# BIOLOGY

Chair	Secretary	Location	Department Phone
Dr. Stacy Hrizo	Melissa Barber	300 Vincent Science Center	724-738-2023

Department Web Site URL (http://www.sru.edu/academics/colleges-and-departments/ches/departments/biology/)

#### **Graduate Coordinator**

Dr. John Lisco

## Faculty

#### Simon Beeching

Professor Biology Ph.D., Indiana University B.A., University of Maine

#### Martin Buckley

Associate Professor Biology Ph.D., Michigan State University M.S., Saint Louis University B.A., Saint Louis University

#### Jennifer Carben

Assistant Professor Biology M.S., Slippery Rock University B.A., Slippery Rock University

#### Shawn Davis

Associate Professor Biology Ph.D., Colorado State University M.S., Colorado State University B.S., University of Delaware

#### **Dean Denicola**

Professor Biology Ph.D., Oregon State University M.S., University of Maine B.A., University of Vermont

#### Amber Eade

Associate Professor Biology Ph.D., State University New York Upstate Medical University M.S., Lake Erie College of Osteopathic Medicine M.A., Chicago School of Professional Psychology B.S., Millikin University

#### Paul Falso

Associate Professor Biology Ph.D., University of California B.S., Allegheny College

#### Miranda Falso

Associate Professor Biology Ph.D., University of Pittsburgh B.S., Allegheny College

#### Wayne Forbes

Associate Professor Biology Ph.D., University of West Indies B.S., University of West Indies

#### **Evan Guiney**

Assistant Professor Biology Ph.D., Stanford University B.A., Amherst College

#### Stacy Hrizo

Professor Biology Ph.D., University of Pittsburgh B.S., West Chester University

#### David Krayesky

Professor Biology Ph.D., University of Louisiana M.S., Southern Illinois University B.S., Johnson State College

#### **Christopher Leininger**

Instructor Biology B.A., Iowa State University

#### John Lisco

Associate Professor Biology Ed.D., University of Memphis M.S., University of Memphis B.S., Mesa State College

#### **Christopher Maltman**

Assistant Professor Biology Ph.D., University of Manitoba M.S., University of Manitoba B.S., University of Manitoba

#### Jennifer Piechowski

Assistant Professor Biology B.S., Baldwin Wallace University M.S., Case Western Reserve University Ph.D., University of Akron

#### Susan Rehorek

Professor Biology Ph.D., University of Adelaide (Australia) B.S., University of Adelaide (Australia)

### Cory Shoemaker

Assistant Professor

#### Biology

Ph.D., Mississippi State University M.S., Mississippi State University B.S., Wittenberg University

#### Mark Shotwell

Professor Biology Ph.D., University of Michigan B.S., Ohio University

#### Joy Strain

Instructor Biology

#### Steven Strain

Professor Biology Ph.D., Oregon State University B.S., Memphis State University

#### **Rebecca** Thomas

Associate Professor Biology M.S., Colorado State University B.S., Pennsylvania State University

## **Programs**

- Environmental Education, Master of Education (MEd) (https:// catalog.sru.edu/graduate/engineering-and-science/biology/ environmental-education-med/)
- Park and Resource Management Online, Master of Science (MS) (https://catalog.sru.edu/graduate/engineering-and-science/biology/ park-resource-management-online-ms/)

### Courses MARS

#### MARS 500 - Problems in Marine Science

Graduate or undergraduate students after advanced registration in the course may complete the course requirements by either of the following options: Students may elect to take a 200-, 300-, or 400-level course in which they desire advanced work and complete, in addition to the regular course requirements, an approved project in the area under the direction of the instructor; or the student may do an independent research project. In order to be admitted to the latter option, students must submit a research proposal to the academic committee of the Marine Science Consortium. The proposal must include the scope and duration of the proposed research, equipment and facilities required, and a recommendation and approval from the academic advisor.

#### Credits: 3

Term(s) Typically Offered: Offered as Needed

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 510 - Oceanography (In-Service Teachers)

An introductory course to familiarize teachers with the nature of the oceans and create an awareness of the interdisciplinary nature of oceanography. The teachers will have the opportunity to participate in field activities, develop skills in handling marine instruments, and perform investigative laboratory activities, which will enhance their effectiveness in classroom teaching of oceanography through personal experience.

#### Credits: 3

Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 530 - Coastal Sedimentation

Study of depositional environments of marine-dominated shorelines; their processes, sediments, sedimentary facies; models for recognizing ancient counterparts in rock record; and growth and development of barrier island-tidal deltas.

Prerequisites: MARS 362<sup>D</sup> or EGEO 361<sup>D</sup> <sup>D</sup> Requires minimum grade of D. Credits: 3 Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 540 - Environmental Science Education

A field-oriented approach to environmental education with special emphasis on coastal zones. Students will relate their own disciplines to education for quality environments. Consideration will be given to sources, facilities, methods, techniques and concepts used in environmental education.

#### Credits: 3

Term(s) Typically Offered: Offered as Needed

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 551 - Coastal Environment Oceanography

This course examines the interaction of biological, chemical, physical, geological and ecological ocean processes as applied to coastal environments. Emphasis is placed on environmental management issues of the coastal zone. Topics include water quality analysis, barrier island geology and ecology, estuarine pollution, beach defense and biological implications in areas of coastal up welling and coastal fronts. Specific cases in coastal pollution will be examined from coastal environments around the U.S., including Kepone in the James River, VA, DDT on the Palos Verde Shelf, CA., Eutrophication on the North Carolina Coast, The Exxon-Valdex Oil spill and Pfsteria in the coastal waters of N.C. and VA. Cross listed as MARS451.

#### Credits: 3

Term(s) Typically Offered: Offered as Needed

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 555 - Ocean Resources

This is an introductory course designed to emphasize the potential resources and the feasibilities of their exploitation. The role of ocean science and engineering in accomplishing this goal will be covered.

#### Credits: 3

Term(s) Typically Offered: Offered as Needed

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 590 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate.

#### MARS 598 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### MARS 690 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate.

#### MARS 695 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

Credits: 1-6

Term(s) Typically Offered: Offered as Needed Enrollment is limited to Graduate level students.

#### MARS 698 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3 Term(s) Typically Offered: Offered as Needed Enrollment is limited to Graduate level students.

#### MARS 700 - Independent Study

Independent Study courses give students the opportunity to pursue research and/or studies that are not part of the university's traditional course offerings. Students work one on one or in small groups with faculty guidance and are typically required to submit a final paper or project as determined by the supervising professor.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment is limited to Graduate level students.

#### MARS 790 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment limited to students with a semester level of Graduate.

#### MARS 795 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

#### Credits: 1-6

Term(s) Typically Offered: Offered as Needed Enrollment is limited to Graduate level students.

#### MARS 798 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

#### Credits: 1-3

Term(s) Typically Offered: Offered as Needed Enrollment is limited to Graduate level students.

#### **PCRM**

#### PCRM 541 - Design Graphics and Problem Solving

The application of design and graphic fundamentals to sustainable systems.

#### Credits: 3

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### PCRM 590 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

#### Credits: 1-3

Enrollment limited to students with a semester level of Graduate.

#### PCRM 595 - Recreation Workshops

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

#### Credits: 1-6

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### PCRM 598 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

#### Credits: 1-3

Enrollment limited to students with a semester level of Graduate or Post Baccalaureate.

#### PCRM 612 - Open Space Planning

The fundamentals of open space planning, including feasibility studies, site analysis, resource analysis, and planning consideration.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 613 - Analysis of Professional Literature

A "how to" course in understanding and using statistical analysis for reading and research and techniques for analyzing research publications and writing literature reviews. Offered only as an on-line course.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 615 - Issues in Parks and Recreation/Resource Management

An integrative course for detailed study of current and future challenges facing the parks and recreation professional.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 616 - Aquatic Systems

Using aquatic environments as a thematic focus, this course provides foundational information and teaching techniques related to aquatic systems. The course will cover resource related information, as well as formal and non-formal teaching techniques about amphibians, reptiles, aquatic macro invertebrates and fish. This course includes training in Aquatic Wild.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 617 - Terrestrial Systems

This course focuses on resource management, sustainability and educational teaching techniques as they apply to terrestrial systems. Emphasis will be placed on forests, endangered systems, and the development of associated natural history skills, The course includes training in Project Learning Tree.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 618 - Wildlife Education

This course provides an overview of wildlife and associated teaching techniques. Emphasis will be placed on current issues in conservation, management and identification. Topics will include ornithology and mammalogy. Students will utilize field studies and hands-on, problem solving activities. This course will include training in Project Wild and other associated teaching aids.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 621 - Green Schools

This course provides an overview of specific practices and technologies used in green school facilities and grounds. Course participants will investigate the role that school facilities play in shaping the student"s awareness of the natural environment and ways of living sustainably. Through conducting case studies of existing schools, course participants will learn how to evaluate school facilities. Course participants will develop proposals recommending changes to the structure or operation of school facilities, which would create more environmentally-focused educational settings.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 631 - Design for Sustainable Landscapes

Focuses on sustainable and regenerative design/spec projects at residential and homestead scales. Selected assignments require students to research and develop creative solutions that span the boundary between house and garden, and reflect the interrelationships among human and natural systems. The course is founded on permaculture principles, including zoning and stacking functions, but it is expanded to provide practical tools for planning, detailing and implementing small site design projects. Projects may be chosen in urban and rural settings.

Prerequisites: PREE 541<sup>C</sup> or PCRM 541<sup>C</sup>

<sup>C</sup> Requires minimum grade of C.

Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 632 - Group Facilitation and Leadership

This course will cover the concepts related to working with groups as a facilitator. Hands-on approaches to program design, sequencing activities, and processing experiences will be examined. Students will facilitate their classmates as well as possible REACH Program participants through a group development experience making use of SRU's low and high challenge courses and the Leadership Reaction Course. Students will participate in course/equipment set-up and risk management practices

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 642 - Sustainable Agriculture Techniques

This course presents the concepts of agroecology and applies them to on-farm practices. Integrates principles of crop, animal, week, and insect biology with whole farm management practices, such as use of crop rotation, agroforestry, cover-cropping and conservation techniques.

#### Credits: 3

Enrollment is limited to Graduate level students.

## PCRM 643 - Sustainable Agricultural Practices in Plant and Animal Husbandry

This course provides an overview of biology as it applies to sustainable crop management, with a strong emphasis on genetic resource conservation. The course provides numerous opportunities for hands-on practice of sustainable agriculture.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 644 - Fertility Considerations in Regenerative Agriculture

This is a follow-up to Soils as a Resource (645), focusing on sustainable management of the soil fertility base through cropping system development and use of organic amendments.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 645 - Soils as a Resource

This course is designed to provide students with an analysis of the soil resource as a pivotal component of agricultural and natural ecosystems. This synthesis of historic and scientific information will enable students to critically evaluate the sustainability of soil management systems.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 654 - Natural and Cultural Resources Law

Provides students with advanced knowledge of public land laws regarding natural and cultural resources. Topics of student include history and associated laws concerning water, mineral, timber, range, wildlife, recreation, and cultural resources.

Credits: 3

Enrollment is limited to Graduate level students.

PCRM 655 - Social Science Research Methods in Conservation

A practical course in using research to study recreation, park, and resource management problems.

#### Credits: 3

Enrollment limited to students in the MED 9625, MED 9626, MS 966B or MS 966D programs.

Enrollment is limited to Graduate level students.

#### PCRM 656 - Environmental Issues

A course designed to develop skills in the identification, investigation, evaluation, and solution of environmental problems and issues. Students will learn how to use these skills, in formal and non-formal educational situations, in the development of an environmentally literate citizenry.

#### Credits: 3

Enrollment limited to students in the MED 9625, MED 9626, MS 966B or MS 966D programs.

Enrollment is limited to Graduate level students.

#### PCRM 657 - Environmental Grant Writing

Grant writing is a specialized skill that can supplement and enhance projects and programming. This course is designed to provide basic information and skills in grant writing, with emphasis on the environmental and educational grant potential. Students will learn how to search for appropriate grant sources, the intricacies of grant writing from both the scientific and sociological venues, as well as grant-related nuances.

Prerequisites: PCRM 655 (may be taken concurrently)<sup>C</sup> or PCRM 799<sup>\*C</sup> or PREE 799<sup>C</sup> (may be taken concurrently).

<sup>C</sup> Requires minimum grade of C.

Credits: 3

Enrollment limited to students in the MED 9625, MED 9626, MS 966B or MS 966D programs.

Enrollment is limited to Graduate level students.

#### PCRM 658 - Environmental Education

A study of the history, philosophy, and theory of environmental education; problems and trends in environmental education; and relationships of environmental education to the total school program.

Prerequisites: PCRM 656 (may be taken concurrently)<sup>C</sup> or PCRM  $681^{*C}$  or PREE  $681^{\circ}$  (may be taken concurrently).

<sup>C</sup> Requires minimum grade of C.

Credits: 3

Enrollment limited to students in the MED 9625, MED 9626, MS 966B or MS 966D programs.

Enrollment is limited to Graduate level students.

#### PCRM 661 - Design and Resource Development for Energy Conservation

This course provides an introduction to the concepts and practices of environmentally conscious design. With an emphasis on understanding the natural and cultural context, the course will address the environmental issues related to the development of a small-scale design project.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 662 - Healthy Building Systems and Materials

This course provides an introduction t the theories and practices related to the design of healthy buildings. The course examines the impacts of the built environment on both human health and environmental health, and the role of the designer in addressing these issues.

#### Credits: 3

Enrollment is limited to Graduate level students.

## PCRM 663 - Alternative Energy and Engineering for Sustainable Systems

The course will explore environmental technology and energy efficiency as they relate to buildings. Topics will include passive and active techniques for thermal comfort, day-lighting and alternative energy resources.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 673 - Ecosystem Ecology

This course examines the principles and practices of ecosystem management. An examination of the ecological concepts and processes that underlie ecosystem integrity is followed by an analysis of the role of humans in shaping and managing ecosystems, including institutional and socioeconomic considerations.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 675 - Recreation Resources Management

The principles and practices of recreational land and water management.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 676 - Site and Building Feasibility Studies

This course is designed to develop a comprehensive feasibility study for selected land-based sustainable enterprises. The course will include an on-site inventory and analysis, market evaluation, preliminary planning and cost-return analysis. Three project tracks recreation resource management, community development and sustainable agriculture.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 677 - Cultural Resource Management

The course presents information on current cultural resource preservation efforts and protection strategies for wildland recreation areas. The course covers: current trends and strategies for identifying cultural resource looting and vandalism; protection strategies for managing cultural and historic resources; and methods for developing a proactive cultural and historic resources protection and management program.

#### Credits: 3 Enrollment is limited to Graduate level students.

#### PCRM 678 - Restoration Ecology

Restoration ecology is an emerging discipline that addresses ecological healing, and this course examines the principles and practices underlying this growing field. Exploration of conceptual issues is followed by a review of key ecological concepts pertinent to successful restoration of biodiversity and other ecological features. Practical issues for implementation of a restoration project are also thoroughly addressed. A prior understanding of ecological principles is required.

#### Credits: 3

#### PCRM 683 - Parks and Recreation/Environmental Education Administration

A study of education administration and curricular development for programs; duties and responsibilities of the coordinator or director; and operation and administration of the areas and facilities.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 686 - Management Strategy in Parks and Recreation

A study of administrative and managerial strategy focused on the needs of a parks and recreation professional. Offered only as an on-line course.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 688 - Interpretive Media

A study of various media useful in an interpretive situation, interpretive planning and analysis, and interpretive programming for park and recreation professionals.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 689 - Applied Ecology

This course is an integration of ecology, resource management, and environmental education to promote an understanding of the application of ecological principles as they relate to sustainability. Emphasis is placed on ecological principles that relate to social value orientations and directly apply to resource management practices.

#### Credits: 3

Enrollment is limited to Graduate level students.

#### PCRM 690 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

Credits: 1-3

#### PCRM 695 - Recreation Workshops

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

#### Credits: 1-6

Enrollment is limited to Graduate level students.

#### PCRM 698 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

Credits: 1-3

#### PCRM 700 - Independent Study

A special study opportunity for students to investigate, in depth, approved topics in recreation, environmental education, or sustainable systems. Topics and credit are established by student and supervising instructor. Independent Study courses give students the opportunity to pursue research and/or studies that are not part of the university's traditional course offerings. Students work one on one or in small groups with faculty guidance and are typically required to submit a final paper or project as determined by the supervising professor.

#### Credits: 1-3

Enrollment is limited to Graduate level students.

#### PCRM 750 - Parks and Recreation/Environmental Education Internship

Individually designed experiential learning intended to provide the student with an opportunity for observation and participation in an array of parks, recreation, and/or environmental education activities in an approved setting.

#### Credits: 3-6

Enrollment is limited to Graduate level students.

#### PCRM 790 - Experimental

A unique and specifically focused course within the general purview of a department which intends to offer it on a "one time only" basis and not as a permanent part of the department's curriculum.

#### Credits: 1-3

Enrollment limited to students with a semester level of Graduate.

#### PCRM 795 - Workshop

A workshop is a program which is usually of short duration, narrow in scope, often non-traditional in content and format, and on a timely topic.

#### Credits: 1-6

Enrollment is limited to Graduate level students.

#### PCRM 798 - Selected Topics

A Selected Topics course is a normal, departmental offering which is directly related to the discipline, but because of its specialized nature, may not be able to be offered on a yearly basis by the department.

#### Credits: 1-3

Enrollment is limited to Graduate level students.

#### PCRM 800 - Thesis

Students pursuing a thesis program should contact their academic advisor concerning research after completing about one-half of their degree coursework. The advisor will assist the student with the necessary steps (such as preliminary selection of a topic and arranging for the appointment of a committee) to proceed.

#### Credits: 6

Enrollment is limited to Graduate level students.