General Information: The Missouri Transect is a NSF EPSCoR funded program to build infrastructure, knowledge, and collaborations in research and education across Missouri. The research and education activities are focused on understanding, modeling, and predicting 1) short- and long-term trends in temperature and water availability; 2) the impact of these trends on the productivity of native flora and agriculture crops; and 3) how different stakeholder communities are likely to respond to a changing climate.

We have interdisciplinary teams focused on specific areas of research and education that interact collaboratively to build the research platform across the state. See the website (missouriepscor.org) and the last page of this application for more information about specific research projects. The Missouri Transect Summer Undergraduate Research Program will pair selected MU undergraduates with Missouri Transect faculty to conduct an independent research project for nine weeks: May 31 - July 28 with travel days on May 30 & July 29. The student stipend for the Missouri Transect program is $4000 for the full nine weeks and is paid as a scholarship through MU Financial Aid.

Eligibility: Applicants are expected to have completed at least one year of full-time college enrollment prior to June 2017 and be currently enrolled at MU. Students graduating prior to December 2017 are not eligible. Students must be citizens or permanent residents of the U.S. Applicants must also have a GPA of 3.0 or higher. **This is a full-time summer program, and students may not enroll in summer courses and must conduct research in Columbia for the nine weeks.**

Placement with Research Mentors: Undergraduates need not have selected a faculty research mentor prior to application; however, if you already have an idea of a mentor, please list that faculty member’s name on your application. Students who have not arranged to work with an MU faculty mentor and who are selected for Missouri Transect funding will be contacted by the program to discuss faculty mentor/research placements. Students who already have a research mentor affiliated with the Missouri Transect program are encouraged to request a letter of recommendation from that mentor.

About Summer Research at Mizzou: Each year approximately 100 undergraduates conduct research at MU and participate in educational programming activities, creating a vibrant community of undergraduate scholars. Students will 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 summer program. Students become part of a research team that typically includes other undergraduate students, graduate students, lab technicians, and post-doctoral researchers. MU is a great place for undergraduates preparing for a challenging career in science research and education. Our Columbia campus includes schools and colleges of Arts & Science; Agriculture, Food & Natural Resources; Engineering; Health Professions; Human Environmental Science; Medicine; and Veterinary Medicine -- all within walking distance. 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. Summer program alumni have entered graduate programs at University of California-Irvine, University of California-San Diego, University of Chicago, University of Colorado, Indiana University, Iowa State University, University of Michigan, University of Missouri, Purdue University, University of Virginia, Washington University in St. Louis, and the University of Wisconsin.

**Educational Programming:** In addition to their research work, students participate in a series of evening seminars and small group sessions designed to provide them with information about research, career preparation and options, and scientific ethics. Speakers from previous years have included MU faculty, a scientist from the Stowers Medical Institute, members of the National Academy of Science, clinical oncology researchers, science teachers, directors of graduate programs, and other scientists. Weekly small group seminars provide opportunities for students to focus on a topic and engage in discussion with peers and faculty members. These specialty discussions are open to all students, regardless of program affiliation. Social activities also provide opportunities for participants to get to know each other and other members of the MU science community. A mandatory orientation session that includes team-building activities is scheduled for Wednesday, May 31.

**Examples of speakers and topics from our past summer programs:**

- **Bill Allen (Journalism)** *A Career of Science Writing*
- **Brandon Blakey (Applied Biosystems Genomic Analysis Division & 1992 Summer Intern Alumnus)** *This is My Life: Industry Sales, Service & Consulting*
- **Dr. Linda Blockus (Undergraduate Research)** *Writing Effective Personal Statements*
- **Dr. Jon Dyer (Dermatology & MU Intern Alumnus)** *You’re a pediatric what??!! Pediatric dermatology clinical research*
- **Dr. Sherry Flint-Garcia (USDA)** *Using sequence diversity to understand agronomic traits*
- **Dr. Michael Garcia (Biological Sciences)** *Insulin and 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. Pam Hinton (Nutritional Sciences)** *Determinants of Bone Health*
- **Dr. Casey Holliday (Pathology & Anatomical Sciences)** *21st Century Paleontology: Functional morphology and evolution of the reptile head*
- **Dr. Salman Hyder (Veterinary Biomedical Sciences)** *Angiogenesis: A Target for Treatment and Prevention of Breast Cancer*
- **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. Gavin King (Physics & Astronomy)** *Poking Molecules with Sharp Needles: Biophysical Insign via Force Microscopy*
- **Dr. Mannie Liscum (Biological Sciences)** *Plants do cool things too: Molecular genetics and cell biology of phototropism*
- **Dr. Dennis Lubahn (Biochemistry and Animal Sciences)** *How wanting to live forever leads to one-eyed sheep and prostrate cancer*
- **Dr. Joel Maruniak (Biological Sciences)** *Finding your right livelihood*
- **Dr. Stephanie McKay (Animal Sciences)** *Bovine Genome: Development of the first generation bovine haplotype map*
- **Dr. Fred vom Saal (Biological Sciences)** *Plastics-based endocrine disrupters and your health*
- **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. Angela Speck (Astronomy) & Dr. Alan Whittington (Geological Sciences)** *Balancing Academic Science Careers and Family Life*
- **Dr. Gary Stacey (Plant Sciences)** *The Importance of Public Policy to your Scientific Career*
Examples of Small Group Seminars from our past summer programs:

- Single Molecule Biophysics
- 3D Modeling and Printing
- Planning/Writing NSF GRF Essays
- Professional Development Topics for Sophomores and Juniors
- Professional Development for Students Seeking to Attend Graduate School
- Current Readings in Cancer Biology
- Medical School Seminar
- Learning to Read Scientific Literature
- Communicating Your Science
- Solar Eclipse of the Century!
- Science & Society: Evolution
- How Animals Work: Modern approaches to animal form and function

Application Information:  The deadline for applying to this program is **Wednesday, February 15, 2017**. Students must complete the attached application form and provide an unofficial transcript (including fall 2016 grades); at least one letter of recommendation (two preferred); a personal statement including career plans, prior research experience (if any); a statement of research interests; and a resume. Completed application packets should be sent to Office of Undergraduate Research for forwarding to the Missouri EPSCoR program, 150 Christopher S. Bond Life Sciences Center, University of Missouri, Columbia, MO 65211. FAX: 573-884-9395 OR completed electronically and emailed to ugr@missouri.edu. Questions can be directed to Jenn Sanders, Assistant Director of Undergraduate Research (SandersJenni@missouri.edu, 573-882-4818) or to Dr. Anna Waldron, Missouri EPSCoR Project Associate Director (waldrona@missouri.edu).

**Important Dates**

- February 15: Application deadline
- March 15: Approximate date of notification
- April 10: Deadline for students to accept
  - May 30: Travel Day
  - May 31: Orientation
  - July 27: Summer Forum
  - July 28: Wrap-Up Day
  - July 29: Travel Day

Website: [undergradresearch.missouri.edu](http://undergradresearch.missouri.edu)
Missouri Transect Summer
Undergraduate Research
Program 2017

Name: ________________________________

Major: ________________________________

Current Grade Level:
☐ Sophomore  ☐ Junior  ☐ Senior

Date of Graduation:
☐ Spring 2018  ☐ Spring 2019  ☐ Other

Date of Birth: ________________

Gender (optional): ________________________________

Racial/Ethnic Background (optional): ________________________________

Citizenship:  ☐ United States  ☐ Other

permanent Resident of the U.S.?  ☐ Yes  ☐ No

Resident of Missouri?
☐ Yes (eligible for in-state tuition)  ☐ No

Phone: ____________________  Cell Phone: ____________________

Permanent Address/Zip Code/Phone: ____________________________________________________________

__________________________________________________________

Courses:

Fall Semester 2016

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Winter/Spring (current) Semester

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Overall GPA: _______ on a _______ scale.

Names of Faculty Providing Letter of Recommendation

1) Required

Name ________________________________

Dept. ________________________________

College/University ________________________________

Email ________________________________

2) Optional, but encouraged

Name ________________________________

Dept. ________________________________

College/University ________________________________

Email ________________________________
Previous Research Experience (if any): 

Educational/College Plans for 2017-18 (courses planned, internships, study abroad, adding a minor, etc): 

Educational and Career Plans after Graduation:

Plans for advanced degree(s): □ MA/MS  □ PhD  □ MD  □ MD/PhD  □ Unknown  □ None  □ Other:

Please include the following with your application:
A) Unofficial transcript, including Fall 2016 grades
B) Resume
C) Personal Statement (1-2 pages) - Please tell us about yourself, why you are interested in STEM research, and personal experiences/characteristics that have influenced you and/or prepared you for a full-time research experience this summer.
D) Statement of Research Interests (1 page) - Please tell us what areas in STEM research interest you and why. What prior experiences have influenced these interests? What are you curious about? What skills are you hoping to build upon or gain this summer?

If you found specific faculty members on the Missouri Transect website (https://missouriepscor.org/research) and/or the last page of this application who have research interests that interest you, please list them here (no more than 6). This listing will help us to understand your research interests; but does NOT guarantee that these faculty will be available as faculty mentors:

Anything else you wish to tell us: 

Please email your application as a single PDF attachment to The Office of Undergraduate Research at ugr@missouri.edu

Letters of recommendation and endorsement can be sent electronically or by mail to Jenn Sanders (SandersJenni@missouri.edu) at 150 Bond Life Sciences Center, University of Missouri, Columbia, MO 65211. Applications will be collected by the Undergraduate Research Office and then forwarded to the Missouri Transect program.

The deadline is February 15, 2017.
EPSCoR Missouri Transect Research Faculty at MU

**Plant Team**

**Ruthie Angelovici** is Assistant Professor of Biological Sciences at MU. She is a new faculty hire funded by Missouri Transect, beginning in Fall 2015. Her research is in the genetic and metabolic control of seed amino acids’ composition.

**Felix Fritschi** is Associate Professor in the Division of Plant Sciences at MU. His research focuses on field-based phenotyping of maize, development of phenotyping under field conditions using robotics, and physiological characterizations relevant to link plant responses to high-throughput methods of phenotyping. He is collaborating with Gui DeSouza on ground-platform imaging and with Jim Peterson on aerial-platform imaging.

**Guilherme DeSouza** is Associate Professor of Electrical and Computer Engineering at MU and an expert in visual sensor networks and robotics. His lab designed and deployed ground robots in maize and soy fields in collaboration with Felix Fritschi’s research group.

**Climate Team**

**Patrick Market** is the Department Chair and Professor of Atmospheric Science in the School of Natural Resources at the University of Missouri. He participates in climate and long-range forecasting research on the Missouri Transect. As the Climate Team lead, he negotiated the purchase and installation of a Doppler weather radar that has improved mid-Missouri microclimate datasets and enhanced predictions of climate variability and extreme events.

**Neil Fox** is responsible for the operation and exploitation of the Doppler weather radar and its data. He also leads the Hinkson Creek Watershed study to investigate alterations to water resources, water quality, natural resources, and society.

**Keith Goyne** investigates the influence of climate change on wetland playa soil chemistry, and plant germination and productivity under different climate scenarios.

**Patrick Guinan** installed and maintains three environmental weather stations on academic K-12 property in Moscow Mills Ninth Grade Center, Putnam County R-I School District, and Butler R-V School District. These weather stations have above- and below-ground sensors and provide opportunities to share science technology with educational institutions, students, teachers, and administrators. These weather stations are a part of the Missouri Mesonet: http://agebb.missouri.edu/weather/stations/index.htm.

**Anthony Lupo** constructs long-range forecasts by making seasonal forecasts and then evaluating them against climatology, or the 30-year mean of temperature or precipitation for a particular period (a day or a month). Dr. Lupo will make long-range forecasts of temperature and precipitation for the winter (December – February) and summer seasons (June – August), periods of most interest to local and regional agricultural communities.

**Bohumil Svoma** creates high resolution fields of projected changes in temperature and precipitation across the central United States.

**Community Team**

**Charles Nilon** is a Professor of Fisheries and Wildlife in the School of Natural Resources at the University of Missouri. He is an expert in urban wildlife ecology and conservation and the human dimensions in wildlife management. Dr. Nilon oversees the Community Team and collaborates with the Climate and Education Teams.

**Mark Morgan** is Associate Professor of Parks, Recreation and Tourism at MU. He is an expert in the social aspects of natural resource management, education and outreach. Dr. Morgan collaborates with Dr. Wilhelm-Stanis on surveying park managers and visitors to Missouri state parks about perceptions, concerns, and experiences related to climate change.

**Sonja Wilhelm Stanis** is Assistant Professor of Parks, Recreation and Tourism at MU. She is an expert in the human dimensions of natural resource management. She is co-lead with Dr. Morgan on the state parks project to assess resiliency by examining the relationship between park visitation and types of weather-related events and natural disasters. She manages the data collection instrument and protocols.

**CI Team**

**Christine Elsik** is an Associate Professor of Animal Science at the University of Missouri. She is an expert in computational biology and bioinformatics. Dr. Elsik will oversee all cyberinfrastructure activities.

**Education and Outreach Team**

**Troy Sadler** is Professor of Science Education at MU. He is an expert in curriculum and instruction with an emphasis in science education. On the Missouri Transect project, he has developed the STEM education needs assessment survey, and will lead recruitment of students from underrepresented groups, workforce training programs and teacher professional development.