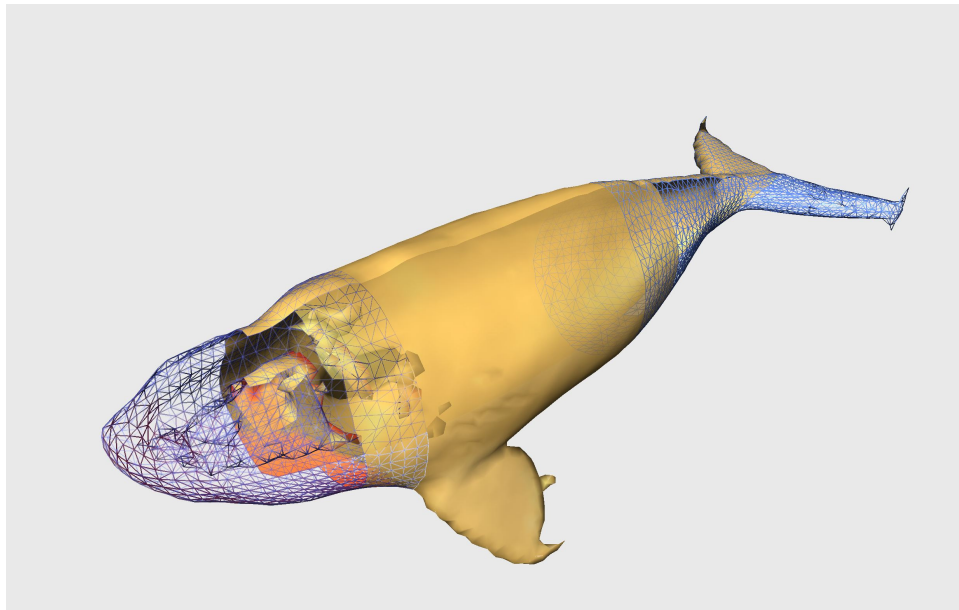# Graduate Programs in Computational Science

Florida State University

August, 2009

Graduate Student Handbook

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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 Moreover, in many cases scientific computations have superseded both theory and experimentation.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 Department of Scientific Computing (DSC) 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 DSC is truly interdisciplinary, today consisting of physicists, biologists, geophysicists, biochemists, engineers, mathematicians, and computer scientists, with an even broader spectrum of interests to be represented in the future. The DSC faculty is also 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 DSC in its research programs. Thus, the DSC is ideally positioned to establish an innovative graduate degree programs in computational science that imparts this same synergy to its students.

This computational science program cuts 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 DSC 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)

- 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. in computational science 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. 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 the student the option to follow the major track which emphasizes the mathematical and computer science aspects 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 train graduate students to have extensive knowledge in computational science and to give the student the opportunity to acquire 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 DSC, the following tracks are available:

- Ph.D. in Computational Science (major track[1])

- 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 it Ph.D. in Computational Science - Geological Sciences.

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[1]emphasizing 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 Univesity forms. The CIP code for the Ph.D. degree is 30.0801.

Master's Programs		
	Computational Science (Major Track)	114010
	PSM in Computational Science	114011
	PSM in Computational Science -	
	Molecular Biology/Bioinformatics	114012
Ph.D. Programs		
	Computational Science (Major Track)	114010
	Computational Science (Atmospheric Science)	114020
	Computational Science (Biochemistry)	114021
	Computational Science (Biological Science)	114022
	Computational Science (Geological Sciences)	114023
	Computational Science (Materials Science)	114024
	Computational Science (Physics)	114025

3 Admissions

All students entering this degree program should have a strong desire to do computational science and have experience in at least one programming language.[2] Students typically possess an undergraduate degree in computer science, computational science, mathematics, statistics, a science or engineering. The University requires the general GRE examination.

3.1 Application Procedure for Students Outside FSU

For students outside of the University who want to apply to the graduate program in computational science a student needs to (i) apply to DSC and (ii) apply to FSU. The procedure is as follows:

Departmental application process:

- complete the departmental on-line application

- send at least three letters of recommendation to the DSC Associate Chair for Graduate Studies (education@sc.fsu.edu)

- send a statement of purpose.

FSU application process:

- complete the FSU application;

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

- pay FSU application fee;

- 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).

The DSC can only recommend admission to the Graduate Admissions Office; the official letter of admission comes from the University. However, the DSC Associate Chair for Graduate Studies will notify students of their recommendation for admission and will also notify the student of any offers of an assistantship.

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 Graduate Admissions Office 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 DSC Associate Chair for Graduate Studies or the FSU Graduate Admissions office. This form must be approved by the DSC, 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 DSC 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 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.

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 should complete their M.S. degree requirements before entering the Ph.D. program.

Core Required Courses		
ISC5305	Scientific Programming	3
ISC5315	Applied Computational Science I	4
ISC5316	Applied Computational Science II (Ph.D. only)	4
Seminars		
ISC 5934	Introductory Seminar on Research in Computational Science	1
ISC 5939	Advanced Graduate Seminar in Computational Science	1
Other		
ISC 5948	Graduate Internship in Computational Science	
ISC 5975	Thesis	
ISC 6981	Dissertation	
ISC 8965	Doctoral Preliminary Exam	0
ISC 8977	Master's Thesis Defense	0
ISC 8982	Dissertation Defense	0

4 Computational Science Courses

The DSC uses the prefix ISC for all computational science courses; see the departmental website for the current list of approved courses. Listed in the accompanying table are the required core courses, seminar course numbers, internship course numbers, numbers for thesis and dissertation credit as well as the courses necessary for defending an M.S. thesis or Ph.D. dissertation. Course numbers for elective coursework can be found from the departmental website or the registrar's website. The seminar ISC5934 may be repeated twice; the number of repeats for the seminar ISC5939 is unrestricted.

5 Degree Requirements

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

- the Graduate College,

- the Department of Scientific Computing,

- 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 Department of Scientific Computing 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 for an M.S. student, before the beginning of the student's third academic year 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, 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.

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 includes independent investigation which is potentially publishable. If the student chooses the thesis option then he/she must meet all University requirements for formating 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.

5.1.2 Major Professor and Supervisory Committee

The student's Supervisory Committee should play an integral role in guiding him/her through their graduate education. By the end of a student's second academic year semester, the student should choose a major professor, i.e., an advisor. The major professor must be an DSC faculty member who has graduate faculty status. In the case of co-advisors, then at least one of the advisors must be an DSC faculty member with graduate faculty status. If the other co-advisor is not an DSC faculty member, then he/she must hold an appointment to Courtesy faculty rank in Computational Science with graduate faculty 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 DSC faculty. The student must complete a departmental form specifying the composition of the Supervisory Committee; it should be completed no later than the semester before 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 departmental Associate Chair for Graduate Studies.

5.1.3 Program of Study

The Program of Study (POS) is formulated to include all coursework which is necessary to meet FSU and DSC requirements. As early as possible, and no later than the third semester of graduate study at FSU, the student should prepare a POS;[3] The POS must be approved by the the student's major professor and the Associate Chair for Graduate Studies for DSC; a copy of the POS should be kept on file in the DSC. Modifications to the POS must be approved by the major professor and the Graduate Coordinator and approved no later than the beginning of the semester of graduation.

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[3]This form and all other DSC forms can be downloaded from the departmental website.

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

Group A. Core required courses: ISC5305, ISC5315 (7 credit hours on a letter-grade basis)

Group B. Core elective courses: 9 credit hours of letter-grade coursework with prefix ISC excluding ISC5305 and ISC5315 and with no more than 3 of the 9 credit hours consisting of graded Directed Individual Study (ISC5906)

Group C. Application courses: 6 credit hours of graduate level courses offered by programs other than computational science; no more than 3 credits may be taken on a non letter-grade basis

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 you are choosing the thesis option

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.

FSU requires that if the student has selected the thesis option then 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. Both of these requirements are automatically satisfied by departmental requirements.

If the student's Supervisory Committee approves a course substitution for any of these requirements, then this substitution must be approved by the departmental Graduate 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/Graduation

The student is required to submit all forms and meet all deadlines required by the FSU Graduate School; these forms and a checklist can be found at The Graduate School's Blackboard sites under the "Theses, Treatises, Dissertations" submenu. The student must register for the zero credit thesis defense (ISC 8977) during the semester he/she defends the thesis.

The thesis is the evidence that the student has successfully completed an independent inquiry which is potentially publishable. 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 FSU Graduate School which can also be found on Blackboard. The student is strongly urged to completed a workshop for preparation of the thesis offered by The Graduate School. 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.

The University requires students to be registered for two credit hours during the semester he/she graduates. If a student does not meet the deadlines for the semester in which he/she has registered for graduation then the student may defer graduation to the next semester. However, if a student does not meet the graduation deadlines but defends and submits all paperwork *before* the start of the next semester, then he/she can request an exception to the requirement of registering for two credits.

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.

5.2 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 should play an integral role in guiding him/her through their graduate education. By the end of a student's second academic year semester, the student should choose a major professor, i.e., an advisor. The major professor must be an DSC faculty member who has graduate faculty status. In the case of co-advisors, then at least one of the advisors must be an DSC faculty member with graduate faculty status. If the other co-advisor is not an DSC 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 DSC faculty. The student must complete a departmental form specifying the composition of the Supervisory Committee; it should be completed no later than the semester before 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 departmental Associate Chair for Graduate Studies.

5.2.2 Program of Study

The Program of Study (POS) is formulated to include all coursework which is necessary to meet FSU and departmental requirements. As early as possible, and no later than the third semester of graduate study at FSU, the student should prepare a POS; the appropriate form can be downloaded from the departmental website. The POS must be approved by the the major professor and the departmental Associate Chair for Graduate Studies; a copy of the POS must be kept on file in the DSC. Modifications to the POS must be approved by the major professor and the departmental Associate Chair for 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 DSC:

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 and ISC5315 and with no more than 3 of the 9 credit hours consisting of letter-grade based Directed Individual Study (ISC5906)

Group C. Applications courses: 6 credit hours of graduate level courses offered by programs other than computational science; at least 3 of these credits are to be taken on a letter-grade basis

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 DSC Graduate 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 departmental Associate Chair for 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/Graduation

The student is required to submit all forms and meet all deadlines required by the FSU Graduate School; these forms and a checklist can be found at The Graduate School's Blackboard sites.

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. There are no formal guidelines for the preparation of this document.

The University requires students to be registered for two credit hours during the semester he/she graduates. If a student does not meet the deadlines for the semester in which he/she has registered for graduation then the student may defer graduation to the next semester. However, if a student does not meet the graduation deadlines but defends and submits all paperwork *before* the start of the next semester, then he/she can request an exception to the requirement of registering for two credits.

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.

5.3 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.

5.3.1 Major Professor and Doctoral Supervisory Committee

The student's Major Professor and Supervisory Committee should play 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 third semester, the student should choose a major professor, i.e., an advisor. The major professor must 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; this committee should be established as soon as possible and prior to the Prospectus. 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 DSC faculty. The major professor must be a member of the DSC faculty and have 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 DSC faculty. If a co-advisor is not an DSC 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 DSC; if a student is following a track leading to a specialization in a particular area, then the faculty member outside of DSC 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 departmental Associate Chair for Graduate Studies.

5.3.2 Program of Study

The Program of Study (POS) is formulated to include all coursework which is required to meet FSU and DSC 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 the departmental website for the appropriate form. This should be done in conjunction with the major professor. The POS must be approved by the major professor and the departmental Associate Chair for Graduate Studies; a copy of the POS must be kept on file in the DSC. Modifications to the POS must be approved by the student's major professor and the departmental Associate Chair for Graduate Studies and submitted no later than one semester before graduation.

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

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

Group B. Core elective courses: 12 credit hours of letter-based coursework with prefix ISC excluding ISC5305, ISC5315, ISC5316 and with no more than 3 of the 12 credit hours consisting of letter-grade based Directed Individual Study (ISC5906)

Group C. Applications courses: 9 credit hours of graduate level courses offered by programs other than computational science; at least 6 credits must be taken on a letter-grade basis

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 DSC Graduate 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." In addition to residency this 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 three semesters 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. Students must register for the zero credit course ISC 8965 during the semester he/she first takes the exam. Exams are typically scheduled during the months of January and August but may be given at other times if the student and the Examination Committee agree. The Examination Committee is responsible for the form and content of the examination. The exam consists of a written portion which covers material related to the required core courses; after successful completion of this portion the student then takes an oral exam covering material from their second area plus a follow-up to the written exam. 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, (iv) failed (second attempt) without possibility of retaking the examination. Students will have the option to retake this examination one time, if it is not successfully completed on the first attempt. Students may not retake the written exam during the same semester that it was failed.

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 the oral portion of the 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 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 DSC the appropriate signed form.

Typically students will complete the Prospectus shortly after their second year of graduate study 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, DSC requires that the Prospectus be completed no later than one academic year 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 Spring Semester.

5.3.8   Dissertation/Graduation

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

The manuscript must be prepared using the formatting guidelines prepared by the Office of Graduate Students. The University suggests that academic courtesy requires that the dissertation must be submitted to each member of the Supervisory Committee at least four weeks prior to the date of the examination.

The student must register for ISC 8982, the zero credit dissertation defense, during the semester he/she defends. In addition, the student is responsible for completing all forms with the University for announcing the exam, etc. The student is strongly urged to attend a Graduate School workshop for preparing dissertations and preparing to graduate. The student should remind the outside committee member that after the defense of the dissertation he/she must submit a form reporting whether all university rules were followed.

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. However, if a student does not meet the graduation deadlines during a semester but defends and submits all paperwork *before* the start of the next semester, then he/she can request an exception to the requirement of registering for two credits.

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.

6   Financial Issues

6.1   Assistantships

The DSC 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 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. The 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 Chair of the DSC makes the final decision on assistantship offers with the aid of recommendations from the Graduate Committee. This Committee uses the annual evaluations (see Section 8) to make recommendations.

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 departmental Associate Chair for Graduate Studies.

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. It is imperative that an out-of-state student begin this process as soon as he/she arrives in Florida.

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 Cour in the County Court House of the Florida County in which the student claims permanent domicile. (Small fee required.)
    - 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 confirmatio of a Graduate Assistantship by the department. This form can be completed by the department.

- Proof of financial independence. In most cases the formal *Statement of Independence* will be sufficient.

- Proof of twelve months continuous physical presence in Florida. Documentation may include: Florida lease agreements, utility bills, band 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 DSC 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 DSC. 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 departmental Associate Chair for 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 Graduate School websites for details concerning this requirement.

7   Registration

The standard course load per semester during the academic year is 9-12 credits for a full-time students. Courses should be chosen in consultation with the major professor and/or the Associate Chair for 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.

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 Graduate 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 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 departmental Associate Chair for Graduate Studies. will serve the role of the advisor or appoint another faculty member to serve as the student's temporary advisor. The Graduate Committee uses this information to assess progress and make recommendations to the Chair 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. 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 a preliminary examination within the next academic year to continue to make satisfactory progress.

8.2   Satisfactory Progress Towards the Degree

The Graduate 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.

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 outline in this document;

- maintain a minimum average GPA of 3.0 on all coursework;

- be actively attending the introductory seminar, ISC 5934;

- have selected a summer internship if in the PSM program;

- be fulfilling assistantship duties in a satisfactory manner.

Second year students should:

- complete the course requirements outline in this document;

- continue to maintain a minimum average GPA of 3.0 on all coursework;

- complete 6 credits of thesis if choosing the thesis option;

- successfully complete project or thesis;

- be fulfilling assistantship duties in a satisfactory manner.

As described in Section 3.2, students in the M.S. program who desire to switch 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 by the end of their second year; this means that students should first attempt the exam by the end of the Fall Semester of their second year in the Ph.D. program.

- Students should be making progress towards satisfying the course requirements outlined in this document and maintaining an average GPA of 3.2.

- As early as possible, and no later than the beginning of the third semester, Ph.D. students should choose a major advisor and complete a POS.

- The prospectus must be completed within a year of passing the preliminary examination.

- 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 his/her 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 DSC Graduate Committee. This appeal should be done in a timely fashion, preferably within two weeks of the action/decision. The student should prepare a written apeal 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 Associate Chair for Graduate Studies who will arrange for a meeting of the Graduate Committee; the 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 English Competency

The DSC 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 administered by the University. Students with exceptional conversational English experience may be recommended for immediate testing or be exempted from this requirement by the departmental Associate Chair for Graduate Studies.

10 Graduation

It is recommended that the semester prior to graduation, the student check with the departmental Associate Chair for Graduate Studies to verify that his/her transcript indicates that all course requirements, seminar requirements, thesis/dissertation hour 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 imposed by that office; a checklist can be found at The Graduate School's Blackboard sites under the "Theses, Treatises, Dissertations" submenu. It is highly recommended that each student attend a workshop sponsored by the Graduate School the semester before they play to graduate.