Applied and Computational Mathematics Seminar

Title: Antarctic ice rise dynamics and challenges in ice sheet modelling

Speaker: Clara Henry

Date: Fri 15th December 2023 at 2:00PM

Location: (See abstract)

Abstract: Location: Science Hub 1.51

Abstract: Ice rises form in Antarctic ice shelves where otherwise floating ice is locally grounded due to elevated bed topography. Ice rises influence the Antarctic Ice Sheet by regulation of ice flow towards the ocean and are ideal locations to study ice flow dynamics due to the various flow regimes present on small spatial scales. Modelling ice flow by solving the three-dimensional Stokes equations with a finite element model, we show that ice rise geometry and the drag imposed on the upstream ice shelf respond with hysteresis to sea level variation. Furthermore, we present a blueprint for the three-dimensional simulation of the isochronal stratigraphy of an ice rise and investigate the influence of the degree of nonlinearity of the strain rate – stress dependence on ice flow dynamics. Lastly, we couple an ice anisotropy evolution equation, finding that parameters used in previous studies result in greatly differing anisotropy fields in three-dimensional simulations. We provide metrics for comparison with observations in order to constrain model parameters.