



## 2008 LIFE SCIENCE AND NATURAL HISTORY GRADUATE COURSES FOR IN-SERVICE TEACHERS

### Clemson University Scientists Address Teachers' Needs

Scientists in Clemson University's College of Agriculture, Forestry and Life Sciences (CAFLS) and the College of Engineering and Science (CoES) offer a wide selection of life science and natural history graduate courses specifically designed for in-service K-12 teachers and nonformal educators. The courses for the 2007-2008 school year and summer are made possible with funding from the Howard Hughes Medical Institute Undergraduate Science Education Program, in addition to federal, state and private grants. Courses are offered on the Clemson campus, through distance education, and at sites throughout South Carolina. Laboratory requirements vary.

CAFLS focuses on careers for "life" and offers majors that represent a vital part of the basics for living. Areas of study include

- Foundational life sciences such as biology, genetics and preprofessional health
- Applied areas of agricultural science
- Environmental concerns for natural resources

### Course Application Procedures

The registration dates, fees, application procedures and contact information vary for the courses offered. Applicants should submit a formal letter of application that includes:

- a brief description of educational background and current teaching level/subjects
- complete home and school contact information (include e-mail)
- the name of the course to which you are applying (if applying to more than one course, please rank them in order of priority - #1 as your first choice)
- a letter of recommendation from a current school supervisor that includes verification of your employment.

Application materials should be mailed to Ginger Foulk, SC LIFE/Biological Sciences, Clemson University, 132 Long Hall, Clemson, SC 29634-0314. Check each course description for specific application deadlines. Online enrollment is not available. Do not send payment until it is requested.

Course fees as quoted are available to certified teachers who are currently employed full-time in a South Carolina K-12 school. Teachers from schools outside SC should inquire as to fees. Limited enrollment is available at normal Clemson University tuition rates to individuals who are not in-service teachers. In addition to the specified course fees, you must pay a \$50 University registration fee if you have not enrolled in a Clemson University course in the past five years. Do not send any payment until it is requested. Please contact Ginger Foulk (foulk@clemson.edu, 864/656-4224) with questions concerning fees.

Apply as early as possible for the courses in which you wish to enroll. Many courses reach the enrollment limits well before the application deadline.

## Distance Learning Spring 2008 Courses

### **BIOSC 730: Plant Safari**

Three credits

**Dates:** January 9 - April 25, 2008

**Format:** Online course with 5 required self-guided field trips to a SC State Park

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes the remaining costs, including books, tuition and materials.

**Instructor:** Dr. Kathy Kegley, South Carolina DNA Learning Center at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

Learn about plants in a state park near you! This online and self-paced course offers a flexible time schedule and an opportunity to develop useful course materials as you learn. Participants will visit a state park of their choice at least once each month during January, February, March, and April in a self-guided tour to search for plants based on clues developed by SC LIFE botanists. For example, one clue might be "Find a woody plant with opposite arrangement of the leaves in winter." When a suitable plant is located, the participant will obtain a digital photograph of the plant, identify it with the assistance of any available resources (e.g. park ranger, park lists of plants, books about local flora, the WWW) and then document the photo with basic information such as family, medicinal, or other uses. Photos with attached information may later be used in lesson plans and teacher or class-created virtual field trips. In addition, teachers will create three learning modules or very short presentations constructed from knowledge learned during the safari. Learning modules will be standards-based. At the end of the course, participants will have learned the main groups of plants (phylogenetic lineages) and additional information in plant ecology, plant physiology and plant anatomy. Photographs and learning modules will be posted on the SC LIFE web site (with credits given to the contributor) and made available to other teachers to use. Enrollment limited to 15 teachers.

See page 1 for application procedures. **The application deadline is November 16, 2007.** Early applicants will receive priority for acceptance. Applicants will be notified of acceptance beginning December 3.

## On-Site Spring 2008 Courses

The courses listed in this section are offered as requested. Please e-mail the contact person listed for additional information or to schedule an on-site course at your school.

### **GEOL 790: SC MAPS Distance Learning Course**

Three credit hours

**Dates:** January 21-April 21, 2008

**Location:** On-site

**Lecture Format:** Broadcast on the SCETV network available in most schools

**Lecture Time:** Selected in consultation with local groups

**Fee:** \$200 per in-service teacher (includes course materials).

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

Course participants learn in-depth about the SC MAPS (South Carolina Maps and Aerial Photographic Systems) program and how to apply it in their classrooms. The course offers a standards-based, content-intensive study of the geology and geography of South Carolina from an interdisciplinary perspective. A minimum of four teachers per group hosts a local teleconference site at their school. Instruction is presented through a combination of videotapes; print media; Internet resources; and live, interactive videoconferencing. On-site master teachers assist groups with class activities. Each group chooses three

study units out of 10 available modules. Unit 1 is required for those who have not previously attended an extended workshop or other SC MAPS course. Each participant must have Internet and e-mail access, either through school or at home.

A registration form, detailed agenda and syllabus are posted on the SC MAPS Web site at [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps).

### **GEOL 790: Implementing Standards Using SC MAPS in Middle School**

Three credit hours

**Location and Dates:** To be announced

**Fee:** \$200 per in-service teacher (includes course materials).

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

This course is a standards-based, content intensive exploration of the geology and geography that shaped human and natural history throughout South Carolina. Each customized course includes 24 hours of class time plus a full-day field trip and a final exam. Interpretation of aerial photographs, satellite images and topographic maps is emphasized. Courses meet at times and places convenient for the majority of participants. Course offerings can be customized for a particular school's curriculum focus if at least 15 teachers participate at that school.

### **BIOSC 730: Implementing Standards Using SC LIFE in Middle School**

Three credit hours

**Location and Dates:** To be announced

**Fee:** \$200 per in-service teacher (includes course materials). An award from the Howard Hughes Medical Institute subsidizes the remaining costs, including books, tuition and materials.

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

This course is a standards-based, content intensive exploration of the habitats, ecosystems, biodiversity and interactions between the abiotic and biotic environment found throughout South Carolina. Each customized course includes 24 hours of class time plus a full-day field trip and a final exam. Participants are encouraged to use technology in gathering biological and environmental data. Courses meet at times and places convenient for the majority of participants. Course offerings can be customized for a particular school's curriculum focus if at least 15 teachers participate at that school.

### **GEOL 790/BIOSC 730/GEOG 601: Implementing Standards Using SC MAPS and SC LIFE in Middle School**

Three credit hours

**Dates:** 5 Saturdays: 1/26, 2/9, 2/23, 3/8 (field trip and final exam dates TBA on the first day of class)

**Location:** Greenville University Center, Greenville, SC

**Fee:** Normal Clemson University tuition for current Clemson students. SC in-service teachers should contact SC MAPS regarding fees.

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

This course is a standards-based, content-intensive exploration of the geology, geography, and natural history of South Carolina. Coursework is covered during five full-day Saturday sessions (3 hours in the morning and 3 hours in the afternoon), including a field trip. The course emphasis will be on integrating the biotic and abiotic environment through hands-on activities using topographic maps, satellite imagery and infrared aerial photographs. Standards correlations focus on middle school topics, but third grade and high school teachers will find the content appropriate to their classrooms as well.

### Summer 2008 Courses

#### **BIOSC 730: Natural History Investigations: Discovering and Communicating Knowledge**

Three credit hours

**Dates:** June 8-20, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructor:** Dr. Greg Yarrow, Department of Forestry and Natural Resources at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

The course will broadly examine current topics and issues in natural resource conservation in South Carolina. The focus of the course, however, will be to design and implement an experimental approach to answer specific questions about conservation and management of unique natural features and resources on the Experimental Forest at Clemson University. The class will work closely with an interdisciplinary expert team at Clemson University (e.g. naturalist, geologist, botanist, wildlife biologist, forester, economist, land-use planner) that is currently working to develop a long-range use and management plan for the Clemson Experimental Forest. Working with the Clemson team, the class will develop a 2-page research plan to address and answer specific questions critical to developing a comprehensive management plan for the Clemson Experimental Forest. The research plan and effort will include a brief description of need, objectives, methods and expected results. The class will implement the plan by collecting and recording data in the field, analyzing and interpreting the data, writing a report of the project for publication, and presenting the finds of the project to the planning team at Clemson University.

During the course teachers will have access to the Department of Forestry and Natural Resources computer lab, GIS lab and other resources necessary to complete their project and requirements for the course. The course will be composed of 1 week of intensive field and lab work, followed by 1 week of writing the project report and presentation to the CU Experimental Forest Planning Committee on June 20, 2008. Written projects will be posted on the SC LIFE web site and will also be submitted for publication. Participants should be prepared for moderate hiking (less than 2 miles per day), while in the field, and wear comfortable field clothes for warm weather. No prerequisites are required for the course; however, a basic knowledge of biology/science would be helpful. Elementary school, middle school, and high school teaching grades are eligible for the course.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Tech for Teachers - Biological Sensors**

Three credit hours

**Dates:** June 9-14, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Ed Pivorun, Department of Biological Sciences at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course will provide teachers with hands-on experience using sensors and computer interfacing hardware to bring biologically relevant signals into the microcomputer for visualization and data analysis. The microcomputer is a powerful tool that can become an easy-to-use data gathering system through the use of analog to digital interfacing hardware available from companies such as Vernier and Pasco.

The course will use the Vernier interface and sensors. You will learn the limitations and ranges of various sensors and the interfacing electronics. The sensors that will be used include pressure, temperature, pH, conductivity, EKG, voltage, oxygen gas (dissolved in water and in the air), carbon dioxide gas, respiratory rate, heart rate and colorimetry. The software allows for automatic data acquisition and various methodologies of data display and analysis.

Various aspects of signal acquisition will employ the biological entity we call the human. You will use sensors to obtain biological and physiological data from the living human body. The course will also emphasize the use of sensors to determine information on biologically relevant factors such as sugar content in the food we eat, the effects of enzymes on biological processes, determining rates of osmosis and diffusion, rates of cell metabolism and the effects of temperature on metabolism.

All the exercises allow the teachers and students to gather biologically relevant data using modern methodologies that permit immediate (real time) display and analysis. Each teacher will receive the interface module and 4-5 sensors that are most useful in the course(s) they teach. Enrollment limited to 6 teachers.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: The Natural History of Wildflowers**

Three credit hours

**Dates:** June 15-21, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Tim Spira, Department of Biological Sciences and Dr. Lisa Wagner, Director of Education at the South Carolina Botanical Garden at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This field-oriented course will provide elementary, middle and high-school teachers with an opportunity to explore plants in an area of exceptional richness and diversity – the piedmont and mountain regions of South Carolina. Participants will learn about common and unusual plants (including trees and shrubs) in their natural communities as well as some of the myriad ways plants adapt to their respective environments. While plants are the primary focus, we will also explore ways in which plants interact with animals, particularly insects, birds and mammals. Participants will learn to better understand and interpret nature and will discover new ways to incorporate plants into classroom activities. Housing will be provided on the Clemson campus with daily field trips and moderate hiking in state parks, heritage preserves and other areas of special interest in upstate South Carolina. The course consists of one week of formal class work and a second week in which

participants work independently on a written project due June 20. While there are no formal course prerequisites, participants should have an interest in plants and their natural history. See page 1 for application procedures. The application deadline is March 7, 2008. Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Upper Savannah River Basin Lakes**

Three credit hours

**Dates:** June 15-21, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructor:** Dr. John Hains, Department of Biological Sciences at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

Aquatic systems, such as lakes, reservoirs and rivers, serve numerous vital roles in communities and societies. Studies of aquatic systems integrate many academic topics, including biology, chemistry, physics, mathematics and social studies. This course will equip participants with the knowledge and resources to incorporate studies of a local lake, reservoir, pond, river or stream into standards-based classroom activities. Participants will explore the Upper Savannah River basin reservoirs (Jocassee, Keowee and Hartwell) and streams to learn about their natural and cultural history, ecology, watersheds, water chemistry, water quality, and aquatic life. Field experiences include water quality testing, stream surveying, aquatic macroinvertebrate sampling, and watershed analyses. Course activities may include moderate hiking, canoeing and boating. Field locations may include Lakes Jocassee, Keowee and Hartwell and their tributary streams. Expect to spend most days in the field (weather permitting), on the water, in bright sunlight. Swimming abilities are advised but not required. Participants will be required submit a plan that describes how they will teach students about their local waterway. Contact Dr. John Hains ([jhains@clemson.edu](mailto:jhains@clemson.edu), 864-506-1111) or Dr. Barbara Speziale (864-656-1550, [bjspz@clemson.edu](mailto:bjspz@clemson.edu)) with questions about course content or requirements.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Creating Interactive CD Resources for Classroom and Laboratory Use**

Three credit hours

**Dates:** June 16-20, 23-27, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Ed Pivorun and Stephanie Stocks, Department of Biological Sciences at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course will focus on how to use Authorware and other software programs to create an interactive CD for use in the classroom or laboratory. Authorware enables you to present information through text, movies, and still images and to quiz the student on that information through multiple choice, matching, and fill in the blank questions. Teachers will be required to complete their interactive CD on whichever standard and/or

indicator(s) they choose during the two week course. Enrollment is limited to 8 teachers to assure individualized attention.

**Prerequisites:** Prior to the start of class, teachers will receive 2 CD samples of how Authorware can be used in the classroom or laboratory. Each teacher will have at least two pre-course consultations with course faculty to help answer questions and concerns about the CD they will be creating for the course and to help gather visual (and textual) resources they may want to incorporate into their CD. Teachers will come to class prepared with a storyboard or layout for their CD based on the pre-course consultations. There may be two afternoon field trips per week, each requiring easy to moderate hiking, in order to obtain any additional images or video in support of their CD.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Inquiry Based Learning: A Companion Course for Biology**

Three credit hours

**Dates:** June 16 – 27, 2008; pending available funding

**Location:** Clemson University, Clemson, SC

**Fee:** TBA. A minimal fee will be required to insure your position in the class. A grant from the South Carolina Department of Education subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Michelle Cook, Department of Teacher Education at Clemson University; Dr. Barbara Speziale and Cora Allard, Department of Biological Sciences at Clemson University

**Contact:** Cora Allard (864/656-0721, [callara@clemson.edu](mailto:callara@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course is designed to assist in-service high school biology teachers use inquiry-based lessons to prepare students for the Biology End-of-course examination. This course will spend minimal time reviewing the areas of cell biology, energetic, molecular genetics, evolution and ecology that are in the SC Science Academic Standards (2005). The majority of the time will be spent learning and developing new inquiry-based activities to implement in the classroom. Each participant will be required to complete a pre-course evaluation and other assignments such as the creation of posters and lesson plans that can be used in the biology classroom.

**The application deadline is February 15, 2008. To apply, please contact Cora Allard, [callara@clemson.edu](mailto:callara@clemson.edu).** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Introduction to Forensic Science - “Crime Scene Investigation”**

Three credit hours

**Dates:** July 7-11, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructor:** Dr. Vincent Gallicchio, Associate VP for Research and Economic Development at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course is designed to introduce science teachers, at all levels, who have had *no* prior teaching experience to the subject of Forensic Science. The overall course goal is to begin to prepare teachers to engage in a dialogue with their students to introduce, demonstrate and discuss the subject of Forensic Science. The course will focus primarily on the use of didactic lectures, case studies and basic laboratory

experiences used in solving crimes. Teachers will become familiar with specific topics that comprise Forensic Science such as: criminalistics, crime scene investigation, trace evidence, firearms, fingerprinting, impression analysis, document analysis, serology, DNA testing, chemistry, pathology, and anthropology. The course will be offered as a five-day schedule incorporating both morning and afternoon sessions. The course will also involve a site visit to the South Carolina Department of Law Enforcement (SLED) forensic laboratory in Columbia, SC and a day-visit to the Crime Scene Laboratories at Greenville Tech in Greenville, SC. As a final assignment each teacher will be required to prepare a lesson plan describing how they would introduce the scientific and other information learned from this class to initiate their own classroom instruction of students. Enrollment limited to 11 teachers.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Welcome to the Gene Age**

Three credit hours

**Dates:** July 14-18, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructor:** John Cummings, SC DNA Learning Center/Department of Biological Sciences at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

The South Carolina DNA Learning Center provides instruction in modern genetics and biotechnology to K-12 students and teachers. Course participants will learn or refine techniques related to the rapidly advancing fields of DNA science, biotechnology and forensics by participating in the hands-on, investigative laboratory field trips available to middle and high school classes during the academic year in the new South Carolina DNA Learning Center. Topics to be covered include DNA extraction, DNA restriction analysis, human DNA fingerprinting, PCR, genetic modification, bacterial culture, human mitochondrial sequencing, detecting of genetically modified organisms and genomics. Materials developed in the class will be disseminated to facilitate the presentation of these topics in middle and high school classrooms, and the role of the South Carolina DNA Learning Center will be emphasized.

All participants will be required to complete a take-home summary project, consisting of a PowerPoint based poster linking one (or more) of the course topics directly to a lesson plan. Instruction in poster production will be provided. Poster topics will be approved before departure from campus, and a period of two weeks will be allotted for submission of the final product. Enrollment limited to 15 teachers.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Introduction to Spiders**

Three credit hours

**Dates:** July 20 -26, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Bill Marcotte, Stephanie Stocks, Cora Allard, Department of Biological Sciences, Ian Stocks, Department of Entomology, Soils and Plant Sciences at Clemson University and guest researchers

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** *www.clemson.edu/SCLIFE*

This course is designed to introduce teachers to spider structure, behavior, ecology, family level identification, and using spiders as organisms of classroom study. It will also introduce teachers to the biology and physiology of both silk and venom and their applications for classroom studies. During the course, the teachers will have several opportunities to interact with various research experts on these subjects both in the laboratory and in the field. Teachers will be required to do some moderate hiking to collect specimens for their own classroom reference collection. This course will be offered as a seven-day session with a take home project due 2 weeks after the course ends. Enrollment is limited to 12 teachers to ensure individual attention.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **GEOL 790/BIOSC 730: Discover Carolina/SC LIFE Summer Field Course**

Three credit hours

**Dates:** July 14-18 and 21-25, 2008

**Location:** Travel throughout South Carolina

**Fee:** \$200 per participant (includes course materials). The State Park Service provides transportation, lodging and most meals for up to 24 participants.

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University and SC State Park Naturalists

**Contact:** SC MAPS (864/656-1560, *scmaps@clemson.edu*)

**Web site:** *www.clemson.edu/scmaps*

The South Carolina State Park Service and SC LIFE sponsor this field course to highlight the Discover Carolina curriculum materials developed by the Park Service in collaboration with the S.C. Department of Education. This year's interdisciplinary focus is centered on elementary school science and social science standards, specifically those that relate to the human and natural history of South Carolina. The program will work with relevant SC LIFE and SC MAPS activities that encourage students to relate land use to the biotic and abiotic environment.

A group of up to 24 teachers travels from the mountains to the sea exploring the natural and historic wonders of South Carolina. A typical day in the Upstate may include identifying vegetation layers in a cove forest at the Oconee Station state historic site and recognizing the effect of human impact on biodiversity at Paris Mountain State Park. A typical day along the coast may include visits to old rice fields at Hampton Plantation State Park and a study of their effect upon native estuarine and fluvial habitats. Participants should be prepared for short hikes and hot weather. Evening sessions include map and aerial photographic studies highlighting changes in human and natural history over time. Participants complete course assignments at home on July 28-August 1. Participants must agree to implement some SC LIFE activities in their classrooms during the 2008-2009 school year and must organize a school field trip to a local Discover Carolina site. Project staff from SC LIFE, SC MAPS and the Park Service will assist participating teachers in these follow-up activities.

**A registration form, detailed agenda and syllabus are posted on the SC MAPS Web site at [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps).** Priority is given to elementary teachers through May 1, 2008. After that date, other teachers will be accepted on a space-available basis.

### **BIOSC 730: DVDe-Construction**

Three credit hours

**Dates:** July 20-25, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Dale Layfield and faculty, Department of Biological Sciences at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course will provide hands-on tools that will guide teachers through the process of importing/editing video clips from the Howard Hughes Medical Institute (HHMI) Holiday Lecture DVD titled "Potent Biology: Stem Cells, Cloning, and Regeneration." A Clemson researcher in stem cells and cloning will provide a background for the subject matter and lead discussions on which aspects of the South Carolina science curriculum this topic would enhance.

Participants will be provided with the software that can edit the clips and will learn how to integrate the media into PowerPoint presentations. Detailed instructions on innovative techniques with PowerPoint will be emphasized. Each participant will develop a series of lessons (at home, after the week-long class) that integrate aspects of the HHMI DVDs. Using online interactive videoconferencing (a special date for this online meeting will be determined by participants), final projects will be shared for peer feedback/additional ideas for classroom uses.

Each participant will be provided with an entire set of the HHMI Holiday Lecture DVDs. Each presentation consists of four lectures by two HHMI Research Scholars and includes videos, classroom demonstrations, computer animations and audience questions. More details regarding the HHMI Holiday Lecture DVDs (including Webcasts of the "Potent Biology" DVD used in this course) can be viewed for free at: <http://www.hhmi.org/lectures/>. Prior computer skills in Microsoft PowerPoint preferred. Enrollment limited to 12 teachers.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Advanced Forensic Science - "Crime Scene Investigation"**

Three credit hours

**Dates:** July 21-25, 2008

**Location:** Greenville Technical College, Greenville, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructor:** James McDonald, M.S., Department of Criminal Justice, Greenville Technical College and Dr. Vincent Gallicchio, Associate VP for Research and Economic Development at Clemson University

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course is designed for science teachers at all levels who *have had* prior teaching experience in the subject of Forensic Science that wish to receive advanced training in methods used in crime scene investigation. The overall course goal is to provide teachers the opportunity to learn new skills and laboratory based exercises in order for them to improve their technical expertise and dialogue with their students to introduce, demonstrate and discuss the subject of Forensic Science. Teachers will be fully engaged in the policies and procedures involved in crime scene investigation by analyzing simulated crime scenes in order to collect evidence and analyze that evidence using a variety of analytical, chemical, and physical procedures. Hands on techniques will cover the analysis of a crime scene with particular attention to the examination of: ballistics, blood, documents, drugs, fingerprints, firearms, footmarks, glass, hair &

fibers, and impressions. Following evidence analysis a report will be given in the form of expert testimony as if given in an actual courtroom situation. The course will be offered as a five-day schedule incorporating both morning and afternoon sessions. As a final assignment, each teacher will be required to prepare a lesson plan describing how they would use the scientific laboratory techniques and other information learned from this class to initiate their own classroom instruction of students. Enrollment limited to 15 teachers.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### **BIOSC 730: Teaching Evolution in the Science Classroom: What Teachers Need to Know**

Three credit hours

**Dates:** July 21-25, July 28 – August 1, 2008

**Location:** Clemson University, Clemson, SC

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including lodging fees, meals, materials and tuition.

**Instructors:** Dr. Margaret Ptacek, Dr. Jerry Waldvogel, Dr. Erika Milam, Dr. Brad Hersh, Dr. Rick Blob, Department of Biological Sciences at Clemson University, Dr. David Cicimurri, Campbell Geology Museum at Clemson University

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

This course is designed to help South Carolina middle and high school science teachers better understand evolutionary theory, how scientists conduct research in evolutionary biology, and how to use creative inquiry techniques to improve the attitudes, as well as, knowledge base of middle school and high school students in facilitating better learning of topics in evolutionary biology. The two-week course will include both lectures from faculty on topics ranging from history of science and evolutionary thought to geology, paleontology, developmental biology and population genetics and “hands on” experiences in conducting research in evolutionary biology. A team of Clemson faculty with expertise in each of these areas will provide the lectures, and evolutionary biologists within the department of Biological Sciences will mentor participants in conducting their own research projects. In addition, an overview of the state standards for evolutionary biology and the legal issues associated with teaching evolution in South Carolina classrooms will be discussed. Teachers will have an opportunity to work in a research scientist’s lab and develop an independent project that could be used in their classrooms. A project report on the research conducted and the development of a classroom exercise that illustrates a principle or process in evolution will be required work. A general knowledge of genetics is strongly recommended. Enrollment limited to 12 participants.

See page 1 for application procedures. **The application deadline is March 7, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning March 17.

### Distance Learning Fall 2008 Courses

#### **BIOSC 730: South Carolina Master Naturalist Program for Teachers**

Three credit hours

**Dates:** August 20-December 5, 2008

**Format:** Online course with two required Saturday field trips

**Fee:** \$200 per in-service teacher. An award from the Howard Hughes Medical Institute subsidizes costs for this course, including materials and tuition.

**Instructors:** Dr. Karen Hall, Department of Forestry and Natural Resources at Clemson University; Dr. Austin Jenkins, Clemson University Sandhill REC; Dr. Brian Callahan, Clemson University Extension, Pickens County; Dr. Chris Marsh, Lowcountry Institute

**Contact:** Ginger Foulk (864/656-4224, [foulk@clemson.edu](mailto:foulk@clemson.edu))

**Web site:** [www.clemson.edu/SCLIFE](http://www.clemson.edu/SCLIFE)

Based on the curriculum of the SC Master Naturalist program, this blended learning course (online and expert-guided field trips) is designed to teach you the overall natural history basics of the state with an emphasis on the Upstate region of South Carolina. This includes such foundation concepts as the underlying geological landscape processes, biological and ecological processes and an emphasis on learning identification basics of a number of groups of organisms (plants, animals, insects, fungi). Students will proceed through various online modules on these topics, practice them on their own and then hone their skills during the expert-guided field trips. At the end of the program, teachers will be certified as a SC Master Naturalist.

Required Saturday field trips will be all day excursions into important areas around the state, led by instructors for the SC Master Naturalist program. You will be able to choose where you'd like to take the field training from at least three locations (Upstate, Sandhill, Lowcountry), though many may prefer to take field training located within their own region. Field trips will only be offered at satellite locations if teacher minimums are met. Moderate to hard hiking conditions will prevail and so participants are encouraged to dress appropriately.

The South Carolina Master Naturalist Program is a volunteer program geared toward teaching interested adults about the natural history and natural resources of the state. Individuals complete core course work and then become certified as a SC Master Naturalist by providing volunteer labor for various projects including conservation-type projects, outreach education and more. As teachers, your service hours for this first year will be returned in the form of service by helping to create the ideas and curriculum associated with a Jr. Master Naturalist program. No prerequisites are required. Teachers from any grade level can be accepted.

See page 1 for application procedures. **The application deadline is June 2, 2008.** Early applicants will receive priority for acceptance and applications will be accepted until the course is full. Applicants will be notified of acceptance beginning June 23.

### On-Site Fall 2008 Courses

The courses listed in this section are offered as requested. Please e-mail the contact person listed for additional information or to schedule an on-site course at your school.

#### **GEOL 790: SC MAPS Distance Learning Course**

Three credit hours

**Dates:** September 15 - December 5, 2008

**Location:** On-site

**Lecture Format:** Broadcast on the SCETV network available in most schools

**Lecture Time:** Selected in consultation with local groups

**Fee:** \$200 per in-service teacher (includes course materials).

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

Course participants learn in-depth about the SC MAPS (South Carolina Maps and Aerial Photographic Systems) program and how to apply it in their classrooms. The course offers a standards-based, content-intensive study of the geology and geography of South Carolina from an interdisciplinary perspective. A minimum of four teachers per group hosts a local teleconference site at their school. Instruction is presented through a combination of videotapes; print media; Internet resources; and live, interactive videoconferencing. On-site master teachers assist groups with class activities. Each group chooses three study units out of 10 available modules. Unit 1 is required for those who have not previously attended an extended workshop or other SC MAPS course. Each participant must have Internet and e-mail access, either through school or at home.

A registration form, detailed agenda and syllabus are posted on the SC MAPS Web site at [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps).

### **GEOL 790: Implementing Standards Using SC MAPS in Middle School**

Three credit hours

**Location and Dates:** To be announced

**Fee:** \$200 per in-service teacher (includes course materials).

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

This course is a standards-based, content intensive exploration of the geology and geography that shaped human and natural history throughout South Carolina. Each customized course includes 24 hours of class time plus a full-day field trip and a final exam. Interpretation of aerial photographs, satellite images and topographic maps is emphasized. Courses meet at times and places convenient for the majority of participants. Course offerings can be customized for a particular school's curriculum focus if at least 15 teachers participate at that school.

### **BIOSC 730: Implementing Standards Using SC LIFE in Middle School**

Three credit hours

**Location and Dates:** To be announced

**Fee:** \$200 per in-service teacher (includes course materials). An award from the Howard Hughes Medical Institute subsidizes the remaining costs, including books, tuition and materials.

**Instructors:** Dr. John Wagner, Department of Geological Sciences at Clemson University, and local master teachers

**Contact:** SC MAPS (864/656-1560, [scmaps@clemson.edu](mailto:scmaps@clemson.edu))

**Web site:** [www.clemson.edu/scmaps](http://www.clemson.edu/scmaps)

This course is a standards-based, content intensive exploration of the habitats, ecosystems, biodiversity and interactions between the abiotic and biotic environment found throughout South Carolina. Each customized course includes 24 hours of class time plus a full-day field trip and a final exam. Participants are encouraged to use technology in gathering biological and environmental data. Courses meet at times and places convenient for the majority of participants. Course offerings can be customized for a particular school's curriculum focus if at least 15 teachers participate at that school.