Chapter 16 - Interdisciplinary Graduate Programs

Doctor of Philosophy Degree Program in Computational Analysis and Modeling (PhD)

Administration

Coordinator
Balachandran Ramachandran, Program Chair and, Associate Dean for Research & Graduate Studies, Engineering and Science

Steering Committee Members
Ben Choi
Weizhong Dai
Galen Turner
Sumeet Dua

Address
More information about the Computational Analysis & Modeling program can be obtained by writing
Program Chair, CAM PhD program
Louisiana Tech University
P.O. Box 10348
Ruston LA 71272
(318) 257-3090
and/or visiting the web site:
http://www.latech.edu/coes/cam/

Objective
The PhD program in Computational Analysis and Modeling is an interdisciplinary doctoral degree program with participation from the College of Engineering and Science, the College of Applied and Natural Sciences, and the College of Business.

The program is intended to produce professionals who have a firm grasp of the fundamentals of mathematical modeling; who have the expertise to implement, analyze, and evaluate such models using state-of-the-art computing environments and advanced visual data analysis techniques; and who have made a cutting-edge contribution to some technical area associated with the program.

Program Administration
The Program Chair and the steering committee, with the approval of the Dean of Graduate School, will establish the policies and procedures applicable to this program, evaluate applications, administer examinations, and oversee all aspects of the student’s work.

Admission Requirements
1. Applicants must meet the general requirements for admission to graduate programs at Louisiana Tech University (see Chapter 15 of this Catalog.)
2. A master's degree in one of the physical or biological sciences, engineering, computer science, or mathematics is recommended but not required. Exceptional students with a bachelor’s degree in an appropriate area will be considered.
3. An official Graduate Record Examination (GRE) score is required. This requirement may be waived in the case of exceptional students.
4. Applicants must submit official transcripts.
5. Letters of recommendation may be required by the coordinator of the program.

Core Requirements, Course Work and Dissertation
Typically, 72 hours of graduate work will be required for the degree. The Core consists of 15 graduate hours of mathematics, 9 graduate hours of computer science, and 9 graduate hours of a third area chosen from chemistry, physics, biology, forestry, finance, statistics, or an engineering discipline. The remaining courses will be determined by discussion between the student and the advisor, with the approval of the interim committee (see below).

The topic for the dissertation may be selected from the disciplines listed above for the third area, but may also include mathematics or computer science.

Committees
An Interim Committee consisting of at least 4 members must be appointed for each student by the end of the first quarter in the program. This Committee will consist of at least 1 member from the following areas:
1. Mathematics and Statistics
2. Computer Science
3. The third discipline selected.

A Doctoral Committee of five members will replace the student's interim committee within one year of passing the qualifying examination. The Doctoral Committee will work with the student to plan the research to be undertaken for the degree. It will be approved by the CAM steering committee and shall have the following membership:
1. The major professor (dissertation advisor),
2. At least one from mathematics and statistics,
3. At least one from computer science,
4. At least one from the student’s Area of Specialization.

Examination Structure, Candidacy, and Time Limitation

Qualifying Examination
The qualifying examination will consist of written examinations in mathematics and in computer science and an appropriate exam in the area of application. The qualifying exam in the area of application may consist of the master's degree in that area. Special permission from the Dean of the Graduate School is required to take any one of these exams more than twice.

Comprehensive Examination
Within one year of passing the qualifying exam, a student is normally expected to pass a comprehensive examination in his/her area of specialization. The comprehensive exam will include a lecture followed by a question/answer period on the student’s proposed dissertation topic that exhibits a clear demonstration of an understanding of the principles and methods involved in his/her proposed area of specialization.

Candidacy
After the student has successfully passed the comprehensive examination, the student will be admitted to candidacy.

Dissertation Defense Examination
The student's Doctoral Committee administers the dissertation defense exam. It will, in most cases, consist of an open public defense of the results of the dissertation. This final exam must be successfully completed in accordance with the
deadlines published by the Graduate School. Those serving on
the doctoral committee must recommend, with at most one
dissent, that the student has satisfactorily passed the dissertation
defense exam.

**Timetable**

**Matriculation** - Interim Committee must be appointed and an
initial plan of study submitted by the end of a student’s first
quarter of study.

**Dissertation Research Proposal** - A proposal outlining the
research to be undertaken for the dissertation must be submitted
by the end of the fourth quarter of enrollment, not including
summers.

**Qualifying Exam** – To be taken in the first Fall Quarter
following three quarters in the program, consisting of written
examinations in mathematics and computer science, and
appropriate examination in the third discipline (may consist of
master's degree).

**Doctoral Committee** - Chosen within one year of passing the
qualifying examination, with the membership as stipulated
above.

**Comprehensive Exam** - (In the area of specialization, the area
in which the dissertation is written) Within one year of passing
the qualifying exam.

**Admitted to Candidacy** - Upon passing the comprehensive
exam, the student is admitted to candidacy for the doctoral
degree.

Please note the maximum time limitations for completing a
doctoral degree stated in Chapter 15 of this catalog.

**Master of Science Degree Program in
Molecular Sciences and
Nanotechnology (MSMSNT)**

**Administration**

Coordinators
Balachandran Ramachandran, Associate Dean for
Research & Graduate Studies, Engineering and Science
William J. Campbell, Associate Dean for Graduate
Studies & Research, Applied and Natural Sciences

Steering Committee Members
Engineering and Science: Yuri Lvov
Applied and Natural Sciences: David K. Mills

**Address**

More information about the Molecular Sciences and
Nanotechnology program can be obtained by writing to one of
the coordinators:

c/o Dean of Graduate School
Louisiana Tech University
P.O. Box 7923
Ruston LA 71272
(318) 257-2924

and/or visiting the web site:
http://www.latech.edu/coes/grad-programs/

**Objectives**

The objectives of this interdisciplinary program are

1. To train graduate students in experimental, theoretical, and
computational aspects of research in molecular biology,
chemistry, and physics, particularly where these disciplines
intersect.

2. To enhance interdisciplinary applied research at Louisiana
Tech University in micro and nanotechnology, including
molecular biology and protein engineering.

3. To prepare graduate students for the next generation of
careers in science and technology by offering a unique,
flexible, and highly marketable graduate degree.

4. To prepare graduate students for interdisciplinary or
traditional PhD programs in biochemistry, chemistry,
materials science, molecular biology, and physics which
emphasize research at the intersections of one or more of the
traditional disciplines.

**Program Administration**

The coordinators and the steering committee, with the
approval of the Dean of Graduate School, will establish the
policies and procedures applicable to this program, evaluate
applications, administer examinations, and oversee all aspects of
the student’s work.

**Admission Requirements**

1. An undergraduate degree in biological sciences, biomedical
engineering, chemical engineering, chemistry, electrical
engineering, or physics, or a closely related discipline such as
biochemistry, biophysics, chemical technology,
engineering physics, molecular biology, or pharmacology.

2. A Graduate Record Examination (GRE) V+Q score of
1050 for students who do not have an undergraduate degree
from an accredited U.S. institution. Outstanding academic
performance at the undergraduate level could offset this
minimum requirement to some extent.

3. All international students are required to submit
documentation of English proficiency before their
applications can be evaluated. The scores must be achieved
within two years of application to the Graduate School.

**Course Requirements**

Thesis or practicum options are available. The thesis option
consists of 24 semester credit hours (SCH) of courses + 6 SCH
of research and thesis for a total of 30 SCH. The Practicum
Option consists of 33 SCH of courses + 3 SCH of practicum for
a total of 36 SCH.

All students will be required to take either MSNT 505
(Nanotechnology Principles) or MSNT 521 (Principles of Cell
and Molecular Biology) depending on research interests. All
students will also take MSNT 502 (Research Methods) and
MSNT 504 (Seminar) as core courses. The remainder of the
curriculum is to be determined by consultation with the research
advisor and advisory committee.

Some remedial work may be necessary to acquire the
required background if the student decides to change fields at
this point (e.g., physics students may have to take biology
classes, and biology students may need to improve their
knowledge of the physical sciences).
Committee, Plan of Study, and Research Proposal

A Graduate Advisory Committee will be appointed for each student by the end of the first quarter of enrollment. The Committee shall consist of at least three members, with at least one member from the two participating colleges (Engineering & Science, and Applied & Natural Sciences). A Plan of Study listing the courses to be taken should be prepared in consultation with the research advisor, approved by the Committee, and submitted by the end of the first quarter of enrollment. The choice between thesis and non-thesis options must be made at this time.

A research proposal detailing the research to be conducted for the thesis or practicum must be prepared in consultation with the advisor, approved by the Committee, and submitted by the end of the second quarter of enrollment.