

College of Science and Mathematics

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Mission

The College of Science and Mathematics is dedicated to excellence in undergraduate education and research. Our outstanding programs are student-centered and designed to prepare students for responsible positions at all levels in research, industry, education, medicine and government. We emphasize learning by doing science and provide active learning experiences in a range of settings. We also encourage collaborative research with faculty, internships and other experiences that facilitate transitions to work or graduate/professional education.

We provide the following:

- foundational understanding of science and mathematics for the educated citizen.
- an exemplary program in mathematics and science for prospective teachers.
- the educational basis and technical skills to prepare science and mathematics students for the workforce.
- the theoretical and practical foundations for success in professional and graduate programs.

Science and Mathematics Programs

The college offers a variety of academic programs, majors, minors, concentrations, interdisciplinary programs and tracks. Most of these are listed below. For an explanation and contact point of each, visit the departmental Web site at <http://csm.jmu.edu/>.

- Actuarial/Financial Mathematics
- American Chemical Society Accredited Degree
- Applied Physics
- Astronomy minor
- Biochemistry minor in biology or chemistry
- Biology major
- Biology minor
- Biotechnology major
- Chemical Education concentration
- Chemistry major
- Chemistry minor
- Chemistry/Business concentration
- Computational and Applied Mathematics
- Computational Sciences
- Pre-dentistry
- Earth Resources
- Earth Science major
- Ecology
- Environmental and Engineering Geology
- Environmental Studies minor
- Forestry
- Fundamental Physics
- Geology major
- Geology minor

- Individual Option - Physics
- Materials Chemistry major
- Materials Science minor
- Mathematics major
- Mathematics minor
- Medical Technology
- Pre-medicine
- Microbiology
- Molecular Biology and Physiology
- Pre-optometry
- Pre-pharmacy
- Physics major
- Physics minor
- Physics/Engineering Combined Program
- Plant Sciences
- Pure Mathematics
- Statistics major
- Statistics minor
- Teaching Licensure for Secondary Teaching Available:
 - Biology
 - Chemistry
 - Earth Sciences
 - Mathematics
 - Physics
- Pre-Veterinary Medicine
- Zoology

Some of these interdisciplinary programs are listed under "Interdisciplinary Programs" beginning on Page 95. These include: the biochemistry and molecular biology minor, the environmental studies minor, the materials science program, and pre-health areas such as pre-medical and pre-dental. The college also supports the following resource and service centers, collections, events and outreach programs that enhance teaching, scholarly activity and community relations.

Resource and Service Centers

Astronomy Park

Located on the east side of campus near the Physics and Chemistry building is a permanent area for sky observing on campus. There are permanent mounts for six portable 10-inch computer controlled telescopes and an area for a portable 14-inch telescope. This site provides a convenient area for sky observing for introductory astronomy students. Students are able to easily see the moon, planets, nebulae, galaxies, star clusters as well as the sun using the appropriate solar filters. The department is also equipped with CCD cameras, spectrometers, a photometer, and multiple solar filters that provide more advanced students with experience in astrophotography and data collection techniques. The public is invited to attend public star gazes which are held several times each semester. For further information, contact William Alexander in the Department of Physics and Astronomy at (540) 568-2312.

The Center for Computational Mathematics and Modeling

This interdisciplinary institute for scientific computing, houses state-of-the-art graphics workstations and a 16 PII node beowulf computer system. The beowulf computer system is a parallel computing environment that can be used on large-scale problems. Faculty and students will have access to this "super computer" from the center and from their offices. The center also operates an Immersive 360° Visualization System. The center uses mathematics both to simulate real-world phenomena and to generate visual data. Faculty members from the sciences, economics, and business disciplines interact with mathematicians to model problems that they are researching with undergraduate students. For further information, contact Dr. James Sochacki in the Department of Mathematics and Statistics at (540) 568-6614.

Electron Microscopy Center

The Electron Microscopy Center serves faculty, staff and students who wish to use the scanning electron microscopy in scientific investigations. The center also provides demonstrations for public school groups and specialized educational programs. For further information, contact Lance Kearns in the Department of Geology and Environmental Science at (540) 568-6421.

John C. Wells Planetarium

Located in Miller Hall, the planetarium serves as a teaching laboratory for both the undergraduates and the local community alike. The facility is used as a resource for introductory astronomy classes and well as welcoming school groups from the region. Several public planetarium shows are offered every month that vary with the seasons. The planetarium is equipped with a GOTO- Chronos/Digistar-3 hybrid planetarium system that offers full dome video as well as exceptionally clear and accurate simulations of the night sky. For further information, contact William Alexander in the Department of Physics and Astronomy at (540) 568-2312.

JMU Meteorite Collection

The James Madison University Meteorite Collection is a growing collection of the many sorts of meteorites to strike the Earth, and is located on the second floor of the Physics/Chemistry building. The display is open to the public year-round during university business hours, and after hours by special arrangement. We hope you enjoy your visit. For further information, contact William Alexander in the Department of Physics and Astronomy at (540) 568-2312.

Microscopy Facility

The Biology Department's Microscopy Facility is equipped with several light and fluorescence microscopes, including a Nikon C1 Confocal Laser Scanning Microscope, enabling time lapse imaging, 3-D image reconstruction and fluorescence imaging. The facility has a dedicated staff member who can provide training on the equipment and help faculty and students with any microscopy aspects of their research projects.

Mineral Museum

Housed with the Department of Geology, the JMU Mineral Museum contains more than 700 exceptionally beautiful display specimens that provide mineralogy students with outstanding visual examples of some of the finest crystals from around the world. Each year, numerous educational groups, mineralogical societies and individual collectors visit the collection. For further information contact Dr. Lance E. Kearns in the Department of Geology and Environmental Studies at (540) 568-6421/6130.

Observatory

Located at the Stokesville, Virginia Campground, a 14-inch telescope is permanently mounted under a 16-foot dome. A set of 10 piers surround the observatory building and provide easy set-up for the observatory's eight, eight-inch telescopes. This site provides dark-sky observing for introductory astronomy students. A photometer, solar filters and a CCD imaging system provide more advanced students with experience in astrophotography and data collection techniques. During the summer months, public access is regularly available on Friday and Saturday nights. For further information, contact Dr. Jon Staib in the Department of Physics and Astronomy at (540) 568-6153.

Office of Statistical Services

Through this office, statistics faculty members and students provide JMU and the local community with assistance in the design and analysis of statistical surveys and experiments. Students obtain practical experience and an appreciation for the impact of statistical methods on today's society. For further information contact Dr. Rickie Domangue in the Department of Mathematics and Statistics at (540) 568-6968.

Shenandoah Valley Regional NMR Facility

This nuclear magnetic resonance facility has been established with grants from The National Science Foundation (9650132), The Merck Foundation, and matching funds provided by James Madison University, Eastern Mennonite University, and Bridgewater College.

NMR spectrometers at the facility include a Bruker Avance DPX-300 NMR, equipped with a variable temperature 5mm QNP (capable of observing ^1H , ^{13}C , ^{19}F or ^{31}P) or a broad band tunable probe and a Dell host computer.

The facility also has a Bruker Avance DRX-400 NMR, equipped with a six position autosampler, a variable temperature 10mm broad band tunable probe, variable temperature 5mm broad band tunable probe with a Z gradient and a Dell host computer. Recently a Bruker Avance Ultra High Shield Plus 600 NMR was installed, equipped with a variable temperature 5mm broad band tunable probe, BST upper shim stack, Bruker Orthogonal Shim System (BOSS-2), and Bruker Smart Magnet System (BSMS) shim and Digital Lock control unit and a Dell host computer. These instruments are housed at JMU and accessed remotely by the participating regional colleges and universities. Currently the systems are running TOPSPIN 1.3 software.

A Web site, <http://csm.jmu.edu/nmr/>, has been established as a means of communicating the efforts of the Regional NMR Consortium to the local scientific community and other interested parties. This group is composed of chemists from Bridgewater College, Eastern Mennonite University, James Madison University and Mary Baldwin College.

Science and Mathematics Learning Center

The College of Science and Mathematics has established a Learning Center for Science and Mathematics located on the second floor of Roop Hall. The center, which is a part of the JMU Student Success Center, provides extra help with math and science for students in general education and beginning science courses. The center is staffed by three full-time coordinators and carefully selected upper level science and math majors.

Annual Events

Physics is Phun Science Show

During the spring the department of Physics and astronomy in conjunction with the Society of Physics Students offers science shows to student groups from grades 6-12. Topic rooms are arranged with presentations and demonstration in various areas of physics and the visiting students rotate among the rooms. JMU faculty and students share their experience and knowledge of science in an engaging format. Typical shows run about two hours. For further information, contact Dr. Kevin Giovanetti, in the Department of Physics and Astronomy at (540) 568-6353.

Science Fair

The Shenandoah Valley Regional Science Fair has been administered by the JMU science faculty for the past 36 years. The science fair is a competition open to all students in grades six through 12 who live in Virginia's Shenandoah Valley. For further information, contact Dr. Thomas DeVore in the Department of Chemistry and Biochemistry at (540) 568-7938.

SUMS Conference

Each fall the Department of Mathematics and Statistics hosts the Shenandoah Undergraduate Mathematics and Statistics (SUMS) Conference, a one-day undergraduate research conference. The SUMS Conference gives undergraduates from JMU and around the country who have completed original mathematical research a chance to present their work to their peers. For further information, visit www.math.jmu.edu/SUMS or contact Dr. Elizabeth Theta Brown or Dr. Laura Taalman in the Department of Mathematics and Statistics at (540) 568-6184.