



# **GRADUATE STUDENT HANDBOOK**

For Graduate Degrees  
in  
Materials Science and Engineering

2020-2021

[research.colostate.edu/samd](https://research.colostate.edu/samd)

## INTRODUCTION

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Welcome to the School of Advanced Materials Discovery (SAMD).

Graduate study in materials science and engineering (MSE) at Colorado State University (CSU) is intended to bring together faculty members and graduate students in a diverse community of scholars having a common interest in advanced professional study and creative work. The program seeks to develop MSE professionals who use their multidisciplinary problem solving skills to address global challenges in the field of MSE. The degree program contains elements that will address materials technology transfer, materials manufacturing, responsible conduct of research, and other professional development skills necessary for success in the materials community.

We hope you enjoy your program of study and the work you complete in our graduate program. The *Graduate Student Handbook* is designed to inform graduate students of their roles and responsibilities, and to make explicit the requirements of the graduate programs. It is your responsibility to familiarize yourself with these policies and abide by them. You are also expected to familiarize yourself with the Graduate and Professional Bulletin published by the Graduate School, and available at the Graduate School's website.

## TABLE OF CONTENTS

<b><u>GRADUATE ADVISORS (Faculty)</u></b> .....	<b>4</b>
Permanent SAMD Faculty .....	4
Core SAMD Faculty .....	5
Associate SAMD Faculty.....	6
<b><u>IMPORTANT INFORMATION FOR NEW GRADUATE STUDENTS</u></b> .....	<b>11</b>
Colorado Residency .....	11
Program of Study .....	12
Assistantship Funding.....	12
Registration.....	13
<b><u>STUDENT GRADUATE COMMITTEE</u></b> .....	<b>13</b>
Committee Composition.....	13
<b><u>HOUSEKEEPING, SAFETY, &amp; RESPONSIBLE CONDUCT IN RESEARCH TRAINING</u></b> .....	<b>15</b>
<b><u>ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT</u></b> .....	<b>17</b>
Obligations of Students Supported on Graduate Research Assistantships (GRAs) .....	17
<b><u>GRADUATE PROGRAM REQUIREMENTS</u></b> .....	<b>18</b>
Masters Plan B .....	19
Masters Plan A .....	19
Suggested timeline .....	20
PhD.....	21
<u>PhD Annual Student Evaluation</u> .....	<u>22</u>
Suggested timeline .....	24
<b><u>MORE INFORMATION ON FINAL EXAMINATIONS</u></b> .....	<b>27</b>
<b><u>PROGRAM OF STUDY SYNOPSIS</u></b> .....	<b>30</b>
<b><u>DISSEMINATION OF RESEARCH, PUBLICATIONS, AND ATTENDANCE AT PROFESSIONAL MEETINGS</u></b> .....	<b>31</b>
Travel Grants .....	31
<b><u>GRADUATE STUDENT RESPONSIBILITIES</u></b> .....	<b>31</b>
Choosing an Advisor .....	32
<b><u>OTHER IMPORTANT INFORMATION</u></b> .....	<b>32</b>
Student Employee Retirement Fund .....	32
Health Contribution .....	34
<b><u>POST GRADUATION</u></b> .....	<b>35</b>

## GRADUATE ADVISORS

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Successful completion of graduate studies requires close cooperation between student and advisor. A permanent advisor is *usually* assigned to every student upon admission based on the research area of the professor. Students on a rotating GRA will not have an advisor upon admission.

If a permanent advisor has not been determined by the start of the first semester, then the student may make an initial plan of study with the Director and/or Program Manager.

The Director of SAMD and Program Manager serve as advisor to students who pursue the coursework-only Master of Materials Science and Engineering degree.

The student and advisor work together to coordinate the plan of study through graduation (i.e. courses, research, committee members, etc.)

**Graduate academic advisors based on research areas are as follows (alphabetized by department):**

### Permanent Faculty Advisors

<b>Faculty Advisor</b>	<b>Department</b>	<b>Research Areas</b>
<b>Margarita Herrera-Alonso</b> Associate Professor	<b>Chemical and Biological Engineering</b>	The molecular and process determinants of solution-based polymer assemblies
<b>Justin Sambur</b> Assistant Professor	<b>Chemistry</b>	Single nanomaterials behave in working solar energy conversion and catalytic devices
<b>Chris Weinberger</b> Associate Professor	<b>Mechanical Engineering</b>	Computer models to describe the properties of ceramics, metals and their alloys
<b>Kaka Ma</b> Assistant Professor	<b>Mechanical Engineering</b>	Design, processing and characterization of metals, ceramics and their composites. Sustainable material engineering
<b>Hua Chen</b> Assistant Professor	<b>Physics</b>	Spin-orbit coupling

## Core Faculty Advisors

<b>Faculty Advisor</b>	<b>Department</b>	<b>Research Areas</b>
<b>Travis Bailey</b> Professor	<b>Chemical and Biological Engineering</b>	Nanoscale self-assembly processes in block copolymer composite materials and their applications
<b>Matt Kipper</b> Associate Professor	<b>Chemical and Biological Engineering</b>	Materials for biomedical applications
<b>Chris Snow</b> Associate Professor	<b>Chemical and Biological Engineering</b>	Guided protein and DNA engineering, particularly the engineering of crystals
<b>David (Qiang) Wang</b> Associate Professor	<b>Chemical and Biological Engineering</b>	Advanced theories and computer simulation techniques to study complex fluids at nano- to meso-scales
<b>Ellen Fisher</b> Assistant Vice President for Strategic Initiatives	<b>Chemistry</b>	Fundamental chemical processes that take place during plasma processing and chemical vapor deposition
<b>Jamie Neilson</b> Associate Professor	<b>Chemistry</b>	Understanding local chemical environments and their influences on electronic properties (e.g., magnetism) in new materials
<b>Amy Prieto</b> Professor	<b>Chemistry</b>	Synthetic methods for nanostructured materials with applications in renewable energy
<b>Tiezheng Tong</b> Assistant Professor	<b>Civil and Environmental Engineering</b>	Membrane-based processes for sustainable water supply
<b>Yan (Vivian) Li</b> Associate Professor	<b>Design and Merchandising</b>	Nanostructured Materials for High-tech Textiles and Smart/Intelligent Medical Textiles
<b>Diego Krapf</b> Associate Professor	<b>Electrical and Computer Engineering</b>	Architecture of mammalian cells
<b>Carmen Menoni</b> University Distinguished Professor	<b>Electrical and Computer Engineering</b>	Characterization of high bandgap oxide materials for the engineering of interference coatings for high power lasers
<b>Su-Jung (Candace) Tsai</b> Assistant Professor	<b>Environmental and Radiological Health Sciences</b>	Exposure assessment, occupational hygiene practices, sampling techniques, engineering controls, and biological effects associated with various airborne particle exposure
<b>Jiangguo (James) Liu</b> Professor	<b>Mathematics</b>	Finite element methods, flow & transport in porous media, poroelasticity
<b>Patrick Shipman</b> Associate Professor	<b>Mathematics</b>	Nanoscale pattern formation at surfaces
<b>Yongcheng Zhou</b> Associate Professor	<b>Mathematics</b>	Modeling of real world problems, through studies combining rigorous mathematical analysis and computational simulations of high fidelity

## Core Faculty Advisors (cont.)

<b>Faculty Advisor</b>	<b>Department</b>	<b>Research Areas</b>
<b>Susan James</b> Professor	<b>Mechanical Engineering</b>	Materials used in biomedical engineering
<b>Ketul Popat</b> Associate Professor	<b>Mechanical Engineering</b>	Tissue engineering and regenerative medicine
<b>David Prawel</b> Assistant Research Professor	<b>Mechanical Engineering</b>	Biomaterials for cardiovascular and orthopedic healthcare; 3D product development
<b>Donald (Don) Radford</b> Professor	<b>Mechanical Engineering</b>	Induced distortion in composites, viscoelastic constitutive modeling, advanced polymer processing, and polymer foams, damage assessment and repair of composites and high temperature composites
<b>Walajabad Sampath</b> Professor	<b>Mechanical Engineering</b>	CdTe PV cell research using with in line continuous fabrication; thin film printed circuit boards and electrical interconnections
<b>Mostafa Yourdkhani</b> Assistant Professor	<b>Mechanical Engineering</b>	Manufacturing of composites, additive manufacturing of polymers, multi-functional materials, bio-inspired material design, polymer nanocomposites, polymer processing, and multiscale characterization & testing techniques

## Associate Faculty Advisors

<b>Faculty</b>	<b>Department</b>	<b>Research Areas</b>
<b>Stuart Tobet</b> Professor	<b>Biomedical Engineering</b>	New technologies to visualize and measure molecules that influence migration in tissue slices
<b>Ashok Prasad</b> Assistant Professor	<b>Chemical and Biological Engineering</b>	Quantitative and predictive models for molecular and cellular biology by using tools and methods from the engineering and physical sciences
<b>David Dandy</b> Professor	<b>Chemical and Biological Engineering</b>	Development, and implementation of micro-total analytical systems ( $\mu$ TAS)

[Click Here to go Back to Table of Contents](#)

## Associate Faculty Advisors (cont.)

<b>Faculty</b>	<b>Department</b>	<b>Research Areas</b>
<b>Kenneth Reardon</b> Professor	<b>Chemical and Biological Engineering</b>	Application of proteomics to microbiome analysis, and the analysis and engineering of bacteria and algae for the production of biofuels and other chemicals
<b>Alan Van Orden</b> Professor	<b>Chemistry</b>	Molecule spectroscopy
<b>Amber Krummel</b> Associate Professor	<b>Chemistry</b>	Molecular level details that drive nano-to microscopic properties in condensed phase systems
<b>Anthony Rappe</b> Professor	<b>Chemistry</b>	Study of catalytic processes. Reactions currently under study include single-site propylene polymerization and hydrocarbon oxygenation
<b>Chris Ackerson</b> Associate Professor	<b>Chemistry</b>	Nanoparticle structure, nanoparticle chemistry, novel nanoparticle synthesis strategies, applications of nanoparticles to biological imaging
<b>Eugene Chen</b> Professor	<b>Chemistry</b>	Intrinsically recyclable polymers; renewable monomers and sustainable polymers; polymer synthesis; new polymerization methodology; transition-metal, main-group & organic catalysis; biomass conversion to fuels, chemicals & materials
<b>Grzegorz Szamel</b> Professor	<b>Chemistry</b>	Macroscopic equilibrium and transport properties of condensed phase systems such as complex fluids using the methods of statistical mechanics
<b>Jamie Neilson</b> Assistant Professor	<b>Chemistry</b>	Understanding local chemical environments and their influences on electronic properties (e.g., magnetism) in new materials
<b>Martin McCullagh</b> Assistant Professor	<b>Chemistry</b>	Theoretical studies of multiscale problems in biology
<b>Matthew Shores</b> Professor	<b>Chemistry</b>	Chemical sensing, magnetic / electronic materials and solar photoconversion
<b>Nancy Levinger</b> Professor	<b>Chemistry</b>	Molecules in confined environments and fundamental processes governing cell cryopreservation

## Associate Faculty Advisors (cont.)

<b>Faculty</b>	<b>Department</b>	<b>Research Areas</b>
<b>Richard Finke</b> Professor	<b>Chemistry</b>	Chemical Catalysis, Alternative Energy, Nanoparticles, Organic Photovoltaics, Water Oxidation Catalysis, and Kinetics and Mechanism
<b>Melissa Reynolds</b> Research Associate Dean	<b>Chemistry</b>	Molecular design and fabrication of biomimetic materials for use in medical device applications
<b>Charles D Shackelford</b> Professor	<b>Civil and Environmental Engineering</b>	Geotechnics, geotechnical engineering for waste containment geoenvironmental engineering groundwater flow, seepage, and contaminant transport
<b>Christopher Bareither</b> Associate Professor	<b>Civil and Environmental Engineering</b>	Soil, geologic, geosynthetic (polymer), chemical, and environmental sciences to solve problems related to protection of human health and the environment
<b>Hussam N Mahmoud</b> Associate Professor	<b>Civil and Environmental Engineering</b>	Repair, and life-cycle cost of deteriorated infrastructure including steel bridges and hydraulic steel structures
<b>Kevin Lear</b> Professor	<b>Electrical and Computer Engineering</b>	Optoelectronic devices and systems to address future critical needs in applications including biosensors and optical communications
<b>Mario Marconi</b> Professor	<b>Electrical and Computer Engineering</b>	EUV and SXR (Soft X-Ray), lasers and applications, nano-lithography nano-Imaging
<b>Randy Bartels</b> Associate Professor	<b>Electrical and Computer Engineering</b>	advancing soft material performance with nanostructure; control of molecular coherences for novel nonlinear optics and manipulation of ultrafast optical pulses, as well as development of EUV laser sources and optical systems
<b>Thomas Chen</b> Professor	<b>Electrical and Computer Engineering</b>	VLSI design & testing, biomedical engineering; computer architecture, parallel processing
<b>Jerry Magloughlin</b> Associate Professor	<b>Geosciences</b>	Geology, fault rocks, metamorphic petrology, geochronology, geoeducation



## Associate Faculty Advisors (cont.)

<b>Faculty</b>	<b>Department</b>	<b>Research Areas</b>
<b>Clayton Shonkwiler</b> Assistant Professor	<b>Mathematics</b>	Geometry to solve topological and physical problems
<b>David Aristoff</b> Assistant Professor	<b>Mathematics</b>	Monte carlo methods, numerical analysis, modeling and simulation, phase transitions and metastability, random graphs and networks
<b>Gerhard Dangelmayr</b> Professor	<b>Mathematics</b>	Instabilities and pattern formation pattern analysis and neural networks methods of mathematical physics
<b>Iuliana Oprea</b> Associate Professor	<b>Mathematics</b>	Hydrodynamic and hydromagnetic stability and bifurcation: the dynamo problem, the electroconvection of nematic liquid crystals; dynamical systems, pattern formation, mathematical modelling;
<b>Olivier Pinaud</b> Associate Professor	<b>Mathematics</b>	Wave propagation in random media, inverse problems and imaging; quantum transport
<b>Simon Tavener</b> Professor	<b>Mathematics</b>	Galerkin finite element methods nonlinear hydrodynamic stability
<b>Christian M Puttlitz</b> Professor	<b>Mechanical Engineering</b>	Experimental and computation techniques to investigate orthopaedic conditions and their treatments
<b>John Williams</b> Associate Professor	<b>Mechanical Engineering</b>	Modeling of erosion phenomena of ion thruster components, as well as experimental evaluation of plasma and ion beam interactions with materials for both aerospace and terrestrial applications

## Associate Faculty Advisors (cont.)

<b>Faculty</b>	<b>Department</b>	<b>Research Areas</b>
<b>Mingzhong Wu</b> Professor	<b>Physics</b>	Microwave magnetics and nanomagnetism
<b>Siu Au Lee</b> Professor	<b>Physics</b>	Quantum computing, laser manipulation of atoms, atom interferometry, nano-lithography
<b>Stuart Field</b> Associate Professor	<b>Physics</b>	Static and dynamic properties of superconducting vortices and other magnetic flux structures
<b>James Sites</b> Professor	<b>Physics</b>	Optical properties, photoluminescence, Hall measurements, and surface analysis
<b>Kristen Buchanan</b> Associate Professor	<b>Physics</b>	Magnetization reversal and spin excitations of patterned magnetic elements

[Click here to go back to Table of Contents](#)

## IMPORTANT INFORMATION FOR NEW GRADUATE STUDENTS

### **Colorado Residency**

- Domestic students are strongly encouraged to declare Colorado residency by the end of their first academic year. This is done by completing a variety of tasks:
  - Students must be able to show proof of residence in Colorado for the 12 months **prior** to the beginning of the second year in the program (e.g. if the semester starts on August 22, 2016, you must be able to show you lived in Colorado on August 22, 2015).
  - You must also establish ties to Colorado (Driver's License/State ID card, voter registration, car registration – if the vehicle is in your name).
- If you are a domestic, out of state student, be sure to review the Residency Office's website for more information about obtaining residency (<http://sfs.colostate.edu/residency/>).
  - Plan on attending an Orientation provided by Student Financial Services. Residency Orientations are offered First and Third Tuesdays of each month from 3-4pm in Room 100A of Centennial Hall.

\*International students are not eligible to declare Colorado residency unless they are immigrating to the United States.

### **Program of Study**

A Materials Science and Engineering (MSE) Bachelors of Science is not required for admission to our MSE Graduate Program. If you are an applicant without a MSE Bachelor's degree, below are courses/subjects our admissions committee recommends you demonstrate knowledge of:

Introductory Materials Science  
Physics I and II (Laws of Thermodynamics)  
Chemistry I and II  
Calculus I, II, and III (Ordinary and Partial Differential Equations)  
Introductory Programming

Once admitted, the admissions committee may recommend/require additional courses to ensure all students are successful in our MSE program. Additional courses may be recommended and/or required of the student's thesis/dissertation committee as well.

The program of study is submitted to the Graduate School as the **GS6** form by the end of the second semester (3<sup>rd</sup> semester for PhD students).

**Changes made in the course** selection will require advisor approval on the **GS25** form (application for graduation) that is submitted the semester before the student plans to graduate.

**Changes in committee** member selection will be made on the **GS9A** form and must be approved by the advisor and the committee members who are added or removed.

Thesis and dissertation work requires students to become involved in appropriate research activities. Graduate students will typically register for up to three formal courses each term, with four semesters typically required to complete the master's degree, and six to eight semesters typically required to complete the Doctor of Philosophy Degree. Students are required to submit scholarly publications during their research (see "Publication Requirements" section). These articles may be appropriately incorporated as chapters in theses and dissertations.

Courses to be applied towards any materials science engineering graduate degrees, including transfer credits from other institutions, must have been completed within the ten (10) years immediately preceding the date of completion of the final CSU degree. Transfer requests are submitted to the Graduate School with the GS6 Program of Study during the second semester and must include a course syllabus and a transcript showing that the course(s) was not used for another degree. The Graduate

School will notify the student by email when the GS6 form has been approved, meaning that the recommended committee is satisfactory, the transfer of credits is completed, and the program of study is acceptable. The *maximum number of transfer credits* for M.E. and M.S. degrees is 6 and for Ph.D. degrees is 30. Transfer information on the graduate school website:

<https://graduateschool.colostate.edu/policies-and-procedures/transfer-credits/>

**To petition for course substitution**, a student must turn in the **Petition for Substitution of Classes**. If the student wants to substitute a course they plan to take that will substitute a requirement, they must submit this form *prior* to taking the course they wish to substitute.

In special cases, the graduate academic committee will review the student's petition after they have taken the course they wish to substitute. Student's should submit petitions to the Program Manager at Carolina.Bañuelos@colostate.edu or via campus mail: 1617 Campus Delivery.

A full-time course load for graduate students is 9 credits per semester. Once finished with coursework, we highly encourage students to register for at least 9 thesis/dissertation credits. This will ensure students graduate on time and faculty/the program is more likely to have funding for 3 to 4 years versus 5 or more.

*Important:* In cases where a graduate student is not registering for classes or research classes, but is continuing research, registration in the program must be kept current by registering for **Continuous Registration (CR)** through RAMweb. Students who are registered for CR may not be on contract for a research or teaching assistantship but may work as student hourly employees. Students are required to register for CR during the semester they plan to graduate. *Students who fail to register for CR will not be allowed to graduate that semester and will be required to apply for readmission (~\$150.00), register for CR (~\$175.00), and reapply for graduation.*

### **Assistantship Funding**

Funding *may* be available for students working on the M.S. Plan A or PhD program. While there is no funding for the Masters Plan B from the SAMD program, there are several scholarship opportunities through Colorado State University. You can access the Colorado State University Scholarship Application via RamWeb (student portal).

Assistantship awards offer a stipend to the student in return for certain specified services to the University. The stipend is treated as income (subject to withholding taxes) and both the University and the student agree to a formal appointment when an assistantship is arranged. Each department is responsible for determining whether a student qualifies for any graduate assistantships. Assistantships cover tuition, differential tuition and provide a monthly stipend throughout the academic year. *Student fees are not covered by the assistantship.*

Assistantships are offered for the full academic year and *must be renewed on a semester basis.*

- Graduate Teaching Assistantship (GTA): Teaching assistants help in the provision of education services to undergraduates. Responsibilities may range from grading papers through leading discussions or lab sessions to complete independent teaching of a class.
- Graduate Research Assistantship (GRA): Research assistants typically work with a professor on a project of importance to scholarship. Rotating GRA's included.

**As a multidisciplinary program, it is the student's responsibility to ensure they attend all required graduate school, SAMD, and department GA trainings. For example, if the student's SAMD GA is through Mechanical Engineering, the student must ensure they are trained as a Mechanical Engineering GA.**

NOTE: If the student holds a graduate assistantship during the fall and/or spring semesters, the student must be registered for at least one on-campus credit each fall and spring semester the graduate assistantship appointment is in effect. Other conditions of GA appointments can be found on the Graduate Assistantships Page. Please review the [Graduate Assistantship – Terms and Conditions of Appointment](#) page by clicking [here](#).

### **Registration**

All graduate students at Colorado State University are required to be continuously registered in the fall and spring semester throughout their degree programs, even if they do not need any more credits to meet graduation requirements. This policy applies from the time of first enrollment through the graduation term. Registration is also required during the summer term if University resources are used. Students on summer assistantships must register for CR-ON or regular credit course(s) in order to remain on an assistantship. Students may fulfill this requirement by registering for any graduate credit-bearing course (regular or non-regular). As an alternative, students may opt for Continuous Registration (CR) status. Registration for CR status is accomplished in the same way as registration for courses. Section ID numbers for on-campus (primarily on-campus) and off-campus (absent from campus) appear in the class schedule under the CR prefix (CR-ON and CR-OFF). *Graduate students registered full time (9 or more credits) are encouraged to maximize their registration to 15 credits.*

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## STUDENT GRADUATE COMMITTEE

### **Thesis/Dissertation Committee**

To guide and supervise a student's progress for the M.S. Plan A and Ph.D. degrees, a graduate committee should be selected by the student and *advisor before the end of the student's second semester of study*. PhD committees need 4 members and M.S. Plan A need 3 members. SAMD committees have members from numerous departments because it is an interdisciplinary studies program.

In SAMD, **“departmental members” are SAMD Core/Permanent Faculty** and **“outside departmental members” are outside of these two categories.** *Associate SAMD faculty are “outside departmental members.”* Committees are composed of the faculty advisor, one outside departmental committee member, and additional co-advisors or committee members with appropriate faculty designations.

***Regardless of in department and out of department composition, a student's committee must have faculty from more than one home department.*** PhD committees need 4 members and M.S. Plan A need 3 members. The graduate committee makes regular evaluations of the student's degree progress and evaluates annual performance. *(Example: a student cannot have 2 core SAMD CBE faculty and one non-SAMD core faculty from CBE as their committee).*

### **Advisor and Graduate Committee Composition**

Once a student finds their advisor, they should work with their advisor to select the rest of the committee. Refer to the faculty section of this handbook or SAMD website for faculty assignment details.

### **Master of Science, Materials Science Engineering (MSE Plan B)**

Coursework only MS students need to complete a final exam (GS24) in the form of a final presentation to their committee. The presentation format and expectations are to be agreed upon by the committee and student. Guidelines for this presentation can be found in the **“more information on final examinations section.”**

### **Typical makeup of Plan B committee:**

Chair- Director of SAMD

In department committee member- Associate Director of SAMD

Outside department member- chosen by student

Student is allowed to choose a committee of their choice, so long as items 1-3 below are met:

- Chair- from the student's department (can be tenured/tenure-track faculty or associate research professor—co-advisor must be tenure or tenured track if advisor is associate research professor)
- A co-advisor or committee member from the student's department (can be tenured/tenure track faculty, associate research professor, or teaching faculty)
- An outside committee member from another department (tenured or tenure-track faculty)

*\*Important: More than one home department must be represented in a student's committee. (ex. All 3 members are in SAMD (2 core/permanent and 1 associate), they cannot all be from the same home department)*

### **Master of Science, Materials Science and Engineering (M.S. Plan A)**

For M.S. candidates, the graduate committee must consist of at least **three** members:

- Advisor from the student's department (can be tenured/tenure-track faculty or associate research professor—co-advisor must be tenure or tenured track if advisor is associate research professor)
- A co-advisor or committee member from the student's department (can be tenured/tenure track faculty, associate research professor, or teaching faculty)
- An outside committee member from another department (tenured or tenure-track faculty)
- A co-advisor or additional committee members from any department may be added to the student's committee, if appropriate, as long as items 1-3 above are met

*\*Important: More than one home department must be represented in a student's committee. (ex. All 3 members are in SAMD (2 core/permanent and 1 associate), they cannot all be from the same home department)*

### **Doctor of Philosophy (Ph.D.)**

For Ph.D. candidates, the graduate committee must consist of at least **four** members:

- Advisor from the student's department (can be tenured/tenure-track faculty or associate research professor—co-advisor must be tenure or tenured track if advisor is associate research professor)
- Two members from the student's department serving as co-advisor or committee member (faculty or staff member with tenured/tenure-track faculty or special faculty appointment)
- An outside committee member from another department (tenured or tenure-track faculty)
- A co-advisor or additional committee members from any department may be added to the student's committee, if appropriate, as long as items 1-3 above are met

*\*Important: More than one home department must be represented in a student's committee. (ex. All 3 members are in SAMD (3 core/permanent and 1 associate), they cannot all be from the same home department)*

For detailed information on Advisor and Graduate Committee Makeup and committee member requirements, please refer to the graduate school's advisor and committee requirements page:

<http://graduateschool.colostate.edu/policies-and-procedures/advisor-committee/>.

## The GS-6 Form

Each student must meet with their advisor to formulate a program of study, which must be submitted electronically to the Graduate School on form GS-6. A worksheet that can be used to prepare the GS-6 form is in the Appendix of this document. The GS-6 form is accessed and submitted via RAMweb. The program of study contains the following three important elements:

- a program of course work, that identifies which classes will be taken and when (including any background or make-up courses);
- a proposed research area;
- and the names of the graduate program committee members.

The Graduate School requires that the student submit the GS-6 before the end of the third semester of registration. However, it may be necessary to submit the GS-6 earlier in order to name the committee members and finalize the course work program.

Instructions on how to complete the GS-6 form are found here:

<http://graduateschool.colostate.edu/documents/GS6-Worksheet-and-eGS6-Instructions.pdf?3/23/2015%2011:07:56%20AM>

## **HOUSEKEEPING, SAFETY, & RESPONSIBLE CONDUCT IN RESEARCH TRAINING**

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All students are required to obtain the necessary training to safely conduct their research. CSU Environmental Health Services (EHS) provides many safety training modules pertinent to common research activities. SAMD students may work in a variety of different laboratory facilities across campus, each of which may also have its own safety training. The following may be required:

- All students engaged in any research or scholarly activity must complete the online *Responsible Conduct in Research* training (available at <https://www.research.colostate.edu/ricro/rcr/>).
- All students must familiarize themselves with the *Facility Safety Plan* for the buildings they are working in.
- All students working in wet laboratories must complete *the Hazardous Waste Generator* training offered by Environmental Health Services. The *Hazardous Waste Generator Training* must be completed before any research activity is commenced, if the lab that the student is working in contains hazardous chemicals or has associated safety risks, even if the student will not work directly with those hazards.
- **Students must complete other training and relevant courses that pertain to their research and/or teaching activities (e.g. laser safety, biosafety, and radiation safety training).**

*\*Students must maintain current training certification (e.g. annual recertification) while they are actively engaged in research.*

*For more information on Research Safety, visit*

<https://www.research.colostate.edu/safety-and-compliance/>

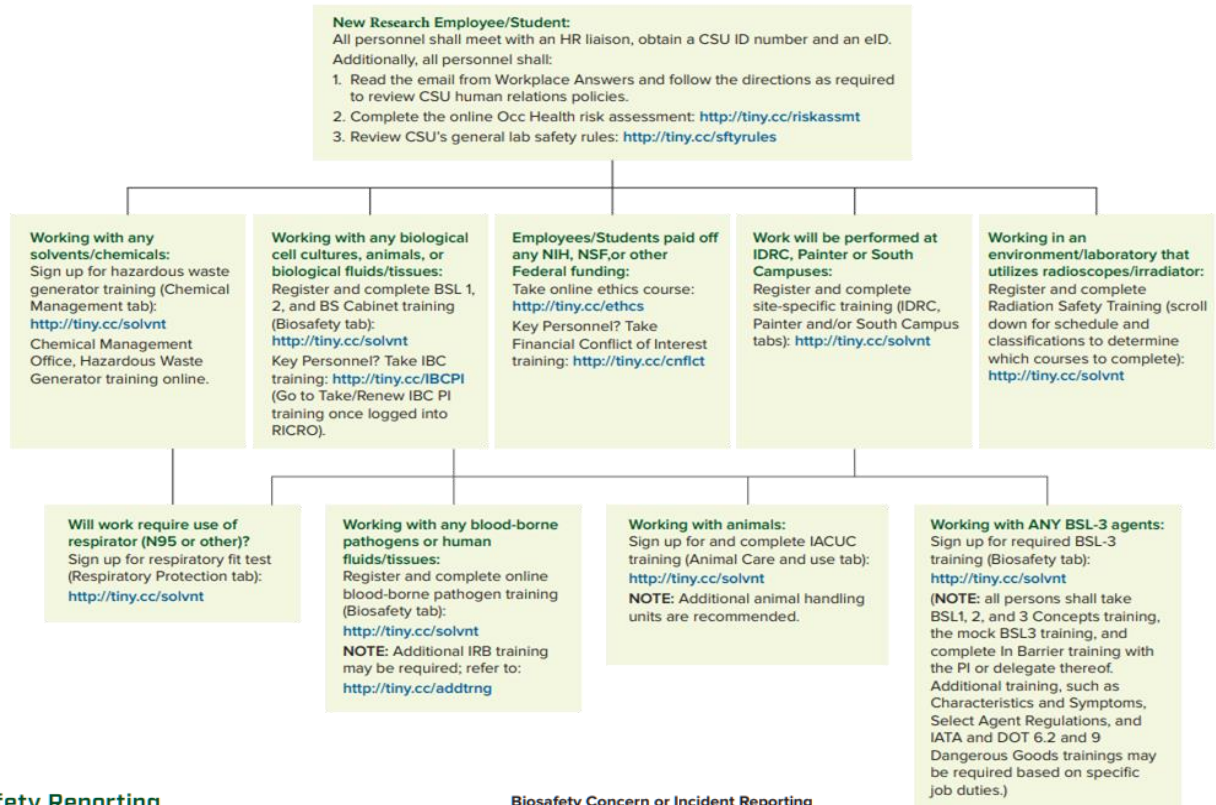
<https://www.research.colostate.edu/research-safety-culture/orange-folder/>

Additional Research Safety information on the next page.

[Click here to go back to table of contents](#)

# RESEARCH SAFETY

## On-boarding and Initial Training Flowchart



## Research Safety Reporting

### Risk Management and Insurance Incident Reporting

This includes safety concerns, near misses, Worker's Compensation incident/claim forms, and vehicle/property damage forms.

<http://tiny.cc/rprt>

### General Safety Concern or Near Miss Reporting

This includes information about safety concerns or opportunities for safety improvement, "close call" types of situations that could have led to an incident, and feedback on currently implemented safety solutions.

<http://tiny.cc/sfty>

### New Incident, Injury, Illness, Exposure Reporting

This includes Worker's Compensation claims and reports of exposures or incidents that have occurred and could lead to future illness or injury.

<http://tiny.cc/newincdnt>

### Biosafety Concern or Incident Reporting

This includes any biological incidents or accidents including, but not limited to: spills, potential exposure, misuse, or non-compliance with a protocol. Call (970) 491-0270.

<http://tiny.cc/biosfty>

### Anonymously Report a Biosafety or Security Concern with Select Agents/Toxins

HHS Office of Inspector General Hotline 1-800-409-9926  
USDA Office of Inspector General Hotline 1-800-424-9121

### CSU System Compliance Reporting Hotline

This includes suspected noncompliance with laws, regulations, and policies.

<http://tiny.cc/hotline>

PI: \_\_\_\_\_

In Case of Emergency, please contact:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Additional Info: \_\_\_\_\_

## CSU Research Support

Entity	Email	Phone	Website
Research Safety Culture Coordinator (RSCC)	Anthony.Appleton@colostate.edu	(970) 491-2015	<a href="https://www.research.colostate.edu/research-safety-culture">https://www.research.colostate.edu/research-safety-culture</a> (Coming Soon!)
Research Integrity and Compliance Review Office (RICRO)	Ricrro_Information_Reply@mail.colostate.edu	(970) 491-1553	<a href="https://www.research.colostate.edu/ricro">https://www.research.colostate.edu/ricro</a>
Institutional Review Board (IRB)	RICRO_IRB@mail.colostate.edu	(970) 491-1553	<a href="https://www.research.colostate.edu/ricro/irb">https://www.research.colostate.edu/ricro/irb</a>
Institutional Animal Care and Use Committee (IACUC)	RICRO_IACUC@mail.colostate.edu	(970) 491-1553	<a href="https://www.research.colostate.edu/ricro/iacuc">https://www.research.colostate.edu/ricro/iacuc</a>
Institutional Biosafety Committee (IBC)	RICRO_IBC@mail.colostate.edu	(970) 491-1553	<a href="https://www.research.colostate.edu/ricro/ibc">https://www.research.colostate.edu/ricro/ibc</a>
Biosafety Office (BSO)	Robert.Ellis@colostate.edu	(970) 491-0270	<a href="https://www.research.colostate.edu/bso">https://www.research.colostate.edu/bso</a>
Responsible Conduct of Research (RCR)	ricro_information_reply@mail.colostate.edu	(970) 491-1553	<a href="https://www.research.colostate.edu/ricro/rcr">https://www.research.colostate.edu/ricro/rcr</a>
Research Integrity Officer	Ellen.Fisher@colostate.edu	(970) 491-5250	<a href="https://www.research.colostate.edu/ricro/rcr/research-misconduct">https://www.research.colostate.edu/ricro/rcr/research-misconduct</a>
Environmental Health Services (EHS)	EHS@colostate.edu	(970) 491-6745	<a href="http://www.ehs.colostate.edu">http://www.ehs.colostate.edu</a>
Chemical Management (Chem. Management)	Andy.Borchert@colostate.edu (Admin) Chris.Giglio@colostate.edu (Chem. Officer) EHS@colostate.edu	(970) 491-2705 (970) 491-4830 (970) 491-6745	<a href="http://www.ehs.colostate.edu/WChemMgt">http://www.ehs.colostate.edu/WChemMgt</a>
Occupational Health (Oc Health)	Joni.Triantis@colostate.edu EHS@colostate.edu	(970) 491-3102 (970) 491-6745	<a href="http://www.ehs.colostate.edu/WHOHP">http://www.ehs.colostate.edu/WHOHP</a>
Radiation Control Office (RCO)	Seth.Ruby@colostate.edu EHS@colostate.edu	(970) 491-4835 (970) 491-6745	<a href="http://www.ehs.colostate.edu/WRad">http://www.ehs.colostate.edu/WRad</a>
Safety and Industrial Hygiene (SIH)	Eric.March@colostate.edu EHS@colostate.edu	(970) 491-4833 (970) 491-6745	<a href="http://www.ehs.colostate.edu/WSafetyIndHygiene">http://www.ehs.colostate.edu/WSafetyIndHygiene</a>
Risk Management and Insurance (RMI)	Sally.Alexander@colostate.edu	(970) 491-7726	<a href="http://rmi.prep.colostate.edu">http://rmi.prep.colostate.edu</a>
Workers' Compensation (Workers Comp)	Kenda.Weigang@colostate.edu workcomp@colostate.edu	(970) 491-4832 (970) 491-5110	<a href="http://rmi.prep.colostate.edu">http://rmi.prep.colostate.edu</a>

EMERGENCIES – Threats to life and safety: Call 911 from anywhere on campus;  
CSUPD non-emergency number (970) 491-6425



VICE PRESIDENT  
FOR RESEARCH  
COLORADO STATE UNIVERSITY



## ACADEMIC INTEGRITY & PROFESSIONAL CONDUCT

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All students are subject to the policies regarding academic integrity found:

- in the current *General Catalog* under "Policies and Guiding Principles," and
- in the *Graduate and Professional Bulletin* under "Student Rights and Responsibilities."

Examples of academic dishonesty can be found in these sources. Faculty, graduate students, and undergraduates all have a responsibility to uphold the integrity of their scholarly work. As part of this responsibility faculty must deal promptly and appropriately with any credible suspected cases of academic dishonesty on the part of a student. This will include promptly investigating all suspected cases of academic dishonesty, and reporting all cases to the Office of Conflict Resolution and Student Conduct Services, when any penalty is imposed. Penalties may include a failing grade for a course, failing a preliminary or final examination, and/or dismissal from the University.

While executing their teaching, research, and course work, a student interacts with many persons, particularly closely with his/her adviser. This provides an opportunity for students to develop skills in working effectively with others that will be of importance throughout their future professional careers. Students are expected to conduct themselves in a courteous and professional manner in all their dealings with others, and particularly in their interactions with their adviser. Any problems involving discriminatory/rude behavior or sexual harassment will be dealt with promptly by the *SAMD Director*, who will take whatever appropriate actions are needed to correct the problem. Students may also seek guidance and/or advocacy from outside of *SAMD* by contacting the Student Resolution Center.

### **Obligations of Students Supported on Graduate Research Assistantships (GRAs)**

Graduate assistantships are renewed periodically (typically on an annual basis) based on satisfactory progress toward degree completion. All graduate students are expected to diligently pursue their respective graduate programs. However, graduate assistants are classified as "at-will" employees by the State of Colorado, meaning that employment can be terminated at any time.

Most advisers arrange for meetings with their students on a regular basis to provide for review of research progress. Uniform progress is important both for the student's timely completion of thesis/technical report requirements for the M.S. or Ph.D. degrees, and also for formal reports normally required by sponsors of research projects. Students are paid over the period of their degree programs with the implicit understanding that successful completion of their programs involves contributions (such as data collection, analysis of data, summarizing results) leading to completed theses, reports, and publications. By its nature, research is a process requiring flexibility in the time devoted to achieve the desired end. This ongoing process often requires a time commitment well beyond a typical "nine-to-five" work schedule to complete the research objectives and publication requirements in a reasonable time. Reasonable times to graduation are two to three years for the M.S. programs and five years for a Ph.D. program.

A formal tracking of these research/thesis requirements is accomplished through course credits taken in MSE 699 or 799. The adviser/instructor has latitude to assign grades for these research credits over a period of semesters, with the full expectation that such research will be satisfactorily completed. An adviser/instructor has complete authority to retroactively change grades given in good faith to U or F if a student fails to satisfactorily complete thesis/report requirements at a later date. Attendance at *SAMD Seminars* is a requirement for satisfactory progress towards degree completion. All graduate assistants are to be evaluated annually by their advisers, and any problems involving lack of satisfactory progress toward thesis/research requirements will be communicated to the *SAMD Director*, who will take whatever appropriate action is needed to correct the problems.

[Click here to go back to table of contents](#)

## GRADUATE PROGRAM REQUIREMENTS

Each MS and PhD program has different coursework, research credit, and degree completion requirements, which conform to requirements of the *Graduate School*. Coursework requirements are summarized in **Table 1** and described in detail in the text that follows. **All students must obtain at least a “B” in each of the required core MSE courses (3.3 avg in core courses).** In addition to at least a B in all core courses, a 3.0 cumulative GPA is required to be in good standing with the graduate school.

	<i>M.S. (Plan A)</i>	<i>M.S. (Plan B)</i>	<i>PhD</i>
<b>Total Credits</b>	30	30	72
<b>Coursework</b>	15 Credits	15 credits	17 Credits
<b>Required MSE courses<sup>1</sup></b>	3 Credits	15 Credits	6 Credits
<b>Specialty Courses (min)<sup>2</sup></b>			
<b>Research (max)</b>	12 Credits (MSE 699)	0	48 credits (MSE 799)
<b>Research Document</b>	Thesis	N/A	Dissertation

<sup>1</sup> See Box 1 for a list of the MSE core courses.    <sup>2</sup> See Box 2 for a list of specialty courses.

### **Box 1** (minimum grade required for courses in this section is a “B”)

Course Number	Course Title/Description	MS A Credits	MS B Credits	PhD Credits
MSE 501	Tech Transfer	1	1	1
MSE 502 A	Scatter	1	1	1
MSE 502 B	Computational	1	1	1
MSE 502 C, D, E , <u>or</u> F	Microscopy, Spectroscopy, Bulk, or Experimental	1	1	1
MSE 503	Mechanical Behavior of Materials	3	3	3
MSE 504	Thermodynamics	3	3	3
MSE 651	Quantum, Band Structure, Electrical/Optical	3	3	3
MSE 793	Professional Development	2	2	4
RCR 550	Responsible Conduct of Research	1	0	1

### **Box 2**

Course	Cr	Course	Cr
BIOM 592. Seminar Credits.	3	MATH 545. Partial Differential Equations I	3
CBE 501. Chemical Engineering Thermodynamics.	3	MATH 550/ENGR 550. Numerical Methods in Science & Eng	3
CBE 514. Polymer Science and Engineering.	3	MATH 560. Linear Algebra	3
CHEM 511. Solid State Chemistry.	3	MATH 561. Numerical Analysis I	4
CHEM 515. Polymer Chemistry.	3	MECH 525/*BIOM 525. Cell & Tissue Engineering	3
CHEM 517. Chemistry of Electronic Materials.	3	MECH 530. Advanced Composite Materials	3
CHEM 550A. Materials Chemistry, Hard Materials.	1	MECH 531/BIOM 531. Materials Engineering	3
CHEM 550B. Materials Chemistry, Soft Materials.	1	MECH 532/BIOM 532. Materials Issues in Mechanical Design	3
CHEM 550C. Materials Chemistry, Nanomaterials.	1	MECH 569/ECE 569. Micro-Electro-Mechanical Devices	3
CHEM 567. Crystallographic Computation.	1	MECH 570/ BIOM 570 Bioengineering	3
CHEM 569. Chemical Crystallography	3	MECH 573/BIOM 573. Structure & Function of Biomaterials	3
CHEM 577. Surface Chemistry.	3	MECH 628. Applied Fracture Mechanics	3
CIVE 560. Advanced Mechanics of Materials.	3	MSE 465/GES 465. Sustainable Strategies for E-Waste Management	3
CIVE 565. Finite Element Method.	3	MSE 481A4. Green Engineering: Materials and Environment	3
CIVE 662. Foundations of Solid Mechanics.	3	MSE 505. Kinetics	3
CIVE 664. Mechanics of Fatigue & Fracture.	3	MSE 631. Defects in Crystals	3
ECE 505. Nanostructures: Fundamentals & Applications	3	PH 531. Introductory Solid State Physics	3
*ECE 569/*MECH 569. Micro-Electro-Mechanical Devices	3	PH 631. Solid State Physics	3
ECE 673. Thin Film Growth	3	PH 731. Condensed Matter Theory	3
MATH 535. Foundations of Applied Mathematics	3	GRAD 544. Ethical Conduct of Research	1

Students should continue to check the MSE website for updated MSE related course list (<https://www.research.colostate.edu/samd/curriculum/materials-related-courses/>) or contact the program manager about additional/new courses that may count as electives.

Additional course information can be found in the CSU course catalog under Materials Science Engineering: <https://catalog.colostate.edu/general-catalog/courses-az/mse/>

To petition for transfer credits or course substitution, a student must turn in the **Petition for Substitution of Classes form**. If a student wants to substitute a course they plan to take, the student must submit this form *prior* to taking the course they wish to substitute.

In special cases, the graduate academic committee will review a petition submitted after the student has taken a course they wish to substitute. petitions should be submitted to the Program Manager at Carolina.Bañuelos@colostate.edu or via campus mail: 1617 campus Delivery

## Master of Science Degree Plan B (Coursework option)

### Credit and Course Requirements

A minimum of 30 credits of coursework must be approved for graduate credit by the student's graduate committee. 24 of the 30 credits must be earned at Colorado State University. 21 of the credits must be earned after admission to the Graduate School. At least 16 credits at Colorado State University must be taken in courses numbered 500 or above. At least 12 of these 16 credits must be in regular (lecture/laboratory) courses.

SAMD M.S. Plan B students must satisfactorily complete 15 credits of the *MSE core courses* (see Box 1) or their equivalents. M.S. Plan B students must also take a minimum of 15 elective credits. At least 3 of these elective credits must be from among the *MSE specialty courses* (see Box 2).

### Other Requirements

Student must meet with SAMD Director or Program Manager to track semester/annual progress. The final examination for the Plan B M.S. degree is a seminar/examination. Student must meet to agree on final exam/seminar expectations with their committee *in the first month* of their intended graduation semester. Student must come to meeting with deadline dates and an idea of their final exam/seminar plan.

Eg. If student plans to graduate in FALL 2020, student needs to meet with committee before the first day of classes of FALL 2020.

## Master of Science Degree Plan A (Thesis option)

### Credit and course requirements

A minimum of 30 credits of course work and research must be approved for graduate credit by the student's graduate committee. 24 of the 30 credits must be earned at Colorado State University. 21 of the credits must be earned after admission to the Graduate School. At least 16 credits at Colorado State University must be taken in courses numbered 500 or above, including thesis credits. At least 12 of these 16 credits must be in regular (lecture/laboratory) courses.

SAMD M.S. Plan A students must satisfactorily complete 15 credits of the *MSE core courses* (see Box 1) or their equivalents, and at least 3 additional credits of *specialty courses* (see Box 2). A 3.0 GPA minimum in the *MSE core courses* must be earned. A maximum of 12 thesis research credits (MSE 699)

may be counted toward the minimum degree requirements.

M.S. Plan A students must also take the *Responsible Conduct of Research* (1 credit course) or complete the online training. This 1 credit may count toward the 12 credit research maximum. More information found here: <https://www.research.colostate.edu/ricro/rcr/>. Upon completion of the training, students must send their certificate of completion to the program manager to ensure this is added to the student's file.

### **Research and Thesis**

An acceptable thesis must be submitted to and approved by the student's graduate committee. See the section below entitled Research Documents and Examinations for more information. It is expected (not required) that the student's M.S. research will result in at least one peer-reviewed publication or other high caliber technical publication.

**The Thesis Defense** (also known as the final examination) is presented at the end of the master's degree program. It is most often an oral presentation describing the research and findings reported in the thesis. The defense is open to all SAMD faculty, staff, and students and includes an open question period for all in attendance as well as a private question period for the committee.

**Scheduling the Thesis Defense:** The Department has set deadlines two weeks prior to Graduate School deadlines to avoid last minute emergencies that could prevent a student from graduating. It is the student's responsibility to contact the SAMD Program Manager to schedule a room for the defense, obtain a template for the announcement, submit the announcement with an abstract, and submit an electronic draft of the thesis to be shared with SAMD faculty and graduate students. Students should begin planning for the defense and thesis submission a minimum of three weeks prior to the defense and a minimum of four weeks prior to Graduate School deadlines.

### **Suggested Timeline:**

#### **A. Three weeks prior to the defense students must:**

1. Confirm a date and time for their defense with their graduate committee

#### **B. Two weeks prior to the defense students must:**

1. Contact the SAMD program manager to request a room reservation for the defense and the template for their thesis defense announcement
2. Edit the announcement template (by filling in the abstract and time/date/room info) and email it to the program manager for distribution and advertising
3. Email a draft of the thesis (.pdf format) to their graduate committee and the program manager

#### **C. Other considerations two weeks prior to the Graduate School deadline for Thesis & Dissertation Submission:**

1. The final examination/defense should be conducted at least two weeks prior to the Graduate School deadline for Thesis & Dissertation Submission to allow for unexpected delays
2. If circumstances prevent a student from meeting department deadlines, the graduate program manager should be informed by the student's advisor so that steps may be taken to ensure that the Graduate School deadlines and requirements are met for the intended graduation term.

**Graduate School Deadlines:** <http://graduateschool.colostate.edu/policies-and-procedures/deadline-dates/>

**On the day of the defense:** The student's advisor is required to pick up the student file from the SAMD program manager office. The file will contain the **GS24 form** (Report of Examination Results) for committee signatures. Student files are not released to students. *The student may choose to bring the completed Thesis/Dissertation Submission Form for committee and department head signature to the defense as a matter of convenience. However, the committee reserves the right to withhold signatures until they have seen the final thesis.*

**Results:** At the conclusion of the examination, the committee members will sign the GS24 form under the "pass" or "fail" section.

The student is required to obtain the SAMD Director's signature on the original GS24 form and **submit a copy to the SAMD program manager.**

The advisor is required to return the student file to the program manager.

**The signed original of the GS24 form must be delivered in person by the student to the Graduate School within 2 days following the examination.**

**Thesis Submission:** The student submits the Thesis/Dissertation Submission Form (**GS30**) to the Graduate School, after which the Graduate School provides directions for electronic submission. Directions may also be found at: <http://graduateschool.colostate.edu/current-students/thesisdissertation/index.aspx>

**Clearance to Graduate:** In addition to submission to the Graduate School, the final dissertation also must be emailed (pdf preferred) to the SAMD program manager for archiving before the student will be cleared for graduation (**GS25B** form) by the department. Graduating students also should check their "Graduate Degree Plan" in RAMweb for discrepancies or comments.

*Any issues found there must be resolved before the student will be cleared for graduation by the Graduate School.*

**Steps to your masters degree on the grad school website:** <http://graduateschool.colostate.edu/current-students/completing-your-degree/steps-to-your-masters-degree/>

[Click here to go back to table of contents](#)

## Doctorate of Philosophy Degree

### ***Credit and Course Requirements***

A minimum of 72 credits *beyond* the bachelor's degree must be approved for credit by the student's graduate committee. A master's degree may be accepted for a maximum of 30 credits. The number of these credits should be determined by an evaluation of student's master's transcript. This evaluation will be completed by the graduate affairs committee, in consultation with the student and the student's adviser. An additional 10 credits may be transferred for courses taken after a student's master's degree was awarded. The graduate admissions committee will determine how many coursework and research credits will be accepted for transfer, with the goal of aligning these credits as closely as possible with the requirements of our Ph.D. program.

A minimum of 32 credits must be earned at CSU after admission to the doctoral program.

For students who complete an MSE M.S. degree at Colorado State and are continuously enrolled, all credits earned in their M.S. program may be applied towards the Ph.D. credit requirements, even if the number of credits exceeds 30. A minimum of 40 semester credits beyond the bachelor's degree must be at or above the 500 level. A maximum of 49 credits of research at the doctoral level (MSE 799) may be counted toward the degree requirements.

SAMD Ph.D. students must satisfactorily complete 17 credits of the *MSE core courses* (see Box 1) or their equivalents, and at least six additional credits of *specialty courses* (see Box 2). **A 3.3 GPA minimum in the MSE core courses must be earned.** If less than a B is earned, the student must retake the course. A maximum of 49 dissertation research credits (MSE 799) may count toward the degree requirements.

PhD students must take the **Responsible Conduct of Research** (1 credit course) or complete the online training. This 1 credit may count toward the 49 research credit maximum. More information found here: <https://www.research.colostate.edu/ricro/rcr/>. Upon completion of the training, students must send their certificate of completion to the program manager to ensure this is added to the student's file.

## Ph.D. Student Annual Evaluation

**Purpose:** The annual student evaluation assists students and advisors in planning for timely completion of program requirements, provides consistent feedback to students as they proceed through the program, alerts students and advisors to problems, and provides students and advisors the opportunity to develop effective approaches for addressing those problems. Evaluation forms are available on the SAMD website and a link is provided below.

**Process:** Evaluations should be completed at the end of every academic year. SAMD Ph.D. students are **required** to meet with their graduate program committee for a presentation and discussion of the student's degree plan. The annual MSE evaluation form (section 1) should be completed by the student and taken for committee review and signatures at the meeting. Once section 1 is completed, the student is advised to email the copy to their committee members prior to the meeting. This ensures faculty has time to prepare questions regarding the student's progress ahead of time.

This presentation and discussion should be about an hour and should cover:

1. The student's academic background and interests, and how any background deficiencies will be addressed through coursework or other professional development activities.
2. The student's performance in coursework.
3. The student's research topic, at an introductory level (even if topic is not set, must have introductory level of topic being explored).
4. A preliminary timeline for completion of the degree.

The advisor and student should agree on a presentation format. This meeting is not a formal examination of the student. It is important for the committee and the student to establish an understanding of the boundaries of the student's background and capabilities early. This will facilitate the committee's ability to contribute advice, expertise, and recommendations throughout the rest of the program of study.

In the meeting, the committee evaluates the breadth and depth of the student's knowledge of MSE core topics to identify knowledge and background gaps. The outcome of this discussion may include binding recommendations of additional coursework requirements to satisfy potential gaps in the student's background.

Evaluation can be found on the SAMD website (<https://www.research.colostate.edu/samd/curriculum/>) or by requesting a copy from the SAMD program coordinator.

*An annual evaluation meeting with the entire committee is required at the end of every academic year (spring semester). The completed and signed form must be submitted to the SAMD Program Manager By **June 1st** (or closest business day after June 1<sup>st</sup>. Example: If June 1<sup>st</sup> is a Saturday, evaluation is due Monday June 3rd).*

Fillable Annual Review form can also be found here: [https://www.research.colostate.edu/samd/wp-content/uploads/sites/10/2019/04/Annual-SAMD-Student-Evaluation\\_Final\\_Fillable.pdf](https://www.research.colostate.edu/samd/wp-content/uploads/sites/10/2019/04/Annual-SAMD-Student-Evaluation_Final_Fillable.pdf)

### **Ph.D. Preliminary Examination (Proposal Defense)**

**Purpose:** The purpose of the preliminary examination is to determine the candidate's background knowledge in the proposed dissertation area and to determine the adequacy of the current research plan to develop a satisfactory dissertation. The exam is based on the candidate's written research proposal that contains a detailed survey of the supporting literature, preliminary data, and a summarized research plan. Upon successful completion of the preliminary exam, the committee and student will agree to a final research plan that includes clear expectations for the content of the dissertation. The Preliminary Examination is generally closed to the student's graduate committee, but an advisor/student may elect to open up the presentation portion of the exam.

The preliminary exam should be completed at a time when the student and the advisor are confident that the student is ready to demonstrate subject area expertise and research competency per the guidelines listed below. **The Graduate School requires that the preliminary exam be completed no less than two terms before the final exam.** (See Section E.4.4 of the Graduate and Professional Bulletin.) Therefore a student taking the preliminary exam after the first day of classes for the spring term (but before the end of the spring term), cannot take the final exam before the first day of classes of the fall term. The term during which the exam is taken counts as the first term; spring, summer, and fall each count as a term.

Only students who have a committee identified will be allowed to take the exam. The goal of this exam is to satisfy the graduate program committee, SAMD, and the Graduate School that a graduate student has the necessary core knowledge and the potential to carry out independent research to successfully complete a Ph.D. in materials science and engineering. To make this determination, the committee will consider the background of the student, their performance in their coursework to date, and their performance on both the written and oral components of the exam. A grade lower than a B in any graduate courses, particularly the core MSE coursework would be a strong indication that a student does not have the core knowledge necessary for a Ph.D. in MSE.

In judging the performance of the student on the written and oral components of the exam, several factors will be considered. Specifically, the committee will judge whether the student:

1. has an acceptable mastery of MSE core topics, equivalent to the content of the MSE core courses;
2. has an acceptable understanding of the literature in their research area;
3. has an ability to formulate meaningful research objectives that will make a significant contribution to their field, plan and conduct research that addresses those objectives, and interpret the results of their research;
4. has made tangible progress toward their research problem.

Satisfactory performance in each of these four requirements is necessary to pass the preliminary examination. For item 4 above, tangible progress may include, but is not limited to: detailed literature surveys pertinent to the project, compilation and analysis of relevant data published by other investigators, learning important techniques, instrumentation, or theory, clear presentation of the work to be carried out, and demonstration of the novelty of the work.

Tangible progress may further include published or publishable results, building of an apparatus, progress on multi-step processes, collection of data, progress on writing computer code for simulation or data analysis, development of an analytical technique, etc. Tangible progress is not to be interpreted

solely as publishable results: level of effort, persistence, and determination are the key to this criterion. Students who have accomplished much research, but who have a shallow depth of understanding will not pass; students who have a solid academic knowledge, but who have accomplished little or no research will not pass.

**The student must distribute to their committee a written research report at least two weeks before the exam.** The report should be a detailed and complete description of the research that the student has conducted and intends to conduct to complete the research component of their degree. The report should contain relevant background (concise literature review that provides context for their contributions to the field), status of research conducted to date, planned future research, a timeline for completion of the work, and references. Relevant display items, such as diagrams of apparatus designed and/or built by the student, figures, tables, data, schemes, etc. should be prepared in a professional manner and used to effectively communicate necessary information.

As a guideline, the report should generally be approximately 15 to 20 double-spaced pages in length (text), exclusive of any references or display items (figures, tables, schemes, etc.). This is a guideline, not intended to be an absolute length requirement. The research report written by the student must reflect their own work; no proofreading or editing should be done by any faculty member prior to the exam. Students are encouraged to seek advice from their adviser and committee members on scope and overall format, but not on specific content and composition. It is important to recognize that the way the report is put together is a measure of a student's thought process and is therefore an important element of evaluation; the advisor must not interfere by editing the document.

**The student is responsible for obtaining form GS-16** (Report of Preliminary Examination) from the graduate school website (or the SAMD program coordinator) and bringing it to the exam. This form will be completed during the exam, and the student must return it to the graduate school upon completion of their exam. At the exam, the student will first present their current research and research plans in a 30-45-minute seminar before his/her committee. The remainder of the exam will consist of a question-and-answer period focusing on basic MSE knowledge and on the student's research.

If a student does not pass the preliminary oral examination, the committee may allow the student to retake the exam. Reexaminations will only be allowed if the committee feels that the student has a significant potential to pass the reexamination. If the committee permits a reexamination, they will provide guidance to the student on shortcomings that should be addressed, and the reexamination must be completed no sooner than two months and no later than four months from the date of the original exam. For the reexamination, the student may be required to complete further work. In some cases the committee will identify specific weaknesses in the student's performance. These will be communicated to the student in a timely fashion so that deficiencies can be rectified for the reexamination. Failure in a single reexamination will result in dismissal from the Graduate School. Students passing the preliminary examination or reexamination, will continue in the Ph.D. program, and will remain in the program until submission and defense of the dissertation, provided that satisfactory progress is maintained.

**Scheduling:** Prior to planning the preliminary exam, students should be actively conducting research with a faculty advisor, have the graduate committee confirmed, and have the GS6 form (Program of Study) form on file with the Graduate School. The preliminary exam is conducted after an extensive literature review and collection of preliminary data which leads to a "working title" or definition of the research project and a written research proposal.

*The preliminary defense is required a minimum of two semesters prior to the final dissertation defense.*



**Suggested Timeline:**

**A. Three weeks prior to the preliminary exam:**

1. Confirm a date and time for your preliminary exam with your graduate committee

**B. Two weeks prior to the preliminary exam:**

2. Contact the program manager to schedule the room
3. Email the written research material to each member of the committee and the graduate program manager.

**On the day of the prelim:** the student's advisor is required to pick up the student file from the program manager office or have program manager drop it off. The file will contain the GS16 form (Report of Preliminary Examination for the Ph.D. Degree) for committee signatures. Student files are not released to students.

The exam will consist of the student's presentation of the research proposal and questions by the committee to further assess the preparedness of the student to continue the degree, followed by analysis of the proposal by the student's committee with recommendations for changes in the plan. The student and advisor will prepare a rough outline of the changes to the research plan suggested by the committee. The student has a maximum of two opportunities to pass the preliminary exam.

**Results:** By completing and signing the GS16 form, the committee shall:

Pass: recommend the student advance to Ph.D. candidacy and accept the research plan as agreed to by the committee during the exam

Fail: Recommend that the student take the preliminary examination again, if the student's research plan or background knowledge is unacceptable but the committee feels that the potential exists for satisfactory performance

Terminate: Recommend the student be terminated from the Ph.D. program

The student is required to obtain the department head's signature on the original GS16 form and submit a copy to the graduate program coordinator. The advisor is required to return the student file to the graduate program coordinator.

**The signed original of the GS16 form must be delivered in person by the student to the Graduate School within 2 business days following the examination.**

## **Doctor of Philosophy Dissertation Defense (Final Exam)**

**Purpose:** The purpose of the Ph.D. dissertation defense (also known as the final exam) is to allow faculty members and the public to critically examine and comment on the dissertation work and its significance and contribution to the research area and literature. Final examinations are open to the public and are conducted in a formal and professional manner.

**Scheduling:** The Department has set deadlines *two weeks prior* to Graduate School deadlines to avoid last minute emergencies that could prevent a student from graduating. *It is the student's responsibility* to contact the program manager to schedule a room for the defense, obtain a template for the announcement, submit the announcement with abstract, and submit an electronic draft of the dissertation to the department to be shared with SAMD faculty and graduate students.

**Suggested Timeline:**

**A. Four to Six weeks prior to the defense:**

1. Provide each committee member with a preliminary copy of the dissertation for review. Common courtesy to both the candidate and committee dictates that committee members be given two weeks to reach a decision on the acceptability of a student's dissertation.
  - a. During this time, committees may request meetings with the candidate to discuss the dissertation and suggest revisions. After this review period, with majority approval by the committee, the candidate may schedule the dissertation defense. In the event that the candidate does not receive approval to schedule the public defense, the committee must make further suggestions to the candidate and set up a follow up meeting.

**B. Two weeks prior to the defense students must:**

1. Contact the program manager to request a room reservation and provide you with a template for your announcement.
2. Edit the announcement with the abstract, date, time and room number.  
Email edited template to program manager for distribution and advertising.
3. Email a draft of the dissertation (pdf format) to the program manager

**C. Two weeks prior to the Graduate School deadline for Thesis & Dissertation Submission**

1. The final examination/defense should be conducted at least two weeks prior to the Graduate School thesis/dissertation submission deadline to allow for unexpected delays.
  - a. If circumstances prevent a student from meeting department deadlines, the program manager should be informed by the student's advisor so that steps may be taken to ensure that the Graduate School deadlines and requirements are met for the intended graduation term.

Graduate School Deadlines: <http://graduateschool.colostate.edu/policies-and-procedures/deadlinedates/>

**Procedure:** To begin the presentation, the candidate is introduced by the advisor. The candidate then presents the findings of the doctoral research to the committee and to the public. The presentation is concluded with a public question and answer period, which is followed by a closed session where the committee members will decide whether to accept or reject the dissertation.

**On the day of the defense:** The student's advisor is required to pick up the student file from the SAMD program manager office. The file will contain the **GS24** form (Report of Examination Results) for signatures by the committee and the department head. Student files are not released to students. The student also may choose to bring the completed Thesis/Dissertation Submission Form to the defense as a matter of convenience, however, the committee reserves the right to withhold signatures until they have seen the final dissertation. This form must also be signed by the department head.

**Results:** If the dissertation is accepted the committee members will sign under the "**pass**" section on the GS24 form. If the dissertation is rejected, the committee will sign under the "**fail**" section, make recommendations that the student must complete in a given length of time, and may or may not schedule a second defense, noting the requirements on the form. Regardless of the results, the student is required to obtain the department head's signature on the original GS24 form and submit a copy to the program manager. *The advisor is required to return the student file to the graduate program coordinator.*

*The signed original of the GS24 form must be delivered in person by the student to the Graduate School within 2 days following the examination.*

**Dissertation Submission:** The student submits the Thesis/Dissertation Submission Form (**GS30**) to the

Graduate School, after which the Graduate School provides directions for electronic submission. Part of a complete GS30 is completion of the **Survey of Earned Doctorates**: PhD graduates must complete the Survey of Earned Doctorates on the NSF website (<https://sedncses.org/login.aspx?redirect=true>) and submit their confirmation certificate with the Thesis/Dissertation Submission Form.

Directions may also be found at: <http://graduateschool.colostate.edu/wp-content/uploads/2014/07/GS30-Procedures.pdf>

**Clearance to Graduate:** In addition to submission to the Graduate School, the final dissertation also must be emailed (pdf preferred) to the SAMD Program Manager for archiving before the student will be cleared for graduation (GS25B form) by the department. Graduating students also should check their "Graduate Degree Plan" in RAMweb for discrepancies or comments. Any issues found there must be resolved before the student will be cleared for graduation by the Graduate School.

**Steps to your PhD Degree can also be found in the graduate school website:**

<http://graduateschool.colostate.edu/for-current-students/completing-your-degree/steps-to-your-phd-degree/>

## **MORE INFORMATION ON FINAL EXAMINATIONS**

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### **M.S. Coursework Only Final Examinations**

The Plan B degree does not require a thesis. Plan B students are required to pass a final seminar (the final examination). The final seminar will be oral and presented to the student's committee. At least one month before the final seminar, the committee and student must meet to discuss the nature and expectations of the seminar. At the discretion of the committee, a written research report/paper may be required. The results of the research should be reported and interpreted at a level appropriate to the degree program. M.S. students should demonstrate that they have substantial expertise in materials science engineering.

Guidelines for seminar:

The following are guidelines, not intended to be an absolute requirement. The student and committee should agree on requirements by the beginning of their final exam semester.

- 20-minute presentation from student
- 30-minute Q/A session from committee
- Possible presentation topics
  - Provide an overview of what you learned in your MSE and specialty courses and how you can apply this knowledge to the future of the MSE field and your future MSE career
  - If you worked on a project at CSU (or at work), discuss the project, its relevance to the MSE field, and how you applied coursework knowledge to your project
  - Select one area (material) of expertise. Apply knowledge from your coursework to that area and discuss the present and future implications of this material in MSE field
  - Propose a seminar topic that is relevant to your MSE degree at CSU

Guidelines for written report:

The following are guidelines, not intended to be an absolute requirement. The student and committee should agree on requirements by the beginning of their final exam semester.

The student must distribute to his/her committee a written research report at least one week before the exam. The report should be a detailed and complete description of the research that the student has conducted and intends to conduct to complete the research component of their degree.

The report should contain relevant background (concise literature review that provides context for their contributions to the field), status of research conducted to date, planned future research, a timeline for completion of the work, and references. Relevant display items, such as diagrams of apparatus designed and/or built by the student, figures, tables, data, schemes, etc. should be prepared in a professional manner and used to effectively communicate necessary information.

As a guideline, the report should generally be approximately 12 to 15 double-spaced pages in length (text), exclusive of any references or display items (figures, tables, schemes, etc.). The research report written by the student must reflect their own work; no proofreading or editing should be done by any faculty member prior to the exam. It is expected that a student may wish to show their adviser the report to get feedback on format. However, it is important to recognize that the way the report is put together is a measure of a student's thought process and an important element of evaluation, and that the adviser must not interfere.

Upon completion of the final examination it is the student's responsibility to collect signatures from all graduate committee members and submit the GS24 (Report of Final Examination Results) to the Graduate School. This form must be received in the Graduate School within TWO working days after the examination results are known.

### **M.S. Thesis and Ph.D. Final Examinations**

M.S. Thesis and Ph.D. students must pass a final examination (thesis or dissertation defense) at the end of their program. **Ph.D. students are not allowed to take the final exam until two terms after completion of the preliminary exam.** (See *Ph.D. Preliminary Examination* section above for an explanation of this timing.) The student is responsible for obtaining form **GS-24 (Report of Final Examination Results)** from the graduate school website and bringing it to the exam. This form will be completed during the exam, and the student must return it to the graduate school upon completion of their exam.

Final exams include submission of a research document (dissertation, thesis, or report, as indicated in Table 1), seminar before the committee, and question-and-answer session. Students should submit their research document to their committee at least two weeks prior to their scheduled exam. Ph.D. dissertations and M.S. theses should be prepared according to the *Thesis Manual* available from the Graduate School website. The SAMD encourages students to include their publications as chapters in their theses and dissertations, rather than rewriting completed work. These should represent primarily the student's own work (e.g., publications on which they are the primary author), and be annotated to acknowledge the contributions of co-authors.

The dissertation, thesis, or report document is an opportunity for the student to synthesize the research that they have conducted as part of their degree program into a cohesive document. In addition to compiling their work in one place, the thesis, dissertation, or report should also communicate how different parts of a research project fit together to form a larger body of work, by emphasizing research themes that may transcend individual publications.

To that end, the document should include a substantial literature review and background section or chapter that concisely surveys the particular field or fields of engineering and science that their work contributes to. This should demonstrate that the student clearly understands how their own work relates to the most important contributions that have been recently made to the field they are working in. The motivation and objectives of the student's research should be made clear (e.g. what hypotheses are being tested and/or what knowledge gap is being filled). Relevant display items, (e.g. diagrams, figures, tables, data, schemes, etc.) should be prepared in a professional manner. Unlike Ph.D. preliminary exams, the adviser and committee members may provide substantial input during preparation of the dissertation, thesis or report document. There are legitimate reasons for omitting some research from the thesis or dissertation (e.g. protection of someone else's intellectual property, contributions to collaborative work that are not within the primary scope of the remainder of the document, etc.). However, the adviser and the committee should be consulted if a student is leaving major components of their research out of their dissertation, thesis, or report document.

[Click here to go back to table of contents](#)

For Ph.D. final exams, the student's research seminar before the committee is a public event. All graduate students are encouraged to attend their colleagues' seminars. Generally, the public audience will be given an opportunity to question the Ph.D. candidate before the committee examines the student. *The question-and-answer session with the committee for both M.S. and Ph.D. students is not a public event.* At the discretion of the committee, select guests may be allowed to participate (e.g. a collaborator who does not happen to be a member of the committee).

In the research report and the seminar, the results of the research should be reported and interpreted at a level appropriate to the degree program. M.S. students should demonstrate that they have substantial expertise in the particular field they are working in, with the ability to define significant research problems and conduct the research necessary to address those research problems. Ph.D. students should additionally demonstrate that they have the capacity to make significant novel experimental and theoretical contributions that lead to advances in their field. *Simply demonstrating mastery of the literature, laboratory techniques, and/or existing theory is not sufficient.*

During the question-and-answer session, the committee will discern whether the student:

1. has an acceptable mastery of the materials science and engineering discipline at a level appropriate to the degree program;
2. has an acceptable understanding of the literature and other disciplines closely related to his/her research area (e.g. disciplines in which elective courses were taken);
3. has an ability to formulate meaningful research objectives that will make a significant contribution to their field, plan and conduct research that addresses those objectives, and interpret the results of their research;
4. has conducted research that makes some novel contribution to their field, and in the case of Ph.D. students, addresses the research objectives and/or design problems that were defined in the preliminary exam.

The following detailed examples are offered to clarify the criteria (1 through 4) above.

1. This is generally taken to mean that questions of a general materials science and engineering nature are "fair game." This includes any topic covered in the MSE core courses (Box 1) and the student's elective courses. Note that these questions may or may not be related to material in the student's presentation or written research report.
2. This should be interpreted as a working knowledge of the relevant literature in the area related to the student's research, including recent advances, outstanding researchers in the field, and recent publications from the student's own research group. The student should also be able to critically evaluate new research in the context of the current state of the art. Encyclopedic knowledge of the literature is not expected.
3. This should be interpreted as an ability to formulate testable hypotheses and engineering design optimization problems, analyze data critically, identify trends in data, explain data analysis procedures, interpret results by offering possible explanations of observations or comparing plausible alternative theoretical approaches or mechanisms. In addition, the committee also looks for the student's ability to extend beyond the data at hand to identify the "next steps" in the research project, projected outcomes for planned experiments or calculations, potential pitfalls in planned research, and possible alternative research paths.
4. Examples of novel contributions include, but are not limited to, original peer reviewed publications that report new techniques, theories, and/or experimental results, invention disclosures or patent applications, and presentations of research at regional or national meetings of professional organizations (e.g. ACS, APS, MRS, etc.).

## SUGGESTED PROGRAM OF STUDY SYNOPSIS

<b>Master of Science Coursework (Plan B) Degree: Synopsis of Procedures Leading to Degree</b>	
1. Meeting with program manager or director to plan student's graduate program	By October 15th of first semester
2. Complete and turn in Program of Study and form committee (GS6)	By middle of third semester. Refer to published deadlines on graduate school website.
3. Meeting with program manager or director to review student's graduate program	By end of third semester
4. Meet with committee to decide on "final exam (GS24)" presentation format and expectations	Before intended graduation semester begins
5. Turn in: Final Examination form (GS24) Application for Graduation (GS25)	Refer to published deadlines from Graduate School Website
5. Graduation	
<b>GS Forms link: <a href="https://graduateschool.colostate.edu/forms/">https://graduateschool.colostate.edu/forms/</a></b>	
<b>GS Deadlines link: <a href="https://graduateschool.colostate.edu/deadline-dates/">https://graduateschool.colostate.edu/deadline-dates/</a></b>	

<b>Master of Science Thesis Option (Plan A) Degree: Synopsis of Procedures Leading to Degree</b>	
1. Selection of advisor	By end of second semester
2. Selection of other members of committee	By end of second semester
3. Meeting with graduate advisor committee to begin planning student's graduate program	By end of second semester/as soon as possible
4. Complete and turn in Program of Study Form (GS6)	By middle of third semester. Refer to published deadlines on graduate school website.
5. Defense of thesis proposal	During 3 <sup>rd</sup> semester/as soon as possible.
6. Application for Graduation (GS25)	Refer to published deadlines from Graduate School Website
7. Schedule Thesis Defense and distribute announcement	2-3 weeks before thesis date
8. Thesis defense (Final Exam)	During last semester Refer to published deadlines from Graduate School Website
9. Report of Final Exam Results (GS24)	Within 2 days of thesis defense
10. Submit signed thesis submission form to Graduate School prior to submitting the electronic thesis	Refer to published deadlines from Graduate School website
11. Provide department with an electronic copy of thesis	Before graduation
12. Graduation	
<b>GS Forms link: <a href="https://graduateschool.colostate.edu/forms/">https://graduateschool.colostate.edu/forms/</a></b>	
<b>GS Deadlines link: <a href="https://graduateschool.colostate.edu/deadline-dates/">https://graduateschool.colostate.edu/deadline-dates/</a></b>	

**Doctor of Philosophy (PhD) Degree:  
Synopsis of Procedures Leading to Degree**

1. Selection of advisor	By end of second semester
2. Submit year one SAMD Evaluation	Due May 10 <sup>th</sup> of every SP semester. Details in handbook
3. Selection of other members of committee	By end of third semester (for GS6 form)
4. Meeting with graduate advisor committee to begin planning student's graduate program	By end of third semester/as soon as possible
5. Complete and turn in Program of Study Form (GS6)	By middle of third semester. Refer to published deadlines from graduate school website
6. Submit year two SAMD Evaluation	Due June 1 <sup>st</sup> (after SP semester). Details in handbook
7. Submit year three of SAMD Evaluation**	Due June 1 <sup>st</sup> (after SP semester). Details in handbook
8. Defense of Dissertation proposal	As early as 7 <sup>th</sup> semester. Must be at least one semester before final dissertation defense (final exam). Must tell program manager in order to have student file for advisor.
9. Application for Graduation (GS25)	Refer to published deadlines from Graduate School Website
10. Schedule Dissertation Defense and distribute announcement	2-3 weeks before dissertation date
11. Dissertation defense (Final Exam)	During last semester Refer to published deadlines from Graduate School Website
12. Report of Final Exam Results (GS24)	Within 2 days of dissertation defense
13. Submit signed thesis submission form to Graduate School prior to submitting the electronic thesis	Refer to published deadlines from Graduate School website
14. Provide department with an electronic copy of dissertation	Before graduation
15. Graduation	

**GS Forms link:** <https://graduateschool.colostate.edu/forms/>

**GS Deadlines link:** <https://graduateschool.colostate.edu/deadline-dates/>

**\*\*PhD Students must submit a yearly evaluation each Spring semester. Evaluation is not required if that is the graduating semester of the student.**

[Click here to go back to table of contents](#)

## DISSEMINATION OF RESEARCH, PUBLICATIONS, AND ATTENDANCE AT PROFESSIONAL MEETINGS

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It is the responsibility of every graduate student, with the assistance of their adviser, to write and pursue publication of thesis or dissertation research findings in peer-reviewed journals, proceedings, or other appropriate formats. While there are no set requirements, the expectation is that a master's thesis will yield at least one refereed publication and a Ph.D. dissertation will yield at least three refereed publications. This publication effort will be performed as part of the normal program of study.

It is desirable for graduate students to participate in professional meetings. Funding for travel to meetings may be available through research grants. Some professional societies also offer travel grants and awards to students. Students are encouraged to apply for travel grants when they are available through CSU departments (including SAMD), The Graduate Student Council, and the Graduate School.

### TRAVEL GRANTS

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MSE students have the opportunity to apply for travel funds for academic purposes (conferences, trainings, etc.). Grants are \$250-\$500, depending on the number of applicants. One award per student per academic year.

#### **Application/Grant information:**

- Student must be enrolled in MSE degree program and in good standing at the time of application and at the time of travel
- Requested funds must be used on travel expenses (airfare, per diem, accommodations, transportation, etc.)
- Priority will be given to first time applicants and conference presenters
- Grant comes in form of reimbursement or direct payment of a travel expense

**Application Submission:** email to program manager (carolina.banuelos@colostate.edu), drop off at Anatomy/Zoology 442, or campus mail to Carolina Bañuelos 1617 Campus Delivery

\*\*\*Application can be found on the SAMD Website, under the current students tab.

### GRADUATE STUDENT RESPONSIBILITIES

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Graduate students are responsible for knowing any special expectations and requirements of their department and program and are expected to remain in good academic standing by making satisfactory degree progress and *must at all times have an advisor*. With regard to meeting Graduate School deadlines and requirements, **ultimate responsibility for a graduate student's program lies with the student**. The student's advisor, graduate committee, the Graduate School office, the SAMD department office, and the SAMD Graduate Committee are all available to help and advise. Several deadlines are critical, and each semester the Graduate School publishes a list of deadlines which must be met in order to graduate during that term.



## CHOOSING AN ADVISOR

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- Take initiative
  - Take time to review faculty member research pages
  - When you find a faculty member with research you are interested in, contact the faculty member. If you email them, be patient. I recommend visiting them during office hours
- Be sure to talk to several different faculty members whose research you find interesting based on your search of their websites, literature, and suggestions from others
- Come to your meetings prepared with questions. Consider the following/ ask them about the following:
  - How do your research interests fit with that of the faculty member? Will they pick your research project or can you decide the direction your project will take?
  - What types of mentoring and professional development activities do they offer or require of students?
  - What are their expectations or guidelines for students in their group?
  - Does their management or mentoring style fit with how you best learn and work?
- It is important to consider research interests when choosing an advisor, but don't forget to talk to group members about the questions you asked the faculty member as they can provide additional insight for making your decision.
  - You want to choose an advisor, and a group, considering how you would be able to work and communicate with fellow members in addition to sharing research interests.
  - 2-5 years can be a long time if you are unable to work effectively with your advisor or group members because you aren't communicating or collaborating successfully
- Be patient and open minded
  - You may have an idea of the exact project you want to work on, but that does not mean faculty has grants for that. You need to be open to working on their specific projects/grants and the research should fall within your research interests

Once you find an advisor, if they do not have funding for you, make sure you and the advisor apply for a SAMD GTA. Applications for GTA's are typically sent out in April/May.

## OTHER IMPORTANT INFORMATION

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### **SERP (Student Employee Retirement Plan)**

#### WHAT IS THE SERP?

SERP is an alternative to Social Security for student employees at Colorado Public Higher Education Institutions who would have been required to participate in Social Security. The SERP has many features of which include:

The SERP allows for a refund of your contributions and any earnings upon termination of employment. After leaving the institution, the account can be rolled over to an IRA or another employer's retirement plan (if the new employer plan allows such transfers) or taken as cash. Certain restrictions do apply. The accounts are fully vested, allowing you to take full ownership of the investments and any earnings.

#### WHO PARTICIPATES IN THE SERP?

Who is required to participate is determined by the employing institution. Generally, undergraduate students taking less than six credit hours each semester and graduate students taking less than three credit hours during the summer semester or less than five credit hours during the spring or fall semester

are required to participate in the plan.

#### HOW DOES THE PLAN WORK?

The plan requires that 7.5% of your pay be deferred to a retirement plan account. This retirement contribution is made on a pretax basis and any earnings accumulate tax deferred until withdrawn.\* TIAA-CREF has been selected as the vendor for the SERP, so all contributions will be automatically sent to them by your employer.

#### HOW TO ACCESS YOUR ACCOUNT

Visit us online at [tiaa-cref.org](http://tiaa-cref.org) to view your account information and change your investment allocation. Or contact TIAA-CREF at 800 842-2252 to speak with a consultant about your account and allocations. Please note, your account is currently invested in the default account chosen by your employer. We encourage you to review the investment choices available to build a portfolio that is suitable to your needs and goals.

The plan requires that you end your student status with the institution before you have access to the accounts. Therefore, termination is equivalent to graduation or no longer being enrolled as a student. Withdrawals prior to age 59½ are subject to ordinary income taxes and are generally subject to a 10% early withdrawal penalty. \*\* Morningstar Direct (September 2010) based on Morningstar expense comparisons by category. Applies to our variable annuity accounts and mutual fund expense ratios. You should consider the investment objectives, risks, charges and expenses carefully before investing. Please call 877 518-9161 or go to [tiaa-cref.org](http://tiaa-cref.org) for a prospectus that contains this and other information. Please read the prospectus carefully before investing. TIAA-CREF products may be subject to market and other risk factors. See the applicable product literature, or visit [tiaa-cref.org](http://tiaa-cref.org) for details. TIAA-CREF Individual & Institutional Services, LLC and Teachers Personal Investors Services, Inc., members FINRA, distribute securities products. Annuity contracts and certificates are issued by Teachers Insurance and Annuity Association (TIAA) and College Retirement Equities Fund (CREF), New York, NY. Group Supplemental Retirement Annuity (GSRA) contract form series G1250.1. ©2010 Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF), New York, NY 10017. C48253 AP20521/26725 (12/10)

**HOW DO I ENROLL IN THE PLAN?** Enrollment is automatic. Once your institution determines that you are eligible to participate in the plan, they will automatically forward your contributions to a TIAA-CREF Group Retirement Annuity Contract (GSRA). The investment election for the account will automatically be set to the default account chosen by your employer and your estate will be named as the beneficiary. After the account is established, please go online or call TIAA-CREF to review your account and make changes to the investment allocations and your beneficiary designation, as necessary.

**WHAT COSTS ARE ASSOCIATED WITH THE ACCOUNT?** TIAA-CREF's expenses are generally less than half the industry average, as measured by Morningstar Direct.\*\* Also, there are no additional sales charges deducted from the contributions or annual account maintenance fees. This means more of your savings is working for you rather than going to expenses.

#### WHAT ARE MY OPTIONS WHEN I AM NO LONGER A STUDENT EMPLOYEE?

Upon Termination of association (generally, after graduation or withdrawal of pursuit of a degree), you'll have three options: 1. Maintain your retirement account with TIAA-CREF 2. Roll over the account to an IRA with TIAA-CREF or another firm, or an employer sponsored retirement plan (if your new employer accepts rollovers) 3. Withdraw the balance from your account. Please note that only options one and two will preserve the tax-deferred status of your contributions and any earnings. If you select option three and withdraw the funds, the distribution will likely be taxable as ordinary income in the year it is withdrawn and may also be subject to an additional 10% early withdrawal penalty.

SERP Distributions/Refunds

Student/Employer

Two Conditions required for refund of contributions and interest:

1. Termination of Student Employment and
2. Departure from the University as a student
  - a. By graduating from CSU
  - b. Or separation from CSU

## Health Contribution

**For any Grad student who is in a higher tax bracket will be taxed for the month of February and September for Health Insurance Contribution.** Therefore, the first paycheck of the semester for the student once only each semester, fall and spring will be less than those for the remainder of the year.

-Please review hyperlink in which provides greater detail pertaining to this

matter: <http://graduateschool.colostate.edu/financial/assistantships/assistantship-health-contribution/>

If you review your paystub by following the instructions below, you will notice for Health Contribution (Contr) is where the additional money was applied.

Instructions to review paystub:

1. Search browse: colostate.edu
2. Select resources (Top right corner)
3. Select Administrative Applications and Resources (AAR) or type in AAR in the search (select first link)
4. Select HR System
5. Select CSU Employee Self-Service
6. Select Pay Advices

Questions regarding the health insurance contribution should be directed to the graduate school at (970) 491-6817.

[Click here to go back to table of contents](#)

## POST GRADUATION

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Remember to keep in touch after you leave campus! Let us know of your employment, research, academic, and personal endeavors!

Each year we hope to correspond with you to keep all alumni up-to-date of developments in SAMD.

**Please direct any questions to:**

Carolina Bañuelos

SAMD Program Manager

442 Anatomy/Zoology

[carolina.banuelos@colostate.edu](mailto:carolina.banuelos@colostate.edu)

970.491.4879

Mailing Address: 1617 Campus Delivery

Fort Collins, 80521