Academic Units Within the College

Department of Biology
Dr. Joanna B. Mott, Academic Unit Head

Department of Chemistry and Biochemistry
Dr. Linette M. Watkins, Academic Unit Head

Department of Geology and Environmental Science
Dr. Stephen A. Leslie, Academic Unit Head

Department of Mathematics and Statistics
Dr. David C. Carothers, Academic Unit Head

Department of Physics and Astronomy
Dr. C. Steven Whisnant, Academic Unit Head

Graduate Programs

The College of Science and Mathematics offers the following graduate degrees:

- Biology (M.S.)
- Mathematics (M.Ed.)

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.
- 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.

Resource and Service Centers

Astronomy Park

Sean Scully
Phone: (540) 568-4511
Website

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

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

Dr. Chris Hughes
Phone: (540) 568-8069
Website: https://www.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 https://
www.jmu.edu/materialsscience. 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

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

Dr. Benjamin A. DeGraff
Dr. Daniel K. Havey
Phone: (540) 568-8811

Lasers are an essential part of our modern society. They are components of home 
electronics, manufacturing equipment, surgical procedures, atmospheric monitoring 
devices, and also are a key piece of technology for chemical research. Lasers have 
transformed modern chemistry. Currently, chemists are able to use lasers to initiate, 
control, and watch chemical reactions on a scale that was unimaginable 50 years ago. 
James Madison University has a large laser spectroscopy laboratory that distinguishes 
it from other primarily undergraduate institutions. Researchers are able to utilize the 
Facility's holdings to perform an abundance of interdisciplinary scientific research.

The JMU Regional Undergraduate Laser Facility has grown through many years of 
support from the National Science Foundation. Holdings include Nd/YAG, Nitrogen, 
helium/neon, argon ion, and diode lasers. The facility is also equipped with an array
of diagnostic tools for laser spectroscopy including an Agilent Infinium 1 GHz digital oscilloscope, five 25 MHz to 400 MHz digital oscilloscopes, a Jarrell-Ash ½ meter scanning monochromator, a CVI digital monochromator, and a Princeton instrument silicon detector array. On-going research with tools in this facility include the synthesis and characterization of luminescent transition metal complexes for use as molecular probes or reporters.

Most recently, the laser facility has received support from the National Institute of Standards and Technology, the James Madison University Department of Chemistry and Biochemistry, and a Research Corporation Department Development Award. New acquisitions include a variety of tunable single-mode diode lasers including a 75 nm New Focus Velocity laser and five NTT:NEL distributed feedback diode lasers for gas sensing of O2, H2O, CO2, and CH4. Additional diagnostic tools include a Bristol Instruments NIR ±60 MHz wavemeter, a Stanford Research Systems 100 kHz spectrum analyzer, and a temperature-stabilized etalon. Emerging research on precision lineshape measurements, gas-sensing of atmospherically relevant small molecules, and optical properties of particulate matter is now underway in the JMU Regional Undergraduate Laser Facility using photoacoustic spectroscopy and cavity ring-down spectroscopy.

**Medicinal Research Collaborative**

Dr. Kevin Minbiole  
Phone: (540) 568-6670  
Dr. Kyle Seifert  
Phone: (540) 568-2286  
Website: [http://csma31.csm.jmu.edu/chemistry/faculty/minbiole/JMUMRC/](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**

Lance Kearns  
Phone: (540) 568-6421  
Website: [https://www.jmu.edu/materialsscience](https://www.jmu.edu/materialsscience)

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**

Dr. C. Steven Whisnant  
Phone: (540) 568-2312  
Website: [ ](http://)
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**

**Alex Bannigan**  
Phone: (540) 568-4521  
Website: [http://www.jmu.edu/microscopy/](http://www.jmu.edu/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**

**Lance Kearns**  
Phone: (540) 568-6421  
Website: [http://www.jmu.edu/geology/museum.html](http://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**

**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**

**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.
Planetarium - John C. Wells Planetarium

Contact: Dr. Shanil Virani  
Phone: (540) 568-4071  
Website: http://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 GOT0- 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

Dr. Alicia James  
Phone: (540) 568-3379  
Website: http://www.jmu.edu/smlc/

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 five full-time coordinators and carefully selected upper level science and mathematics majors.

Shenandoah Valley Regional NMR Facility

Thomas Gallaher  
Phone: (540) 568-3683  
Website: http://www.jmu.edu/chemistry/svrnmr/

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, 13C, 19 F or 31P) 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 website, http://www.jmu.edu/chemistry/svrnmr/, 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.

**Annual Events**

**Physics is Phun Science Show**

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**

Dr. Thomas DeVore  
Phone: (540) 568-7938  
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 6-12 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**

Dr. Elizabeth Theta Brown  
Dr. Laura Taalman  
Phone: (540) 568-6184  
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 [http://www.jmu.edu/mathstat/sums/](http://www.jmu.edu/mathstat/sums/).