



# Chemistry Speaker Series

## Dr. Chao Zheng

### Organic Synthesis to Brain Imaging: New Strategies for PET Tracer Development

Friday, April 17<sup>th</sup>, 2026

12:00pm - 1:00pm - PLZ 410

**Title:** From Organic Synthesis to Brain Imaging: New Strategies for PET Tracer Development

**Abstract:**

Positron emission tomography (PET) provides a powerful approach for imaging molecular processes in the living brain, but the development of new PET tracers is often limited by synthetic accessibility. The short half-lives of carbon-11 and fluorine-18 impose stringent demands on reaction speed, efficiency, and practicality, while many biologically important molecular scaffolds remain difficult to access through existing synthetic and radiochemical methods. As a result, advances in organic synthesis and radiochemistry are both essential for expanding the scope of PET tracer development.

In this lecture, I will discuss our recent work at the interface of organic chemistry, radiochemistry, and molecular imaging. I will first highlight several methodological advances from our laboratory in reaction development, alkene functionalization, and fluorine-18 radiochemistry. Together, these studies show how new synthetic strategies can address important bottlenecks in PET radiotracer synthesis and expand access to structurally challenging imaging agents.

I will then briefly discuss how these chemical advances support tracer development and brain imaging applications, using our work on synaptic density PET imaging as an example. Selected studies in neurological disorders will be presented to illustrate how innovations in PET tracer development can help enable translational imaging research in neuroscience.

Short bio: Chao Zheng, PhD is an Assistant Professor at the University of Toronto, with appointments in Psychiatry, Pharmacology & Toxicology, and Chemistry. He is also a Scientist at the Brain Health Imaging Centre and the Azrieli Centre for Neuro-Radiochemistry at the Centre for Addiction and Mental Health (CAMH). He received his PhD in Organic Chemistry from Peking University and completed postdoctoral training in molecular imaging, radiochemistry, and positron emission tomography (PET) neuroimaging at Massachusetts General Hospital/Harvard Medical School and Yale University.

Dr. Zheng's research lies at the interface of organic synthesis, radiochemistry, and molecular imaging. His laboratory develops new synthetic and radiochemical methods for fluorine-18 labeling and applies these approaches to PET tracer development and translational brain imaging in neurological disorders.

Lab website: [www.zhenglab.ca](http://www.zhenglab.ca)