Department of Molecular Genetics with Prof. Leah Cowen and Department of Chemistry with Prof. Rob Batey on discovery, elucidation of mechanisms of action, and preclinical development of compounds with novel antifungal activity. In 2023, he began his independent career at Brock University in the Department of Chemistry as an Assistant Professor.