MEMBERS OF THE CENTER FOR ENVIRONMENTAL STUDIES

Alex Apotsos, Visiting Lecturer in Geosciences

Henry W. Art, Professor of Biology and Environmental Studies

Sonya Auer, Visiting Assistant Professor of Biology

Lois M. Banta, Professor of Biology

Ron D. Bassar, Assistant Professor of Biology

Ben Benedict, Lecturer in Art

Mary K. Bercaw-Edwards, Associate Professor for Literature of The Sea, Williams-Mystic Maritime Studies Program

Julie C. Blackwood, Assistant Professor of Mathematics

Roger E. Bolton, Professor of Economics, Emeritus

Cory E. Campbell, instructional Technology Specialist

Phoebe A. Cohen, Associate Professor of Geosciences

Anthony J. Carrasquillo, Assistant Professor of Chemistry

David Cassuto, Class of 1946 Visiting Distinguished Professor of Environmental Studies

Jose E.A. Constantine, Assistant Professor of Geosciences

Mea S. Cook, Associate Professor of Geosciences

David P. Dethier, Professor of Geosciences*

Joan Edwards, Professor of Biology

Laura Ephraim, Associate Professor of Political Science

Michael Evans, Assistant Director of The Zilkha Center for Environmental initiatives

Jessica M. Fisher, Assistant Professor of English

Antonia Foias, Professor of Anthropology and Sociology

Jennifer L. French, Professor of Spanish

Sarah S. Gardner, Lecturer in Environmental Studies

Matthew Gibson, Assistant Professor of Economics

Lisa Gilbert, Associate Professor of Geosciences and Marine Sciences
Environmental studies call upon citizens, organizations, and governments to grasp complex scientific concepts, address conflicting human values, and make difficult economic, political and ethical choices. A proper understanding of environmental issues is therefore an interdisciplinary exercise. The concentration in Maritime Studies is designed to help students to:

- Effectively address complex environmental issues by integrating perspectives from the natural sciences, the social sciences, and the arts and humanities;
- Understand ecological principles and the nature of living systems;
Apply scientific methods to collect environmental data and evaluate environmental quality;
Understand the political and economic factors that inform, enable, and constrain environmental policy;
Understand the social, cultural, and historical factors that shape environmental thought, history, and behavior;
Develop significant understanding of one or more of the essential methodological approaches required in addressing environmental challenges;
Apply their learning in a practical setting.

The program is administered by the Center for Environmental Studies (CES), located in the Class of 1966 Environmental Center. Founded in 1967, CES was one of the first environmental studies programs at a liberal arts college. In addition to the academic program described below, CES is the focus of a varied set of activities in which students lead and participate, often with other members of the Williams community. CES offers extensive resources including databases, funding for student-organizations, and student initiated activities, and generous support for summer research and internships. The Class of 1966 Center, a Living Building and the Program’s home, includes a classroom, living room, study rooms, kitchen, as well as student gardens. The CES manages the Hopkins Memorial Forest, a 2600-acre natural area northwest of campus, in which there are field-study sites and a laboratory, and where passive-recreation opportunities may be found in all seasons. CES also operates the Environmental Analysis Laboratory in Morley Science Center. The Maritime Studies concentration builds on the course offerings of the Williams-Mystic Maritime Studies Program at Mystic Seaport.

ADVISING
Concentrators (or first-years and sophomores interested in the concentration offered by CES) are encouraged to talk at any time with the Chair or Associate Director of Environmental Studies, or any other members of CES or Maritime Studies for advice. All incoming concentrators will choose a faculty advisor in the spring of their sophomore year.

Advisors for 2019-20: Henry Art, Sarah Gardner, Pia Kohler, Laura Martin, Mea Cook, James Manigault-Bryant.

CONCENTRATION IN MARITIME STUDIES
The Maritime Studies concentration provides students with an opportunity to explore how humans interact with the environment, including the maritime environment. Understanding the oceans and our interactions with them is of increasing importance in this era of climate change, sea-level rise, fisheries crises, and the internationalization of the high seas. We encourage students to investigate our WaterWorld from the perspectives of the humanities, social sciences, and physical sciences. Maritime Studies is an interdisciplinary, cross-divisional program that includes the literature, history, policy issues, and science of the ocean. Candidates for the concentration in Maritime Studies must complete a minimum of seven courses: the interdisciplinary introductory course (GEOS 104 Oceanography), four intermediate core courses (at Williams-Mystic), an elective, and the senior seminar.

Students who have completed other study-away programs that emphasize maritime studies should consult with the CES chair about the possibility of completing the Maritime Studies concentration.

Required Courses (7 courses)
Introductory Course
MAST/ENVI/GEOS 104 Oceanography

Students who take MAST 211/GEOS 210 Oceanographic Processes at Williams-Mystic can substitute an extra elective in lieu of GEOS 104.

Capstone Course
ENVI/MAST 412 Senior Seminar: Perspectives on Environmental Studies

Core Courses (taken as part of Williams-Mystic program at Mystic Seaport):
MAST/ENGL 231 Literature of the Sea
MAST 311/BIOL 231 Marine Ecology OR MAST 211/GEOS 210 Oceanographic Processes
MAST/ENVI 351/ PSCI 319 Marine Policy
MAST/HIST 352 America and the Sea, 1600-Present

Elective Courses
Elective courses are listed based on either a clear maritime statement in the course description or broad practical/theoretical applicability to maritime studies. Concentrators will take a minimum of one course from the list below. If concentrators find other courses in the catalog that they believe meet the requirements for a MAST elective, they may bring them to the attention of the Chair or Associate Director.
INDEPENDENT STUDY AND WINTER STUDY

In addition to courses fulfilling the Maritime Studies concentration requirements, the following courses are offered:

- MAST 397, 398 Independent Study: Maritime Studies
- MAST 493-W31-494 Senior Thesis: Maritime Studies

Winter study courses play an important role in the program, offering opportunities to learn about aspects of environmental studies with which students would like to become more familiar. We encourage students to bear in mind their interests in the environment and maritime studies when reviewing each year’s Winter Study offerings.

HONORS IN MARITIME STUDIES

Candidates for honors in Maritime Studies will complete a thesis in their senior year. The project will involve original research (archive, museum, field, or laboratory) followed by on-campus analysis and write-up of results. The thesis may either be a one-semester plus winter study project, or a full year (two semesters plus winter study). In either case, data collection during the summer before the senior year may be necessary. In some cases, the
thesis project may be a continuation and expansion of the student's Williams-Mystic research project. Honors will be awarded if the thesis shows a high degree of scholarship, originality, and intellectual insight.

MAST 104 (F) Oceanography

Cross-listings: GEOS 104 ENVI 104 MAST 104

Secondary Cross-listing

The oceans cover about 72% of Earth's surface, yet we know the surface of Venus better than our own ocean floors. Why is that? This integrated introduction to the oceans covers formation and history of the ocean basins; the composition and origin of seawater; currents, tides, and waves; ocean-atmosphere interactions; oceans and climate; deep-marine environments; coastal processes; productivity in the oceans; and human impacts. Coastal oceanography will be investigated on an all-day field trip, hosted by the Williams-Mystic program in Connecticut. This course is in the Oceans and Climates group for the Geosciences major.

Class Format: discussion, three hours per week and laboratory, two hours per week in alternate weeks/one all-day field trip

Requirements/Evaluation: two hour exams, lab work, participation in the field trip, and a final exam

Prerequisites: none

Enrollment Limit: 48

Enrollment Preferences: first-year and sophomore students, MAST concentrators

Expected Class Size: 48

Grading: yes pass/fail option, no fifth course option

Distributions: (D3)

This course is cross-listed and the prefixes carry the following divisional credit:

GEOS 104 (D3) ENVI 104 (D3) MAST 104 (D3)

Attributes: ENVI Natural World Electives EXPE Experiential Education Courses GEOS Group A Electives - Climate + Oceans

Fall 2019

LEC Section: 01   MWF 9:00 am - 9:50 am   Mea S. Cook
LAB Section: 02   W 1:00 pm - 3:00 pm   Mea S. Cook
LAB Section: 03   R 1:00 pm - 3:00 pm   Mea S. Cook

MAST 211 (F)(S) Oceanographic Processes

Cross-listings: MAST 211 GEOS 210

Primary Cross-listing

This course examines ocean and coastal environmental science issues including carbon dioxide and the ocean's role in climate, El Niño and other ocean-atmosphere oscillations that influence our weather, coastal erosion and other hazards, coastal pollution, and fisheries. The focus is on controlling processes with regional comparisons. Blue water oceanography is conducted in the Atlantic and comparative coastal oceanography includes trips to southern New England shores, and the West and Gulf coasts of the US as part of the Williams-Mystic program.

Class Format: including coastal and near-shore field trips, 11 days offshore, and a laboratory or field research project

Requirements/Evaluation: two tests, a research project, and a presentation

Grading: yes pass/fail option, yes fifth course option

Unit Notes: offered only at Mystic Seaport

Distributions: (D3)

This course is cross-listed and the prefixes carry the following divisional credit:

MAST 211 (D3) GEOS 210 (D3)

Attributes: ENVI Natural World Electives EVST Living Systems Courses EXPE Experiential Education Courses GEOS Group A Electives - Climate + Oceans
MAST 231  (F)(S)  Literature of the Sea

Cross-listings:  MAST 231  ENGL 231

Primary Cross-listing
Taking advantage of our maritime museum, coastal setting, and three field seminars, we study canonical and lesser-known novelists, short-story writers, dramatists, and poets who set their works in the watery world, often in the exact places where we travel as a class. We read, for example—depending on fall or spring semester—Ernest Hemingway when sailing on the Straits of Florida, John Steinbeck when exploring Cannery Row on Monterey Bay, and Mark Twain on a steamboat on the Mississippi. We read Kate Chopin on the sands of the Gulf of Mexico, Rudyard Kipling out on Georges Bank, and Herman Melville’s masterpiece *Moby-Dick* aboard Mystic Seaport's historic whaleship, the *Charles W. Morgan*, a vessel nearly identical to the vessel he climbed aboard at age twenty-one. In the classroom we examine these works through a mixture of lecture, small-group discussion, and writing. To further appreciation and analysis, this interdisciplinary course uses students’ emerging knowledge of maritime history and marine science.

Class Format: weekly lectures, including coastal and near-shore field trips and ten days at sea

Requirements/Evaluation:  regular papers, class participation, journal-writing, and a final paper

Grading:  no pass/fail option,  no fifth course option

Unit Notes:  offered only at Mystic Seaport

Distributions:  (D1)

This course is cross-listed and the prefixes carry the following divisional credit:
MAST 231 (D1)  ENGL 231 (D1)

Attributes:  AMST Arts in Context Electives  ENVI Humanities, Arts + Social Science Electives

Fall 2019
LEC Section:  01    TBA    Christian  Thorne

Spring 2020
LEC Section:  01    TBA    Mary K. Bercaw Edwards

MAST 311  (F)(S)  Marine Ecology

Cross-listings:  BIOL 231  MAST 311

Primary Cross-listing
Using the principles of evolutionary biology and experimental ecology, this course examines the processes that control the diversity, abundance and distribution of marine organisms. Major marine communities, including estuaries, the rocky shore, sandy beaches, salt marshes, coral reefs, and the deep sea are discussed in detail.

Class Format: including coastal and near-shore field trips, 10 days offshore, and a laboratory or field research project

Requirements/Evaluation:  two tests, a research project, and a presentation

Prerequisites:  BIOL 101 or GEOS/MAST 104, or permission of instructor

Grading:  yes pass/fail option,  yes fifth course option

Unit Notes:  offered only at Mystic Seaport

Distributions:  (D3)

This course is cross-listed and the prefixes carry the following divisional credit:
BIOL 231 (D3)  MAST 311 (D3)
MAST 324  (S)  Corals and Sea Level

**Cross-listings:** MAST 324  ENVI 324  GEOS 324

**Secondary Cross-listing**

In coastal communities, increasing flood damage from storm surges and chronic inundation by seawater are already happening as a result of sea level rise. How do we know what contributes to the observed change in sea level in the last century? What does the geological record teach us about what controls the natural variation in sea level on short and long timescales? How can we use this information to separate anthropogenic effects from natural change in modern systems? And how does this inform us on what to expect through the 21st century and beyond? In this course, we will examine how sea level is reconstructed using geological archives and how coral-based sea level data led to breakthroughs in our understanding of the long-term evolution of the ocean and climate, the controls in the timing of ice age cycles, the singularity of modern climate change, and how high the future seas will rise. During Spring Break, the class will travel to Barbados, a renowned locality for Quaternary sea level reconstruction, to observe modern and ancient reefs, and collect samples that will be the basis of individual or group projects in the second half of the semester. Participation in the Spring Break trip is not required for successful completion of the course, but course enrollment is necessary to attend the trip.

**Requirements/Evaluation:** short papers, labs, participation in discussion, and a research project

**Prerequisites:** GEOS 104 or GEOS 210 or GEOS 215 or MAST 311 or permission of instructor

**Enrollment Limit:** 10

**Enrollment Preferences:** Geoscience majors, students who commit to the Spring Break trip

**Expected Class Size:** 10

**Grading:** no pass/fail option, no fifth course option

**Distributions:** (D3)

**This course is cross-listed and the prefixes carry the following divisional credit:**

MAST 324 (D3)  ENVI 324 (D3)  GEOS 324 (D3)

**Attributes:** ENVI Natural World Electives  EXPE Experiential Education Courses

Not offered current academic year

MAST 351  (F)(S)  Marine Policy

**Cross-listings:** ENVI 351  PSCI 319  MAST 351

**Primary Cross-listing**

This seminar utilizes the interdisciplinary background of the other Williams-Mystic courses to examine national and international contemporary issues in our relationship with our ocean and marine environment. This seminar takes a topical approach to the study of ocean and coastal law and policy, examining climate change, fisheries, coastal zone management, admiralty law, marine biodiversity, ocean and coastal pollution, and ocean governance.

**Class Format:** discussions, guest lectures by active professionals, and includes coastal and near-shore field trips, and 10 days offshore

**Requirements/Evaluation:** an independent research paper, a presentation, and a final exam

**Grading:** yes pass/fail option, yes fifth course option

**Unit Notes:** offered only at Mystic Seaport

**Distributions:** (D2)

**This course is cross-listed and the prefixes carry the following divisional credit:**

ENVI 351 (D2)  PSCI 319 (D2)  MAST 351 (D2)

**Attributes:** ENVI Environmental Policy  EXPE Experiential Education Courses  POEC International Political Economy Courses
MAST 352  (F)(S)  American Maritime History  (DPE) (WS)

Cross-listings:  HIST 352  MAST 352

Primary Cross-listing

This course surveys American maritime history from the colonial era to the 21st century. We will consider the dynamic relationship between the sea and American life, and the broad influence that each has had on the other. Special emphasis will be placed on how diverse peoples shaped and experienced America's maritime past. We will sample from different fields of historical inquiry including labor, environmental, cultural, political, technological, and energy history in order to gain a deeper understanding of America's maritime heritage.

Class Format: classroom discussion as well as field seminars

Requirements/Evaluation:  class participation, weekly response papers, three longer papers

Prerequisites:  BIOL 101 or GEOS/MAST 104, or permission of instructor

Grading:  no pass/fail option,  no fifth course option

Unit Notes:  offered only at Mystic Seaport

Distributions:  (D2)  (DPE)  (WS)

This course is cross-listed and the prefixes carry the following divisional credit:

HIST 352  (D2)  MAST 352  (D2)

Writing Skills Notes: Students must complete weekly 1-page papers, two 5-page papers, and a final 10- to 15-page paper. Additionally, students will participate in several in-class writing workshops and peer critiques that cover argument and style. Students will receive from the instructor timely comments on their writing skills, with suggestions for improvement.

Difference, Power, and Equity Notes: Maritime activity has long provided opportunities for some while burdening others with tremendous costs. From the slave trade and the encounters between native and European mariners to the power wielded by multi-national shipping conglomerates, this course investigates contests over power, empire, and capitalism as they played out on the maritime stage.

Attributes:  AMST Space and Place Electives  ENVI Humanities, Arts + Social Science Electives  EXPE Experiential Education Courses  HIST Group F Electives - U.S. + Canada  HIST Group P Electives - Premodern

MAST 397  (F)  Independent Study: Maritime Studies

Maritime Studies independent study.

Grading:  yes pass/fail option,  yes fifth course option

Distributions:  No divisional credit

Fall 2019

IND Section: 01  TBA  Henry W. Art

MAST 398  (S)  Independent Study: Maritime Studies

Maritime Studies independent study.

Grading:  yes pass/fail option,  yes fifth course option
Distributions: No divisional credit

Spring 2020
IND Section: 01

MAST 402 (S) Senior Seminar: Perspectives on Environmental Studies (WS)
Cross-listings: MAST 402 ENVI 412
Secondary Cross-listing

The Environmental Studies and Maritime Studies programs provide students with an opportunity to explore the myriad ways that humans interact with diverse environments at scales ranging from local to global. The capstone course for Environmental Studies and Maritime Studies, this seminar brings together students who have specialized in the humanities, social studies and/or the sciences to exchange ideas across these disciplines. Over the course of the seminar, students will develop a sustained independent research project on a topic of their choice.

Requirements/Evaluation: active participation, discussion leading, several smaller assignments and multi-step capstone project
Prerequisites: declared major/concentration in Environmental Studies or Maritime Studies, ideally to be taken in final semester at Williams
Enrollment Limit: 14
Enrollment Preferences: Environmental Studies majors and concentrators, Maritime Studies concentrators
Expected Class Size: 14
Grading: no pass/fail option, no fifth course option
Unit Notes: required course for students wishing to complete the Maritime Studies concentration

Distributions: No divisional credit (WS)
This course is cross-listed and the prefixes carry the following divisional credit:
MAST 402 No divisional credit ENVI 412 No divisional credit

Writing Skills Notes: This course is focused on building up cross-disciplinary writing and communication skills. In addition to 3 short writing assignments, there will be a scaffolded capstone project through which emphasis will be placed on honing writing skills, including for different audiences, and there will be opportunities to revise and resubmit work. Students will receive from the instructor timely comments on their writing skills, with suggestions for improvement.
Attributes: ENVI Core Courses EVST Core Courses EVST Senior Practicum

Spring 2020
SEM Section: 01    MW 7:00 pm - 8:15 pm     Pia M. Kohler
SEM Section: 02    W 1:10 pm - 3:50 pm     Pia M. Kohler

MAST 404 (S) Coastal Processes and Geomorphology (QFR)
Cross-listings: MAST 404 ENVI 404 GEOS 404
Secondary Cross-listing

Can people live safely along the coast? Recent events like SuperStorm Sandy and the Tohoku Tsunami have shown us how the ocean can rise up suddenly and wreak havoc on our lives and coastal infrastructure. Only educated geoscientists can evaluate the risks and define informed strategies to prevent future coastal catastrophes. Currently almost half the global population lives within 100 km of the coast, with a large percent of those living in densely populated cities (e.g., New York, New Orleans, Los Angeles, Shanghai, Hong Kong, Cape Town, Sydney, Mumbai). Despite the growing risks and challenges associated with climate change and rising sea levels, the coastal population continues to grow rapidly. To help ensure these growing populations can live safely along the coast requires a detailed understanding of the processes that shape the coastal zone. These processes act across a variety of scales, from deep-time geologic processes that dictate coastal shape and structure, to decadal-scale processes that determine shoreline position and evolution, to weekly and daily processes such as storms and tides. This course will provide an in-depth look at the forces--wind, waves, storms, and people--that shape the coastal zone, as well as the geologic formations--sandy beaches, rocky cliffs, barrier islands, deltas, and coral reefs--that are acted upon and resist these forces. Coastal dynamics are strongly affected by human interventions, such as seawalls, dredged channels, and sand dune removal, as well as by sea level rise and changes in storm frequency and magnitude associated with climate change.
Finally, the course will provide students with a perspective on how the U.S. seeks to manage its coastal zone, focusing on sea level rise and coastal
This class will include a quantitative lab that will use MATLAB software to model and evaluate various coastal processes. Students will gain a basic understanding of MATLAB functionality, and will be asked to independently apply what they have learned to various data sets provided by the instructor.

**Class Format:** lecture two times a week with a lab one time per week

**Requirements/Evaluation:** lab reports, tests, and an independent research project

**Prerequisites:** GEOS 104, GEOS 210, or permission of instructor

**Enrollment Limit:** none

**Enrollment Preferences:** none

**Expected Class Size:** 10

**Grading:** yes pass/fail option, yes fifth course option

**Distributions:** (D3) (QFR)

This course is cross-listed and the prefixes carry the following divisional credit:

MAST 404 (D3) ENVI 404 (D3) GEOS 404 (D3)

**Attributes:** ENVI Natural World Electives

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Spring 2020

LEC Section: 01  MWF 8:30 am - 9:45 am  Alex A. Apotsos

**MAST 493 (F) Senior Thesis: Maritime Studies**

Maritime Studies senior thesis.

**Grading:** no pass/fail option, no fifth course option

**Distributions:** No divisional credit

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Fall 2019

HON Section: 01  TBA  Henry W. Art

**MAST 494 (S) Senior Thesis: Maritime Studies**

Maritime Studies senior thesis.

**Grading:** no pass/fail option, no fifth course option

**Distributions:** No divisional credit

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Spring 2020

HON Section: 01

**Winter Study**

**MAST 31 (W) Sen Thesis: Maritime Studies**

Maritime Studies senior thesis.

**Class Format:** independent study

**Grading:** pass/fail only

Winter 2020

HON Section: 01
MAST 99 (W) Independent Study: Maritime Studies

Open to upperclass students. Students interested in doing an independent project (99) during Winter Study must make prior arrangements with a faculty sponsor. The student and professor then complete the independent study proposal form available online. The deadline is typically in late September. Proposals are reviewed by the pertinent department and the Winter Study Committee. Students will be notified if their proposal is approved prior to the Winter Study registration period.

Class Format: independent study
Grading: pass/fail only

Winter 2020
IND Section: 01