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Welcome to the Interdisciplinary Materials Science Graduate Program at the Colorado School of Mines!

Congratulations on your admission to the Interdisciplinary Materials Science Graduate Program at CSM! You are joining a diverse, exciting, and supportive interdisciplinary community that is engaged in cutting-edge instructional and research activities across a wide variety of materials systems and applications.

A few words about your program: Foremost, it is interdisciplinary. This means that we have faculty from Physics, Metallurgy, Chemistry, Chemical Engineering, Mechanical Engineering, and Electrical Engineering all participating. The result is a very dynamic academic program with a lot of cross-collaborations among faculty and students with different backgrounds. We have built the program purposely to accommodate participants with widely varying undergraduate backgrounds. We hope that you take advantage of this diversity to learn as much from your fellow students as you do from your classes! A few suggestions to get you started: Find out what your fellow program students are researching for their masters or PhD projects. Create a qualifying exam study group with fellow students from different undergraduate backgrounds. Take some time to explore Golden’s famous microbreweries with your classmates!

I know you will enjoy your time at CSM and I look forward to your active engagement in our program, our community, and in all that Golden has to offer! Please reach out to me at any time for any questions you may have as well as suggestions on how we can make your experience here as worthwhile as possible.

Ryan O’Hayre
Program Director
Interdisciplinary Materials Science Graduate Program
Colorado School of Mines
I. Overview of Programs

The Materials Science graduate program at Mines is an interdisciplinary collaboration among the departments of Chemical and Biological Engineering, Chemistry, Civil and Environmental Engineering, Mechanical Engineering, Metallurgical and Materials Engineering, and Physics.

A. Master of Science, non-thesis

The non-thesis Master of Science degree has been designed to accommodate students especially from a non-materials undergraduate background looking for a capstone materials degree to prepare them for industry, or for engineers or scientists who are already working in industry in materials-related fields. The thesis requirement is replaced with the requirement to complete a case study. The industrial-oriented student, who most likely has technical laboratory or manufacturers experience, may find this program more suited to their employment responsibilities.

1. Requirements

   30 total semester hours of acceptable coursework and case study credit including:
   - 24 hours of courses
   - 6 hours of case study credits

2. Time to Completion: 1 to 1½ years

B. Master of Science, thesis-based

A Master of Science degree requires the ability to perform research work as well as understand and apply the advanced concepts presented in graduate-level courses in your area of specialization. A Master of Science thesis, which is a report of original scientific research or development, is required for the completion of your degree. You will conduct your research project with the guidance of your advisor but must demonstrate independent thinking.

1. Requirements

   30 semester hours of acceptable coursework and research credits including:
   - 18 hours of Materials Science courses
   - 6 - 12 hours of thesis research credits (depending on focus area requirements)

   Submit a thesis and pass the Defense of Thesis examination before the Thesis Committee

2. Time to Completion: 1 ½ to 2 years

C. Doctor of Philosophy

The Doctor of Philosophy degree is awarded to those students who have demonstrated unusual competence in their field. The recipient must produce an original contribution to the science and/or engineering of the chosen research field. You must display a deep understanding of that field and demonstrate the ability to apply this knowledge effectively toward the solution of new problems. Doctoral study is a period of intensive
study and research under the direction of the advisor and with the guidance of the Doctoral Committee, appointed by the Graduate Dean.

1. **Requirements**

   a) **Credits (72 total)**

   Minimum of 24 hours of coursework including:
   - Three core Materials Science courses (9 credits hours)
   - Five elective courses within the Materials Science program or a participating department (15 credit hours)

   *The remaining 48 will be primarily research credits.*

   b) **Qualifying Examination**

   A qualifying examination is given annually at the end of the spring semester under the direction of the Materials Science Graduate Affairs Committee.

   c) **Thesis Proposal Defense**

   A student’s thesis committee administers the thesis proposal defense. The proposal defense should occur no later than the student's fourth semester.

   d) **Dissertation Defense**

   Doctoral students must submit a thesis and successfully defend it in an oral presentation to the Thesis Committee in a public meeting.

2. **Time to completion: 4-5 years**

II. **What to do first**

*Keep an eye on your student email!* Many of the following items will be brought to your attention there, with specific instruction for their completion.

A. **Establish residency**

   You must be a full-time resident in Colorado for one (1) full year before you can achieve resident status for in-state tuition purposes. If you are not a Colorado resident, it is recommended that you do the following immediately:

   - Register your car in the state of Colorado
   - Get a Colorado driver’s license
   - Register to vote in the state of Colorado
   - Retain a copy of your rental agreement

   You will need to submit a Petition for In-State Tuition Classification before your third semester. Full information on residency requirements as well as the form you need can be found from the registrar’s [website](#).
B. **Human resources paperwork**
This must be submitted before you can get paid. Pick up the packet at the Office of Human Resources (located in Guggenheim, Suite 110). A notary public is available there, so take your government-issued ID with you when you drop off the packet.

C. **Official transcripts**
Send these to the Office of Graduate Studies as soon as possible. You will not be able to register for your second semester until you have done so.

D. **Required training**

1. **Safety Training (repeated annually)**
At the beginning of each semester, Environmental Health and Safety presents a mandatory General Safety class for all incoming graduate students. Students who need access to chemical stores and waste collection services are provided additional training. You are required to attend the Safety Seminar held in your home department/division each year.

2. **Sexual Harassment Prevention Training**
Session times and registration instructions are listed on the graduate school website.

3. **Orientation**
Plan to attend both the graduate student orientation and the Materials Science program orientation. Details will be emailed to you.

E. **Register for courses**
You should register for at least your two core courses for your first semester. Consult your advisor regarding additional courses. In addition to course credits, register for research credits (MLGN 707 - Graduate Thesis) to add up to 15 credit hours total.

F. **Sign your contract**
This will be made available through your research center administrator.

G. **BlasterCard access and keys**
Your BlasterCard is your Mines student ID and doubles as a key card for campus buildings and some labs. You can pick up your BlasterCard at the Campus Living Office in Elm Hall, 1795 Elm Street (west entrance). Be sure to pick up your RTD College Pass while you are there! Once you have your BlasterCard, you can submit a Building Access Request Form (found on the Facilities Management webpage) to request keys and building access. The building proctor for Hill Hall is Scott Pawelka (HH 219, spawlka@mines.edu). The form should be submitted to the lock shop at 1318 Maple Street, Building 3. If you do not know the key numbers you need, the lock shop can look them up by room number when you turn in the form.
H. Parking

There is no free all-day street parking in the vicinity of CSM. Mines is a Pay-to-Park campus from 7am to 5pm, Monday through Friday. General and commuter parking passes are available. Passes must be reserved and paid for online and can be picked up at the Parking Services office at 1318 Maple Street (right next to the lock shop).

III. Living in Golden

A. Housing

Golden is the most convenient town to live in, but students live anywhere from Boulder to Littleton. Commutes from Lakewood and Arvada are very manageable. In Golden, plan on spending $350-$900 for a room or $950-$1200 for your own residence. For surrounding towns, rent is slightly less.

1. Apartments

Rental housing is a competitive market in this area, so plan to turn in more than one housing application if you are applying for a place on your own. Be ready to act quickly!

2. Mines Park

These apartments offer convenient, affordable apartment housing for Mines students. Shared, single, and family housing options are available. Applications are accepted in spring for the fall semester and these apartments fill fast.

3. Mineslist

Mineslist is a Facebook group dedicated to Mines students buying, selling, and looking for roommates/rentals.

4. Craigslist

Searching “CSM” or “Mines” can be particularly useful for finding convenient housing or rooms with other students.

B. Food and Drink

1. Coffee

<table>
<thead>
<tr>
<th>Higher Grounds Café</th>
<th>Pangea</th>
</tr>
</thead>
<tbody>
<tr>
<td>803 14th Street</td>
<td>1205 Cheyenne Street</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Windy Saddle</th>
<th>Café 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1110 Washington Ave</td>
<td>1301 Arapahoe Street</td>
</tr>
</tbody>
</table>

2. Golden Breweries

<table>
<thead>
<tr>
<th>Golden City Brewery (“GCB”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>920 12th Street</td>
</tr>
</tbody>
</table>

Note: If you can’t find your advisor and/or fellow graduate students, check here.
March  Toad Brewing
900 Washington Avenue

Barrels and Bottles Brewery
600 12th Street

Cannonball Creek Brewing Company
292 Washington Avenue

New Terrain Brewing
16401 Table Mountain Parkway

3. Lunch Favorites
Sherpa House
1518 Washington Avenue
Thai Gold
714 14th Street

Woody’s Wood-Fired Pizza
1305 Washington Avenue
Snarfs
1301 Washington Avenue

D’Deli
1207 Washington Avenue
On campus options: MINES dining

C. Public Transit
Public transportation is administrated by RTD. A free College Pass is distributed to all Mines students, which includes unlimited rides on buses and trains during the school year. The closest light rail station is the Jefferson County Government Center – Golden Station. Also, the GS bus offers transportation between Golden and Boulder and includes a route between Mines and NREL.

D. Student Discounts
The Student Activities Office offers discounted rates on a climbing gym, museum entries, and many other activities. See their website for details.

E. Recreation Center
The Student Recreation Center offers several courts, a natatorium, jogging track, climbing wall, and weight room. They offer daily fitness classes that are free to Mines students. It is also a great place to rent reasonably priced gear for outdoor recreation! They have gear for many sports including kayaking, camping, skiing, fishing, and biking.

IV. Thesis-Based Degree Timelines

A. Master of Science, thesis-based

1st Year

Fall
MLGN 593 – Bonding, Structure, and Crystallography
MLGN 591 – Materials Thermodynamics
Select thesis committee

Spring
MLGN 592 – Advanced Materials Kinetics and Transport
Electives
2nd Year
Complete remaining coursework
Defend thesis

You must complete a minimum of 18 hours of approved graduate coursework. Up to nine hours of 400-level courses may be counted towards graduation. Up to nine hours of coursework with a grade of B or better may be transferred from another recognized institution upon the approval of the Graduate Affairs Committee and the Graduate Dean. A total of 30 hours is needed for the Master of Science degree.

B. Doctor of Philosophy

1st Year

Fall
MLGN 593 – Bonding, Structure, and Crystallography
MLGN 591 – Materials Thermodynamics
Select thesis committee

Spring
MLGN 592 – Advanced Materials Kinetics and Transport
Electives
Qualifying Exam

The three required core courses must be completed within the first fall and spring semesters for all doctoral candidates. Students must obtain a grade of B- or better in each class to be eligible to take the qualifying examination at the end of the spring semester.

A qualifying examination is given annually at the end of the spring semester under the direction of the Materials Science Graduate Affairs Committee. All first-year Materials Science PhD students are expected to successfully complete the qualifying examination within three semesters to remain in good standing in the program. Those who do not pass the exam will be allowed one additional attempt in the semester immediately following their first attempt. The examination covers material from the core curriculum plus a standard introductory text on Materials Science, such as "Materials Science and Engineering: An Introduction", by William Callister.
Advice regarding the qualifying exam

from those who have experience it

- Start studying/reviewing early on
- Form a study group. Meet often. Study Callister!
- Keep all of your notes from the core courses so that you have them to study with. In fact, while you’re taking the core classes, keep in mind that you will be taking the qualifying exam, and organize your thoughts and even your study plan during the core class semesters. This will help for when you begin to prepare for the qualifying exam. You will have a study plan ready to go and you’ll be familiar with how it is structured. This will make for more of a review, rather than trying to re-learn everything. You won’t have to spend much time organizing your thoughts for study, but rather be able to hit the ground running as you prepare.
- You’ll probably do fine. It is designed to test your thought process, which no amount of studying can change. However, you still need to study.
- Focus study time on material from classes.

2nd Year

Before the semester begins, be sure to submit your Petition for In-State Tuition Classification. Consult your advisor regarding elective courses.

A student’s thesis committee administers the thesis proposal defense. The proposal defense should occur no later than the student’s fourth semester. While the proposal itself should focus on the central topic of a student’s research efforts, during the proposal defense, candidates may expect to receive a wide range of questions from the Committee related to the proposal, including the major concept areas of Materials Science within the context of a candidate’s research focus. The Committee formally reports results of the proposal defense to the Materials Science Program Director using the Committee Reporting form developed by the Office of Graduate Studies. The written proposal is a 10 – 20 page summary of the proposed research topic, problem to be solved, experimental methods, work completed thus far, work to be completed, a proposed dissertation format, and timeline for completion. This same information is then presented in a ~20 min oral thesis proposal overview to the thesis committee. Upon completion of the PhD thesis proposal defense, the chair of the committee will report results to the Program Director and Program Administrator.
3rd Year
Complete coursework
Apply for admission to candidacy

4th-5th Year(s)
Complete thesis
Defend thesis

V. Teaching Assistantships
Students may be required to work as teaching assistants throughout their degree program. The details of these assignments are dictated by the student’s home department.

VI. Research Ethics Requirement
All students supported at any time in their graduate career through the National Science Foundation as research assistants, hourly employees, or fellowship awardees must complete training in the responsible conduct of research (RCR). To satisfy the RCR requirement, students must complete one of the following options:
- LAIS 565
- SYGN 502
- Chemistry program option available to students in Chemistry program
- Physics program option available to students in Physics program

VII. Required Forms
A. Advisor/Committee (thesis-based degree seekers only)
The committee can be selected as early as the first semester and should be selected no later than the second semester (for MS students) or the fourth semester (for PhD students). The form, as well as committee member requirements, can be found on the graduate school website.

B. Degree Audit
This form should be completed as soon as all coursework has been completed and no later than the semester preceding the semester of graduation. Note that the Advisor/Committee Form requires 2 weeks for processing and must be approved prior to submission of the degree audit form.
   December graduation – Submit form no later than May 1
   May graduation – Submit form no later than November 1

C. Admission to Candidacy (PhD students only)
You must submit this form after you have successfully completed all required coursework, passed the qualifying exam, and completed your thesis proposal defense. It can be
submitted with or after the degree audit form and must be submitted by the first day of classes of the semester you are either graduating or desiring reduced registration.

**Graduation Application**
Applications are submitted through Trailhead and are due by the beginning of the semester you wish to graduate.

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**VIII. Contacts**
Dr. Ryan O’Hayre, Materials Science Program Director
[rohayre@mines.edu](mailto:rohayre@mines.edu)
HH 354

Megan Steelman, Interdisciplinary Graduate Program Administrator
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HH 206A