

MBES Selective Schedule

Module 1 Drugs from the Sea

Preceptor – Dr. Peter Moeller,

E- mail address peter.moeller@noaa.gov

Telephone number 762-8867

Monday, March 20 – Peter Moeller, 9:00am – 11:00am, HML, Room B-212

Tuesday, March 21 – Michelle Hsia, 9:00am – 11:00am, HML B-120
“Identification of unknown marine toxins”

Thursday, March 23 – David Rowley, 3:00pm – 5:00pm, HML B-212
Lecture Titled *“Why the choice of invertebrates as NP source”*

Friday, March 24 – David Rowley, 9:00am – 11:00am, HML B-120
“Role of bacteria in NP production (who’s making what)” and
“Increasing importance of marine actinomycetes in NP production and screening”

Friday, March 24 – John Vournakis, 2:00pm – 4:00pm, HML B-120

Module 2 - Marine Microbiology
March 27-31

Preceptor – Dr. Pam Morris

E-Mail address: morrisp@musc.edu

Telephone number 843-762-8803

Monday, March 27 - Pam Morris, 9:00a.m. – 11:00a.m., HML, Room B-212
“Microbial Communities”

Tuesday, March 28 – Hal May, 9:00a.m. – 11:00a.m., HML, Room B-120
“Geomicrobiology / Bioremediation”

Thursday, March 30 – Jill Stewart, 9:00a.m. – 11:00a.m., HML, Room B-120
“Environmental Health Microbiology”

Friday, March 31 – Pam Morris, 9:00a.m. – 11:00a.m., HML, Room B-120

“Microbial Metagenomics”

Module 3 Marine Mammals

April 3- 14

Preceptor – Dr. John Baatz

E-mail address baatzje@musc.edu

Telephone number 792-1049

Tuesday, April 4 – John Baatz, 10:00am – 12:00, White House

“Introduction”

Thursday, April 6 – Greg Bossart, 10:00am – 12:00, White House

“Pathology”

Monday, April 10 – Sebastiano Gattoni-Celli, 10:00 – 12:00, White House

“Skin Cell Models & Applications”

Thursday, April 13 – Mark Kindy, 10:00 – 12:00, White House

“Models of Brain Insult”

Friday, April 14 – Tracy Romano, 10:00 – 12:00, White House

“Immune cell response to toxins”

Module 4 Vectors

April 17 - 21

Preceptor – Dr. Karen Burnett

E-mail address burnettk@cofc.edu

Telephone number 762-8933

Marine organisms as disease vectors (*Drs. Karen Burnett and Erin Burge*).

Tuesday, April 18: 9 – 11 am. HML Auditorium.

Friday, April 21: Noon – 2pm. HML Auditorium.

Module 5

Experimental design and data interpretation: The challenge from the field.

Preceptor – Dr. Joyce Nicholas

E – mail address nicholjs@musc.edu

Telephone number 876-1132

Monday, April 24 – Dr. Joyce Nicholas,

10:00am – 12:00pm, 135 Cannon Place,

When you get off the elevator, the kitchen is directly in front of you (room 404). Walk through the kitchen and you'll come out at the conference room.

Tuesday, April 24 – Dr. Robert Ball

2:00 pm – 4:00pm – HML, Room B-120

Module 6 Public Policy

May 1-5

Preceptor – Dr. Fred Holland

E-mail address fred.holland@noaa.gov

Telephone number 762-8813

Monday, May 1 – Dr. Fred Holland, 9-11am, HML, Room B-212

Tuesday, May 2 – Dr. Paul Sandifer, 9-11am, HML Room B-120

“Status of America’s Oceans”

DESCRIPTION OF SEVEN WEEK ELECTIVE 2006

Title: *Environment, Oceans, and Humans: The Inextricable Relationship between Environmental and Human Health*

Ph.D. Program: MCBP: Marine Biomedicine and Environmental Sciences

Description

This course introduces students to some of the topical issues in marine and environmental sciences. The course shows the application of cell and molecular biology to environmentally relevant questions that ultimately impact human health. In addition students will participate in learning how results from research in environmental cell and molecular science are synthesized with economics and law to form public policy. The role of federal and SC state government agencies in these processes will be presented through the appropriate representatives of these agencies on the Ft. Johnson campus.

This is a course that includes students reading papers in conjunction with active class participation through discussions and debates on topical issues.

Course Outline

The course is divided into 7 modules.

Module 1. Drugs from the sea.

The oceans remain the last frontier for natural product discovery. Increasing bacterial resistance to antibiotics, the rising incidence in cancer rates, and the presence of insidious fungal infections necessitate that scientists look beyond the chemical synthesis approach (combinatorial chemistry has failed) to find new drugs. This part of the course presents an overview of the process of drug discovery from organism identification, to isolation and characterization of the active molecules to clinical testing and finally approval of drugs for human use. Current research will be presented by 4th year graduate students.

Module 2. Biogeochemistry of the oceans.

Microorganisms play an essential role in geochemical cycles and transformation of organic/inorganic pollutants in ocean systems. This module focuses on key biogeochemical cycles in the oceans (carbon being one of enormous significance). Brief presentations of articles from the primary literature assigned prior to the class will be followed by group discussion.

Module 3. Hot topics in marine microbiology.

This exploding area of marine science finds its origins from the fact that microbes constitute a significant portion of the total biomass of the seas, yet less than 1% of marine microbes have been isolated and characterized. Recent studies have broadened our understanding of the types and overall abundance of prokaryotic organisms present in the marine environment. Culture-independent approaches to the study of marine microbial ecology have uncovered exciting new microbial communities living in the water column, as well as organisms living in extreme environments in the deep ocean and polar regions. Students

will learn about the application of molecular genetic approaches to recent questions in microbial ecology. Several papers detailing some of the most important discoveries from the last few years will be discussed.

Module 4. Marine mammals as sentinels for human health.

The oceans are the ultimate repositories for anthropogenic contaminants. These contaminants have direct effects on the metabolic machinery of marine organisms. Scientists have long sought accurate and consistent “biomarkers” that can be used to judge the health of the organism and environment. Traditionally there has been a weak link between these biomarkers to human health. However, gross and microscopic pathologies in marine mammals such as dolphins have appeared with increasing frequency. Some data suggests that humans living near the marine environment inhabited by these dolphins are also experiencing increased rates of pathologies such as cancer. Dolphins being mammals and thus sharing close molecular biology with humans may represent a "sentinel species" for the health of humans. Unfortunately little is known about the physiology and cell biology of dolphins. This module will introduce students to ongoing research by Marine Biomedicine researchers and students.

Module 5. Environment and cancer.

Environmental agents are increasingly being targeted as “players” in the development of human and animal cancer. However, direct evidence is lacking in most cases for the effects of environmental compounds in the induction of this disease. This module presents students with a wide perspective on the relationship of the environment to cancer.

Module 6. Introduction to marine genomics.

This section of the course provides an overview of contemporary functional genomics applied to economically and ecologically important marine species. Emphasis is placed on Crustacea and Mollusca, as this group of invertebrates is the focus of a multidisciplinary and multi-institutional research and graduate training program in Marine Biomedicine and Environmental Sciences. The module is divided into 3 major areas reflecting the academic disciplines brought to bear on this highly integrative field: genomics, proteomics, and bioinformatics. Specific questions to be addressed will include: In what ways do genomic projects differ from traditional experimental approaches in biomedicine? What components characterize a genome project? What are the pros and cons of genome projects? What benefits could be expected to result from genome projects? What is the relationship of genomics to "bioinformatics", "transcriptomics", "proteomics" and "lipomics"? The design and technical execution of genomics projects will be presented. A comparison of complete genomics projects with ones that have a more restricted goal and extent will be presented.

Module 7. Environmental Science and Public Policy: Impact and Relationships

Environmental policy and law are based on a number of different factors including data provided by scientists. This module explores some of these factors as they relate to molecular biology and training of MBES students. Presentations will be made from scientists and policy makers from agencies whose missions are directed towards marine /environmental science and human health. They will give their perspective on topical issues in marine science as it relates to human health and the training of Marine Biomedicine students. Students will present data and arguments pro and con in a debate format on timely environmental issues that incorporate molecular marine biology.

Module 8.

Type and Amount of Work Expected of Students

This is a class with a high expectation of active student participation. It will involve student presentations (10-15 min) on primary article literature, debate preparation and participation, seminars, papers, lectures, and field experience where relevant. Students will participate in all of these activities with faculty supervision. A final written paper will be assigned.

List of Potential Faculty and Current Graduate Students Teaching the Elective

Course Director: E. R. Lacy

Grade:

25% Participation in class discussion

20% Debate presentation

20% Paper presentations for total of ~10 (10-15 min) presentations on primary article literature

35% Written assignment