

HEILAND LECTURE SERIES

“What can the data science revolution do for geoscience?”

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4:00 p.m. - Coolbaugh 209

The modern world is built on machine learning and data science: an explosion of research activity has resulted in mathematical tools that underpin financial trading, enable self-driving cars, and help you select films on Netflix. Supporting this is a wealth of innovative research within the fields of statistics and computer science. How can these ideas benefit geoscience?

In this talk I will highlight a variety of areas where ideas borrowed from data science have enabled something fundamentally new—from data processing through to earthquake early warning. Geoscience is data-rich, but we often cannot directly observe the systems we care about: we must work with incomplete, sometimes contradictory measurements made at the Earth’s surface and at the present time. The tools of machine learning are designed to help untangle this kind of puzzle, and will allow new insights into the workings of our planet.



Dr. Andrew Valentine is a studied physics at the University of Cambridge, and then completed a DPhil at the University of Oxford under the supervision of John Woodhouse. His doctoral research focussed on methodological aspects of global seismology, particularly efforts to quantify and improve the accuracy of tomographic images. He then spent several years as a postdoc in Jeannot Trampert’s group at Universiteit Utrecht, The Netherlands, becoming increasingly involved in efforts to apply machine learning concepts to a range of geophysical problems. In 2016 he joined the Australian National University as Fellow in Seismology and Mathematical Geophysics, and recently received a Discovery Early Career Research Award from the Australian Research Council. Andrew’s core research focus is the mathematics of inversion and inference, and its applications across the spectrum of geoscience.