

OCN 629 - Molecular Methods in Marine Ecology (2 credits) Fall 2009

Course Instructor: Guangyi Wang and Grieg Steward

Course Coordinator: Guangyi Wang

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Office Hours: by appointment

Guest Lecturer: Zackary Johnson (Duke) and Patrick Schloss (University of Massachusetts)

Frequency: Every other fall semester **Maximum Enrollment:** 8

Class Time and Location: M 2:00-3:40 PM, MSB 307

Lab Time and Location: M 2:00- 3:40 PM, POST 08 and/or POST 20

Course description: Community biodiversity underpins ecosystem function in the oceans and other natural environments by mediating most biogeochemical cycles. This course introduces the advancement of molecular methods in unraveling the fundamental relationship between biodiversity and functioning of ecosystems. It aims to provide hands-on laboratory analyses of environmental samples for biodiversity study using molecular approaches and to overview guidelines on how to analyze biodiversity data for the understanding of community functions in marine or other natural environments. Additionally, it demonstrates how bioinformatics techniques can be used to validate biodiversity data and to critically improve the quality of the final product (manuscript) of an environmental study. This course is primarily targeting graduate students in Oceanography, Marine Biology, Zoology, Geology and Geophysics, and other environmental sciences as well as advanced undergraduates in Global Environmental Sciences.

Grading:

Lecture participation, lab participation and performance	40%
One research paper critique presentation and leading class discussion	30%
Final comprehensive lab report (mini-manuscript in AEM format)	30%

Materials:

No textbook is required for this class. However, the following books will be made available for students to consult on some topics.

Molecular Microbial Ecology (advanced methods) by A. Mark Osborn and Cindy J. Smith, Taylor & Francis, 2005.

An Introduction to Molecular Ecology by Trevor C. Beebee and Graham Rowe, Oxford University Press, 2008.

Additional reference papers and protocols will be provided for lab sections and further readings.

Student Learning Outcomes: Upon completion of OCN 629 a student should be able to:

- Analyze biodiversity of environmental samples with adequate molecular methods;
- Study functional ecology of community in conjunction with other classical biogeochemical analyses;

- Design molecular experiments of community ecology;
- Properly interpret molecular biodiversity data;
- Write molecular biodiversity based paper for peer-reviewed journals;
- Critically review molecular biodiversity oriented publications.

Class Schedule (*subject to change with the guest lecturer's travel schedule)

Week	Topic	Activity	Instructor	Date
Week 1	course introduction, biodiversity & ecosystem function	lecture	Wang	24-Aug
Week 2	Molecular markers and methods	lecture	Wang	31-Aug
Week 3	HOLIDAY - Labor Day	No class		7-Sep
Week 4	Biodiversity data analysis	lecture	Schloss	14-Sep
Week 5	Biodiversity data analysis	Lab lecture	Schloss	21-Sep*
Week 6	Molecular biodiversity analysis –clone library	Lab lecture	Wang	28-Sep
Week 7	Molecular biodiversity analysis –clone library	Lab lecture	Wang	5-Oct
Week 8	Molecular biodiversity analysis –clone library	Lab lecture	Wang	12-Oct
Week 9	Molecular biodiversity analysis –T-RFLP	Lab lecture	Steward	19-Oct
Week 10	Molecular biodiversity analysis –T-RFLP	Lab lecture	Steward	26-Oct
Week 11	Molecular biodiversity analysis –T-RFLP	Lab lecture	Steward	2-Nov
Week 12	Population abundance analysis	Lecture	Johnson	9-Nov
Week 13	Population abundance analysis	Lab lecture	Johnson	16-Nov
Week 14	Population abundance analysis	Lab lecture	Johnson	23-Nov
Week 15	Paper critique session 1		Student	30-Nov
Week 16	Paper critique session 2		Student	7-Dec
	Last instruction day			10-Dec
Week 17	Project report due			14-Dec