PRESIDENT'S DAY 2018
TALK ABSTRACTS

Julian Dowdeswell (Lyell Medal)
Director, Scott Polar Research Institute, University of Cambridge

A view from the sea: the marine-geophysical signature of past ice sheets

The deglaciation of high-latitude continental shelves since the Last Glacial Maximum has revealed suites of subglacial and ice-contact landforms that have remained well-preserved beneath tens to hundreds of metres of water. Once ice has retreated, sedimentation is generally low on polar shelves during interglacials and the submarine landforms have not, therefore, been buried by subsequent sedimentation. By contrast, the beds of modern ice sheets are hidden by several thousand metres of ice, which is much more difficult than water to penetrate using geophysical methods. These submarine glacial landforms provide insights into past ice-sheet form and flow, and about the processes that have taken place beneath former ice sheets. Examples will be given of streamlined subglacial landforms that indicate the distribution and dimensions of former ice streams on high-latitde continental margins. Distinctive landform assemblages characterise ice stream and inter-ice stream areas. Such information can be used to test the predictive capability of ice-sheet numerical models. These marine geophysical and geological observations of submarine glacial landforms enhance our understanding of the form and flow of past ice masses at scales ranging from ice sheets (1000s of km in flow-line and margin length), through ice streams (100s of km long), to surge-type glaciers (10s of km long).

Janne Blichert-Toft (Murchison Medal)
Directeur de Recherche, CNRS and Ecole Normale Superieure de Lyon

The ever enigmatic early Earth seen from the perspective of Nd-Hf-W isotope systematics in komatiites

Among the many topics I have been working on during my 30-year career, the early Earth was always one of them. I began working on this fascinating subject during my Ph.D. and am still working actively on it today. Therefore, among my currently ongoing research projects, I have chosen to focus on the early Earth during President's Day at the Geological Society of London, and more specifically on komatiites, a rock type that, with a sole exception, only existed in the Archean and Proterozoic eras of Earth history. But so did TTGs, so why komatiites? Komatiites form by large degrees of partial melting in deep mantle plumes and their compositions approach those of mantle peridotite. It is therefore considered that komatiites have recorded the chemical and isotopic characteristics of their ancient deep-seated mantle sources and, as such, bear witness to the putative primordial terrestrial magma ocean, metal-silicate and silicate-silicate differentiation processes, mantle and magma ocean dynamics, crustal growth and recycling, and, conceivably, even the timing of onset of plate tectonics, possibly the most controversial and still unresolved issue in modern geology.

Peter Dolan (William Smith Medal)
Co-Founder Director - Ikon Science Limited

Squeezing Value from Seismic Data

or

Many bangs bounce back
To deliver bucks from form
Fabric and fluids

Abstract to follow

Terry Plank (Wollaston Medal)
Arthur D. Storke Memorial Professor, Department of Earth and Environmental Sciences, Lamont Doherty Earth Observatory of Columbia University

At the Speed of Volcanic Eruptions

What causes some eruptions to be more explosive than others? Theory points to the speed at which magma races to the surface. Slow ascent speeds allow gas to escape and eruptions to proceed more peacefully. It has been difficult, however, to clock magma ascent rates because few methods can operate at the relevant timescale of minutes to hours. Our latest work uses the zonation of water inside volcanic crystals to quantify the speed of ascent. Importantly, we have calibrated the method in the laboratory, and are just starting to apply it to a variety of past eruptions of known vigor. Thus far, every volcanic olivine crystal we have measured is zoned in water, providing the potential for every olivine to be a clock of magma ascent in the run-up to eruption.