MU plant science professor wins $1 million grant

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David G. Mendoza-Cozatl, center, shown with members of his lab, has received a $1 million grant from the National Science Foundation to continue his research into the molecular transport of heavy metals in plants. Courtesy David G. Mendoza-Cozatl

BY GH Lindsey

COLUMBIA—A recently hired plant science professor at MU has been given the National Science Foundation's most prestigious award for young scientists and a five-year, $1 million grant for his work on plant nutrition.

David Mendoza-Cozatl, an assistant professor of plant sciences, was recently awarded a five-year CAREER grant from the foundation to continue research on the nutrient transport system in plants.

The grant also supports efforts to promote interdisciplinary education programs in science.
Research could improve human nutrition

Mendoza-Cozatl’s research focuses on how plants transport molecules, such as nutrients and toxic metals, to leaves and seeds. Some heavy metals, such as iron, zinc and copper, are necessary nutrients for humans, but others, such as mercury and lead, can be toxic in high concentrations.

To reach the seeds or travel among leaves, nutrients must reach the pholem, one of the plant’s two circulatory systems, with the help of transporter proteins. Each type of molecule has a specific transporting protein, but most of these proteins remain unidentified, Mendoza-Cozatl said.

By identifying which proteins move which molecules, he hopes to engineer plants that can provide more iron and other essential nutrients for the people who consume them.

A lack of iron is the most common nutritional deficiency in the world, and it can cause anemia and other conditions, according to the World Health Organization.

Other potential applications involve using plants that absorb toxic metals in the soil to clean contaminated areas or limiting the amount of toxic metals a plant will absorb so crops will not pass these metals along to animals or humans. Some heavy metals have been linked to health problems such as diabetes, high blood pressure and certain types of cancer.

Interdisciplinary education programs

In addition to the research component, the CAREER grant helps develop the careers of junior faculty “who effectively integrate teaching, learning and discovery.”

For the education portion, Mendoza-Cozatl proposed two interdisciplinary programs: one to encourage collaboration by biological engineers and plant scientists and another to give students interested in science journalism an opportunity to work in a lab.

The strength of the education component of a CAREER application can make or break chances to receive the grant, he said.

“The science usually isn’t the problem,” he said. “It’s the educational component and how you integrate the two that make the difference for the CAREER award.”

He is working with Heather K. Hunt, an assistant professor of bioengineering, to set up meetings between graduate students in plant science and bioengineering to try to find potential areas of collaboration and give their students experience working across disciplines.

“We’re trying to identify common ground for collaboration,” Mendoza-Cozatl said.

Interdisciplinary research benefits scientists by giving them access to new tools and novel solutions from other fields, he said.
"Engineers are taught how to solve complex problems," Hunt said. "In some cases, the interesting problems are in different disciplines."

Learning to work with scientists in other fields gives engineering students marketable skills and helps them learn how to communicate with people in other fields who don't use the same terminology, she said.

"It can be hard to bridge the language gap between disciplines," Hunt said. "But the future relies on bridging that gap."

Mendoza-Cozatl is also setting up a program to embed journalism students in his lab, where they would actively participate in research and then publish photos, videos or writing about the experience.

This program is part of a campuswide initiative to improve communication about scientific research, said John Stemmle, an MU assistant strategic communication professor and co-director of the Health Communication Research Center, who is working with Mendoza-Cozatl on the program.

"The more that journalists are able to get where scientists are coming from to better tell their stories, the better they can provide the public with more knowledge about the scientific process and scientific research," Stemmle said.

'An institution where research can work'

Mendoza-Cozatl was hired in September 2011 after completing postdoctoral work at the University of California-San Diego.

He received multiple job offers following his postdoctoral training but chose MU because of the facilities and support for research.

From his lab in the Bond Life Sciences Center, he needs only to cross the hall to reach the DNA core, which analyses the expression of genes, or the proteomic core, which analyses proteins for his research.

"Great facilities really make the difference," he said.

The university's interdisciplinary approach to research also drew Mendoza-Cozatl. He is a member of MU's Interdisciplinary Plant Group, which is made of 57 faculty members from five different disciplines, all interested in research on plants.

"It's important to find an institution where research can work," he said.

Senior faculty from the group, including Director Bob Sharp, mentored Mendoza-Cozatl since he arrived on campus, and several group members looked over his grant proposal before he submitted it.
“We’re proud of David’s accomplishment in receiving this prestigious award,” Sharp said. “David’s program on heavy metal transport in plants is a key component of the effort to expand our strengths in plant stress biology.”

Mendoza-Cozatl credits the six members of his lab at MU for the success of the research. “This is a lab effort, and I just happen to be at the helm,” he said.

Now that he has received a CAREER grant, Mendoza-Cozatl is eligible for the Presidential Early Career Award for Scientists and Engineers, the U.S. government’s highest award for young researchers. Twenty CAREER grantees are nominated for the higher honor each year.
Questions arise over $1.2 billion bond plan

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JEFFERSON CITY — A proposal to borrow $1.2 billion ran into an unexpected delay on Wednesday along with questions from lawmakers skeptical of the plan to promise future state revenue for debt payments.

Rep. Chris Kelly, D-Columbia, said the delay, caused by the late delivery of a new version of the bonding proposal, shouldn't affect its final passage. The House Budget Committee will vote next week to send the measure to the House floor, he said.

More serious questions, however, will come as Kelly and other supporters try to explain why borrowing now is a good idea and how it differs from federal borrowing practices. The GOP-led legislature has made federal deficit spending and debt one of its main arguments against accepting new federal aid to expand Medicaid.

"A lot of us on the committee ... have been on the record criticizing the federal government for raising the federal debt ceiling to $16 trillion," Rep. Mark Parkinson, R-St. Charles, said.

Kelly told the House Budget Committee the bond issue he is proposing jointly with House Speaker Tim Jones is more like a home mortgage or business expansion.

"There is nobody in the body more incensed by federal debt than me," Kelly said. "There is a significant difference."

The proposal, which would go before voters as a constitutional amendment, has grown and changed since Jones and Kelly introduced it. The $1.2 billion price tag is up $250 million, with $700 million set aside for college and university construction.

Kelly said he would like the issue to go before voters in a special election in November.

The timing of the election would be up to Gov. Jay Nixon.

With low interest rates, a good credit rating and significant capital needs, the state would be foolish not to borrow money now, Kelly said.
Any good business with the needs of the state and the ability to repay would do so, he said.

The proposal would go to voters, accompanied by a list of projects to be financed.

"Anybody who has paid any attention to this knows the most significant repair and maintenance problem in the state of Missouri is in Fulton," Kelly said, referring to Fulton State Hospital.

Rebuilding the hospital has been estimated to cost $200 million to $250 million. The bond issue sets aside $500 million for state government needs, including $40 million for state park improvements.

"We have parks sewer systems that are leaking," Kelly said. "Of anybody who should not be polluting Missouri waterways, it is the parks."

The University of Missouri has a project on each campus it would like to fund with its share.

The four projects are estimated to cost $239.4 million, and the bond proposal requires the school fund at least 10 percent.

The latest version also adds a taxpayer protection commission to watch over spending and puts an emphasis on projects for energy efficiency and water infrastructure.

Kelly's experience helped as he explained how lawmakers spent a $600 million bond issue voters approved in 1982. The bonds would be sold as lawmakers approved projects through appropriation bills, he said. Debt payments would grow over time, with a maximum annual cost of about $75 million.

The bonds should be issued quickly, he said, to take advantage of current markets. "If we all share any common belief, it is that interest rates applicable in the state of Missouri today will not be here that much longer."
WASHINGTON — Incoming college freshmen could end up paying $5,000 more for the same student loans their older siblings have if Congress doesn't stop interest rates from doubling.

Sound familiar? The same warnings came last year. But now the presidential election is over and mandatory budget cuts are taking place, making a deal to avert a doubling of interest rates much more elusive before a July 1 deadline.

"What is definitely clear, this time around, there doesn't seem to be as much outcry," said Justin Draeger, president of the National Association of Student Financial Aid Administrators. "We're advising our members to tell students that the interest rates are going to double on new student loans, to 6.8 percent."

That rate hike only hits students taking out new subsidized loans. Students with outstanding subsidized loans are not expected to see their loan rates increase unless they take out a new subsidized Stafford loan. Students' non-subsidized loans are not expected to change, nor are loans taken from commercial lenders.

The difference between 3.4 percent and 6.8 percent interest rates is a $6 billion tab for taxpayers — set against a backdrop of budget negotiations that have pitted the two parties in a standoff. President Barack Obama is expected to release his budget proposal in the coming weeks, adding another perspective to the debate.

Last year, with the presidential and congressional elections looming, students got a one-year reprieve on the doubling of interest rates. That expires July 1.

Neither party's budget proposal in Congress has money specifically set aside to keep student loans at their current rate. House Republicans' budget would double the interest rates on newly
issued subsidized loans to help balance the federal budget in a decade. Senate Democrats say they want to keep the interest rates at their current levels but the budget they passed last week does not set aside money to keep the rates low.

In any event, neither side is likely to get what it wants. And that could lead to confusion for students as they receive their college admission letters and financial aid packages.

"Two ideas ... have been introduced so far — neither of which is likely to go very far," said Terry Hartle, the top lobbyist for colleges at the American Council on Education.

House Republicans, led by Budget Committee Chairman Paul Ryan, have outlined a spending plan that would shift the interest rates back to their pre-2008 levels. Congress in 2007 lowered the rate to 6 percent for new loans started during the 2008 academic year, then down to 5.6 percent in 2009, down to 4.5 percent in 2010 and then to the current 3.4 percent a year later.

Some two-thirds of students are graduating with loans exceeding $25,000; one in 10 borrowers owes more than $54,000 in loans. And student loan debt now tops $1 trillion. For those students, the rates make significant differences in how much they have to pay back each month.

For some, the rates seem arbitrary and have little to do with interest rates available for other purchases such as homes or cars.

"Burdening students with 6.8 percent loans when interest rates in the economy are at historic lows makes no sense," said Lauren Asher, president of the Institute for College Access and Success, a nonprofit organization.

Both House Education Committee Chairman John Kline of Minnesota and his Democratic counterpart, Rep. George Miller of California, prefer to keep rates at their current levels but have not outlined how they might accomplish that goal.

Rep. Karen Bass, a California Democrat, last week introduced a proposal that would permanently cap the interest rate at 3.4 percent.

Senate Democrats say their budget proposal would permanently keep the student rates low. But their budget document doesn't explicitly cover the $6 billion annual cost. Instead, its committee report included a window for the Senate Health Education and Pension Committee to pass a student loan rate fix down the road.

But so far, the money isn't there. And if the committee wants to keep the rates where they are, they will have to find a way to pay for them, either through cuts to programs in the budget or by adding new taxes.

"Spending is measured in numbers, not words," said Jason Delisle, a former Republican staffer on the Senate Budget Committee and now director of the New America Foundation's Federal Budget Project. "The Murray budget does not include funding for any changes to student loans."
The Congressional Budget Office estimates that of the almost $113 billion in new student loans the government made this year, more than $38 billion will be lost to defaults, even after Washington collects what it can through wage garnishments.

The net cost to taxpayers after most students pay back their loans with interest is $5.7 billion. If the rate increases, Washington will be collecting more interest from new students' loans.

But those who lobbied lawmakers a year ago said they were pessimistic before Obama and his Republican challenger Mitt Romney both came out in support of keeping the rates low.

"We were at this point and we knew this issue was looming. But it wasn't anything we had any real traction with," said Tobin Van Ostern, deputy director of Campus Progress at the liberal Center for American Progress. "At this point, I didn't think we'd prevent them from doubling."

This time, he's looking at the July 1 deadline with the same concern.

"Having a deadline does help. It's much easier to deal with one specific date," Van Ostern said. "But if Congress can't come together ... interest rates are going to double. There tends to be a tendency for inaction."