

# **Graduate Student Handbook**

**MS and Ph.D.**

**Imaging Science**



**Chester F. Carlson  
CENTER for  
IMAGING  
SCIENCE**

**2017-2018 Academic Year**

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## **1. Introduction**

The Chester F. Carlson Center for Imaging Science offers graduate programs leading to the Master of Science and the Doctor of Philosophy in Imaging Science. Graduate students are able to conduct research in a wide variety of areas, including astronomical imaging, biomedical imaging, color imaging, image processing, human vision and perception, nanoimaging, optics, and remote sensing. The graduate handbook is intended to provide you with information about the academic programs, policies and procedures, and your responsibilities as a student. Our dedicated faculty and staff are available to assist you as you pursue your degree.

## **2. Program Administrative Contacts**

Dr. David Messinger, Director

Office: Carlson 2264

Phone: 585-475-4538

Email: [messinger@cis.rit.edu](mailto:messinger@cis.rit.edu)

Joseph Pow, Associate Director

Office: Carlson 2259

Phone: 585-475-7323

Email: [pow@cis.rit.edu](mailto:pow@cis.rit.edu)

Dr. Charles Bachmann, Graduate Program Coordinator

Office: Carlson 3250

Phone: 585-475-7238

Email: [bachmann@cis.rit.edu](mailto:bachmann@cis.rit.edu)

Dr. Emmett Lentilucci, Chair, Graduate Admissions

Committee Office: Carlson 3132

Phone: 585-475-7778

Email: [emmett@cis.rit.edu](mailto:emmett@cis.rit.edu)

Beth Lockwood, Academic Coordinator

Office: Carlson 2274

Phone: 585-475-2786

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Joyce French, Staff Assistant

Office: Carlson 2265

Phone: 585-475-7152

Email: [french@cis.rit.edu](mailto:french@cis.rit.edu)

### **3. Graduate Admission Requirements**

Imaging science encompasses a wide variety of scientific disciplines and students with diverse backgrounds are accepted into the program. Undergraduate preparation leading to a Bachelor of Science degree in engineering, computer science, applied mathematics, physics, or other sciences is usually required, but exceptional students from other fields may be accepted. All students admitted to the doctoral program in imaging science must have completed courses in the following areas:

- Calculus (one year)
- University physics (one year)
- Modern physics
- Computer language

Admissions decisions are made by a committee comprised of graduate faculty of the Carlson Center for Imaging Science. To be admitted, students must have a record of academic achievement from their undergraduate institutions, as indicated by official transcripts; demonstrate proficiency on the Graduate Record Examination (GRE) (only required if applying for an assistantship); and letters of recommendation from two people well-qualified to judge their abilities for graduate study.

The following URL outlines the graduate admission process:

<http://www.cis.rit.edu/graduate-programs/graduate-application-process>

### **4. Financial Assistance**

Graduate assistantships and tuition remission scholarships are available to qualified students. These students are typically funded as Graduate Teaching Assistants during their first year and as Research Assistants thereafter. The stipend for a newly accepted Ph.D. student for the 2015-2016 Academic Year is \$20,000. Prorated summer term support is generally available, but not guaranteed, once a student has begun work with a research advisor. A limited number of tuition scholarships and assistantships are available to MS students.

Applicants seeking financial assistance from the center must have all application documents submitted to the Office of Graduate Enrollment Services by January 15 for the next academic year. Students whose native language is not English must demonstrate proficiency in English, as evidenced, for example, by a minimum TOEFL score of 600 (paper based), 250 (computer based) or 100 (Internet based). The minimum IELTS score is 7.0. Students whose native language is not English are advised to obtain as high a TOEFL or IELTS score as possible if they wish to apply for a teaching or research assistantship.

## **5. MS Imaging Science Program**

The Master of Science in Imaging Science provides a student with an advanced curriculum in topics related to Imaging Science and prepares them for a career in research or product development in the imaging industry. The Master of Science degree requires completion of 30 credits and can be obtained by completing a research dissertation (Thesis Option) or completing a research project (Project Option). The degree can be completed entirely online.

<http://www.rit.edu/programs/imaging-science-ms>

*Note in the Fall of 2013 RIT converted from a quarter calendar system to a semester calendar. Students admitted to the program prior to the Fall of 2013 must complete requirements in place at the time of admission. These students should have in place an Individual Advisement Plan (IAP) which serves as a plan of study across the quarter-to-semester transition. See the link at the bottom of the above URL for MS requirements under the quarter system. Note that each credit hour earned under the semester system counts as 1.5 quarter system credit hours.*

### **5.1. MS Thesis Option**

Normally, all full-time MS students on campus pursue the Thesis Option. MS students who pursue this option must complete IMGS-616 Fourier Methods for Imaging, three additional core courses from the five remaining, and two specialty track courses. The MS degree requires a minimum of six credits of Research & Thesis, two of which are satisfied by the Imaging Science Seminar sequence. A minimum of 24 course credits are required. Specialty tracks may require prerequisite core courses taught in fall semester. Table 5.1 shows a typical MS course sequence.

#### **MS Thesis Research Committee**

The MS Thesis Research Committee is composed of a minimum of three people: the student's Graduate Program Faculty research advisor and two additional members who hold at least an MS in a field relevant to the student's research. At least two of these three committee members must be from the Graduate Program Faculty of the Carlson Center. All MS research committees must include at least one faculty member with a direct appointment to the Carlson Center. A student may have a committee member who is not a member of the RIT faculty by submitting their CV to the Graduate Program Coordinator for review and approval by the Graduate Curriculum Committee.

**Table 5.1 Imaging science thesis option, MS degree, typical course sequence**

Course		Sem. Cr. Hrs.
<b>First Year</b>		
IMGS-616	Fourier Methods for Imaging*	3
<i>Choose three of the following five core courses including 613*:</i>		9
IMGS-619	Radiometry*	
IMGS-620	The Human Visual System*	
	Elective	3
IMGS-606	Imaging Science Seminar I	1
IMGS-682	Image Processing and Computer Vision*	
IMGS-633	Optics for Imaging*	
	Specialty track course #1	3
IMGS-607	Imaging Science Seminar II	1
<b>Second Year</b>		
IMGS-613	Noise, Probability and Systems Modeling*	
	Specialty track course #2	3
	Elective	3
IMGS-790	Research and Thesis	2
IMGS-790	Research and Thesis	2
<b>Total Semester Credit Hours</b>		<b>30</b>

\*Asterisk indicates core course. If course not used as one of required core courses then may be applied to electives or specialty track

Table 5.2 summarizes key events and milestones in the career of an Imaging Science MS (Thesis) student. Except for the hard deadline for participation in Commencement, the dates in the timeline are representative. Individual students will have different timelines to graduation depending on circumstances. The typical MS thesis student finishes their degree in about 2.5 years.

**Table 5.2 MS Thesis Option Milestones**

<b>When</b>	<b>What</b>	<b>Responsible</b>
Application Year	Application decision; matriculate into program; financial support established	Applicant, Admission Committee, Center Staff
<b>Year 1</b>		
July/Aug	Register for classes	Student, Academic Coordinator, Graduate Program Coordinator
July/Aug	Teaching Assistant or Research Assistant duties assigned (if applicable). Documents completed to work on campus and receive assistantship	Associate Director, Staff Assistant, Student Employment Office, Student
Spring Term	Research Advisor selection by student. Student informs Graduate Program Coordinator	Student (note until Advisor is selected, Graduate Program Coordinator serves in this role).
End of Spring Term	Submission of initial Plan of Study and submit transfer credit request (if applicable) to Graduate Program Coordinator	Student, Research Advisor, Graduate Program Coordinator
End of Summer Term	Formulate research topic; Research Committee formed	Student, Research Advisor, Graduate Program Coordinator
<b>Year 2 until completion</b>		
Every term	Periodic Research Committee briefings	Student, Research Advisor
At least 4 weeks prior to defense	Student to provide to Graduate Program Coordinator an electronic copy of thesis defense announcement with abstract, date, time, and location. Student will distribute draft thesis to Research Committee	Student, Graduate Program Coordinator, Staff Assistant
Midway through term	Thesis defense	Student, Research Committee
By April 15 for Spring term graduation	Thesis sign-off and submission for binding to Wallace Library and UMI/Proquest	Student, Research Committee
End of term in which all degree requirements are met	Certification of the MS degree	Graduate Program Coordinator

## 5.2. MS Project Option

For those students with industry experience, the MS Project Option may be appropriate. Rather than writing a research thesis, the project option involves two additional courses, one of which is a systems project course where the student conducts a systems project with a faculty advisor. This option is most commonly pursued by online students. All students who pursue this option

must complete IMGS-616 Fourier Methods, three additional core courses from the remaining five, two specialty track courses, three graduate electives, and the systems project course.

**Table 5.3 Imaging science project option, MS degree, typical course sequence**

	Course	Sem. Cr. Hrs.
<b>First Year</b>		
IMGS-616	Fourier Methods for Imaging	3
	<i>Choose three of the following core courses (including 613):</i>	9
IMGS-619	Radiometry*	
IMGS-620	The Human Visual System*	
IMGS-682	Image Processing and Computer Vision*	
IMGS-633	Optics for Imaging*	
	Specialty track course #1	3
	Elective	3
<b>Second Year</b>		
IMGS-613	Probability, Noise and Systems Modeling*	
	Specialty track course #2	3
	Elective	3
	Elective	3
IMGS-740	MS Systems Project Paper	3
<b>Total Semester Credit Hours</b>		<b>30</b>

\*Asterisk indicates core course. If course not used as one of required core courses then may be applied to electives or specialty track

## 6. MS Online Program

The MS Imaging Science degree can be obtained entirely online by taking courses through distance learning. The program is identical to the on-campus MS program Project Option.

Most Imaging Science online courses are captured and recorded as they are being taught in the classroom in real-time using various Internet technologies. Online students will need access to broadband Internet and be able to deal with the limitations of learning advanced technical material without face-to-face interaction with the instructor and fellow students. Since these online courses are recorded, they can be viewed by an online student after the class has occurred, offering flexibility to allow students to accommodate their work schedules.

It is important to note that not all Imaging Science and elective courses are taught online, so there are fewer electives and specialty tracks available in the online program. Applicants should also consider their learning styles and self-discipline when attempting this mathematics and physics intensive program. For example, it is much easier for on-campus students to form study groups and meet informally for review sessions, etc.



## 7. Ph.D. Imaging Science Program

The Ph.D. curriculum offers students a thorough course of study and research, structured and directed by experts in the field. Graduates of the program will contribute to an increase in the fundamental body of knowledge associated with imaging science. They will acquire the capabilities, skills, and experience to continue to expand the limits of the discipline, and to meet future scholarly, industrial, and government demands on the field.

<http://www.rit.edu/programs/imaging-science-phd>

*Note in the Fall of 2013 RIT converted from a quarter calendar system to a semester calendar. Students admitted to the program prior to the Fall of 2013 must complete requirements in place at the time of admission. These students should have in place an Individual Advisement Plan (IAP) which serves as a plan of study across the quarter-to-semester transition. See the link at the bottom of the above URL for PhD requirements under the quarter system. Note that each credit hour earned under the semester system counts as 1.5 quarter system credit hours.*

All students must complete a minimum of 60 semester credit hours of course work and research. Students must have a minimum of 32 course credits and a minimum of 18 research credits, with the additional credits required to total 60 met by course or research credits as determined by the students plan of study developed jointly with their advisor. The core curriculum includes courses that span and integrate a common body of knowledge essential to an understanding of imaging processes and applications. Courses are defined by the student's study plan and must include the core courses plus a sequence in a topical area such as remote sensing, image processing, color imaging, human vision and perception, medical imaging, computer vision, and microlithographic imaging technologies.

Students may take a limited number of credit hours in other departments, must complete research credits, including two credits of research associated with the graduate seminar course. Graduate elective courses offered by the Carlson Center for Imaging Science and other RIT academic departments in fields closely allied with imaging science allow students to concentrate their studies in a range of imaging science research and imaging application areas.

It is the student's responsibility to understand the requirements of the imaging science degree program. All degree requirements are published yearly in the RIT catalog. Alterations in an individual student's requirements (course substitutions, transfer credit, requirement waivers, credit by examination) must receive prior approval in writing. Questions regarding changes made in the curriculum during a student's program of study should be directed to the Graduate Program Coordinator.

**Table 7.1 Required Core Courses in PhD program**

Course Number	Class Name	Credit Hours
IMGS-606, 607	Imaging Science Graduate Seminar I, II	2**
IMGS-609	Graduate Laboratory I	2
IMGS-613	Probability, Noise, and System Modeling	3
IMGS-616	Fourier Methods for Imaging	3
IMGS-619	Radiometry	3
IMGS-620	The Human Visual System	3
IMGS-633	Optics for Imaging	3
IMGS-682	Image Processing and Computer Vision	3

\*\*The seminar courses count toward Research and Thesis credit requirements.

### **Advancement to candidacy**

Advancement to Ph.D. candidacy proceeds through the following steps.

- Advisor selection
- Submission and approval of preliminary study plan
- Passing a written qualifying exam
- Study plan revision based on outcome of qualifying exam and advisor recommendation
- Research committee appointment
- Candidacy exam based on thesis proposal

If the faculty decision, following the qualifying exam, is not to permit the candidate to continue in the doctoral track, the advisor and graduate coordinator will counsel the student about options, including pursuit of an MS degree. If the faculty decision is to permit the candidate to continue in the doctoral track then the program continues with study plan revision, research committee appointment, candidacy exam, and, finally, dissertation defense.

### **Ph.D. Qualifying Exam**

The Ph.D. Qualifying Exam is designed to test the student's understanding of fundamental imaging science concepts as taught in the first year graduate curriculum. This includes material from IMGS-616, -619, -620, -633, and -682 and the graduate laboratory sequence IMGS-609/610. It is generally administered as a daylong written exam on the 2<sup>nd</sup> Friday of June. The questions address material taught in the core, but from a holistic perspective. Students who do not pass may be required to repeat the exam, or address a deficiency through remedial actions.

### **Ph.D. Research committee**

Once the student has passed the Ph.D. qualifying exam and is well along in the process of

formulating a dissertation research proposal (i.e., typically during the second or perhaps third year of study), the student, in consultation with his/her Graduate Faculty advisor, must present a request to the Graduate Coordinator for the appointment of a Research Committee. The committee must include a minimum of four people including the advisor, one other member of the Graduate Faculty, a person competent in the field of research (this committee member may also be a member of the Graduate Faculty), and the Provost's Representative ("external chair"). The external chair must be a tenured member of the RIT faculty who holds a Ph.D. and is not a faculty member or Graduate Faculty member of the Center. Further, if the advisor is a member of the Graduate Faculty with a home department other than the Center, then the external chair cannot have the same home department as the advisor. The external chair is appointed by a request initiated by the Graduate Coordinator through the Dean of Graduate Studies. A student may have a committee member who is not a member of the RIT faculty by submitting their CV to the Graduate Program Coordinator for review and approval by the Graduate Curriculum Committee. The research committee will supervise the student's research, including review of the research proposal (typically as part of the Ph.D. candidacy exam), meeting with the student during the course of the research, and conducting the dissertation defense. All Ph.D. research committees must include at least one faculty member with a direct appointment to the Center.

### **Research proposal**

The student and the research advisor select a research topic for the dissertation. The proposed research must be original and publishable. Although the topic may deal with any aspect of imaging, the research is usually concentrated in an area of current interest within the center. The research proposal is presented to the student's Ph.D. research committee during the candidacy exam at least six months prior to the dissertation defense.

### **Residency**

All students in the program must spend at least two consecutive terms (summer excluded) as resident full-time students to be eligible to receive the doctoral degree. A full-time academic workload is defined as a minimum of nine academic credits per term or an equivalent amount of research, as certified by the Graduate Program Coordinator.

### **Exceptions to residency requirement**

If circumstances warrant, the residency requirement may be waived via petition to the graduate coordinator, who will decide on the student's petition in consultation with the advisor and graduate faculty. The request must be submitted at least nine months prior to the thesis defense.

### **Time limitations**

All candidates for a doctoral degree must maintain continuous enrollment during the research phase of the program. Such enrollment is not limited by the maximum number of research credits that apply to the degree. Normally, full-time students complete the course of study for the doctorate in approximately three to five years. A total of seven years is allowed to complete the requirements after passing the Qualifying Exam.

### **Final Examination of the Dissertation (Ph.D. Thesis Defense)**

The Research Advisor, on behalf of the student and the student's Research Committee must notify the Graduate Coordinator of the scheduling of the final examination of the dissertation by forwarding to the Graduate Coordinator the title and abstract of the dissertation and the scheduled date, time, and location of the examination. The final examination of the dissertation may be scheduled no sooner than six months after the date on which the student passed the candidacy exam (at which the thesis proposal was presented and approved).

Barring exceptional circumstances (requiring permission from the Graduate Coordinator), the examination may not be scheduled sooner than four weeks after formal announcement (i.e. Center-wide hallway postings and email broadcast) has been made concerning the dissertation title and abstract and the defense date, time, and location.

The final examination of the dissertation is open to the public and is primarily a defense of the dissertation research. The examination consists of an oral presentation by the student, followed by questions from the audience. The Research Committee may also elect to privately question the candidate following the presentation. The Research Committee will immediately notify the candidate and the Graduate Coordinator of the examination result by submission of a signed form that becomes part of the student's academic file.

### **En Route to an Imaging Science Ph.D. at RIT: Key Events and Milestones**

Table 7.2 summarizes key events and milestones in the career of an Imaging Science Ph.D. student at RIT.

**Table 7.2 Ph.D. Milestones**

<b>When</b>	<b>What</b>	<b>Responsible</b>
Application Year	Application decision; matriculate into program; financial support established	Applicant, Admission Committee, Center Staff
<b>Year 1</b>		
July/Aug	Register for classes	Student, Academic Coordinator, Graduate Program Coordinator
July/Aug	Teaching Assistant or Research Assistant duties assigned (if applicable). Documents completed to work on campus and receive assistantship	Associate Director, Staff Assistant, Student Employment Office, Student
Spring Term	Research Advisor selection by student. Student informs Graduate Program Coordinator	Student (note until Advisor is selected, Graduate Program Coordinator serves in this role).
End of Spring Term	Submission of initial Plan of Study and submit transfer credit request (if applicable) to Graduate Program Coordinator	Student, Research Advisor, Graduate Program Coordinator
2 <sup>nd</sup> Friday of June	Ph.D. Qualifying Exam	Student, Graduate Program Coordinator, Exam Committee
June 30	Ph.D. Qualifying Exam Pass/Fail Decision	Graduate Faculty, Director
End of Summer Term	Formulate research topic; Research Committee formed	Student, Research Advisor, Graduate Program Coordinator
<b>Year 2</b>	Formulate Dissertation Proposal	Student, Advisor
Spring term	Research and Candidacy Exam Committee appointed	Student, Advisor, Graduate Program Coordinator (Dean of Graduate Studies approval)
June 1	Submit updated Study Plan (if necessary)	Student, Advisor
<b>Years 2+</b>	Periodic Research Committee briefings	Student, Research Committee
4 weeks prior to candidacy exam	Circulate dissertation proposal to research committee	Student
At least 6 months prior to Ph.D. defense	Proposal defense and candidacy exam	Student, Research Committee
<b>Final Year</b>	Periodic Research Committee briefings	Student, Research Committee
At least 4 weeks prior to defense	Announce dissertation defense	Student, Advisor, Graduate Program Coordinator
At least 4 weeks prior to defense	Circulate dissertation to committee	Student, Research Committee
By April 1 for participation in May Graduation	Dissertation defense with conditional pass	Student, Research Committee
April 15 for May Graduation	Dissertation submitted to Wallace Library and UMI/ProQuest with proof of submission delivered to Graduate Program Coordinator	Student
End of term in which all requirements are met	PhD requirements certification	Graduate Program Coordinator

## **8. Plans of Study**

Please see the following links for example Plans of Study. Type over entries as appropriate to create your individualized plan of study. An initial plan of study can be created at anytime, but should be done prior to registering for your second semester of your program. Updates can be made later. Be sure to keep a current plan of study on file with your Advisor and the Graduate Program Coordinator. The following links are populated for a student beginning their program this academic year, but can (and should) be modified to match the student's plan.

MS Thesis Option

[http://www.cis.rit.edu/files/GradDocuments/MS\\_Thesis\\_POS\\_2015.xlsx](http://www.cis.rit.edu/files/GradDocuments/MS_Thesis_POS_2015.xlsx)

MS Project Option

[http://www.cis.rit.edu/files/GradDocuments/MS\\_Project\\_POS\\_2015.xlsx](http://www.cis.rit.edu/files/GradDocuments/MS_Project_POS_2015.xlsx)

Ph.D.

[http://www.cis.rit.edu/files/GradDocuments/PhD\\_POS\\_2015.xlsx](http://www.cis.rit.edu/files/GradDocuments/PhD_POS_2015.xlsx)

## 9. Graduate Program Faculty

The following faculty members constitute the Graduate Program Faculty of the Chester F. Carlson Center for Imaging Science and are eligible to serve as thesis advisors for students studying for their MS or Ph.D. in Imaging Science.

*Faculty whose home department is the Carlson Center:*

Charles Bachmann, Associate Professor  
Stefi Baum, Research Professor  
Gabriel Diaz, Assistant Professor  
Roger Dube, Research Professor  
Roger Easton, Professor  
James Ferwerda, Associate Professor  
Richard Hailstone, Associate Professor  
Maria Helguera, Research Professor  
Joseph Hornak, Professor, Imaging Science and Chemistry  
Emmett Ientilucci, Assistant Professor  
Guoyu Lu, Assistant Professor  
Christopher Kanan, Assistant Professor  
Joel Kastner, Professor  
John Kerekes, Professor  
Robert Kremens, Research Professor  
Poorna Kushalnagar, Research Assistant Professor  
David Messinger, Professor and Director  
Zoran Ninkov, Professor  
Jeff Pelz, Professor  
Jie Qiao, Associate Professor  
Navalgund Rao, Research Professor  
Carl Salvaggio, Professor  
John Schott, Research Professor  
Grover Swartzlander, Professor, Imaging Science  
Jan van Aardt, Professor  
Anthony Vodacek, Professor

*Faculty whose home department is outside the Carlson Center:*

Iris Asllani, Assistant Professor, Biomedical Engineering  
Peter Bajorski, Professor, School of Mathematical Sciences  
Mishkat Bhattacharya, Assistant Professor, School of Physics and Astronomy  
Roy Berns, Professor, Color Science  
Nathan Cahill, Associate Professor, School of Mathematical Sciences

Sohail Dianat, Professor and Head, Electrical and Microelectronic Engineering  
Marcos Esterman, Associate Professor, Industrial and Systems Engineering  
Mark Fairchild, Associate Dean for Graduate Education and Research, Professor and Color  
Science Director  
Donald Figer, Professor, Director, Center for Detectors  
Ernest Fokoué, Associate Professor, School of Mathematical Sciences  
Thomas Gaborski, Assistant Professor, Biomedical Engineering  
Andrew Herbert, Professor, Psychology  
Matthew Hoffman, Assistant Professor, School of Mathematical Sciences  
Seth Hubbard, Assistant Professor, Physics and Microsystems Engineering  
Michael Kotlarchyk, Professor and Head, School of Physics and Astronomy  
Cristian Linte, Assistant Professor, Biomedical Engineering  
Sildomar Monteiro, Assistant Professor, Electrical and Microelectronic Engineering  
Michael Pierce, Assistant Professor, School of Physics and Astronomy  
Ray Ptucha, Assistant Professor, Computer Engineering  
Eli Saber, Professor, Electrical and Microelectronic Engineering  
Andreas Savakis, Professor and Head, Computer Engineering  
Bruce Smith, Professor and Director, Microsystems Engineering  
Brian Tomaszewski, Associate Professor, Information Sciences and Technologies  
Richard Zanibbi, Associate Professor, Computer Science



## **10. Definitions, Policies and Procedures**

All RIT policies and regulations as they appear in RIT publications apply in full to students in the Chester F. Center for Imaging Science. There are, however, a few additional policies and practices that apply only to Imaging Science. For your guidance, this publication contains an outline of this information.

RIT Policies and Procedures apply to all students and can be found at the following URL:

<http://www.rit.edu/academicaffairs/policiesmanual/>

### **10.1 Academic Standards/Grades**

A cumulative Grade Point Average (GPA) of 3.0 or above must be achieved within one term of full-time study, or the equivalent (9 credits), to be in good academic standing. If a student's program cumulative GPA is less than 3.0 the student must raise their GPA to a 3.0 within one term of full-time study (9 credits) or the student will be suspended. A grade of D or F at the graduate level does not count as a completed course. The course must be retaken, if it is program requirement. Graduate courses cannot be repeated to improve a grade. If a course is repeated to satisfy program requirements the original grade will continue to be part of the student's program cumulative GPA.

### **10.2 Advisor**

Graduate Faculty advisors are assigned to all Imaging Science students. Advisors are prepared to assist students with issues regarding curriculum requirements, elective choices, transfer options, RIT support facilities, and concerns of a more personal nature (such as managing your time effectively, making the adjustment to college life or coping with the unexpected). We strongly urge you to establish a firm relationship with a faculty advisor soon after you begin your program of study in Imaging Science. First year students are assigned to the Graduate Program Coordinator, unless they already have a tentative research topic, in which case they are assigned to a faculty advisor in a research group. During the first year, the students should select a member of the Graduate Program Faculty who will serve as their Research (or Project) Advisor (who then also acts as an academic advisor) and inform the Graduate Program Coordinator.

### **10.3 Building Access**

Students enrolled in graduate programs in the Carlson Center for Imaging Science have swipe card access to the building and specific rooms through their RIT ID card. Access to labs is based on need and requires approval of the faculty responsible for the lab.

### **10.4 Certification of Degree**

Certification of a graduate degree requires verification that the student has completed all course and research credits required for the degree based on an approved plan of study. The student must satisfy the residency requirement and achieve a minimum program cumulative grade point average of 3.00 (a B average). Full payment or satisfactory adjustment of all financial obligations is required. All materials must be returned to the Wallace Library.

### **10.5 Change of Program**

Enrolled students who wish to change their program (MS to Ph.D., or Ph.D. to MS) should consult with the Graduate Program Coordinator.

### **10.6 Class Attendance**

No record of attendance is kept by the Chester F. Carlson Center for Imaging Science administrative offices. Reports of absences are not required. However, a record of absences may be kept by any faculty member and may be used by that faculty member to determine a grade. Non-attendance does not constitute withdrawing from a class.

### **10.7 Cooperative Education/Internships**

Cooperative education experiences are not required for degree completion for students in the MS or Ph.D. in imaging science at RIT. However, opportunities are available to students and may be pursued with permission of the student's advisor and graduate program coordinator. The following steps are required to participate in co-op:

- Offer letter and position description from potential employer
- Approval of Advisor
- Approval of Graduate Program Coordinator
- International students are advised to meet with ISS regarding eligibility
- Enroll in Co-op through SIS
- Register position on Co-op website
- Evaluation of co-op experience by supervisor and student
- Grade of Satisfactory (S) or Unsatisfactory (U) assigned

### **10.8 Course Exemption**

An instructor may recommend approval of a course requirement exemption based upon previous experience or course work. However, this exemption does not alter the total credit requirement for the degree program. Requests for course exemption must be initiated by the student, in writing, to the Graduate Coordinator. Approval of the request is subject to graduate faculty consensus.

### **10.9 Course Substitution and Non-Imaging Science Electives**

To substitute alternative courses for required (core) curriculum courses, or to count elective courses from other departments (e.g., Business, Liberal Arts) that appear to fall outside the field of imaging science, permission must be granted by the Graduate Coordinator (possibly subject to the consensus of the Carlson Center's Graduate Faculty). To initiate a request of this nature, the student must provide his or her faculty advisor with a description of the desired course. A written rationale which describes the importance of a desired non-imaging science elective in terms of career goals and curriculum specializations may be necessary. This justification is expected to take place in the context of the student's full study plan (indicating all courses to be taken to satisfy the degree requirements). Approvals for substitutions for required courses are normally subject to graduate faculty consensus. Note that, for the MS

program, a maximum of 6 credits may be taken outside the Center.

### **10.10 Course Withdrawal**

If a student wants to stop participating in a class following the six-day add/drop period, the student must officially withdraw (drop with penalty) from the course and will receive a grade of W. This grade will be reflected on the student's permanent record. Withdrawal from a course which causes a student to carry less than 9 academic credits (or causes loss of full-time status) may result in suspension of the student's scholarship. Students are encouraged to consult with their advisor and/or the graduate program coordinator prior to withdrawing from a course.

A course withdrawal resulting in a W grade may be obtained through the Friday of the twelfth week of the semester only. Following that date, a request for a late withdrawal form must be signed by the professor of the course, the Director of the Center, and the Dean of the College of Science. A rationale for late withdrawal must be provided.

### **10.11 Credit by Exam**

With the approval of the Graduate Program Coordinator, students with an undergraduate degree in imaging science (or related fields) can request credit by examination for certain graduate courses offered by the center, provided there is substantial curriculum overlap with the corresponding undergraduate course. Credit for graduate courses also may occasionally be granted by examination in the event that the student petitions an instructor to administer the exam. A Credit by Examination form must be completed, fee paid to Student Financial Services, and filed with the department prior to taking the exam. The exam is pass/fail. The notation on a student's permanent record is X (examination) and does not affect the RIT grade point average.

### **10.12 Credit/Course Limitations**

Students may not enroll in more than 18 credit hours per semester; overloads require the approval of the Graduate Program Coordinator. Tuition is charged per credit hour for each credit from 1 to 11 credits. A set tuition charge is applied for 12 through 18 credits. The Graduate Program Coordinator may limit the total number of credit hours a student may take per term and, in the event of probationary academic standing, may require enrollment in specific courses. Teaching and research assistants may not register for more than 10 course credits plus one research credit without prior approval of the Graduate Program Coordinator.

Students must consult with their faculty advisor or graduate coordinator for permission to take courses that are not part of an approved plan of study. If a student is receiving a tuition scholarship the tuition for courses that are not approved may not be paid by the scholarship. Credit bearing courses taken for an Audit grade will not be covered under tuition scholarships. Student Activity fees, parking fees, health fees, and fees for Activity/Wellness courses are not covered by a student's tuition scholarship.

### **10.13 Email/Communication**

Important information will be sent to your RIT email and through Center for Imaging Science distribution lists. You are encouraged to forward all RIT email to an address that you check daily.

### **10.14 Graduate Program Faculty**

The term "Graduate Program Faculty" (or sometimes "Graduate Faculty") as used in this document includes: faculty members with direct appointments to the Chester F. Carlson Center for Imaging Science within the RIT College of Science; faculty members from other departments and colleges at RIT who have been appointed to the Graduate Faculty in the Center; and the Center's research faculty. These faculty are identified in Section 9 of this document.

### **10.15 Graduate Student Offices**

Graduate students are assigned offices on a space-available basis. Full-time Ph.D. students with graduate assistant responsibilities are given priority.

### **10.16 Imaging Science Seminar**

Throughout the academic year seminars are given on Wednesdays in the Carlson Auditorium CAR 1125. Attendance of seminars is required of first year graduate students and strongly recommended for all students. The seminars are open to the public and announced on the CIS web site.

### **10.17 Independent Study**

Independent Study provides students the opportunity to learn about a topic not covered in the regular courses offerings of RIT. A form must be completed and signed by the student and the faculty responsible for evaluating the Independent Study, and by the Graduate Program Coordinator.

### **10.18 Intersession, Summer Term Expectations**

Students are not required to be enrolled during Intersession or summer term. Students receiving an assistantship must consult with their research advisor regarding expectations during Intersession and summer term.

### **10.19 Leave of Absence/Institute Withdrawal**

Students wishing to take a leave of absence should consult with their Advisor and the Graduate Program Coordinator. They should also review the RIT policy at [http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D2\\_1.html](http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D2_1.html).

### **10.20 Maintenance of Registration**

Candidates for the doctoral degree must maintain continuous enrollment during the research phase of the program. Such enrollment is not limited by the maximum number of research credits that apply to the degree.

### **10.21 Participation in Commencement**

Master of Science students who expect to complete all degree requirements by the end of the following summer term are eligible to participate in the spring Commencement and to have their names published in the Commencement Book. MS students may only participate in graduation and be listed in the commencement booklet one time.

Ph.D students who are expected to complete all degree requirements, including the dissertation defense, by the end of summer term may participate in the spring term graduation ceremonies. Those not having completed the dissertation defense with at least a conditional pass on or before April 1 and not having completed all other degree requirements as of the end of the spring term must have their likely summer-term completion documented by April 1 in letters of request to the COS Dean from their dissertation advisor and school head. The Dean will then make all final decisions regarding participation in commencement ceremonies. Ph.D students may only participate in graduation and be listed in the commencement booklet one time.

Ph.D regalia must be ordered for candidates. Provide the Academic Coordinator height, weight, address, phone number and email. Regalia will be available for pick up at Barnes & Noble Bookstore @RIT prior to Commencement.

For more information see this link: <http://www.rit.edu/~w-comenc/welcome.php>

### **10.22 Registration/Enrolling in Courses**

Students are responsible for enrolling each term through the Student Information System <https://sis.rit.edu>. Registration takes place during the preceding term (except fall registration, which begins during spring term). Students should enroll based on program requirements and their approved plan of study. Entering students have the opportunity to register by July or early August of the summer prior to their first year; an email will be sent to entering students with instructions for registration and course requirements. It is the responsibility of students to make appointments with their faculty advisor (or, for incoming students, the Graduate Program Coordinator) at the time of registration to discuss course selection, elective requests and possible transfer credit requests.

### **10.23 Schedule Verification and Changes**

It is the student's responsibility to enroll and to verify their schedule is correct. A student may change their schedule at any time up to the end of the first six days of class, following the procedure outlined by the RIT Registrar. Students are strongly encouraged to consult with the Graduate Program Coordinator, Academic Advisor or Academic Coordinator before adding or dropping classes. Changes in a course schedule through this process are not reflected on a student's grade report or permanent record.

### **10.24 Student Records**

Student records are housed in the Dean's Office, College of Science and in the Chester F. Carlson Center for Imaging Science. Administrative support is available to students through these offices in areas of registration, course selection, scheduling, records, and program advisement. Answers to questions are often available on a walk-in basis. Students who wish a consultation should make an appointment with the Academic Coordinator or Graduate Program Coordinator.

In accordance with the Family Educational Rights and Privacy Act of 1974 (commonly known as the Buckley Amendment), RIT students have the right to inspect, review and challenge the accuracy of official educational records. RIT policy ensures that only proper use is made of such records. With the exception of copies made for internal use (provided by the registrar for advising purposes), copies of a student's permanent record (transcript) or non-public information from student records will not be released without the student's written consent. Official written requests from students must be made for transcript release.

Directory information may be released at any time to persons or agencies indicating a legitimate interest. *Directory Information* includes the following: a student's name, mailing address and telephone number, date and place of birth, major field of study, participation records in official RIT activities and sports, weight and height if a member of an athletic team, dates of attendance at RIT, degrees and awards received.

### **10.25 Time Limitations: The "Seven Year Rule"**

For the doctoral degree, the initiation of the seven year time period occurs when the student passes the qualifying exam. Normally, full-time students complete the course of study for the doctorate in approximately three to five years.

For the MS degree, successful completion of all course and research credits or project requirements is required within seven years of the term in which the first course applied to degree requirements was completed. If a student is pursuing an MS thesis, continuous enrollment during the research phase of the program is required.

In rare cases, extensions of the seven-year rule may be granted. Petition for an extension is made to the Dean of Graduate Studies, and is initiated via written request to the Graduate Program Coordinator. The process to petition for an extension is at this link:

<http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D12.html>

### **10.26 Transfer Credit**

Transfer credit may be awarded based on an approved plan of study. Official transcripts from an accredited university must be on file with RIT Registrar. Course descriptions and syllabi may be requested by the Faculty Advisor or Graduate Program Coordinator before approval will be given for transfer credit. A grade of B or the equivalent must be earned for a course to be transferred. The grade of a transferred course does not apply to Program Cumulative GPA. A

maximum of 6 credits may be transferred to the MS degree. A maximum of 30 credits may be transferred to the Ph.D. degree

### **11. Graduation Checklist**

Students will complete the following checklist as they complete their degree.

- Complete an Application for Graduation Form found at this link: <http://www.rit.edu/academicaffairs/registrar/forms>
- Review of required/elected courses and research credits per approved plan of study
- Schedule Dissertation/Thesis defense
- Provide title of dissertation/thesis and names of committee and outside chair, if applicable to Graduate Program Coordinator
- Confirm all material returned to Wallace Library
- Confirm no outstanding balance with Student Financial Services
- After successful defense and approval of dissertation/thesis, submit required number of copies to Wallace Library for binding and to UMI/Proquest for archiving. Follow instructions at this link: <http://infoguides.rit.edu/thesis-services>
- Provide Graduate Program Coordinator and/or Academic Coordinator contact and employment information
- Certification for the degree will occur at the end of the term in which all requirements are satisfied. (Certifications are not processed at the end of intersession.)
- Complete Survey of Earned Doctorates (Ph.D. student only)

### **12. Externally Sponsored Projects Disclosure Policy**

RIT policy requires all RIT individuals (faculty, staff, and students) be informed with the pertinent details of externally sponsored research projects at RIT, including who is sponsoring the project. Graduate students who are financially supported by these projects have the right to know these pertinent details including:

- name of the Principal Investigator,
- title of the project,
- abstract of the project,
- name of the sponsor and original source of funds (if different),
- amount of the project funding,
- project duration, and
- existence of any classified information.

This information can be found by on RAPID (<https://apps.rit.edu/research/srs/rapid/>).

### 13. Shared Expectations for Ethics and Professional Integrity

The Chester F. Carlson Center for Imaging Science is dedicated to a challenging and collaborative educational experience in imaging science that is grounded in the integrity of the students, faculty, and staff. That integrity is expressed by our actions, individually, as well as by our actions collectively, including those in research; on laboratory, programming, and homework assignments; on examinations; and in our collaborations and interactions with one another. RIT has a policy on academic honesty, which is maintained at: <http://www.rit.edu/academicaffairs/policiesmanual/sectionD/D8.html>

The shared expectations described in this document build on, and are in addition to, the RIT policy. The purpose of this shared expectations document is to assure that we in CIS are taking an active and engaged approach to maintaining the highest possible levels of scientific and professional ethics and integrity and that the students, faculty, and staff of CIS have a common code of ethics and integrity and a common understanding of the consequences of violating that code.

Research: it is unethical to falsify any data in an experiment, or computational or theoretical results, whether the data or results are to be submitted to internal or external review (e.g., in a thesis or dissertation or for a conference or journal paper or a grant proposal). Similarly data and results cannot be plagiarized. If data are demonstrated to have been falsified or plagiarized on a capstone or graduate thesis or dissertation, the faculty has discretion to determine the penalty, up to and including expulsion from the program. If data have been falsified on a paper submission, the paper shall be withdrawn and the faculty shall have discretion to determine the penalty.

Examinations: students must not plagiarize the work of others nor allow others to plagiarize their work on written examinations. The faculty will try to arrange the room in such a manner to remove or discourage such temptation. Faculty may require students to attest to their conduct on any submitted material by signing a statement such as, *"I have neither given nor received unauthorized assistance on this examination."* The faculty member has discretion to determine the penalty for violations of this policy.

Homework: the faculty member has the obligation to specify the conditions to be fulfilled on homework submissions (e.g., can be done collaboratively, must be done alone, etc.). As a rule, students may not submit the work of others as their own. In many, if not most, homework scenarios, collaborative effort on homework is part of the learning process and is therefore useful, but students may be asked to reference any assistance that they have received. Similarly, group planning and/or checking of final answers may be permissible, but both are examples of collaborative efforts that must be attributed if required by the professor. Faculty may require students to attest to their conduct on any submitted material (e.g., laboratory reports, computer programs, term papers) by signing a statement such as, *"I have followed all guidelines and requirements and have attributed all assistance received."*



Collaboration: collaboration among students is often encouraged as an integral part of the learning experience, be it in the classroom or for research. Some examples include group projects, laboratory assignments, and test preparation. Whenever submitted work is the result of such collaboration, clearly crediting all who contributed will eliminate the possibility that the collaboration is in violation of *RIT's Academic Honesty Policy*, which states, "Any act of improperly representing another person's work as one's own is construed as an act of academic dishonesty."

Incoming students will discuss with faculty and each other this Shared Expectations *for Ethics and Professional Integrity* and the RIT Academic Honesty Policy and after having an opportunity to ask questions, will sign a copy of the Expectations indicating that that they have read and discussed it and are aware of the consequences of policy violations. In some cases, the penalties for violation of the policy are stipulated; in others they are not rigidly defined, giving the faculty discretion in specifying the consequences. Those consequences may include failure in a course, suspension of funding for a term or longer, or expulsion from the program in severe cases such as falsifying research data or multiple violations. In all cases, academic honesty violations will be reported to the CIS Director, so that the Director can maintain an overview of instances of academic dishonesty occurring with the Center for Imaging Science and so that the Director can assure that penalties are applied consistently and fairly.

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I have read RIT's Academic Honesty Policy and the Chester F. Carlson Center for Imaging Science *Shared Expectations on Ethics and Professional Integrity*. I understand the importance of honesty and integrity in science and education and I understand that the consequences of violating this policy may include failing a course, loss of funding, and/or expulsion from the program.

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Name

Date

#### **14. Relevant RIT Links**

Enrollment, Records, Course Bulletins, Class Schedules, Calendars: <https://sis.rit.edu>

Graduate Financial Aid/Scholarships: <http://www.rit.edu/programs/graduate-financial-aid>

Information Technology Services: <http://www.rit.edu/its/>

International Student Services: <http://www.rit.edu/studentaffairs/iss/>

Office of Co-operative Education and Career Services: <http://www.rit.edu/emcs/oce/>

Office of Dean of Graduate Studies: <http://www.rit.edu/academicaffairs/gradstudies/>

Research Computing: <http://rc.rit.edu/>

Student Employment: <http://www.rit.edu/emcs/seo/>

Student Rights & Responsibilities: <http://www.rit.edu/studentaffairs/studentconduct/rr.php>

Thesis/Dissertation Publishing/Binding/Archiving: <http://wallacecenter.rit.edu/scholarly-publishing-studio/graduate-support/thesis-dissertation-assistance>

Wallace Library: <http://library.rit.edu/>