

Marine Natural Products
SIO 124
Syllabus
(4 units, Spring 2018, instructor: Paul Jensen)
T/TH 9:30-10:50

Overview: This course will provide a detailed introduction to marine natural products (MNPs). It is geared for upper level undergraduates interested in gaining a fundamental understanding of this field. It begins with an introduction to marine natural product chemistry including descriptions of various structural classes of natural products and the mechanisms of their biosynthesis. The basic techniques of natural product isolation and structure elucidation will be introduced. This will be followed by an overview of the types of marine organisms that have been studied and how they are collected, processed, and screened for biological activities. The methods applied to marine microorganisms will also be described, including isolation and fermentation techniques. The course will cover new advances in the field of natural product discovery including a range of “omic” techniques such as genome mining that have transformed this field. This will be followed by lectures addressing chemical ecology, i.e., what we know about why these compounds are produced in nature. Finally, the course will conclude with an overview of commercialized marine natural products and an introduction to patent law and how university discoveries are developed. Grades will be assigned based on quizzes (20%) and exam scores (80%).

Module 1:

Course objectives. Introduction to marine natural products. Classes of compounds and their biosynthesis.

Module 2:

Compound isolation, methods of structure elucidation Bioassays, pharmacology.

Guest lecture: Ted Molinski April 19th

Module 3:

Macroorganisms: diversity, distributions, how to collect and process

Module 4:

Macroorganisms: natural product discovery, marine toxins.

Microorganisms: diversity, distributions

Module 5:

Microorganisms: sample collection and processing, culture collections, fermentation and extraction methods, important compounds

Midterm: May 8, 2018 (40%)

Module 6:

New methods in natural product discovery: Genomics, metagenomics

Module 7:

Metabolomics/chemical interactions

Module 8:

Chemical ecology

Module 9:

Marine natural products as drugs. Patent law and academic inventions.

Finals week: exam (40%)