Student: Brian Lohman (Blohman@vandals.udiaho.edu)
Host: Dr. Michael A. Bell, Stony Brook University, New York.
Project Title: Stages in the Skeletal Ontogeny of Morphologically Contrasting Populations of the Threespine Stickleback

VISIT NARRATIVE:

My previous experience and continuing interest in threespine stickleback (*Gasterosteus aculeatus)* as a model system motivated my visit to Dr. Michael Bell, a leader in the stickleback research community. The stickleback is a well established model for studies of evolution because numerous replicate populations act as independent tests of evolutionary processes. This creates opportunity to study development in the context of evolution. The three goals for my project were: 1) to create a developmental staging system for stickleback emphasizing skeletal traits, 2) to compare the development of morphologically contrasting populations in order to determine mechanisms in development that lead to their differences, and 3) to develop a method for whole mount collagen staining in developing stickleback. Results from this project will help others who wish to study the expression of genes involved in the development of skeletal features by indicating when to sacrifice fish in order to capture events of interest. My experience has been very successful. It began with a field collection trip to Alaska where adults were gathered and crosses were performed. After returning to Stony Brook, New York I continued to raise my fish and sample from the developing populations regularly to assemble the developmental series. At present all samples to be included in the developmental series have been collected. I learned whole-mount clearing with trypsin enzyme and classic histological staining methods, and I developed my own novel method. These included alizarin, for bone, alcian, for cartilage, and a novel whole-mount antibody stain for collagen. I spent many hours conducting necessary background research and planning this new method, and so far it appears to be functioning as expected. Further analysis will be necessary to determine whether antibody staining for collagen visualizes different materials than alcian, which stain similar structures. I am currently continuing to process samples that were collected during this fellowship so that I can accomplish my first and second goals. I am continuing to photograph specimens in order to assemble the growth series as part of my fist goal. During this internship I encountered several problems that are difficult to solve. During the early stages of development I sampled conservatively in order to ensure that enough fish survived to adulthood, but this left me with few specimens per sample. If I was to attempt this project a second time I would take more specimens at each stage to ensure that I could retry methods if errors occurred or samples were damaged in processing.