

Mizzou Weekly

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Drought simulators mimic field conditions for plant researchers



FIELD CONDITIONING MU plant researchers Robert Sharp and Felix Fritschi are leading a multi-disciplinary effort to use drought simulators to test the effects of water-deficit stress on soybean and corn varieties. Photo courtesy of CAFNR

PLANT SCIENCE

Recreating the environment to improve plant research

Some part of the United States experiences a severe drought every year, devastating agriculture, increasing the cost of food and causing famine.

Researchers at MU's [College of Agriculture, Food and Natural Resources \(http://cafnr.missouri.edu/\)](http://cafnr.missouri.edu/) (CAFNR) recently completed two drought simulators to study how reduced water availability affects plants and crop productivity, and how new breeds of drought-tolerant plants can boost yields.

The simulators, located at the [Bradford Research and Extension Center \(http://aes.missouri.edu/bradford/\)](http://aes.missouri.edu/bradford/) east of Columbia, vary the amount of water that test plants receive, mimicking everything from short dry spells to persistent and severe drought conditions. Essentially two 50-by-100-foot greenhouses on railroad tracks, they move away from test plants when the weather is sunny and cover the plots when rain approaches. By varying the position of the greenhouse, researchers can precisely allow a specified amount of rainfall to fall on the plants. Test plots of the same plants just outside the drought simulators provide a scientific control.

The simulators are critical in drought research. Plant responses are complex and currently difficult to study, said Robert (Bob) Sharp, a co-investigator and professor of plant sciences, and new director of MU's Interdisciplinary Plant Group.

"The ability to manage the timing, duration and intensity of water-deficit stress under field conditions is essential to examine plant responses to drought," said Bob Sharp, a co-investigator and director of MU's [Interdisciplinary Plant Group \(http://ipg.missouri.edu/\)](http://ipg.missouri.edu/). "Thus, the drought simulators will bridge the gap between controlled-environment facilities, such as growth chambers and greenhouses, and real conditions encountered in the field."

The simulators are part of a \$1.5 million Missouri Life Sciences Research Board grant. When additional funding is available, simulators will be built at the Delta Research Center in Portageville, Mo., in the southeastern part of the state, and at the Horticulture and Agroforestry Research Center in New Franklin, Mo. These locations represent a variety of environments, crop species and soil types, allowing researchers to test any agriculturally important crop, forage and turf species grown in Missouri and surrounding states.

“This network of drought simulators will be unlike any other network in the U.S., providing Missouri scientists with state-of-the-art field facilities to conduct a broad range of drought-related research,” said Felix Fritschi, assistant professor in the CAFNR Division of Plant Sciences. “Our objective is to develop real-world products and practices to improve food security and increase profitability for farmers.”

Thirteen co-investigators from several disciplines, including water quality, soil biology, soil physics, plant-insect and plant-disease interaction, and plant breeding, genetics and plant root biology will collaborate on the project. Researchers also plan to study the genetic characteristics of plants that are extremely tolerant to dry climates and how these characteristics might be used to improve commercial crops.

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Deskbound faculty and staff keep massage therapist busy

HEALTH AND FITNESS

Massage can ease pain, reduce blood pressure

“Jeff is booked.”

Try to make an afternoon appointment with MU massage therapist Jeff Rioux, and that’s likely the message you’ll receive — unless your back pain can wait until after Thanksgiving.

Rioux is a licensed therapist, specializing in orthopedic massage, sports massage, Swedish relaxation massage and therapeutic stretching. Rioux, who has been practicing for 11 years, said about 99 percent of his clients are MU faculty and staff, who are eligible for discounts through the Healthy for Life Wellness Program.

“Usually when people think of massage therapy, they think of it as a treat, like eating chocolate,” he said. “But there is an increased awareness that massage has a role to play in pain management and other clinical issues.”

Rioux said the most common culprit responsible for his clients’ pain is the computer seat. Sitting down for the majority of the day, five days a week can cause misalignment in hips and shoulders. “Not only is a sedentary lifestyle bad for our heart,” he said, “it’s bad for the rest of our bodies.”

Gaye Baker, reimbursement coordinator for MU’s Department of Ophthalmology, is one of Rioux’s regular clients. She originally sought help with headaches, but now she’s motivated by prevention.

“People who work at desks a lot get a lot of back and shoulder tension,” Baker said. “This just helps me keep any problems away.”

Few scientific studies have measured the health effects of massage therapy, which is considered complementary or alternative medicine. The National Institute of Health, however, reports that massage can help reduce blood pressure and heart rate and is effective in treating depression and pain. And a recent study by the American Hospital Association/Health Forum found that 64 percent of hospitals use massage therapy as part of outpatient care.

“It used to be a very small percentage of the population that would consider massage therapy for chronic headaches, arthritis or hamstring (injuries),” Rioux said. “They would have previously just taken a pill.”

Rioux said every case is different, and he designs exercise regimens for his clients to practice between sessions. “If a client is motivated and does the exercises religiously, it may only take three sessions.”

Baker, who tries to schedule a deep-tissue massage every other week, said the therapy is a “great value for the price. I would say if you judge by how long it takes to get into his schedule now, that most of his other clients feel the same way.”

For MU employees, sessions at University Hospital cost \$35 for 30 minutes; \$50 for one hour; and \$70 for 90 minutes. Rioux will also schedule two-hour, off-site chair massages for \$150.

There have been discussions about expanding Rioux’s practice at University Hospital. Until then, new clients should try to schedule a morning or lunchtime appointment. They can also try to slip in after a cancellation.

At press time, he said, “the first opening I have for an afternoon slot is the 28th of November.”

To make an appointment, call 573-884-1312.

— Megan Cassidy

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Quitting smoking linked to improvements in personality and outlook

PSYCHOLOGY

Study could guide cessation strategies

People who quit smoking become less impulsive and more positive, according to MU researchers who found that ex-smokers show improvements in their overall personalities.

Andrew Littlefield, a doctoral student in the Department of Psychology in the College of Arts and Science, said evidence suggests smoking is impulsive for younger smokers, who might favor immediate rewards over long-term negative consequences.

“They might say, ‘I know smoking is bad for me, but I’m going to do it anyway,’” Littlefield said. “However, we find individuals who show the most decreases in impulsivity also are more likely to quit smoking. If we can target anti-smoking efforts at that impulsivity, it may help the young people stop smoking.”

Researchers compared people, aged 18 to 35, who smoked with those who had quit smoking. They found that individuals who smoked were higher in two distinct personality traits during young adulthood: impulsivity, or acting without thinking about consequences; and neuroticism, or being emotionally negative and anxious.

Littlefield found that those with higher levels of impulsivity and neuroticism were more likely to engage in detrimental behaviors, such as smoking. However, Littlefield also found that those who quit smoking had the biggest declines in impulsivity and neuroticism from ages 18 to 25.

“Smokers at age 18 had higher impulsivity rates than non-smokers at age 18, and those who quit tended to display the steepest declines in impulsivity between ages 18 and 25,” Littlefield said. “However, as a person ages and continues to smoke, smoking becomes part of a regular behavior pattern and less impulsive. The motives for smoking later in life — habit, craving, loss of control and tolerance — are key elements of smoking dependence and appear to be more independent of personality traits.”

Substance use is still a complex relationship of genetic and environmental factors, Littlefield said. The tobacco-use study will contribute to ongoing research on the relationship between personality and substance abuse. Littlefield recently received a \$30,000 grant from the National Institutes of Health to study genetic influences on personality and alcohol use.

The study, “Smoking Desistance and Personality Change in Emerging and Young Adulthood,” has been accepted by the journal *Nicotine and Tobacco Research*. The study was co-authored by Kenneth J. Sher, a professor in the MU Department of Psychology.

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MU astronomy class to get first-hand account of the heavens

REENTRY

Former astronaut returns to the classroom

Students enrolled in Introduction to Astronomy at MU this semester will have a big advantage: an instructor that has actually walked in space.

Linda Godwin, a veteran astronaut, has come home to the university's Department of Physics, where she earned her graduate degree while studying low-temperature, solid-state physics. In addition to teaching Introduction to Astronomy, Godwin will contribute to outreach in the department and will use her ties to NASA and the space program to contribute to new or existing projects, or perhaps develop a new class.

However, the most important lesson she may be teaching is the importance of physics and science, and the impact it could have on students' future careers.

"The MU Department of Physics and Astronomy already has a tremendous outreach program, so I want to be sure that what I bring meshes with what they already have," Godwin said. "My main goal is to draw students into physics and present them with options related to science and the scientific process – no matter what they go on to do. My degree got me in the door at NASA because we could work with investigators in all areas of science. Learning physics helps you understand how the whole world works."

Godwin had a 30-year career with NASA, which she joined in 1980. She became an astronaut in 1986, and her career became more focused on other fields, depending on the mission into space. For example, she had to use earth science for measurements and observations as she orbited around the planet, and she learned engineering during both of her missions to dock with space stations. In 1996, she helped transfer astronauts to space station Mir; in 2001, she helped bring cargo to the International Space Station. She retired from NASA in 2010.

"The last shuttle flights have been focused on cargo flights, but when I was an astronaut, we had many dedicated science missions. The role we had to perform on each flight is embedded in my memory and that's what I remember most," Godwin said. "The feeling of being there and looking out at the Earth – that's a perspective that still stays with me."

Godwin's husband, Steven Nagel, has joined the College of Engineering staff and will be teaching a course next spring. Nagel became a NASA astronaut in 1979 and logged 723 hours in space.

"Many astronauts have gone back to their communities to talk about what they've learned," Godwin said. "We are the only ones currently at the University of Missouri, and it is so nice to be back in the Midwest."

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MU, Russian scientists to study atmospheric blocking

CLIMATE RESEARCH

A rare event with serious consequences

Atmospheric blocking is a relatively unknown weather phenomenon responsible for prolonged bouts of extreme conditions, such as the heat wave that led to destructive wildfires in Texas this summer.

To better understand and predict atmospheric blocking patterns, MU researchers are collaborating on a project with the A.M. Obukhov Institute of Atmospheric Physics of the Russian Academy of Sciences.

[Tony Lupo \(http://snr.missouri.edu/seas/faculty/lupo-a.php\)](http://snr.missouri.edu/seas/faculty/lupo-a.php), professor and chair of the Department of Soil, Environmental and Atmospheric Sciences in the School of Natural Resources, said atmospheric blocking occurs when hot, dry weather gets stuck in one place, leading to extreme heat and drought conditions.

The joint research will focus on developing methods for spotting and predicting atmospheric blocking. Lupo will lead MU's part of the investigation, while A.M. Obukhov Institute scientists will mine existing scientific literature looking for new clues, create computer prediction models and analyze the influence of anticyclones on blocking events. The research team will also analyze the social and economic impacts that blocking events caused during the 20th century.

By better understanding the effects of blocking and how to identify the weather phenomenon, forecasters and government officials will be able to better prepare communities for extreme weather.

"Blocking events are important because of the effects on people living in affected areas," Lupo said. "Heat waves caused by blocking killed 15,000 people in Russia last year."

Atmospheric blocking occurs between 20-40 times each year throughout the world and usually lasts between 8-11 days, Lupo said. Although atmospheric blocking is rare, it can trigger dangerous conditions, such as a 2003 European heat wave that caused 40,000 deaths.

Atmospheric blocking has a major effect on the environment and commerce, as well. In 2004, a blocking event over Alaska decreased precipitation and increased temperatures, melting glaciers and causing fierce forest fires in the interior of the state. Blocking can also have positive effects. In 2004, blocking caused prolonged pleasant temperatures and sunny skies leading to excellent crop yields in Missouri. However, a cold snap in spring 2007 caused by blocking killed budding plants.

Lupo, who has studied atmospheric blocking for more than 20 years and has authored more than 20 scientific papers on the subject, is a Fellow of the Royal Meteorological Society in London. In 2005, he was named a Fulbright Scholar and spent a summer at the Russian Academy of Sciences working with fellow climate scientists. Lupo is a member of the International Panel of Climate Change that shared the 2007 Nobel Peace Prize with Al Gore.

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Taste test

Mizzou's international students will offer a taste of their cultures at the International Bazaar at 11 a.m. Sept. 27 on Lowry Mall.

A Mizzou tradition since 1974, the bazaar is a chance for students to learn about each other, taste food from around the world and make friends in a celebration of diversity. Visitors can watch a flag ceremony and then enjoy food, beverages, cultural displays and souvenirs. Admission is free to the event, which is sponsored by the MSA/GPC International Programming Committee.

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FERPA explained

The Office of the University Registrar will offer an informational session on the Family Educational Rights and Privacy Act (FERPA) from 9-10:30 a.m. Sept. 28 in 10 Middlebush Hall.

FERPA allows students to access their education records, as well as some control over the disclosure of personal and academic information. The session is recommended for anyone in the MU community who handles student records, grades or identifying information.

For more information, call the University Registrar at 884-9153.

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Pizza and Projects

Four MU postdoctoral fellows will discuss their research and experiences at the first [Mizzou Advantage](http://www.missouri.edu/mizzou-advantage/) (<http://www.missouri.edu/mizzou-advantage/>) Pizza and Projects seminar at noon today in the Gwynn Hall lounge.

Vu Nguyen, Lisa Rees, Lanika Ruzhitskaya and Matt Saltzberg were awarded Mizzou Advantage Preparing Future Faculty Postdoctoral Fellowships for 2011–12. The fellowships offer recent MU doctoral graduates a chance to gain experience in designing and teaching interdisciplinary courses while conducting research.

Pizza will be served on a first come first serve basis. For more information on future Pizza and Projects events, contact LeAnne Stewart, at stewartle@missouri.edu.

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Facing reality

A symposium hosted by the MU School of Journalism will explore the burgeoning world of reality and non-traditional news television at 9 a.m. Sept. 23.

“Reality Television — Journalism Outside the Box” will feature four top producers of reality television — all MU journalism graduates — who will describe their journeys from “News 101” to their current programs.

A Q & A with the producers will follow the symposium.

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