

Biodiversity and Systematics of Nemerteans

Most people are unaware that the vast majority of living organisms on Earth remain undiscovered and unnamed. In the face of current biodiversity crisis biologists are challenged to quickly discover and describe hundreds of thousands of species to establish a baseline, in order to monitor how ecosystems are altered due to climate change and other impacts of human activity. The vast amount of undescribed diversity, vanishing taxonomic expertise, and the slow pace of traditional morphology-based taxonomy necessitates an alternative approach to biodiversity assessments and species descriptions. Application of molecular methods promises to expedite species discovery and description. Dr. Svetlana Maslakova is an expert on the biology and systematics of nemerteans, a phylum of marine invertebrates with ~ 1300 described species. Nemerteans are important in marine ecosystems as top predators, and some species are economically significant as predators of commercially important species of crustaceans and clams. Nemerteans also have biomedical potential as toxin producers. To learn more about these beautiful and fascinating worms watch these short videos produced by Dr. Maslakova in collaboration with a professional videographer from the Smithsonian Institution: <http://bocasarts.weebly.com/nemertean-tools.html>

REU interns in the Maslakova lab may participate in one of the following two projects:

1. *Assessing nemertean species diversity in the Caribbean Sea*

One current research project in the Maslakova lab focuses on assessing and describing the diversity of nemerteans in the Caribbean Sea using DNA-barcoding. Only ~38 species of nemerteans are currently described from the Caribbean, but Maslakova and colleagues have already discovered over 191 species, and keep finding new ones. We have recently collected and preserved several hundred new specimens, some potentially representing new species from the Caribbean coast of Panama. An REU intern working on this project will learn about modern practices in systematics and biodiversity research and get hands-on experience with universally applicable molecular techniques such as DNA extraction, PCR, gel electrophoresis, and DNA sequence analysis, while helping to characterize nemertean diversity in the Caribbean.

2. *Describing nemertean diversity in the NE Pacific*

When people think about undescribed species, they usually imagine remote or tropical regions, with high levels of diversity and few studies. But much of the undescribed diversity is found right under our noses, in parts of the world that are thought to be well studied. For example, while only ~65 intertidal species of nemerteans are reported from the Oregonian Biogeographic Province, Maslakova lab has found that the actual species diversity is nearly twice that number, with many undescribed and cryptic species. Cryptic species look alike morphologically, but are separately-evolving lineages, which can be differentiated using DNA-sequence data. Over the past 12 years members of the Maslakova lab had discovered many new species in Oregon, which are still awaiting description. An REU intern working on this project will have the opportunity to participate in intertidal field-work in Southern Oregon, and learn to describe nemertean species using a combination of morphological and DNA-barcoding approaches.