General Information
The Office of Undergraduate Research at the University of Missouri or MU coordinates a number of summer research programs for undergraduates enrolled at other institutions. All programs run from May 30 - July 27 with travel days on May 29 & July 28 (9 weeks). Students live in on-campus air-conditioned housing (double rooms), and receive a meal plan paid by the program. Many programs provide one credit hour of research, travel to & from Columbia, and stipends starting at $3600.

Funds are available for approximately 50 non-MU students in various programs. An additional 50+ students participate in provided educational and social program activities, creating a vibrant summer community. Students work on their own research project under the guidance of an MU faculty mentor and present their results at a poster Forum at the end of the program on July 26. Students work as part of a team that typically includes graduate students, lab technicians, & post-doctoral researchers.

The Campus and Community
MU, the flagship campus of the University of Missouri system, is home to 33,266 students and 2,184 faculty. With more than fifteen schools and colleges, and eight interdisciplinary programs & centers, MU is a great place for undergraduates preparing for a challenging career in sciences research and education. The Columbia campus includes schools and colleges of Arts & Science; Agriculture, Food & Natural Resources; Engineering; Health Professions; Medicine; and Veterinary Medicine. MU is home to the nation’s largest (10MW) nuclear reactor found on a college campus. The MU Research Reactor (MURR) provides advanced research opportunities for students and faculty in the neutron-related sciences and engineering and is an excellent facility for radiochemistry research.

Columbia, a vibrant community with a population of 120,000, offers most of the benefits of large cities (restaurants, art, theater, music) yet maintains the atmosphere of a small, diverse college town. There are numerous trails for running and biking, and a variety of city and state parks nearby.

Eligibility
Applicants are expected to have completed 1+ years of full-time college enrollment prior to June 2018. Students should be pursuing a major in fields related to the program for which they are applying. Students graduating before December 2018 are not eligible. Students must be citizens or permanent residents of the U.S. See information on individual programs for additional requirements.

Application Information
The deadline to apply is February 14, 2018. Students must complete the attached application and provide: an unofficial transcript (including Fall 2017 grades); letters of recommendation (two preferred); a personal statement including career plans, any prior research experience, a statement of research interests; and a resume. Completed packets should be combined into one PDF document and emailed to the Office of Undergraduate Research at ugr@missouri.edu. Questions can be directed to Jenn Brown, Assistant Director of Undergraduate Research at BrownJen@missouri.edu, 573-882-4818.

Educational Programming
Students also participate in a full series of evening and small group seminars designed to provide information about research, career preparation and options, and scientific ethics. Weekly small group seminars provide opportunities for students to focus on a topic and engage in discussion with peers and faculty. These topics include:
have included evolution, animal locomotion, science communication, professional development, etc. Social activities also provide opportunities for participants to get to know each other. A mandatory orientation session is scheduled for Wednesday, May 30.

Past Evening Seminar Topics:
- Dr. Bill Allen (Journalism) A Career of Science Writing
- Dr. Michael Garcia (Biological Sciences) Insulin & your nerves: Myelin to multiple sclerosis
- Dr. Linda Godwin (Physics & Astronomy) Space: A Personal Perspective from Low Earth Orbit
- Dr. Sheila Grant (Bioengineering) Nanostructure Materials for Tissue Engineering
- Dr. Casey Holliday (Anatomical Sciences) 21st Century Paleontology: Functional morphology & evolution of the reptile head
- Dr. Marc Johnson (Molecular Microbiology & Immunology) How do viruses put themselves together?
- Dr. Brick Johnston (Health Psychology) The Neuropsychology of Spirituality: Identifying the Neurologic Mechanisms of Mysticism after Traumatic Brain Injury
- Dr. Mannie Liscum (Biological Sciences) Plants do cool things too: Molecular genetics & cell biology of phototropism
- Dr. Dennis Lubahn (Biochemistry & Animal Sciences) How wanting to live forever leads to one-eyed sheep & prostate cancer
- Dr. Joel Maruniak (Biological Sciences) Finding your right livelihood
- Dr. Jack Schultz (Bond Life Sciences Center) Talking science to the public: Why don’t they listen?
- Dr. Ray Semlitsch (Biological Sciences) The graduate application process
- Dr. Gary Stacey (Plant Sciences) The Importance of Public Policy to your Scientific Career

Faculty Mentors
Students are encouraged to read about potential faculty mentors on the appropriate MU websites. Students should list up to 8 faculty with whom they are interested in working on their application, regardless of the program(s) to which they are applying. Note: there is some program overlap for many mentors. Please check to ensure that mentors participate in the program(s) for which you are applying.

Please visit departmental websites for comprehensive lists of faculty members & their research before completing your application.

Biochemistry & Molecular Biosciences

The MU Biochemistry Department is internationally known for its cutting-edge interdisciplinary research and state-of-the-art facilities. The research interests of our faculty span a wide range of modern biochemistry topics, including the molecular basis of human diseases, cell signaling, host-pathogen interactions, plant biology, structural biology, metabolic engineering, proteomics, metabolomics, and single-molecule studies of molecular machines.

https://biochem.missouri.edu/index.php

Preference will be given to applicants from other institutions who are interested in applying to the MU Biochemistry PhD program after completion of their undergraduate degree.

Eligibility Requirements:
- Applicants must meet basic eligibility requirements.
- Students must be planning on pursuing a PhD in Biochemistry.
- Students must have completed two years of college, two semesters of organic chemistry, & have a minimum of a 3.0 GPA.
Faculty Mentors

- Lesa Beamer – Structural biology of metabolic disorders
- Donald Burke – Molecular mechanisms of viral pathogenesis
- Shi-Jie Chen – Computational studies of RNA structure and folding
- Peter Cornish – Single molecule studies of molecular machines
- Sue Deutscher – Combinatorial biology applied to cancer
- Dave Emerich – Molecular analysis of bacterial periplasm
- William Folk – Biochemical studies of plant medicines used for arthritis and diabetes
- Kent Gates – Molecular mechanisms of drug action
- Mark Hannink – Mitochondrial to nuclear signaling pathways in cancer
- Gerald Hazelbauer – Transmembrane receptors in bacterial chemotaxis
- Antje Heese – Protein trafficking in plant immunity and nutrient uptake
- Xiao Heng – Structural biology of virus-host interactions
- Gavin King – Atomic force microscopy of proteins
- Abraham Koo – Regulation of plant hormones
- Dennis Lubahn – Phytochemicals and estrogen signaling
- Bruce McClure – Molecular basis of pollen signaling
- Scott Peck – Mechanisms of plant-pathogen interactions
- Mick Petris – Trafficking and utilization of copper
- Charlotte Phillips – Inherited connective tissue disorders
- Tom Quinn – Molecular design for cancer imaging and therapy
- Linda Randall – Molecular chaperones in protein export
- R. Michael Roberts – Reproductive biology
- Krishna Sharma – Molecular basis of eye diseases
- Gary Stacey – Legume-microbe interactions
- Lloyd Sumner – Plant metabolomics
- Jack Tanner – Structural biology of amino acid metabolism
- Jay Thelen – Proteomics of seed development
- Peter Tipton – Mechanistic enzymology
- Steve Van Doren – Protein structure and dynamics
- Gary Weisman – Nucleotide receptors in human disease
- Shuqun Zhang – Kinases in plant signaling
- Xiaoqin Zou – Computational drug design

Miller Animal Sciences

The objective of the Miller Summer Research Internship program is to introduce students to animal sciences research, emphasizing food & fiber producing animals. Animal Sciences faculty research a variety of areas, including: ruminant & nonruminant nutrition; reproductive physiology; genetics & molecular biology; environmental physiology; & production & management. Each student will be working directly within a laboratory under the supervision of an internationally recognized researcher. The participant will gain an understanding of recent advances in basic science & applied animal sciences research. Students will receive a stipend of $3800.

www.animalsciences.missouri.edu

Eligibility Requirements:
- Applicants must meet the basic eligibility requirements.
- Students are expected to have a minimum of a 3.0 gpa & have completed 2 years of college.
- Selection is partially based on the applicant’s potential & motivation for graduate study (PhD level) in animal sciences.

Faculty Mentors:

- Jared Decker, Beef genomics
- Christine Elsik, Computational genomics
- Jeffre D. Firman, Poultry physiology & nutrition
- Rodney D. Geisert, Reproductive physiology-swine
- Jonathan Green, Molecular biology
- William R. Lamberson, Animal breeding & genetics
- Carol Lorenzen, Meat science
- Dennis Lubahn, Nutritional aspects of estrogen & hedgehog signaling in reproduction & cancer
- Mathew Lucy, Molecular endocrinology
- Tom McFadden, Lactational physiology
- Allison Meyer, Ruminant nutrition
- David Patterson, Extension beef cattle reproduction
- Randall Prather, Reproductive physiology/molecular biology
- Rocio Rivera, Animal molecular & cell biology
- R. Michael Roberts, Molecular biochemistry
- Tim Safranski, Extension-swine breeding & genetics
- Robert Schnabel, Genetics
- Marcia Carlson Shannon, Extension-swine nutrition
- Michael Smith, Reproductive physiology
- Tom Spencer, Reproductive Biology & Genomics
- Peter Sutovsky, Molecular/cell/development biology
- Jeremy Taylor, Genomics
- Kathy Sharpe Timms, Infertility & endometriosis
- Kevin Wells, Genetics
Cell & Molecular Biology

The MU Life Sciences Fellows Program (lifesci.gradprograms.missouri.edu) is actively seeking to diversify their graduate program application pool. Preference will be given to students interested in applying to PhD programs in the life sciences at the MU. Applicants are expected to have completed at least one year of full-time college enrollment prior to June 2018, be pursuing a major in biology, biochemistry, microbiology, or related field, and be a citizen or permanent resident of the U.S. Interns selected for this program will conduct research with faculty mentors who are members of the NIGMS T32 Training Grant at MU. Additional questions may be directed to Dr. Mark Hannink (HanninkM@missouri.edu).

Faculty Mentors:

- **Peter Cornish** - Single molecule analysis of ribosome function
- **Mark Hannink** - Mitochondrial movement & oxidative stress
- **Abraham Koo** - Regulation of jasmonate plant hormone levels
- **Dennis Lubahn** - Botanical prevention of prostate cancer
- **Scott Peck** - Phosphoproteomics of plant signaling
- **Brenda Peculis** - Regulation of RNA stability
- **Mick Petris** - Trafficking & utilization of copper
- **Charlotte Phillips** - Mutant collagen molecules & bone diseases
- **Gary Stacey** - Functional genomics of plant development
- **Jay Thelen** - Proteomic analysis of seed development
- **Peter Tipton** - Chemical mechanisms of enzyme-catalyzed reactions
- **Steve Van Doren** - Protein structure determination using NMR
- **Judy Wall** - Environmental microbiology
- **Gary Weisman** - Purinergic receptors & human disease
- **Shuqun Zhang** - Biochemical & genetic analysis of MAPK in plants
- **James Birchler** - Structure & function of chromosomes
- **David Braun** - Genetic control of carbon partitioning in plants
- **Anand Chandrasekhar** - Developmental biology of zebrafish
- **Dawn Cornelison** - Stem cells of muscle
- **Michael Garcia** - Molecular biology of neurofilaments
- **Mannie Liscum** - Phototropism & plant development
- **Paula McSteen** - Genetic regulation of meristem in plants
- **Kathy Newton** - Mitochondrial genetics of plants
- **Chris Pires** - Functional genomics of polyploidy
- **David Schulz** - Neurobiology of ion channels
- **Laura Schulz** - Physiological mechanisms of placenta
- **John Walker** - Protein kinases in plant development
- **Deborah Anderson** - Molecular pathogenesis of Yersinia pestis
- **Brenda Beemtsen** - Mosquito-parasite interactions & innate immunity of mosquitoes
- **Donald Burke-Aguero** - Aptamers as therapeutic agents against HIV
- **Dongsheng Duan** - Development of novel gene therapies
- **Bumsuk Hahm** - Interplay between viruses & host immunity
- **Marc Johnson** - Role of gag & env proteins in HIV assembly
- **Shan-Lu Liu** - Host restriction of viral infections & viral countermeasures
- **Chris Lorson** - Novel therapies for spinal muscular atrophy
- **David Pintel** - Host-virus interactions using paroviruses
- **Habib Zaghouani** - Mechanisms of autoimmune diseases
- **Guoquan Zhang** - Vaccine-induced protective immunity against *Coxiella burnetii*
- **Jianlin (Jack) Cheng** - Bioinformatics, computational biology
- **Dong Xu** - Bioinformatics, computational biology

Plant Stress Biology

The University of Missouri plans to host a new REU site program focused around the scientific theme of Plant Stress research. Our undergraduates will work on questions relating to abiotic & biotic plant stress. Taking advantage of the collaborative & interactive research environment fostered by the Interdisciplinary Plant Group (IPG) (ipg.missouri.edu) at MU, each undergraduate will be mentored by two IPG-affiliated faculty whose labs investigate different stresses to work on a collaborative project at the interface of these stresses & plant growth & development.

Faculty Mentors:

- **Ruthie Angelovici**, metabolic and genetic control of seed amino acid composition under stress and non-stress conditions
- **David Braun**, genetic control of carbohydrate partitioning, heat and drought stress
- **Felix Fritschi**, crop responses to abiotic stress under natural field conditions
- **Walter Gassmann**, genetic and molecular basis of the plant innate immune system
- **Antje Heese**, protein trafficking of plant immune receptors, genetic and molecular characterization of trafficking components
- **Paula McSteen**, plant developmental genetics and its interaction with abiotic stress
- **David Mendoza-Cózatl**, partitioning of trace metal nutrients, plant responses to nutrient limitation and excess
- **Melissa Mitchum**, genetic and molecular analyses of plant-nematode interactions
- **Scott Peck**, proteomics of protein phosphorylation and signaling during plant-pathogen interactions and drought stress
- **J. Chris Pires**, evolutionary plant genomics, plant-insect and plant-fungal interactions
- **Robert Sharp**, root growth regulation under drought stress
Other Summer Programs

MU Alcohol Research Training Summer School (MU-ARTSS)
Summer Research Internship in Biomedical Sciences
NSF Summer Research Experience in Computational Neuroscience
NSF Summer Research Experience in Physics: Materials & Modeling (Pending)
Missouri Louis Stokes Alliance for Minority Participation
Bioengineering Materials Design & Processing (Pending)

For more information, visit:
www.undergradresearch.missouri.edu/summer