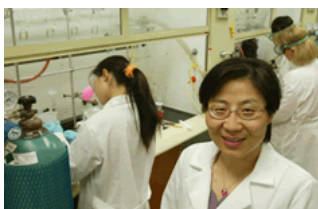


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Chemistry assistant professor Minghui Chai currently researches the synthesis of bio-dendrimers and the synthesis of dendrimer-drug bioconjugates. She also focuses on NMR analysis of supramolecular systems and AFM analysis of synthetic and bio-nanostructures.

Ph.D. in the Science of Advanced Materials (SAM)

The Ph.D. program in the Science of Advanced Materials builds on successful research programs of faculty from several departments in the College of Science and Technology (CST) to provide students with a strong, interdisciplinary foundation in the science of advanced materials, with training in current techniques for the predictive modeling of new materials, their synthesis, and their characterization.

Minimum Totals for Graduation: 90 hours

The SAM program will produce highly-trained scientists capable of carrying out quality, original research. Admission is selective. Criteria emphasize not only previous academic success, but also evidence of student creativity and commitment to research. Students must pass a set of comprehensive exams to complete the program, and conduct research in a chosen specialty area that culminates in the doctoral dissertation.

- ▶ [Click here to learn more about individual faculty research areas.](#)

▶ Curriculum

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Curriculum

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The program curriculum features approximately 30 credit hours of classroom instruction and 60 hours of directed research and dissertation credit. The SAM curriculum also includes the following components: core courses that establish a solid foundation in the science of materials; advanced courses in a number of specialized areas; seminar courses focusing on the current SAM literature and developing essential skills in scientific communication; and the dissertation.

The first year

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At the end of the first year, all students will complete a qualifying examination covering the material contained in the core courses. Students passing this exam will be granted candidacy status and will continue toward the Ph.D. degree. Those who do not pass will have a second opportunity to take the exam early in the second year. Those who fail a second time will be terminated from the program and encouraged to complete the requirements for an appropriate M.S. degree. These programs generally include some additional courses not required in the SAM program. Most students will be able to complete such courses and the M.S. research thesis requirement in one additional year.

The second year

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During the second year, Ph.D. students will take a series of cumulative examinations to demonstrate competence in their area of specialization. These exams will be based on coursework, the current scientific literature in the area, and other appropriate material. Students passing these exams will attain dissertator status. Those who fail a portion of the cumulative exams will have a second opportunity to pass that portion. Students who fail a second time will be terminated from the program and encouraged to complete the requirements for an appropriate M.S. degree.

Students normally will be expected to begin directed research work no later

Science of Advanced Materials Ph.D. Program Contact Information



For more information on the Ph.D. program in the Science of Advanced Materials, please contact:

Jessica Lapp
Program Coordinator

Mailing address:
Department of Physics
Central Michigan University
203 Dow Science Complex
Mount Pleasant, MI 48859

E-mail: jessica.lapp@cmich.edu

Phone: (989) 774-2221

- ▶ [Click here to apply to the Ph.D. program in the Science of Advanced Materials.](#)

than during the first summer of residence. Students will identify a research advisor as early as possible, and form a dissertation committee consisting of at least four members. The committee chair (research director) and two other members will come from the program faculty. One of these will have research expertise outside the student's immediate area of specialization. At least one additional committee member will come from an institution external to CMU, including industrial labs, as appropriate.

The third year and beyond

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During the third year, students will prepare an original research proposal, present it as a seminar to program faculty and students, and defend it before the dissertation committee. Students will carry out the bulk of their doctoral research in years 3-5 of the program. The final requirements will be the preparation and oral defense of a scholarly dissertation that presents the results of the student's dissertation research. The oral defense and dissertation must be approved by the dissertation committee and by the [College of Graduate Studies](#). A student's progress through the program will be monitored by an annual review of his/her performance by the program director of dissertation committee.

Degree requirements

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Required Courses I - Science Core (3 hours)

One course from the following, after consultation with the program advisor:
SAM 620 Chemical Principles in the Science of Materials
SAM 630 Physical Principles in the Science of Materials

Required Courses II - Materials Core (9 hours)

SAM 700 Advanced Materials I: Inorganic and Nanomaterials
SAM 710 Advanced Materials II: Polymers, Composites, and Biomaterials
SAM 720 Materials Characterization and Modeling Lab

Required Courses III - Specialization (12 hours)

The student must enroll in 12 credits of graduate courses in one specialized area of materials such as computational materials modeling, polymeric materials, or materials characterization, selected in consultation with and approved by the program advisor.

Required Courses IV - Current Topics Seminar (6-10 hours)

SAM 785 Seminar: Current Topics in the Science of Advanced Materials
Students may enroll multiple times until 6 to 10 credits are earned.

Elective Courses (0-12 hours)

Students may enroll in up to 12 credit hours of elective graduate courses selected in consultation with, and approved by, the program advisor.

Research (32-48 hours)

SAM 796 Directed Research in the Science of Advanced Materials
(Students work in the lab of advisor)

Dissertation (12 hours)

SAM 899 Dissertation

TOTAL: 90 semester hours

Admission requirements

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Applications are considered for fall semester entrance only. Applicants should apply **by February 1** to compete for financial awards, but applications will continue to be reviewed until all assistantship positions are filled.

Students with a bachelor's degree in physics, chemistry, biochemistry, biology, geology, engineering, mathematics or other relevant areas of science will be considered for admission. Applicants must be admitted to the [CMU College of Graduate Studies](#) and the SAM program. Transcripts of previous undergraduate and graduate studies, GRE scores, a statement of research interests, and three letters of recommendation will be used in evaluating candidates for admission.

Applicants already holding an M.S. degree in a materials-related area may also apply for entry into the program. Relevant graduate coursework taken previously may be counted toward meeting some of the program requirements. A completed M.S. thesis on a materials-related topic will be

counted toward the directed research credits required on the SAM Ph.D. Students who have completed the M.S. in physics or chemistry will also be exempt from the qualifying exam.

Applications for admission are available through the [College of Graduate Studies](#).

Graduate Admissions

E-mail: grad@cmich.edu

Phone: (989) 774-GRAD

Web site:
[Click here for the College of Graduate Studies web site.](#)

Mailing address:

College of Graduate Studies
Central Michigan University
100 Foust Hall
Mount Pleasant, MI 48859

Office of International Education

E-mail: intlapp@cmich.edu

Phone: (989) 774-4308

Web site:
[Click here for the Office of International Education web site.](#)

Mailing address:

Office of International Education
(OIE)
Central Michigan University
106 Bovee University Center
Mount Pleasant, MI 48859 U.S.A.

Support

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Students in the SAM program may apply for support as teaching or research assistants. Students will normally work as teaching assistants during their first two years and as research assistants during the final three years of the program.

Faculty and student presentations

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- ▶ [SAM 785 - Solar Energy Posters](#)

- ▶ Nanotechnology:
Current Research and Potential Opportunities at CMU
Drs. Brad Fahlman and Bob Howell (Department of Chemistry)
and Dr. Valeri Petkov (Department of Physics)
PowerPoint presentation - December 5, 2007
[Click here to view the PDF file of this presentation.](#)

- ▶ Beyond the Nanotechnology 'Hype':
Current and Future Materials Applications for the Nanoregime
Dr. Brad Fahlman (Department of Chemistry)
Webcast presentation - October 13, 2006
[Click here to view the webcast \(Length: 56 minutes, 33 seconds\).](#)