UNIVERSITY OF LOUISVILLE

COLLEGE OF ARTS & SCIENCES

Department of Chemistry

Brown and Williamson Series

Friday, April 9, 2021
@12:30 pm
Via: MS TEAMS

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Titan in a Jar

ABSTRACT:

Titan, Saturn's icy moon, is an ideal planetary body to study prebiotic chemistry, origins of life, and the potential habitability of an extraterrestrial environment. It features a nitrogen-based atmosphere, complex organic chemistry fueled by radiation from the sun and Saturn's magnetosphere, ethane-based lakes on top of water-ice surface on the poles, organic dunes on the equator, and seasonal evaporation and precipitation of hydrocarbons in a process notably similar to Earth's hydrological cycle. As part of NASA's New Frontiers Mission, a rotorcraft named Dragonfly will be launched in 2027 and is expected to arrive on the surface of Titan in 2034. In light of the imminent Dragonfly mission, revisiting the fundamental chemistry of the smallest organic molecules that make-up the surface of Titan is of outmost importance. Here, we present our findings derived from experimental modeling of the composition and structure of the Titanean haze and surface mineral deposits, with the accent on the simplest nitriles.

BIO:

Tom Runčevski was born in Macedonia where he finished his undergraduate studies in chemistry in 2011. He did his PhD at the Max Planck Institute (MPI) for Solid State Research in Stuttgart, Germany, with Prof. Robert E. Dinnebier. His graduate work was on structural characterization of materials with diffraction and spectroscopic methods, with the focus on structure solution and refinement of polycrystalline materials. He graduated in 2014 with honors, and he was awarded with the Otto Hahn Medal of the Max Planck Society. After one year postdoctoral stay at the MPI, he joined UC Berkeley and Lawrence Berkeley Nat Lab in 2015, as a postdoctoral researcher with Prof. Jeffrey R. Long, working on characterization of porous materials. In 2018, he started his independent career the Southern Methodist University, as an assistant professor of chemistry.