



SAGES

**Postdoctoral and Early
Career Researcher
Exchange (PECRE)
Fellowship Final Report**

Scottish Alliance for Geoscience, Environment and Society

Craig Smeaton

Host: Professor Thomas Bianchi (<https://bianchilab.wordpress.com/>)

Host Institution: Department of Geological Sciences, University of Florida

Background

The PECRE visit was hosted by Prof. T. Bianchi at the University of Florida. Prof. Bianchi's and his lab are global leaders in coastal (especially fjords) carbon research and the use of biomarkers in these environments. The PECRE focused on introducing me to Biomarker techniques with the aim of applying them to a long sedimentary record from a Scottish fjord (Loch Sunart).



Activities undertaken During PECRE

The research undertaken during the PECRE focused on understanding carbon inputs in to Loch Sunart sediments over the last 1000 years. This entailed the measurement of sediment samples from core MD04-2832 to investigate the terrestrial signatures present. This analysis included bulk elemental and isotopic analysis alongside a number of biomarker indices. The biomarkers techniques included alkanes and fatty acids. Over the 3 weeks spent in Florida myself in collaboration with X.Cui (PhD in Bianchi Group) extracted and measured the biomarkers creating the first down core biomarker record for Scottish coastal waters. Initial interrogation of the data indicates that the interaction between humans and climate may be the main driver of C input to coastal sediments.

Activities enabled by PECRE

Apart from the data produced from the time spent in Florida there I was able to initiate several other activities. This includes an application for a MASTS Visiting Fellowship (Summer 2017) for Thomas Bianchi aimed at widening Scottish networks and the production of a manuscript for the work undertaken during the PECRE (target journal: *Nature Climate Change*). Additionally, during the PECRE I contributed to ongoing work within the Bianchi Lab which culminated in a small project with X.Cui (now: MIT) utilising RampedPyrOx techniques on marine sediments.

Wider Benefits to SAGES

My interactions with the wide field of experts during my time in Florida will hopefully lead to future continued pursuits which includes work with the wider SAGES community. Moreover, a number of abstracts have been submitted to international conferences around the world, providing an international platform for SAGES funded research.

Summary

The PECRE provided the opportunity to develop skills (biomarkers) not readily available to me in the Scottish research environment. The visit widened my research network and gave me insight into a large highly productive global research group. The data produced during this visit is unique for Scotland and will be interest to a wide global audience. The PECRE was a great success and very useful in my journey as an early career researcher.

I would like to thanks T.Bianchi and X. Cui for hosting me a providing a great and productive visit.

Outputs

1. **Manuscript:** Biomarker record, *In Progress*, (Target: *Nature Climate Change* (In Progress))
2. **Manuscript:** RampPyrOX, *In Progress* (Target: Nature Geo, PNAS or GRL)
3. **Abstract:** AGU 2017, New Orleans (presented by T. Bianchi)
4. **Abstract:** Shackleton Meeting, London (presented by W. Austin)
5. **Abstract:** EGU 2018, Vienna (presented by C. Smeaton)
6. **MAST Visiting Fellowship**, Thomas Bianchi, (Summer 2017) – *Complete*

