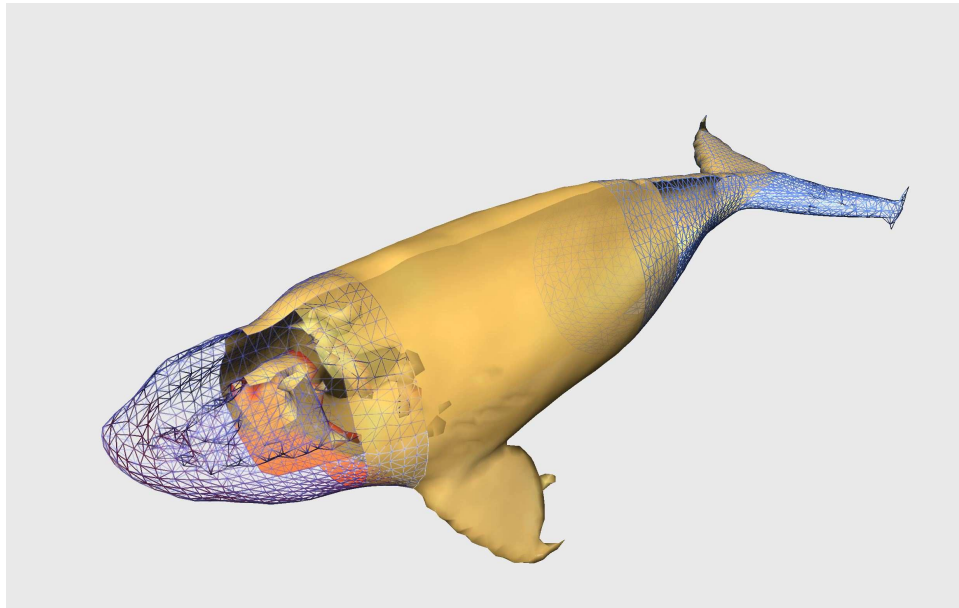


Graduate Programs in Computational Science

Florida State University



Graduate Student Handbook



Contents

1 Graduate Study in Computational Science	4
2 Graduate Degrees in Computational Science	4
2.1 Master's Programs	5
2.2 Ph.D. in Computational Science	5
2.3 Major codes for Graduate Programs in Computational Science	6
3 Admissions	6
3.1 Application Procedure for Students Outside FSU	6
3.2 Transferring from Another Graduate Program at FSU	7
3.3 Continuation to the Ph.D. in Computational Science	7
4 Computational Science Courses	8
5 Degree Requirements	9
5.1 Requirements for M.S. Degree in Computational Science	9
5.1.1 Types of Program	9
5.1.2 Major Professor and Supervisory Committee	9
5.1.3 Program of Study	10
5.1.4 Foreign Language Requirement	11
5.1.5 Minimum GPA Requirement	11
5.1.6 Thesis/Project	11
5.1.7 Time Limitations	11
5.1.8 English Competency	11
5.2 Requirements for Professional Science Master's Degree in Computational Science	12
5.2.1 Major Professor and Supervisory Committee	12
5.2.2 Program of Study	12
5.2.3 Summer Internship	13
5.2.4 Foreign Language Requirement	13
5.2.5 Minimum GPA Requirement	13
5.2.6 Project	13
5.2.7 Time Limitations	14
5.2.8 English Competency	14
5.3 Requirements for Ph.D. Degree in Computational Science	14
5.3.1 Major Professor and Doctoral Supervisory Committee	14
5.3.2 Program of Study	15
5.3.3 Foreign Language Requirement	16
5.3.4 Preliminary Examination Requirement	16
5.3.5 Admission to Candidacy	16
5.3.6 Minimum GPA Requirement	16
5.3.7 Prospectus	16
5.3.8 Dissertation	17
5.3.9 Time Limitations	17
5.3.10 English Competency	17

6	Financial Issues	18
6.1	Assistantships	18
6.2	Tuition Waivers	18
6.2.1	Florida Residency	18
6.3	Summer Support	19
6.4	Fellowships	19
6.5	Health Insurance	19
7	Registration	19
7.1	Registration for Examinations	20
8	Evaluations	20
8.1	Annual Progress Evaluations	20
8.2	Satisfactory Progress Towards the Degree	20
8.2.1	Students in Master’s Programs	21
8.2.2	Ph.D. Students	21
8.3	Appeals	22
9	Graduation	22

1 Graduate Study in Computational Science

Over the last few decades, computations have joined theory and experimentation to form the three pillars of scientific discovery and technological design. Moreover, in many cases scientific computations have superseded both theory and experimentation. Thus, whether one is studying sub-atomic particles or galaxies, whether one is designing minute nano-composites or huge skyscrapers, whether one is sequencing the human genome or protecting fragile ecosystems, whether one is studying the flow of blood in capillaries or predicting the winds in a hurricane, computations play a central role. The computations that enable these and a myriad of other studies depend on the invention, implementation, and testing of algorithms and software that computers use to solve scientific and engineering problems. This is the work of computational scientists.

The high national priority of computational science is amply illustrated by the fact that the President's Information Technology Advisory Committee (PITAC) in 2003 chose it, along with health care information technology and cyber security, as the three areas of greatest national importance related to information technology. The Committee's June 2005 report *Computational Science: Ensuring America's Competitiveness* has the following conclusion.

"The most scientifically important and economically promising research frontiers in the 21st century will be conquered by those most skilled with advanced computing technologies and computational science applications."

The graduate programs in computational science offered by FSU's School of Computational Science (SCS) are committed to training computational scientists through an innovative curriculum and an interdisciplinary research environment. The computational science courses are designed to function across disciplines rather than within a single discipline. The faculty of the SCS is truly interdisciplinary, today consisting of physicists, biologists, geophysicists, biochemists, engineers, mathematicians, statisticians, and computer scientists, with an even broader spectrum of interests to be represented in the future. The SCS faculty is collectively bound by one common interest: developing better computational tools. It is very fortunate that computational algorithms are very ecumenical in nature; a method that solves a problem in one discipline more often than not can also be used in several other disciplines. It is this synergy between disciplines that is being exploited by the SCS in its research programs. Thus, the SCS is ideally positioned to offer innovative graduate degree programs in computational science that impart this same synergy to its students.

These computational science programs cut across departments, concentrating on the sub-disciplines that are common to all: programming, algorithm development, analysis and implementation, visualization, statistics, etc. The program strives to provide students with knowledge in various disciplines while obtaining depth in at least one area. In this way the computational scientist can also serve as a translator between domain experts who have most of their knowledge in a single field as well as a conduit to transfer technology from one discipline to another.

2 Graduate Degrees in Computational Science

The SCS offers two programs at the master's level and a Ph.D. in computational science. Specifically, the programs are

- M.S. in computational science,
- Professional Science Master's (PSM) in computational science,
- Ph.D. in computational science.

2.1 Master's Programs

The M.S. degree in computational science provides two main tracks for students. The first path is typically taken by students who are seeking a Ph.D. and also want to complete the M.S. requirements. The second path is a professional degree program which gives the student the opportunity to acquire professional skills such as project management in addition to the training in computational science; typically the PSM degree is a terminal degree. Hands-on experience through a summer internship program allows the professional master's student to integrate material learned through coursework with problems of interest to industry and government agencies. Both programs require the same core coursework in computational science.

The PSM program allows students the option to follow the major track which emphasizes the mathematical and computer science aspects of computational science or to specialize their studies in computational methods for bioinformatics.

2.2 Ph.D. in Computational Science

The goal of the Ph.D. program in computational science is to have graduate students acquire extensive knowledge in computational science while having the opportunity to gain expertise in a particular area of science or engineering. Thus the degree provides the student with breadth as well as depth. Graduates should be able to successfully collaborate with scientists in other disciplines. Ideally, students should learn to develop and analyze new computational procedures which can be utilized in a variety of fields.

Based on the current expertise in SCS, the following tracks are available:

- Ph.D. in Computational Science (major track¹),
- Ph.D. in Computational Science with a Specialization in Atmospheric Science,
- Ph.D. in Computational Science with a Specialization in Biochemistry,
- Ph.D. in Computational Science with a Specialization in Biological Science,
- Ph.D. in Computational Science with a Specialization in Geological Sciences,
- Ph.D. in Computational Science with a Specialization in Materials Science,
- Ph.D. in Computational Science with a Specialization in Physics.

If the student chooses one of the tracks then his/her diploma will reflect this; for example if the specialization in Geological Sciences is chosen then the student's diploma will indicate a *Ph.D. in Computational Science - Geological Sciences*.

¹emphasizing the mathematical, statistical, and computer science aspects of computational science.

2.3 Major codes for Graduate Programs in Computational Science

The following major codes have been assigned to the graduate programs in computational science. These codes are necessary for completion of many University forms. The CIP code for the Ph.D. degree is 30.0801.

Master's Programs		
Computational Science (Major Track)		113910
PSM in Computational Science		113911
PSM in Computational Science - Molecular Biology / Bioinformatics		113912
Ph.D. Programs		
Computational Science (Major Track)		113910
Computational Science (Atmospheric Science)		113920
Computational Science (Biochemistry)		113921
Computational Science (Biological Science)		113922
Computational Science (Geological Sciences)		113923
Computational Science (Material Science)		113924
Computational Science (Physics)		113925

3 Admissions

All students entering this degree program should have a strong desire to do computational science and have knowledge of at least one programming language.² Students typically possess an undergraduate degree in computer science, computational science, mathematics, statistics, or a science or engineering discipline. The University requires the general GRE examination for all applicants to graduate school.

3.1 Application Procedure for Students Outside FSU

Applicants outside of the University who want to apply to the graduate program in computational science need to (i) apply to SCS and (ii) apply to FSU. The procedure is as follows:

SCS application process:

- complete the SCS on-line application;
- send at least three letters of recommendation to the SCS Director of Graduate Studies (education@scs.fsu.edu);
- send a statement of purpose;
- international students need to complete the Certificate of Financial Responsibility form;

²Typically students are required to have a working knowledge of C/C++, Fortran 90 or Java.

FSU application process:

- complete the FSU application; this can be done on-line for domestic applicants but must be printed and completed for international applicants;
- pay FSU application fee³;
- have sent to FSU official copies of transcripts from all institutions attended;
- have official copy of GRE examination sent;
- have official TOEFL scores sent (international applicants only).

Once the FSU Graduate Admissions office receives a student's completed file, they will forward copies of the transcript and an official action form to SCS for admission decisions. The SCS can only recommend admission to the Office of Graduate Studies (OGS); the official letter of admission comes from the University. However, the SCS Director of Graduate Studies will notify students of their recommendation for admission and will also notify the student of any offers of financial support.

3.2 Transferring from Another Graduate Program at FSU

Students who are currently completing another graduate program (such as a Master's program) at FSU may simply reapply to the FSU OGS⁴ for the computational science program.

Students who are currently enrolled in another graduate program at FSU but are not completing a degree in that program, should complete a transfer form which can be obtained from the SCS Director of Graduate Studies or the FSU Registrar. This form must be approved by the SCS Director, the Chair of the student's current program and the Dean of Arts and Sciences. Transfer of students from other programs is limited to those students who can justify that their interests are a better fit in computational science than in their current program.

3.3 Continuation to the Ph.D. in Computational Science

Students who hold only an undergraduate degree are typically admitted into the M.S. program in computational science even if their ultimate goal is a Ph.D. This allows the student the opportunity to make sure that the graduate program fits their interests and allows SCS to evaluate their ability to get a Ph.D. in computational science. After two years of graduate study, the student can make a more informed decision whether he/she desires to get a Ph.D. If this is no longer the student's goal, then he/she can easily complete the M.S. degree requirements and leave with this degree. If a Ph.D. is desired, then the student has two options for being admitted into the Ph.D. program.

Students in the M.S. program who have maintained at least a 3.2 GPA, have chosen a major professor and have passed the preliminary examination by the end of their second year of graduate study will automatically be switched into the Ph.D. program at their request. All students are encouraged, but not required, to complete an M.S. degree before switching to the Ph.D. program.

³A student may apply to more than one graduate program at FSU with a single application fee.

⁴Office of Graduate Studies

Courses		
ISC 5224	Introduction to Bioinformatics	3
ISC 5225	Molecular Dynamics: Algorithms and Applications	3
ISC 5226	Numerical Methods for Earth and Environmental Sciences	3
ISC 5227	Survey of Numerical Partial Differential Equations	3
ISC 5228	Markov Chain Monte Carlo Simulations	3
ISC 5305	Scientific Programming	3
ISC 5306	Programming Skills for Computational Biology & Bioinformatics	3
ISC 5315	Applied Computational Science I	4
ISC 5316	Applied Computational Science II	4
ISC 5317	Computational Evolutionary Biology	4
ISC 5907	Directed Individual Study in Computational Science	1-6
ISC 5935	Selected Topics in Computational Science	3
ISC 5936	Numerical Methods for Stochastic Differential equations	3
ISC	Scientific Visualization	3
ISC	High Performance Computing	3
Seminars		
ISC 5934	Introductory Seminar on Research in Computational Science	1
ISC 5939	Advanced Graduate Student Seminar in Computational Science	1
Other		
ISC 5948	Graduate Internship in Computational Science	3
ISC 5975	Thesis	
ISC 6981	Dissertation	
ISC 8964	Doctoral Qualifying Exam	0
ISC 8965	Doctoral Preliminary Exam	0
ISC 8977	Master's Thesis Defense	0
ISC 8982	Dissertation Defense	0

Table 1: Current ISC courses

Students in the M.S. program who have not passed the preliminary exam by the end of their second year of graduate study may apply for the Ph.D. program. These students will be considered along with all the other applicants for graduate study in computational science and for assistantships. These students must complete their M.S. degree requirements before entering the Ph.D. program.

4 Computational Science Courses

The School of Computational Science is using the prefix ISC for all computational science courses. Listed in Table 1 are the courses which have been approved as well as two seminars, an internship, the necessary courses to complete thesis and dissertation requirements, and the courses necessary for scheduling doctoral exams.

5 Degree Requirements

Graduate degree students in *computational science* at Florida State University must meet requirements specified by

- the Graduate College,
- the School of Computational Science,
- the student's Supervisory Committee.

The Graduate College degree requirements are published in the *Graduate Bulletin* which can be found online at <http://registrar.fsu.edu/bulletin/grad/default.htm>. The requirements specified by the School of Computational Science are described in this document. Any requirements specified by the student's Supervisory Committee must be communicated to the student by completion of the prospectus for a Ph.D. student and before the beginning of an M.S. student's third semester.

Typically, students must complete the requirements that are in effect at the time of admission into the degree program. However, if requirements change during a student's graduate career, then he/she may choose to follow the later rules. However, a student must completely follow one set of rules; i.e., the student may not "pick and choose" rules from different Graduate Handbooks.

All SCS forms that are mentioned in this document can be downloaded from the website as pdf templates.

5.1 Requirements for M.S. Degree in Computational Science

5.1.1 Types of Program

The M.S. degree program is structured as a two-year program for full-time students. The student must choose between the thesis or non-thesis option for the M.S. degree. The thesis option requires the completion of a master's thesis which involves an independent investigation which is potentially publishable. If the student chooses the thesis option then he/she must meet all University requirements for formatting and submitting the document. The non-thesis option requires the student to complete a project which does not have to constitute original work. Both options require a minimum of 32 credit hours; for the thesis option the 32 credits include 6 credit hours of thesis. Students who want to continue their studies to obtain a Ph.D. may use their prospectus to satisfy the project requirement.

5.1.2 Major Professor and Supervisory Committee

The student's Supervisory Committee plays an integral role in guiding him/her through the graduate education. No later than the second semester, the student should choose a major professor, i.e., an advisor. The major professor must be an SCS faculty member who has graduate directive status. In the case of co-advisors, then at least one of the advisors must be an SCS faculty member with graduate directive status. If the other co-advisor is not an SCS faculty member, then he/she must hold an appointment to Courtesy faculty rank in Computational

Science with graduate co-directive status. Upon request of the major professor, a Supervisory Committee will be established which will oversee the Program of Study, monitor the student's adherence to graduate policies, evaluate progress towards the degree, and assess the thesis or final project. The Supervisory Committee must consist of a minimum of three members of the graduate faculty including the major professor; the Committee must consist of a majority of tenured/tenure-track SCS faculty. The composition of the Supervisory Committee must be on file in the SCS; this form must be on file at the time the student schedules the defense of his/her project or thesis.

Any changes in the Supervisory Committee must be approved by the major professor and the Director of Graduate Studies. In addition, the appropriate form must be submitted.

5.1.3 Program of Study

The Program of Study (POS) is formulated to include all coursework which is necessary to meet FSU and SCS requirements. As early as possible, and no later than the second semester of graduate study at FSU, the student should prepare a POS; see Appendix I for a sample of this form. The POS must be approved by the student's major professor and the Director of Graduate Studies for SCS; a copy of the POS should be kept on file in the SCS. Modifications to the POS must be approved by the major professor and the Director of Graduate Studies and submitted no later than one semester before graduation.

The POS must include a minimum of 32 credit hours and meet the following minimum coursework requirements imposed by SCS.

Group A. Core required courses: ISC5305, ISC5315 (7 credit hours);

Group B. Core elective courses: 9 credit hours of coursework with prefix ISC excluding ISC5305, ISC5315 and with no more than 3 of the 9 credit hours consisting of Directed Individual Study (ISC5907) or Selected Topics in Computational Science (ISC5935);

Group C. Application courses: 6 credit hours of graduate level courses offered by programs other than computational science;

Seminar Requirement. 4 credit hours of seminar (Includes 2 credit hours of ISC5934; ISC5939 or seminars from other departments may be taken for the remainder);

Thesis. 6 credit hours of thesis (ISC5975) if the thesis option is chosen.

Note that if a student has selected the thesis option then these requirements constitute the 32 credit hours necessary for the degree; if the project option is selected, then an additional 6 credit hours of coursework must be taken.

In addition, if the student has selected the thesis option then the University requires that at least 18 of the 32 credit hours must be taken on a letter-grade basis. If the non-thesis option is chosen, at least 21 of the 32 credit hours must be taken on a letter-grade basis.

If the Supervisory Committee approves a course substitution for any of these requirements, then this substitution must be approved by the SCS Director of Graduate Studies following the guidelines developed by SCS Curriculum Committee.

The University allows a maximum of 6 hours of semester credit as transfer credit from another accredited graduate school as long as the hours are not counted toward a previous degree. Transfer of credit not counted towards a previous degree within FSU is limited to 12 credit hours.

5.1.4 Foreign Language Requirement

There is no foreign language requirement for the M.S. in computational science.

5.1.5 Minimum GPA Requirement

The student must maintain an average GPA of at least 3.0 in all coursework contained in the Program of Study.

5.1.6 Thesis/Project

The thesis is the evidence that the student has successfully completed an independent inquiry which is potentially publishable and is able to communicate the results in both a written and oral manner. The student must defend the thesis to the Supervisory Committee. A prospectus is not required for a thesis. The manuscript for the thesis must be prepared using the formatting guidelines prepared by the Office of Graduate Students. The manuscript must be submitted to the Supervisory Committee at least 10 days before the date set for the exam.

The project is the evidence that the student can communicate a topic in computational science in both a written and oral manner. The student must defend the project to the Supervisory Committee. A prospectus is not required for the project. The written description of the project must be submitted to the Supervisory Committee at least 10 days before the date set for the exam.

5.1.7 Time Limitations

The Graduate College imposes the condition that all requirements for the master's degree be completed within seven calendar years from the time the student first registers for graduate credit.

5.1.8 English Competency

The SCS is responsible for ensuring that international students achieve competency in spoken English sufficient to communicate as a scientist and to participate in quality instruction when serving as a Teaching Assistant. International students must demonstrate competency in spoken English. Exceptions to this are international students from English speaking countries or foreign students with an undergraduate degree from a U.S. institution.

International students should register for the course "Spoken English for International TAs" until they pass the SPEAK test. Students with exceptional conversational English experience may be recommended for immediate testing or be exempted from this requirement by the Director of Graduate Studies.

5.2 Requirements for Professional Science Master's Degree in Computational Science

The Professional Science Master's degree program is structured as a two-year program for full-time students. There is no thesis option but all students must complete a project and an internship.

5.2.1 Major Professor and Supervisory Committee

The student's Supervisory Committee plays an integral role in guiding the student through his/her graduate education. No later than the end of the second semester, the student should choose a major professor, i.e., an advisor. The major professor must be an SCS faculty member and have graduate directive status. In the case of co-advisors, then at least one of the advisors must be an SCS faculty member with graduate directive status. If the other co-advisor is not an SCS faculty member, then he/she must hold an appointment to Courtesy faculty rank in Computational Science with graduate co-directive status. Upon request of the major professor, a Supervisory Committee will be established which will oversee the Program of Study, monitor the student's adherence to graduate policies, evaluate progress towards the degree, and assess the final project. The Supervisory Committee must consist of a minimum of three members of the graduate faculty including the major professor; the Committee must consist of a majority of tenured/tenure-track SCS faculty. The major professor must be a member of the SCS faculty. The composition of the Supervisory Committee must be established by completing the appropriate form. This form must be on file at the time the student schedules the defense of his/her project.

Any changes in the Supervisory Committee must be approved by the major professor and the Director of Graduate Studies. In addition, the appropriate form must be submitted.

5.2.2 Program of Study

The Program of Study (POS) is formulated to include all coursework which is necessary to meet FSU and SCS requirements. As early as possible, and no later than the second semester of graduate study at FSU, the student should prepare a POS;⁵ see Appendix I for a sample of the appropriate form. The POS must be approved by the the major professor and the Director of Graduate Studies; a copy of the POS must be kept on file in the SCS. Modifications to the POS must be approved by the major professor and the Director of Graduate Studies and submitted no later than one semester before graduation.

The POS must include a minimum of 36 credit hours and meet the following minimum requirements imposed by SCS:

Group A. Core required courses: ISC5305, ISC5315 (7 credit hours);

Group B. Core elective courses: 9 credit hours of coursework with prefix ISC excluding ISC5305, ISC5315 and with no more than 3 of the 9 credit hours consisting of Directed Individual Study (ISC5907) or Selected Topics in Computational Science (ISC5935);

⁵A L^AT_EX template for the form, as well as other SCS forms, can be downloaded from the SCS website.

Group C. Applications courses: 6 credit hours of graduate level courses offered by programs other than computational science;

Seminar requirement. 2 credit hours of seminar (ISC5934);

Group D. Professional skills courses: 6 credits hours of approved management or related courses;

Internship. 6 credit hours of internship credit (ISC5948).

At least 21 of the 36 credit hours must be taken on a letter-grade basis.

In addition, if the student is following a track other than the major track, then he/she must complete a total of 6 credit hours in that area; these courses must be approved by the Supervisory Committee and may also serve to satisfy the Group C requirements listed above.

If the Supervisory Committee approves a course substitution for any of these requirements, then this substitution must be approved by the SCS Curriculum Committee.

The University allows a maximum of 6 hours of semester credit as transfer credit from another accredited graduate school as long as the hours are not counted toward a previous degree. Transfer of credit not counted towards a previous degree within FSU is limited to 12 credit hours.

5.2.3 Summer Internship

The PSM degree requires an internship which is typically done between the student's first and second academic years of study. The internship is typically done in industry or a laboratory off-campus but an equivalent on-campus experience may be substituted with the approval of the student's supervisory committee and the Director of Graduate Studies. The student is required to register for ISC5948 during his/her internship. Typically, the student's final project will arise from work during his/her internship.

5.2.4 Foreign Language Requirement

There is no foreign language requirement for the PSM in computational science.

5.2.5 Minimum GPA Requirement

The student must maintain an average GPA of at least 3.0 in all coursework contained in the Program of Study.

5.2.6 Project

The project is the evidence that the student can communicate a topic in computational science in both a written and oral manner. The student must defend the project to the Supervisory Committee. A prospectus is not required for the project. The written description of the project must be submitted to the Supervisory Committee at least 10 days before the date set for the exam.

5.2.7 Time Limitations

The Graduate College imposes the condition that all requirements for the master's degree be completed within seven calendar years from the time the student first registers for graduate credit.

5.2.8 English Competency

The SCS is responsible for ensuring that international students achieve competency in spoken English sufficient to communicate as a scientist and to participate in quality instruction when serving as a Teaching Assistant. International students must demonstrate competency in spoken English. Exceptions to this are international students from English speaking countries or foreign students with an undergraduate degree from a U.S. institution.

International students should register for the course "Spoken English for International TAs" until they pass the SPEAK test. Students with exceptional conversational English experience may be recommended for immediate testing or be exempted from this requirement by the Director of Graduate Studies.

5.3 Requirements for Ph.D. Degree in Computational Science

For the Ph.D. degree the student can choose to follow the major track which emphasizes the mathematical and computer science aspects of computational science or follow one of the application tracks in science or engineering listed in Section 2.2.

5.3.1 Major Professor and Doctoral Supervisory Committee

The student's major professor and Supervisory Committee plays an integral role in guiding him/her through their graduate education. The major professor should be chosen based upon mutual research interests. It is to the student's advantage to choose an advisor as early as possible. However, no later than the beginning of the student third (academic year) semester in the degree program, he/she should choose a major professor, i.e., an advisor. The major professor must be an SCS faculty member and have doctoral directive status and have competency in the area of the student's research for the dissertation. Upon request of the major professor, a Supervisory Committee will be established which will oversee the student's Program of Study, monitor adherence to graduate policies, evaluate progress towards the degree, and assess whether the student's research constitutes a significant contribution to the area of computational science. The Supervisory Committee must consist of a minimum of five members of the graduate faculty including the major professor; the Committee must consist of a majority of tenured/tenure-track SCS faculty. The major professor must be a member of the SCS faculty with doctoral directive status; in the case where there are co-advisors, at least one of the two major advisors must be a member of the SCS faculty. If a co-advisor is not an SCS faculty member, then he/she must hold an appointment to Courtesy faculty rank in Computational Science with doctoral co-directive status. One faculty member must be drawn from outside of SCS; if a student is following a track leading to a specialization in a particular area, then the faculty member outside of SCS must be drawn from that area. The composition of the Supervisory Committee must

be established via the appropriate form; this form must be on file at the time the prospectus defense is scheduled.

Any changes in the Supervisory Committee must be approved by the major professor and the Director of Graduate Studies. In addition, the appropriate form must be submitted.

5.3.2 Program of Study

The Program of Study (POS) is formulated to include all coursework which is required to meet FSU and SCS requirements as well as coursework necessary to gain knowledge in the student's chosen research area. As early as possible, and no later than the end of the third semester of graduate study at FSU, the student should prepare a POS; see Appendix I for a sample form. This should be done in conjunction with the major professor. The POS must be approved by the major professor and the Director of Graduate Studies; a copy of the POS must be kept on file in the SCS. Modifications to the POS must be approved by the student's major professor and the Director of Graduate Studies and submitted no later than one semester before graduation.

The POS must meet the following minimum coursework requirements imposed by SCS or the Graduate College:

Group A. Core required courses: ISC5305, ISC5315, ISC5316 (11 credit hours);

Group B. Core elective courses: 9 credit hours of coursework with prefix ISC excluding ISC5305, ISC5315, ISC5316 and with no more than 3 of the 9 credit hours consisting of Directed Individual Study (ISC5907) or Selected Topics in Computational Science (ISC5935);

Group C. Applications courses: 9 credit hours of graduate level courses offered by programs other than computational science;

Seminar requirement. 6 seminar credit hours (ISC5934, ISC5939 or seminar credits from another department);

Dissertation requirement. 24 credit hours of dissertation.

In addition, if the student is following a track (or area of specialization) then he/she must complete a total of 9 credit hours in that area; these courses must be approved by the Supervisory Committee and may also serve to satisfy requirement the Group C requirements listed above.

If the Supervisory Committee approves a course substitution for any of these requirements, then this substitution must be approved by the SCS Director of Graduate Studies in conjunction with the Curriculum Committee.

When planning the graduate program, the student should be aware of the university residency requirement which states that "after having finished thirty semester hours of graduate work or being awarded the master's degree, the student must be continuously enrolled on The Florida State University Tallahassee campus for a minimum of twenty-four graduate semester hours of credit in any period of 12 consecutive months." This residency requirement implicitly implies a minimum of 54 credit hours (including dissertation hours) for receiving a Ph.D. after completion of an undergraduate degree.

5.3.3 Foreign Language Requirement

There is no foreign language requirement for a Ph.D. in computational science.

5.3.4 Preliminary Examination Requirement

Satisfactory completion of a preliminary examination is required for admission to candidacy for a Ph.D. degree. The preliminary examination is typically taken after the first year of graduate study and covers material from the required core courses (Group A) plus another area (from Group B or Group C) chosen by the student in conjunction with an Examination Committee consisting of the major professor and at least two other graduate faculty who may or may not be members of the Supervisory Committee. Exams are typically scheduled during the months of April, August and January but may be given at other times if the student and the Examination Committee agree. The student should realize that it is often difficult to arrange an examination during the summer because of the unavailability of committee members due to travel and research plans. The Examination Committee is responsible for the form and content of the examination. Students will have the option to retake this examination one time (for a total of two attempts), if it is not successfully completed on the first attempt. Students may not retake the exam during the same semester that it was failed. Possible outcomes of the Preliminary Examination are: (i) passed, (ii) conditional pass with additional work to be completed, (iii) failed but can retake one time, (iii) failed (second attempt) without possibility of retaking examination.

If a student changes his/her major professor after satisfactorily completing the preliminary examination, then his/her new major professor has the option to require the student to retake a preliminary examination.

Students should refer to Section 8 to see the timeline one needs to follow in passing exams so that satisfactory progress towards the degree is made.

5.3.5 Admission to Candidacy

After the student has successfully passed the preliminary examination, an admission to candidacy form must be completed and filed in the Office of the University Registrar. After this form is filed, the student will be allowed to register for dissertation hours.

5.3.6 Minimum GPA Requirement

The student must maintain an average GPA of at least 3.2 in all coursework contained in the Program of Study.

5.3.7 Prospectus

After successful completion of the preliminary examination, the student, along with the major professor, must determine a suitable topic of research which will result in original, publishable work. The student is required to submit and defend to his/her Supervisory Committee a prospectus. This prospectus provides the Supervisory Committee with an outline of a research project as well as a summary of a literature survey in the student's chosen research area. The Supervisory Committee will ascertain if successful completion of this project is suitable for awarding a Ph.D.

in Computational Science. After successfully defending the prospectus, the student must submit to SCS and the Graduate College the appropriate forms.

Typically students will complete the prospectus shortly after their second year in the degree program and always after the successful completion of the preliminary examination. Since the prospectus is intended to consist of a literature survey and a research plan rather than a summary of research completed, SCS requires that the prospectus be completed no later than one semester (excluding summer) after successfully passing the preliminary examination. For example, if the preliminary examination is passed in the Spring Semester then the prospectus must be completed by the end of the following Fall Semester.

5.3.8 Dissertation

The dissertation is the evidence that the student has successfully produced an original and publishable body of work and should be the completion of the research outlined in the prospectus. The student must defend the dissertation in an oral examination administered by his/her Supervisory Committee. All members of the University's graduate faculty are invited to attend as well as interested members of SCS.

Academic courtesy requires that the dissertation be submitted to each member of the Supervisory Committee and to the Director of SCS at least two weeks prior to the date of the examination. The manuscript must be prepared using the formatting guidelines prepared by the OGS.

The University requires that if the student has been admitted to candidacy then he/she must register for dissertation credits each term in which a substantial amount of work is being done on the dissertation. If the student has satisfied all of the coursework requirements and is completing the dissertation away from campus, then he/she must meet the University requirements of registering for a minimum of 2 dissertation credits per semester. See Graduate Bulletin for details.

5.3.9 Time Limitations

The Graduate College imposes the condition that all requirements for the doctoral degree be completed within five calendar years from the time the student passes the preliminary examination. If this time limit passes, then the Supervisory Committee can choose to allow the student to pass a new preliminary examination.

5.3.10 English Competency

The SCS is responsible for ensuring that international students achieve competency in spoken English sufficient to communicate as a scientist and to participate in quality instruction when serving as a Teaching Assistant. International students must demonstrate competency in spoken English. Exceptions to this are international students from English speaking countries or foreign students with an undergraduate degree from a U.S. institution.

International students should register for the course "Spoken English for International TAs" until they pass the SPEAK test. Students with exceptional conversational English experience may be recommended for immediate testing or be exempted from this requirement by the Director of Graduate Studies.

6 Financial Issues

6.1 Assistantships

The SCS offers assistantships in the form of Teaching and Research Assistantships to full-time students. The Teaching Assistantships (TAs) may involve assisting a faculty member with his/her computational science course or it may involve hands-on training opportunities in systems and network administration. Research assistantships (RAs) are typically funded by an individual faculty member's grant or contract (typically from agencies other than the University). Students receiving such support assist faculty member with their research.

Assistantships carry a stipend and a tuition waiver. Typically assistantship duties will require 15 hours per week.

Assistantships are offered on an academic year (9 month) basis. Continuation of support is contingent upon the student making satisfactory progress towards the degree and performing the assistantship duties in a satisfactory and timely manner. The Director of the SCS makes the final decision on assistantship offers with the aid of recommendations from the Curriculum Committee. This Committee uses the annual evaluations (see Section 8) to make recommendations.

Assistantships for incoming students are awarded on a competitive basis. Initial offers of support are typically made beginning in January for students starting the following August.

6.2 Tuition Waivers

To be eligible for a tuition waiver, the student must be enrolled as a full-time student, be appointed as an RA or TA and meet all College eligibility requirements. For any questions concerning eligibility, the student should see the SCS Director of Graduate Studies or the SCS Coordinator of Administrative Services.

University policy limits the number of years a graduate assistant can receive tuition waiver support from the University central waiver pool. The standard is 3 years for an M.S. degree and three additional years for a Ph.D.

The SCS has a very limited number of non-resident tuition waivers. See the following section as this relates to domestic students.

6.2.1 Florida Residency

Out-of-state domestic students will receive an out-of-state tuition waiver for the first year. During the first year, the student is required to establish Florida as his/her legal residence; consequently, a domestic student will receive a tuition waiver at the in-state rate after the first year. If an out-of-state domestic student does not receive in-state status by the beginning of the second year, then the student is responsible for the difference in tuition.

Domestic students not granted state resident status at the time of their admission must petition for a change of status through the Registrar's Office at the end of their first year (usually in June). Procedures for reclassification of residency include:

- Evidence of legal ties to the State of Florida:

- Declaration of Domicile (required) obtainable in person from the Clerk of the Circuit Court in the County Court House of the Florida County in which the student claims permanent domicile. (The fee in Leon County is currently \$15.00.)
 - Copies of drivers license, voters and vehicle registration. Legal ties with a previous state of residence must be switched to Florida within 30 days of filing your Declaration of Domicile.
- Official confirmation of Graduate Assistantship by SCS. This form is completed by SCS.
 - Proof of financial independence. In most cases the formal *Statement of Independence*, which is included on the graduate assistant verification form will be sufficient.
 - Proof of twelve months continuous physical presence in Florida; immediately prior to the first day of classes for the semester you wish to apply for residency. Documentation may include: Florida lease agreements, utility bills, bank records, etc.
 - Submit an official application for reclassification of residency, with required documentation, prior to the first day of classes.

6.3 Summer Support

The SCS will attempt to provide summer support as needed as long as funds permit. Students often receive summer support in the form of an RA from individual faculty members on a research grant or in the form of a TA from SCS. To receive summer support, a student should be on campus during the time of his/her appointment unless approved by the student's major professor; if the student has not chosen a major professor, then the SCS Director of Graduate Studies should be contacted for approval.

6.4 Fellowships

The University offers several fellowships for students including fellowships especially for students in under-represented groups. The interested individual should check the FSU website <http://gradstudies.fsu.edu/fellowships.html> for details.

6.5 Health Insurance

Effective Fall 2007, health insurance is mandatory for all new graduate students. The student should check the OGS website for details concerning this requirement.

7 Registration

The standard course load per semester during the academic year is 9-12 credit hours for a full-time student. Courses should be chosen in consultation with the major professor or the Director of Graduate Studies. The student should notify the staff Graduate Administrator of the total number of hours he/she registers for so that the appropriate tuition waiver can be entered. Students must be full time to receive a tuition waiver. Students are responsible for meeting the

deadlines imposed by the FSU Registrar's Office for timely registration to avoid late registration fees.

7.1 Registration for Examinations

The OGS requires that M.S. students who choose the thesis option must register for thesis defense (ISC8976, zero credits) during the semester of the defense. M.S. students who choose the non-thesis option must register for the Master's Comprehensive Examination (ISC8966, zero credits) during the semester the student's project is defended. The oral defense of the project satisfies the Comprehensive Examination requirement.

Doctoral students must register for the Preliminary Doctoral Examination (ISC8964, zero credits) during the semester of their examination. Doctoral students must also register for dissertation defense (ISC8985, zero credits) during the semester of the defense.

8 Evaluations

Evaluations are an integral part of the assessment of the student's progress towards the degree as well as the satisfactory completion of his/her graduate assistantship duties. In the following sections we describe the annual review process and outline the criteria that the Curriculum Committee will use to assess the student's progress.

8.1 Annual Progress Evaluations

Every spring semester the student is required to complete a *Graduate Student Activities Report* in conjunction with his/her major professor; in addition, the supervisor for the student's TA/RA will be asked to assess the student's performance of his/her assistantship duties. If the student has not chosen a major professor at the time he/she is completing this report, then the Director of Graduate Studies will serve the role of the advisor or appoint another faculty member to serve as the student's temporary advisor. See Appendix I for a sample Graduate Activities Report. The Curriculum Committee uses this information to assess progress and make recommendations to the Director for financial support for the next academic year. The student and his/her advisor will be notified in writing of the Committee's assessment. Typically students are rated as making satisfactory or unsatisfactory progress towards the degree; any deficiencies noted are expected to be remedied. In addition, the Committee may include requirements for the student to meet in the upcoming year to continue to make satisfactory progress. For example, the student may be told that he/she needs to pass the preliminary examination within the next academic year to continue to make satisfactory progress.

8.2 Satisfactory Progress Towards the Degree

The Curriculum Committee will use the following criteria as general guidelines for a student making satisfactory progress toward the degree. In addition to these criteria, if appropriate, the Committee will use the assessment of the student's research accomplishments by his/her major professor included in the student's activities report as well as the assessment of the student's assistantship supervisor.

8.2.1 Students in Master's Programs

Students entering the graduate program with an undergraduate degree should complete all requirements for the M.S. degree within two years. Under special circumstances, a student and his/her advisor may request an additional semester of support.

First year students should:

- choose a major professor;
- complete a POS and have the form on file;
- work towards satisfying the course requirements outlined in Section 5.1 (for M.S. degree) or 5.2 (for the PSM degree);
- maintain a minimum average GPA of 3.0 on all coursework;
- be actively attending the introductory seminar ISC5934;
- have selected a summer internship (PSM students only);
- be fulfilling their assistantship duties in a satisfactory manner.

Second year students should:

- complete the course requirements outlined in Section 5.1 (for M.S. degree) or 5.2 (for the PSM degree);
- maintain a minimum average GPA of 3.0 on all coursework;
- complete 6 credits of thesis (for students choosing thesis option);
- successfully complete project or thesis;
- be fulfilling their assistantship duties in a satisfactory manner.

As described in Section 3.3, students in the M.S. program who desire to automatically be switched to the Ph.D. program should pass the preliminary examination by the end of their second year in the M.S. program.

8.2.2 Ph.D. Students

Students entering the Ph.D. program with an M.S. degree or transferring from the M.S. program in computational science should typically complete the Ph.D. in three to four years. Under special circumstances, a student and his/her advisor may request an additional semester of support.

General criteria:

- Students who have been admitted directly into the Ph.D. program (without passing the preliminary examination) must pass the exam within three (excluding summer) semesters; typically by the end of the Fall Semester of the second year in the Ph.D. program. Since students have two attempts at passing the preliminary exam, it is recommended that the first attempt be made before the beginning of the third semester in the Ph.D. program.
- Students should be making progress towards satisfying the course requirements outlined in Section 5.3 and maintaining an average GPA of 3.2.

- As early as possible, and no later than the third semester, Ph.D. students should choose a major advisor and complete a POS.
- The prospectus must be completed by the semester after passing the preliminary examination (excluding summer semesters).
- After a student has passed the preliminary examination and completed the prospectus, then his/her evaluation will be primarily based upon the major professor's assessment of the student's research progress and the successful completion of assistantship duties.
- The student should be fulfilling their assistantship duties in a satisfactory manner.

8.3 Appeals

The student may appeal a grade that he/she feels has been inequitably awarded. See the Graduate Bulletin for the Grade Appeals System.

The student has the right to appeal any decision made by his/her Preliminary Examination Committee or Supervisory Committee to the SCS Curriculum Committee. This appeal should be done in a timely fashion, preferably within one week of the action/decision. The student should prepare a written appeal document which must contain (i) a description of the action or decision, including dates and individuals involved, and (ii) a statement of the resolution sought with justification. The appeal document should be given to the Director of Graduate Studies who will arrange for a meeting of the Curriculum Committee; the Curriculum Committee must meet concerning this appeal within one week if the appeal is made within the academic year. Confidentiality should be exercised during the entire appeals process. A student will not suffer a punitive action or decision for having pursued an appeal.

9 Graduation

It is recommended that the semester prior to graduation, the student check with the SCS Director of Graduate Studies to verify that his/her transcript indicates that all the course requirements, seminar requirements, thesis/dissertation hours requirements, residency requirements, etc. have been satisfied. This way any deficiencies can be remedied in the final semester.

The FSU Office of Graduate Studies has rigid deadlines that must be met for applying for graduation and for (electronic) submission of a thesis or dissertation. The student should be cognizant of the deadlines and due dates published on the webpage of the FSU Office of Graduate Studies (OGS). A summary of the steps necessary for graduation is summarized below; however the student is responsible for checking the OGS website to determine if any additions or modifications to the requirements have been made.

Checklist for PSM or M.S. students choosing the non-thesis (project) option

- Before the end of the second week of the semester in which a student expects to graduate, he/she must apply for graduation at the Registrar's office. If the student has applied a previous semester and did not receive the degree, then the application procedure must be repeated.

- At the Registrar's Office the candidate will receive a *Final Term Degree Clearance Form* which, when completed, certifies that all requirements have been met.
- Students must have completed the coursework requirements as outlined in Section 5.1 for the M.S. student and in Section 5.2 for the PSM student. The student must have a 3.2 average GPA.
- Students must register for the Comprehensive Exam (the defense of the project) for zero credits for the final semester.

Checklist for M.S. students choosing the thesis option

- Before the end of the second week of the semester in which a student expects to graduate, he/she must apply for graduation at the Registrar's office. If the student has applied in a previous semester and did not receive the degree, then the application procedure must be repeated.
- At the Registrar's Office the candidate will receive a *Final Term Degree Clearance Form* which, when completed, certifies that all requirements have been met.
- The student must submit a completed *Defense Announcement Form* to the OGS at least two weeks prior to the defense.
- The student must have satisfied the course requirements outline in Section 5.1 with a 3.0 average GPA.
- Students must have completed 6 credits of thesis and must register for the thesis defense for zero credits for the final semester. The University requires the student to register for a minimum of one credit hour of thesis during the final semester even if the six credits of thesis have been completed in previous semesters.
- The student must successfully defend.
- The student must make sure that the thesis is formatted to the University requirements as outlined in the *Guidelines and Requirements for Electronic Theses, Treatises and Dissertations* and provided by the OGS. A \LaTeX style file is available for use.
- Schedule an appointment with the OGS Clearance Advisor for format approval of the manuscript; this may also be done by e-mail.
- The student must submit the following to the OGS Clearance Advisor by the final submission deadline. All signatures must be original.
 - Final Degree Clearance Form with required signatures and proof of payment of fees,
 - one original signed signature page,
 - Electronic Access Agreement Form,
 - University Library Exit Survey (OGS online form),
 - Student Information form (OGS online form),

- Responsible Conduct of Research and Creativity Survey (OGS online form),
- the electronic thesis in PDF format.

Checklist for Ph.D. students

- Before the end of the second week of the semester in which a student expects to graduate, he/she must apply for graduation at the Registrar's office. If the student has applied in a previous semester and did not receive the degree, then the application procedure must be repeated.
- At the Registrar's Office the candidate will receive a *Final Term Degree Clearance Form* which, when completed, certifies that all requirements have been met.
- The student must submit a completed *Defense Announcement Form* to the OGS at least two weeks prior to the defense.
- The student must have met all of the course requirements as outlined in Section 5.3
- The student must have completed 24 credits of dissertation by the end of his/her degree and be registered for a minimum of one credit hour of dissertation during the final semester even if the 24 credits of dissertation have been completed in previous semesters.
- The student must successfully defend.
- The student must make sure that the dissertation is formatted to the University requirements as outlined in the *Guidelines and Requirements for Electronic Theses, Treatises and Dissertations* and provided by the OGS. A \LaTeX style file is available for use.
- The student must schedule an appointment with the OGS Clearance Advisor for format approval of the manuscript; this may also be done by e-mail.
- The student must submit the following to the OGS Clearance Advisor by the final submission deadline. All signatures must be original.
 - Final Degree Clearance Form with required signatures and proof of payment of fees,
 - one original signed signature page,
 - one paper copy of the abstract,
 - one paper copy of the title page,
 - Survey of Earned Doctorates (paper form),
 - UMI Doctoral Microfilming Agreement (paper form),
 - Electronic Access Agreement Form (paper form),
 - University Library Exit Survey (online form),
 - Student Information form (online form),
 - Ph.D. Completion Exit Survey (online form).
 - Responsible Conduct of Research and Creativity Survey (online form),
 - the electronic dissertation in PDF format.