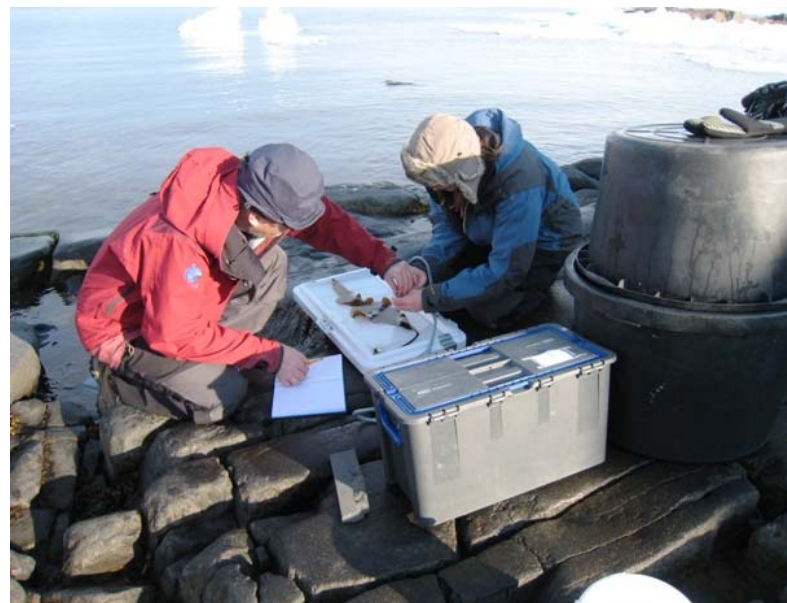


**Fieldwork at Svalbard in August and September 2009,**  
*by Elen Belseth, Master Student at the Norwegian University of  
Science and Technology (NTNU), Dept. of Biology*

During two weeks in August/September I was aboard the research vessel R/V Jan Mayen doing fieldwork for my Master Thesis on the arctic kelp *Laminaria solidungula*. It was an incredible meeting with the vast nature of Svalbard. The cruise started in Longyearbyen, propounded north along the west coast of Spitsbergen, around Gyldenøya and Tommelen in Hinlopenstredet before we headed to Rijpfjorden at Nordaustlandet. We also spent a day in the multiyear ice at 81.16° N before heading back to Longyearbyen. During the cruise, my supervisors and I collected samples of the kelp by Scuba diving on different locations, mainly in Hinlopenstredet, but also at Rossøya and Kongsfjorden. We settled at the top deck of the vessel to do photosynthetic measurements using an underwater Pulse Amplitude Modulated fluorometer (DIVING-PAM, Waltz) to measure photosynthesis *versus* irradiance curves. I will use these measurements to look into the eco-physiology in the kelp and its ability to live and grow in the Arctic climate.

This trip was a great opportunity for me to do my fieldwork. I also got to meet several other students and professors from all over the world. It was very interesting to gain knowledge of their work and doings. This together with new knowledge about how to use different kinds of equipment used for marine research, made this a unique experience for me.



Master Student Elen Belseth and supervision Prof. Geir Johnsen measuring photosynthetic activity on the Arctic kelp *Laminaria solidungula* using a variable fluorescence (PAM) technique, Svalbard August 2009 (photo by Anniken Lydon).

**Investigation into hydrography driven gene flow**

*By Anniken Lydon, Cal Poly State University, San Luis Obispo.  
Dept. of Biology*

From the middle of August to the end of September 2009, I enrolled in the Benthic Fauna course offered by UNIS. During this course, I attended lectures covering the types of benthic communities/organisms found around Svalbard, and the influence of oceanography on both substrate type and the distribution of organisms within different fjord systems. During a two week research cruise aboard the R/V *Jan Mayen*, we were able to sample benthic communities within the different

fjords around the island of Spitsbergen, into the Hinlopen Strait and culminating with a trip into the sea-ice.

The Benthic Fauna course (AB-321) offered by UNIS was an amazing learning platform for me and a great opportunity to experience the Arctic fjords of Svalbard first-hand while engaging in international research collaborations. Through this course and participation in the research cruise aboard the R/V *Jan Mayen*, I was also able to collect *Laminaria digitata* tissue samples (with the aid of SCUBA divers and UNIS professors) from five hard-bottom areas around Svalbard for my Master's Thesis. The five populations of *L. digitata* were collected from the Isfjord, Kongsfjord, Smeerenburgfjord, the Hinlopen Strait, and near the Rossøya island. With these tissue samples, I intend to assess gene flow between the fjord systems of Svalbard and analyze the influence of currents on gene flow. I will perform DNA extractions and PCR amplifications for all individuals in the upcoming months. The PCR products from seven, polymorphic, nuclear DNA regions will yield a "DNA fingerprint" for each individual. These DNA fingerprints will then allow us to analyze how each individual is related to other specimens in our sample bank. Once the genetic analysis is complete, I will run assignment tests to place each individual into a genetic population regardless of where it was collected geographically. This analysis will indicate which populations are exchanging genetic material and any directionality in gene flow around the Svalbard archipelago. I will then analyze whether the directionality of gene flow is correlated with hydrographic models of the major current systems to see if hydrography drives gene flow between populations of *L. digitata* around Svalbard. Some populations from mainland Norway will later be included in this study in order to assess the broader effects of the Barents Sea hydrography on gene flow between Norway and Svalbard.