

College of Science and Mathematics

Dr. David F. Brakke, Dean

Dr. Judith A. Dilts, Associate Dean

Phone: (540) 568-3508

Location: Bioscience Building, Suite 3001, 951 Carrier Drive

MSC: 4114

Website: <http://www.jmu.edu/csm>

Academic Units

Department of Biology	144
Dr. Joanna B. Mott, Academic Unit Head	
Department of Chemistry and Biochemistry	151
Dr. Linette M. Watkins, Academic Unit Head	
Department of Geology and Environmental Science	200
Dr. Stephen A. Leslie, Academic Unit Head	
Department of Mathematics and Statistics	249
Dr. David C. Carothers, Academic Unit Head	
Department of Physics and Astronomy	283
Dr. C. Steven Whisnant, Academic Unit Head	

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 between students and 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.
- 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.
- An exemplary program in mathematics and science for prospective teachers.

Science and Mathematics Programs

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

- Actuarial/Financial Mathematics

- American Chemical Society Accredited Degree

- Applied Physics
- Astronomy minor
- Biochemistry minor for biology or chemistry majors
- Biochemistry concentration
- Biology major and minor
- Biophysical chemistry major
- Biotechnology major
- Biophysical chemistry major
- Chemical Education concentration
- Chemistry major and minor
- Chemistry/Business concentration
- Computational and Applied Mathematics
- Computational Sciences
- Earth Science
- Ecology
- Environmental and Engineering Geology
- Environmental Science minor
- Environmental Studies minor
- Forestry M.S. Program
- Fundamental Physics
- Geology major and minor
- Human Science minor
- Individual Option - Physics
- Materials Chemistry concentration
- Materials Science minor
- Mathematics major and minor
- Medical Technology
- Microbiology

- Molecular Biology and Physiology
- Pre-dentistry
- Pre-medicine
- Pre-optometry
- Pre-pharmacy
- Pre-Veterinary Medicine
- Physics major and minor
- Physics/Engineering Combined M.S. Program
- Plant Sciences
- Pure Mathematics
- Statistics major and minor

Teaching Licensure for Secondary Teaching Available:

- Biology
- Chemistry
- Earth Sciences
- Mathematics
- Physics

Some of these cross disciplinary programs are listed in the Cross Disciplinary Programs section of the catalog. These include: the biochemistry and molecular biology minor, the environmental science 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

Contact: Sean Scully

Phone: (540) 568-4511

Website:

<http://csma31.csm.jmu.edu/physics/scully/outreach.html>

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.

The Center for Computational Mathematics and Modeling

Contact: Dr. James Sochacki

Phone: (540) 568-6614

This cross disciplinary 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 360o 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.

Center for Materials Science

Contact: Dr. Chris Hughes

Phone: (540) 568-8069

Website: <http://csm.jmu.edu/materialsscience>

The educational mission of the Center for Materials Science is to develop and maintain an innovative interdisciplinary and multidisciplinary undergraduate program in materials science that will increase the maturation of students, their research experience and their employment opportunities. The mission includes the integration of undergraduate education with basic and applied research in materials science.

Faculty in the Center for Materials Science have expertise in a wide variety of areas including inorganic and organic synthesis, microfabrication, nanotechnology, thin film growth and surface modification, materials characterization and modeling and simulation of complex systems. The facilities include a class 10000 clean room, electron beam lithography and many types of microscopy and other analytical techniques. A more complete description of the instrumentation and facilities is available at <http://csm.jmu.edu/materialsscience/facilities.html>.

Collaborative work is welcome and can include consultation with faculty, assignment of student projects, or simply access to facilities.

Department of Chemistry & Biochemistry LC/MS Facility

Contact: Dr. Christine A. Hughey

Phone: (540) 568-6633

The JMU liquid chromatography/mass spectrometry (LC/MS) undergraduate research facility, housed within the Department of Chemistry & Biochemistry, was established in 2010 with two Major Research Instrumentation (MRI) grants from the National Science Foundation.

The LC/MS instruments housed in the facility include: (1) an Agilent 6460 triple quadrupole (QQQ) mass spectrometer coupled to two Rapid Resolution LC pumps and a diode array detector, (2) an Agilent 6224 time of flight (TOF) mass spectrometer coupled to an Infinity UHPLC pump, and (3) an Agilent 6530 quadrupole time of flight (q-TOF) mass spectrometer coupled to an Infinity UHPLC pump. All three instruments are equipped with an electrospray source. The time of flight instruments afford the high mass accuracy and high resolution necessary for identification of unknowns in complex mixtures. The MS/MS capability of the q-TOF affords additional structural information. The sensitivity of the QQQ makes this instrument ideal for small molecule quantitation. Together, these three instruments provide a robust platform for the qualitative and quantitative analysis of biological and environmental samples.

JMU Regional Undergraduate Laser Facility

Contact: Dr. Oleksandr Kokhan

Phone: (540) 568-1656

Website: www.jmu.edu/chemistry/lasers.shtml

Medicinal Research Collaborative

Contact: Dr. Kyle Seifert

Phone: (540) 568-2286

Contact: Dr. Kevin Caran

Phone: (540) 568-6632

Website:

<http://csma31.csm.jmu.edu/chemistry/faculty/minbiole/JMUMRC>

The Medicinal Research Collaborative is an assembly of researchers who share ideas and pool resources to advance medicinal research at James Madison University. Members come from a variety of scientific departments and represent a diversity of expertise. And since members of the collaborative often team up on research, the MRC presents a set of highly interdisciplinary projects that aim to advance fundamental science that supports medicine. Key liaisons include researchers at SRI *;* Shenandoah Valley, a non-profit organization with a new research site in Harrisonburg, as well as other members of the JMU community with ties to medicine and intellectual property.

Electron Microscopy Center

Contact: Lance Kearns

Phone: (540) 568-6421

Website:

<http://csm.jmu.edu/materialsscience/microscopy.html>

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.

JMU Meteorite Collection

Contact: Dr. C. Steven Whisnant

Phone: (540) 568-2312

Website:

<http://csma31.csm.jmu.edu/physics/outreach.html#meteorites>

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.

Microscopy Facility

Contact: Joanna B. Mott

Phone: (540) 568-6733

Website: <http://csm.jmu.edu/biology/microscopy>

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

Contact: Lance Kearns

Phone: (540) 568-6421

Website: www.jmu.edu/geology/museum.html

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.

Observatory

Contact: Dr. Jon Staib

Phone: (540) 568-6153

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.

Office of Statistical Services

Contact: Dr. Rickie Domangue

Phone: (540) 568-6968

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.

John C. Wells Planetarium

Contact: Mr. Shanil Virani

Phone: (540) 568-4071

Website: www.jmu.edu/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.

Science and Mathematics Learning Center

Contact: Dr. Alicia James

Phone: (540) 568-4369

Website: www.jmu.edu/smlc

The College of Science and Mathematics has established a Learning Center for Science and. 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 five full-time coordinators and carefully selected upper level science and mathematics majors.

Shenandoah Valley Regional NMR Facility

Contact: Dr. Jun Yin

Phone: (540) 568-3683

Website: www.jmu.edu/chemistry/nmr.shtml

The Shenandoah Valley Regional NMR Facility was established with grants from The National Science Foundation (9650132) and The Merck Foundation with matching funds provided by James Madison University, Eastern Mennonite University and Bridgewater College.

The JMU NMR Facility is comprised of three NMR spectrometers: 300,400 and 600. These instruments are housed at JMU and can be accessed remotely by the Regional NMR Consortium. The group is composed of chemists from Bridgewater College, Eastern Mennonite University, James Madison University, Mary Baldwin College and the University of Virginia.

Annual Events

Physics is Phun Science Show

Contact: Dr. Kevin Giovanetti

Phone: (540) 568-6353

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.

Science Fair

Contact: Dr. Thomas DeVore

Phone: (540) 568-7938

The Shenandoah Valley Regional Science Fair has been administered by the JMU science faculty for over four decades. The science fair is a competition open to all students in grades 6-12 who live in Virginia's Shenandoah Valley.

SUMS Conference

Contact: Dr. Elizabeth Theta Brown

Phone: (540) 568-8763

Contact: Dr. Laura Taalman

Phone: (540) 568-6184

Website: www.jmu.edu/mathstat/sums

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.