

F24.031 Molecular Dynamics of Titan's Lakes

Overview

Titan is a moon of Saturn and with Earth they are the only places in the solar system known to have persist liquids on their surfaces. This proposed project is part of a larger effort to understand the surface of Titan. The lakes are primarily comprised of molecular nitrogen, methane, and ethane, with smaller amounts of other molecules. This project entails performing molecular simulations of these systems to quantify thermodynamics and dynamics of these systems.

What the student will DO and LEARN

The I2S student will learn to use high performance computing, write some code, and perform computational chemistry calculations. Learning the basics of this, enough to get started, typically takes about 10 hours. They will then work the collaborative team including researchers from Chemistry, Astronomy, and Lowell Observatory to understand Titan and other places in the outer solar system.

Additional benefits

This project is part of a larger collaboration, with many active pieces. While the student will primarily work with the faculty mentor to run simulations, they will interact with researchers collecting observational data with telescopes and laboratory data with a chamber capable of cooling to 20 K (-400°F). The student will be able to build relationships with these researchers and see in real time how their research fits into many aspects of how we understand the solar system.

Additional qualifications

Willingness to learn

Time commitment

6 hrs/week for 15 weeks