



Applied and Computational Mathematics Seminar

Title: Fluid Physics of Ice-Covered Oceans

Speaker: Nicole Shibley (University of Cambridge)

Date: Wed 5th February 2025 at 10:00AM

Location: (See abstract)

Abstract: This seminar will take place in Science East E1.19.

Fluid processes in Earth's polar regions can influence polar and global climate and may also allow for a better understanding of the physics governing climate systems of certain ice-covered planetary bodies. In this talk, I will describe how a particular Arctic Ocean mixing and heat transport process, diffusive convection, helps contextualize the warming Arctic through a synthesis of observational and theoretical approaches. In particular, we will discuss how different ocean mixing mechanisms impact distinct regions of the Arctic and how intermittent turbulence in a changing Arctic can disrupt the diffusive-convective process. I will also describe the development of a novel methodology for inferring ocean mixing metrics from oceanographic acoustic measurements, which helps elucidate how intermittent turbulence may interact with diffusive-convective structures. Finally, we will consider how models of Earth's polar processes, adapted to understand ice-covered moons in the Solar System, can provide insight into planetary bodies where in-situ measurements are not available. Emphasis will be placed on how fluid dynamics can address current and future climate and environmental challenges both on Earth and elsewhere in the Solar System.