

Department of Chemistry & Biomolecular Science
Clarkson University
PhD Defense

Tyler Wilkinson

will speak on

**Investigations into the Iron Oxidative Storage and
Reductive Mobilization Processes of Ferritin**

Abstract:

Iron is necessary for all living things and in nearly all organisms is stored within the protein ferritin. Ferritin is a large, hollow protein which in mammals is composed of 24 subunits. It oxidizes iron(II) to iron(III) and stores it internally in a mineral core. The principles of this process are well known but specifics including kinetics are not as well understood. Release of iron(III) occurs by several potential mechanisms. Ferritin is degraded by the lysosome releasing all of its stored iron. It has long been suggested that additional mechanisms of iron release from ferritin exist such as reductive mobilization, where reducing agents reduce the core iron and cause its release more gradually. This mechanism has been studied extensively for decades but is still not well understood. Using primarily UV-Vis and fluorescence spectroscopy we conducted several studies to better understand these processes. In the first we determined that chaotropic agents had no effect the rate of release by FMN as previously believed and that the process does not involve entrance of FMN into ferritin. The second study investigated the kinetics of iron oxidation by several ferritins and determined that it proceeds by a two-phase process, not following Michaelis-Menten behavior as previously believed. The third study explored the reductive mobilization of ferritin using *E. coli* cell lysate in place of buffer. The fourth study includes an investigation into the interaction of ATP with ferritin, which appears to behave as an inhibitor to iron oxidation by ferritin and may have a role in iron homeostasis.

Wednesday, April 27, 2022, 10:00 am EST

In-person location: BH Snell 330

Petersen Board Room

ZOOM: <https://clarkson.zoom.us/j/92107313342>