

above. At least 9 credit hours must come from required courses in the MA in Bioethics program. There is no thesis requirement. All work must be completed within four years of the date of initial enrollment in the graduate program. Up to 3 hours of transfer credit may be considered in place of elective course work. Transfer credit acceptance is based on review and approval of grades, course syllabi, and other relevant information.

Admitted students may enroll in the general Graduate Certificate program or may specialize by enrolling in the Graduate Certificate in Clinical Bioethics or the Graduate Certificate in Biomedical Research Ethics. The specialized certificate options require particular courses within the general requirements described above. The Graduate Certificate in Clinical Bioethics requires students to enroll in BIE 705: Clinical Ethics for 3 of the 9 credit hours of required courses. The Graduate Certificate in Biomedical Research Ethics requires students to enroll in BIE 702: Biomedical Research Ethics for 3 of the 9 credit hours of required courses. Students in the specialized certificate programs may utilize elective courses designed to provide supervised observational and experiential opportunities in relevant settings.

Clinical and Population Translational Science (CPTS)

Bowman Gray Campus

Program Co-Directors

Kathryn Weaver

Overview

The objective of this certificate program is to provide training in epidemiology, biostatistics, and applied clinical and population research methods to health professionals, research professionals, and health sciences students, residents, and fellows. Students trained in the program will develop skills: 1) to develop meaningful and feasible research questions, 2) to design and implement studies to answer clinical and population research questions, 3) to communicate through grant applications, protocols, manuscripts, abstracts, and presentations, and 4) to collaborate productively in multidisciplinary scientific teams. Courses are primarily taught by faculty within the Division of Public Health Sciences and are held on Tuesdays and Thursdays.

Interpreting and Translation Studies (ITS)

Program Co-Directors

Sally Barbour and Olgaierda Furmanek

Overview

For students who are not able or ready to commit to earning a Master of Arts degree in interpreting and translation studies, but who would like to focus on an area of interest, the program offers four Graduate Certificates and one Post-Graduate Certificate in specialized areas. Pairing various certificates provides a comprehensive package for students to reach their career goals in a more flexible, customized manner. Credits from a certificate program can often be transferred to a graduate degree program. A student who chooses to complete three certificates can meet the requirements for an MA in Interpreting and Translation Studies.

Certificate Requirements

Students are required to complete 15 credit hours of instruction within four consecutive semesters. Credits from a certificate program can often be transferred to a graduate degree program. A

student who chooses to complete three certificates can meet the requirements for an MA in Interpreting and Translation Studies. The minimum GPA average required for graduation is 3.0.

Foreign Language or Special Skills Requirements for Certificates

The Graduate Certificate in Interpreting Studies, the Graduate Certificate in Translation Studies and the Graduate Certificate in Audiovisual Translation and Interpreting are language-specific. Applicants who do not have a college or high school degree from another country are required to take an online language proficiency assessment in their non-native language and may be subject to a written exam and/or oral interview. Proven interpreting experience is required for the Post-Graduate Certificate in Teaching of Interpreting.

Certificates Offered:

Graduate Certificate in Interpreting Studies (language-specific)
Graduate Certificate in Translation Studies (language-specific)
Graduate Certificate in Audiovisual Translation and Interpreting (language-specific)
Graduate Certificate in Intercultural Services in Healthcare
Post-Graduate Certificate in Teaching of Interpreting (students holding an MA, MS, or MBA)

Medieval and Early Modern Studies (MDV)

(Departments of English, Romance Languages, Religion, History, Political Science and International Affairs, Philosophy, Music, Classics, Art History, Divinity School, German, Humanities, Art History)

Program Director

Herman Rapaport

Professors

Stewart Carter, Roberta Morosini, Gilian Overing, Mary Pendergraft,

Gale Sigal, Harry Titus, Ulrike Wiethaus

Associate Professors

Bernadine Barnes, Michaelle Browers, Jefferson Holdridge,

Judy Kern, Sol Miguel-Prendes, Monique O'Connell,

Olga Valbuena-Hanson, Neal Walls

Patrick Toner, Charles Wilkins

Darlene Rae May

Adjunct Associate Professor

Darlene Rae May

Overview

The Interdisciplinary Graduate Certificate Program in Medieval Studies (GCPMS) is designed to allow MA students in English and Religion to both broaden their knowledge of and focus their studies on the medieval period. The GCPMS combines programmatic interdisciplinary coursework, training in the technical skills of medieval studies, and linguistic preparation. The program offers prospective and first-year MA students a competitive advantage in admission to doctoral programs. Students may be admitted to the program by permission of the directors when they are admitted to the graduate program in the department to which they apply or at any time during their first year.

Students must complete all graduate requirements for the MA in English or religion (separately listed in this bulletin under each department) and may take undergraduate courses in any participating department towards the certificate. (A listing of courses that satisfy the medieval studies minor can be found in the Wake Forest University Undergraduate Bulletin.) Courses satisfying the certificate may overlap with department graduate requirements, but acquiring the certificate requires coursework beyond that of the disciplinary MA.

Students are required to take a minimum of four additional courses (12 hours) with a medieval focus; these courses should represent two different disciplinary fields in addition to that of the candidate's home department. In consultation with the program director, one or more of these

additional courses may be taken as directed reading or as medieval language courses. The graduate thesis must have a medieval focus, and the thesis committee should have at least two participating departments represented.

The GCPMS generally does not require more time to complete than the host MA program in English or religion. While students working towards the GCPMS are required to take four courses in medieval studies beyond the standard requirements of the departmental MA, some of those additional courses may be taken as an overload during the academic years or during the summer. Students are strongly encouraged to apply for extramural fellowships to study one or more summers at the international sites where a medieval studies curriculum is available (e.g., St Peter's College at Oxford (see the medieval studies minor in the Wake Forest University Undergraduate Bulletin for details)). A final mechanism is to request approval from the relevant departmental graduate committee to apply two of the courses taken toward completion for the MA degree toward the certificate program with the addition of relevant course-related materials.

Students in the GCPMS may avail themselves of many activities and opportunities including the medieval studies lecture series; the paper competition that rewards the winners with funding to the International Congress on Medieval Studies at Western Michigan University; the Gordon A. Melson Graduate Student Award in Medieval Studies, specifically awarded to an outstanding graduate student to attend the International Congress on Medieval Studies at Western Michigan University; the medieval studies summer program at St. Peter's College, Oxford; the annual Wake Forest Medieval Studies Student Society Conference, a student-organized interdisciplinary conference inviting participation from graduates and undergraduates from surrounding universities; the medieval section of the department's library in the Archie Ammons English Department Faculty Lounge; the establishment of internships and fellowships for La corónica: A Journal of Medieval Spanish Language, Literature and Cultural Studies (see the website at <http://college.holycross.edu/lacronica>), edited by Professor Sol Miguel-Prendes, a medievalist in the Romance Language department.

Structural and Computational Biophysics (SCB)

(Programs of Biology, Chemistry, Computer Science, Mathematics, Molecular and Cellular Biosciences and Physics)

Program Director

Professors

Freddie R. Salsbury Jr
Rebecca Alexander, Edward E. Allen, Ulrich Bierbach,

Keith D. Bonin, James F. Curran, Larry W. Daniel, Martin Guthold,
David J. John, Daniel B. Kim-Shapiro, S. Bruce King, Douglas S. Lyles,

Gloria K. Muday, James Norris, Fred W. Perrino, Leslie B. Poole, Peter Santago,

Stan J. Thomas

Associate Professors

Thomas J. Hollis, W. Todd Lowther, Jed C. Macosko, V.,

Paul Pauca, Freddie R. Salsbury Jr., Brian W. Tague, William H. Turkett Jr.

Assistant Professors

Adam Hall, Derek Parsonage

Overview

The Interdisciplinary Graduate Track in Structural and Computational Biophysics (SCB) is designed to meet the need for scientists and educators with broad, interdisciplinary training in the quantitative biological, biochemical, and biomedical sciences. Students who successfully complete the SCB Track and degree requirements will receive a certificate in Structural and Computational Biophysics, as well as the degree in the program in which they matriculate. The Track is

implemented by collaboration among the programs of Biology, Chemistry, Computer Science, Mathematics, Molecular and Cellular Biosciences and Physics at Wake Forest University.

Following matriculation and at least one semester of coursework in a participating program (currently, Biology, Chemistry, Computer Science, Mathematics, Molecular and Cellular Biosciences and Physics), students can apply for admission to the SCB Graduate Track. Admission to the Track is initiated by meeting with the SCB program representative. The student will then submit a letter of intent and a Wake Forest University graduate transcript to their department representative who will present it to the SCB advisory committee. The letter of intent should express the student's interest in the SCB program, a proposed plan of study, and how the SCB program meets the student's career and academic goals. Following favorable evaluation, applicants may be recommended for admission by the SCB advisory committee, with final approval determined by the Graduate School. Prior to admission, it is recommended that applicants complete coursework in introductory chemistry, introductory biology, introductory biochemistry, molecular biology, or cell biology; calculus-based physics, and programming in a high-level language; however, all applicants should meet the prerequisites for the individual graduate degree program to which they are applying (physics, chemistry, biology, mathematics, molecular and cellular biosciences or computer science).

Students in the Interdisciplinary Graduate SCB Track must complete all graduate degree requirements in the individual department to which they were admitted. (The official degree requirements for the PhD in Physics, Biology, Chemistry, or programs under the Molecular and Cellular Biosciences Track or the MS in Computer Science or Mathematics are described under the department listing.) In addition, at least 15 hours of the student's graduate coursework should consist of courses approved as part of the SCB Track (listed in this bulletin), including a general, introductory SCB course and two hours of journal club credit. At least one course must be at the 700 level. Students must take at least two graduate hours in each of the curriculum areas: chemistry/biochemistry, computer science/mathematics, and biophysics. All students in the SCB Track must complete and defend a PhD dissertation (or MS thesis for computer science or mathematics) that involves original, interdisciplinary research in the area of structural and computational biophysics or computational biology; broadly defined. The dissertation committee will consist of members from at least three participating SCB departments. All students must successfully complete a course in scientific ethics. Each semester, several seminars from the participating departments will be designated as SCB discussion group seminars. Students in the Track are required to attend these seminars.

Students in the SCB Track have access to state-of-the-art equipment and facilities in multiple departments, including the Wake Forest Structural Biology Facility (scb.wfu.edu), the DEAC Linux cluster (deac.wfu.edu), and well-equipped research laboratories in biophysics, biochemistry, and biomedical engineering.

The Interdisciplinary Graduate Track in Structural and Computational Biophysics began in 2005. Information on the program and links to faculty research interests can be accessed at scb.wfu.edu.

Courses of Instructions

Courses listed in this bulletin are examples and are those already approved for the Interdisciplinary Graduate Track in Structural and Computational Biophysics at Wake Forest University. Other courses may be allowed by the SCB Track director. Course descriptions can be found under the department which administers the course.)

SCB-Specific Courses

SCB 701. Structural and Computational Biophysics Journal Club. (1) Seminal and current publications in structural and computational biophysics are read and discussed. *P—Admission to the SCB*

graduate track or POI.

SCB 710. Research Topics in Structural and Computational Biophysics. (1) Lectures and discussions on research topics in the field of structural and computational biophysics and biology. Topics depend on the specialty of the instructors in a given semester. *P—Admission to the SCB graduate track or POI.*

Curriculum Area 1. Chemistry/Biochemistry

General prerequisites: Two semesters of undergraduate chemistry and one semester of undergraduate biochemistry or molecular biology; one semester of organic chemistry is considered ideal, but is not required for most courses. (If additional prerequisites are required, they are listed individually by course.)

CHM/PHY 641. Fundamentals of Physical Chemistry. (3 or 4)

BIO 672. Molecular Biology. (3 or 4)

BIO/CHM 670. Biochemistry: Macromolecules and Metabolism. (3)

BIO/CHM 670L. Biochemistry Laboratory: Macromolecules and Metabolism. (1)

MCB 701 Molecular and Cellular Bioscience A (1-6)

MCB 711 Biological Systems and Structures (2)

Curriculum Area 2. Physics

General prerequisites: Two semesters of undergraduate physics. (If additional prerequisites are required, they are listed individually by course.)

PHY 607. Biophysics. (3)

PHY 625. Biophysical Methods Laboratory. (1) *C—PHY 607.*

PHY 685. Bioinformatics. (3) *P—*Introductory courses in biology, chemistry, and molecular biology or biochemistry or permission of instructor; also listed as CSC 685, though requirements and prerequisites are different.

PHY 620. Physics of Biological Macromolecules. (3) *P—PHY 651 or CHM 641, or POI.*

Curriculum Area 3. Computer Science/Mathematics

General computer science prerequisites: Programming in a high level language. (If additional prerequisites are required, they are listed individually by course.)

CSC 621. Database Management Systems. (3)

CSC 631. Object-oriented Software Engineering. (3)

CSC 646. Parallel Computation. (3)

CSC 652. Numerical Linear Algebra. (3)

CSC/MTH 626. Introduction to Numerical Methods. (3)

CSC 671. Artificial Intelligence. (3)

CSC 685. Bioinformatics. (3)

CSC 721. Theory of Algorithms. (3)

CSC/MTH 753. Nonlinear Optimization. (3) *P—Computer Science 655.*

CSC/MTH 754. Numerical Methods for Partial Differential Equations. (3) *P—CSC 655 or MTH*

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655.

MTH 605 Applied Multivariable Mathematics (4)

Mth 606 Advanced Mathematics for the Physical Sciences (3)

MTH 652. Partial Differential Equations. (3)

any of MTH 654-667 excluding 661 (3)

MTH 750 Dynamical Systems (3)

Sustainability (SUS)

Program Director

Professors

Dan Fogel
Miles Silman, Abdou Lachgar, Keith Bonin, Dilip Kondepudi,

Associate Professors

Assistant Professors

Alan Palminter, Robert Whaples, Dick Schneider, Sid Shapiro, John Knox
David Phillips, Saylor Breckenridge, Justin Catanoso
Ron Von Burg, Judith Madera, Steven Folmer,
Michael Gross, Rob Erhardt

Research Professors

Associate Faculty

Bailey Green
Dedee DeLongpre Johnston, Amy Wallis,
Vanessa Zboreak, Mark Curtis, Rebecca Dickson

Overview

The Graduate Certificate in Sustainability Program is a twelve credit hour certification that consists of the four core courses of the Master of Arts in Sustainability and can be obtained on a stand-alone basis or in conjunction with another master's program. This track provides students with exposure to sustainability issues in the natural sciences, social sciences, humanities, business management, law, and policy. Candidates of the Graduate Certificate in Sustainability Program will utilize our program as a mechanism for adding value to their professional endeavors while simultaneously satisfying the urgent societal need for highly knowledgeable leaders in the field of sustainability.

Students wishing to change from the certificate program to the master's program will be expected to qualify for and apply to move into the full master track. Successful completion of the Graduate Certificate Program in Sustainability does not guarantee admission to the Master of Arts in Sustainability program.

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