Science Education

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Degree awarded:
Ph.D. in Science Education

Program web site:
http://sciedphd.stonybrook.edu/

Application
https://app.applyyourself.com/AYApplicantLogin/fl_ApplicantLogin.asp?id=sunysb-gs

Science Education
The Institute for STEM Education (I-STEM) provides graduate education leading to a PhD in Science Education for those who wish to work as
1. university or college science educators, directing science teacher education programs, working closely with schools and school systems on local, state and national science projects;
2. university research or policy specialists, with the bulk of their time spent on guiding research on various aspects of science instruction;
3. directors and supervisors in K-12 school systems, covering the design and implementation of science programs at local, county and state levels; and,
4. classroom teachers with improved knowledge of science education theory and practice.

A carefully sequenced series of science education core courses and research experiences, coupled with exposure to science education events at state and national levels, provide the backbone of the program. Students are introduced to current science education research areas. As part of the coursework students are required to complete research projects, write and submit articles for publication, make presentations at science education conferences and learn to use computer and library research resources.

Beyond the science education core coursework, students take courses in statistics and research methodologies, complete breadth and depth requirements in science content areas and undertake independent research under the guidance of advisors in science education and in their science cognate discipline. The program targets part-time students from the region, but will expand after the first cohort groups by attracting full-time students. Part-time students should complete the program in approximately five to six years.

Science Education Admission Requirements:
The following will be required
A. A bachelor’s degree in a science subject
B. A master’s degree in either a scientific field or in education
C. Official transcripts of all colleges and universities attended
D. GRE general test scores (required for PhD programs - taken within last 5 years)
E. Graduate GPA of at least 3.0
F. 3 letters of recommendation
G. Interview and writing sample
H. Statement of intent
I. Completed application form
Degree Requirements for the Ph.D. in Science Education

A. Course Requirements (5 courses from the following)

- CSM 599 Graduate Research in Science Education
- CSM 600 History and Philosophy of Science Education
- CSM 610 Nature and Practice of Science
- CSM 620 Science Teacher Education
- CSM 630 Science Education Research Seminar
- CSM 640 Directed Study in Science Education
- CSM 650 Introduction to Measurement and Assessment in Science Education

B. Statistics and Research Methodology courses (3 courses, which may include the following)

- CSM 635 Qualitative Research Methods in Science Education
- CSM 645 Introduction to Quantitative Research Methods

C. Science Content Breadth and Depth Courses (up to 6 courses)

D. Independent Research

- CSM 699 Dissertation Research on Campus or CSM 700 Dissertation Research Off Campus
- CSM 701 Dissertation Research Off Campus-International

The courses to be taken depend upon the type of master’s degree that the entering student holds. Students holding a master’s degree in a specific scientific discipline will be required to complete graduate courses in other science disciplines. Students holding masters degrees in education will be required to complete graduate coursework in their scientific field. The required breadth and depth courses are determined by transcript review by the Graduate Program Director upon acceptance into the program.

E. Qualifying examination

Students will complete a qualifying examination after their fifth semester and upon the completion of all the science education core courses. The qualifying examination will have three components:

Paper 1 – a common examination question for all students based on a topic from the science education core courses.

Paper 2 - an individualized examination question, written by the student’s advisor, based upon a student’s dissertation research area.

An oral presentation and defense of the two papers

F. Research Proposal

Students are required to prepare and defend a dissertation proposal based on their proposed research. The students will present a formal written dissertation proposal that includes details of the research questions, a complete literature review, the methods chosen to answer the research questions and details of how the collected data will be analyzed. The proposal will be presented and defended in an oral hearing before the dissertation committee. If appropriate, Institutional Review Board (IRB) approval to conduct the research will be secured. On satisfactory completion of the dissertation proposal, a recommendation for advancement towards candidacy will be forwarded to the graduate school.

G. Advancement to Candidacy

When the above requirements have been satisfactorily completed, a recommendation for advancement to candidacy for the Ph.D. will be forwarded to the Graduate School.

H. Dissertation

The dissertation research outlined in the thesis proposal will be supervised by the committee, which will normally include both science education and science faculty.

I. Dissertation Defense

The dissertation defense, which completes the requirement for the PhD consists of a public seminar presentation of the dissertation work followed by an oral examination before the dissertation examining committee.

J. Teaching Experience
A semester of a practicum in teaching will be required in addition to the completion of the Science Teacher Education core course. This may include making seminar presentations, assisting in laboratories, science teacher professional development, and leading discussion sessions. Formal and informal feedback on a candidate’s teaching will be provided by program faculty.

K. Residence Requirement

The University requires at least two consecutive semesters of full-time graduate study.

Science Education Faculty

**Full Professors**

Bugallo, Mónica, Professor of Electrical and Computer Engineering and Faculty Director of the Women in Science and Engineering Program (WISE). Ph.D., 2001, University of A Coruña, Spain: Statistical signal processing; engineering education; women in science and engineering.


Ferguson, David L., Distinguished Service Professor and Chairperson of Technology and Society. Ph.D., 1980, University of California, Berkeley: Quantitative methods; computer applications (especially intelligent tutoring systems and decision support systems); mathematics, science, and engineering education.

Hanson, Gilbert N., Distinguished Service Professor of Geosciences. Ph.D., 1964, University of Minnesota: Application of radiometric and geochemical methods to petrologic and tectonic problems.

Hanson, David M., Distinguished Service Professor of Chemistry. Ph.D., 1968, California Institute of Technology: Design and development of classroom learning structures; text-based and web-based learning systems; and course assessment systems.

Lopez, Glenn R., Professor of Marine Sciences. Ph.D., 1976, Stony Brook University: Marine biology; benthic ecology; animal-sediment interactions.

McCarthy, Robert, Professor of Physics and Astronomy and Director of Masters of Arts in Teaching Physics Program. Ph.D., 1971, University of California, Berkeley: Experimental elementary particle physics; physics education of teachers.

**Associate Professors**

Aubrecht, Katherine, Associate Professor of Chemistry. Ph.D., 1999, Cornell University: Development of learning materials about sustainability for the chemistry curriculum; context-based approaches in chemical education; biodegradable and bio-renewable polymers; environmentally benign synthetic methodology.


Kelly, Angela, Associate Professor of Physics. Ph.D., 2006, Teachers College, Columbia University: Science education; physics education; engineering education; physical science access for traditionally underserved groups; sociocognitive perspectives of STEM participation and persistence.

Nehm, Ross, Associate Professor of Ecology and Evolution. Ph.D., 1998, University of California, Berkeley: Biology education; science assessment; assessment technologies; problem solving processes; science learning; novice-expert studies; evolution education; textbooks and knowledge representation.

Rushton, Gregory T., Associate Professor of Chemistry. Ph.D., 2004, University of South Carolina: Conceptual change in tertiary chemistry learning environments; classroom discourse practices; policy reform in K-16 chemistry education; large-scale demographic analyses of K-12 STEM teaching populations; science teacher leadership; curricular reform through research-driven decisions; pedagogical content knowledge (PCK) in chemistry.

Scarlatos, Lori L., Associate Professor of Computer Science. Ph.D., 1993, Stony Brook University: Educational technology; tangible, physical, multi-modal, and collaborative human-computer interfaces; serious games; computer graphics; multimedia.

Sheppard, Keith, Associate Professor of Biology and Cell Biology and Director of Institute for STEM Education. Ed.D., 1997, Teachers College, Columbia University: Science education, chemistry education, physics education, history of science education, science learning, science teacher education.

**Research Associate Professor**

Moloney, Daniel, Research Associate Professor of Biochemistry and Cell Biology, Director of NIH Bridges to Baccalaureate Program, and Director of Biotechnology Teaching Laboratories. Ph.D., Stony Brook University: cell signaling regulation; cancer chemoprevention; DNA barcoding; biotechnology; STEM education.

Stony Brook University Graduate Bulletin: www.stonybrook.edu/gradbulletin
Research Assistant Professor

Zachar, Zuzana, Research Assistant Professor of Biochemistry and Cell Biology and Director of Masters of Arts in Teaching Biology Program. Ph.D., Stony Brook University: Cancer chemotherapy; transposon biology; regulation of alternative splicing of mRNA and nuclear architecture; biology education of teachers.

NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.