Glaciomarine fjords along the West Antarctic Peninsula (WAP) are highly productive ecosystems in which seasonal pulses of phytodetritus deliver food to the seafloor and sustain rich benthic communities. However, the timing and intensity of phytodetritus pulses, and benthic community response, remain unevaluated in WAP fjords. We used a calibrated seafloor camera to study the arrival and utilization of phytodetritus over a 9-month period (Dec 2015 – Sept 2016) in the middle basin of Andvord Bay, a typical northern WAP fjord. The amount of phytodetritus on the seafloor was analyzed through development of automated color-recognition methods. Processing of phytodetritus by Ampharetid polychaetes, a dominant deposit feeder, was determined through measurement of fecal casts produced over time. Comparisons between “pre-bloom”, “bloom”, and “winter” periods indicated a rapid increase in deposit-feeding of almost five times background rates during an intense pulse of phytodetritus. Nonetheless, the bulk of phytodetritus was not consumed by large deposit feeders but appeared to degrade quickly (i.e. within weeks), presumably by microbial processes.

This contrasts with similar depths (500-600 m) on the open shelf where most phytodetritus is consumed rapidly by mobile deposit-feeders such as holothurians (Sumida et al. 2014). Our work highlights the substantial differences in pelagic-benthic coupling and organic-carbon cycling within WAP fjords compared to the much less productive open Antarctic shelf ecosystem.
The aim of my dissertation is to study the nuances in the interannual dynamics of marine picoplankton and sea ice associated microbial communities off the North West Antarctic Peninsula (NWAP) during winter. A comprehensive study of community structure, diversity and spatio-temporal distribution has been correlated with physicochemical parameters of this heterogenic polar environment. In this seminar I will present the characterization of the picoplanktonic fraction in the epi and mesopelagic layers off the NWAP during three consecutive winters that exhibited highly variant sea ice conditions. Combining local hydrography and geobiochemical data with microbial abundance, distribution and taxonomical analyses, an active winter picoplanktonic community has been identify, particularly in the upper mixed layer. Sea ice type and the Antarctic circumpolar current play a significant influence on the marine microbial communities, allowing the picoeukaryote Bathycoccus to thrive in open waters. My results highlight potential parasitism and bacterial chemoautotrophy as major players in this sea ice marginal zone during the Antarctic winter.