

# Seminar by, Dr. Duncan A. Young

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## *The search for Antarctica's Million-Year-Old Ice*

**Biosketch:** Dr. Young works on the ice sheets of Antarctica and also on the exploration of Jupiter's moon, Europa. Recent work focuses on the search for ancient ice in East Antarctica's ice sheet, the geological controls on the evolving West Antarctic sheet, as well as the great subglacial basins of East Antarctica. Duncan is also a member of the instrument science team for REASON, an ice penetrating radar for NASA's Europa Clipper mission.

**Abstract:** Earth's climate experienced a radical change about ~900 thousand years ago. Isotopes in ocean sediment cores indicate that temperature and sea level when from varying every 40 thousand years (coupled to Earth's obliquity cycles) to much larger variations every ~100 thousand years - which characterize the eight great ice ages that reshaped the planet and likely shaped human evolution. To test the meaning of those ocean sediments, and what that signal means of sea level and greenhouse gases, we need a direct record of the Earth's atmosphere. We have extracted reliable climate signals from ice cores, which trap samples of the Earth's atmosphere, going back 800 thousand years, but any stratigraphically intact ice beyond that point will be acutely sensitive to ice dynamics and variations in geothermal heat flow. Multiple nations have begun the endeavor of recovering ice of this age from the East Antarctic Ice Sheet.

The Center for Oldest Ice Exploration (COLDEX), a new NSF Science and Technology Center, is using a phased approach for locating stratigraphically intact ice core capturing this "mid-Pliocene" climate transition. We will begin with a broad, regional airborne survey of the southern flank of Dome A, Antarctica, imaging the large-scale structure of the ice sheet and underlying crust using ice penetrating radar, aeromagnetism and airborne gravity. Based on the results of that survey, we will perform targeted airborne surveys of several regions at ice thickness length scales in the following season to characterize candidate sites, which will be used to locate follow-on ground-based high-resolution studies.

Date: Friday September 23<sup>rd</sup>, 2022

Time: 4:00 – 4:50 PM

Zoom Meeting ID: 949 0718 4824