Chemistry Departmental Colloquium

Visualizing and Controlling Chemical Processes in Live Biological Samples

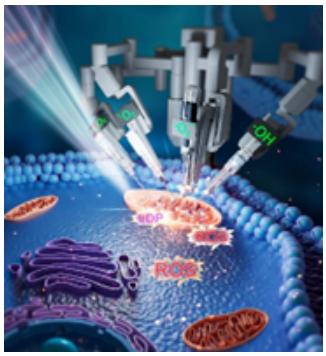
Dr. C. Jesse Zhang

Assitant Professor of Chemistry

Abstract: Why can video games feel more compelling than movies? Because instead of passively watching, players can actively explore, make choices, and determine progress. In the same way, we find optical control of chemical processes in living organisms even more exciting than optical imaging.

Biological systems are intricate and exquisite chemical machinery. To better understand how cells work, how diseases develop, and how drugs function, we need to go beyond simply observation toward active control. Traditional methods for controlling chemical processes in cells rely on chemical treatments, but these approaches affect entire cells or organisms and lack high spatiotemporal precision.

Building on our expertise in chemical imaging, my group has developed optical methods that allow us not only to see chemical events in real time but also to control them with unprecedented spatiotemporal accuracy and selectivity. This ability to actively participate, rather than merely watch, represents an exciting step toward the next generation of understanding fundamental biology and precisely regulating biological activities.



Thursday, October 2, 2025 **3:30pm** **WTHR 104**

PURDUE UNIVERSITY

James Tarpo Jr. and Margaret Tarpo Department of Chemistry