

POSTDOCTORAL & EARLY CAREER RESEARCHER EXCHANGE – POST EXCHANGE REPORT

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**EXCHANGE TO THE UNIVERSITY OF WASHINGTON, SEATTLE, USA
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I received SAGES+ PECRE support to visit the Department of Earth & Space Sciences, University of Washington (Seattle, USA) between February-April 2017, where I collaborated with Prof. Eric Steig. A world-leading expert in polar climate and ice-core science, much of Prof. Steig's work has aimed to better constrain the key atmospheric controls driving glaciological change over Greenland and Antarctica, over both contemporary and long-term timescales.

Under the expert guidance of Prof. Steig, whom I originally met at Edinburgh University during his sabbatical visit to the School of GeoSciences (AY2014/2015), I used my PECRE to enrich the results of my on-going Ph.D. research with polar climate model data, which would otherwise have been very difficult/impossible to achieve without SAGES+ support. Specifically, my visit to the University of Washington enabled me to receive training in, and become acquainted with, cutting-edge techniques in polar atmospheric modelling and output interpretation, in an attempt to better constrain the roles of ice, ocean and climate forcings acting upon the rapidly melting West Antarctic Ice Sheet. This research involved synthesizing remotely sensed observations of pronounced glaciological change along this sector of Antarctica over the past ~30 years (as derived from my earlier Ph.D. research), with medium resolution global climate model outputs to examine the influence of near-surface climatological processes on ocean-forced glacier recession (e.g. using ECWMF ERA-Interim data, with additional plans to use higher resolution GFDL CM2.6. outputs in the future).

Building upon the preliminary work of Steig et al. (*Ann. Glaciol.*, 2012) and Dutrieux et al. (*Science*, 2014), who utilized similar methodologies to examine a smaller subset of West Antarctica, our collaborative research has revealed the presence of distinct, regionally-contrasting inter-annual variability in ocean forcing across the West Antarctic Ice Sheet; new and exciting findings which substantiate recent observations of glaciological change as inferred from the satellite record. Overall, our findings underscore the requirement for continued, close observation of the West Antarctic Ice Sheet and its offshore surrounds in the future, as a prerequisite to generating more accurate estimations of ice-mass loss and global sea-level rise contributions from this highly-dynamic sector in the coming decades.

Having now returned to Edinburgh, I am confident that the exciting results yielded from this successful PECRE exchange will generate a minimum of 2 peer-reviewed articles in leading scientific journals, one of which is already near-submission. These findings will also form a substantial component of my Ph.D. thesis. Moreover, the results stemming from this exchange have generated a plethora of new research questions and theories, which I am certain will fuel further discussion and future collaboration with Prof. Steig and his group in the years to come. Through Prof. Steig's teaching and guidance, I also return to Edinburgh with a new skillset in climate model output manipulation and interpretation, the results of

which I look forward to disseminating to the wider SAGES+ community, via e.g. the annual “SURGE” glaciology meetings.

I am truly thankful to SAGES+ for providing me with PECRE funding to enable this engaging and highly productive exchange.

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Caption: Prof. Eric Steig (right), myself (left) and one of The University of Washington’s famous cherry trees (center-left) outside the Department of Earth and Space Sciences, University of Washington, Seattle.