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DISCOVERY

OFFICE OF VICE PRESIDENT FOR RESEARCH

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OVPR VISION AND MISSION

VISION: TO BE A LEADER AND CATALYST FOR SCHOLARSHIP EXCELLENCE

MISSION: THE OFFICE OF THE VICE PRESIDENT FOR RESEARCH ADVANCES THE OVERALL SCHOLARSHIP AGENDA OF THE UNIVERSITY; SUPPORTS THE SCHOLARSHIP INITIATIVES OF WMU FACULTY, STUDENTS AND STAFF; AND ASSURES COMPLIANCE WITH ALL APPROPRIATE FEDERAL AND STATE REGULATIONS.

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DISCOVERY ADVANCES

Hail & Farewell is often repeated as we close one academic & fiscal year and look forward to the new one. The past year was full of challenges, successes, and the occasional setback. The future dawns with great promise and its own set of challenges.

Hail to all the new faculty and research staff coming on board this year. That includes WMU School of Medicine who is bringing in their third class of medical students and expanding their research faculty and staff for the coming year.

Farewell to many great colleagues including Paula Kohler who will be leaving OVPR and retiring from WMU on 30 June 2016. She has been an outstanding Associate Vice President for Research for the past seven years, contributing with enthusiasm, innovation, and integrity to the vision and operation of research at Western. We also acknowledge the contributions she made to Discovery and leadership for the previous ten years as a faculty member, professor, and department chair in the College of Education and Human Development. Throughout the whole time, she has directed a national center effort. We wish her the best as she transitions to the University of Central Florida.

Congratulations to all the individuals and collaborative groups that were so successful in receiving external grants this past year in what continues to be an extremely competitive nationwide environment. We honored many at the Million Dollar Club Luncheon hosted by the President, Provost, and Vice President for Research during Spring Convocation. Special recognition is due to those who received over \$5 million dollars in external funding over a five year period. For more details, see the OVPR website. Congratulations also to all the

recipients of internal funding including FRACAA, SFSA, and the TDF.

WMU Discovery Experts has been updated and improved by a new PURE engine from Elsevier. It continues to help faculty, staff, students, and external constituents to connect, explore, and collaborate. Faculty should be automatically receiving periodic information about possible grants available from funding agencies that are related to their profile. You can update your profile to tailor it more closely to your current research interests and enter information about your many other activities that are not automatically entered by Elsevier. If you have questions or seek details, contact Jay Hoinville at jay.hoinville@wmich.edu.

Strategic Planning has been intensive this past year and culminated in the new WMU Strategic Plan approved by the BOT. The coming year will see many initiatives to create and implement plans to raise Discovery including the roles of centers, institutes, and discovery communities. Strategic planning can help us identify key research areas that will best position WMU to lead nationally and globally.

Farewell 2015-16 & Hail 2016-17 Enjoy the time to recreate. We look forward to working with all next year.

Dan Litynski, VP for Research

WMU RESEARCH TEAM WINS MICHIGAN DOT GRANT TO STUDY IMPACT OF SPEED ON CRASHES

A team of three researchers from Western Michigan University has been awarded a \$161,802 grant from the Michigan Department of Transportation to study whether changing speed limits on Michigan interstate freeways has had an impact on crash types and severity.

The grant was awarded to Drs. Valerian Kwigizile and Jun-Seok Oh, assistant professor and professor, respectively, of civil and construction engineering, and Dr. Hyunkeun Cho, assistant professor of statistics. The team will study how changes in speed limits have impacted the frequency and severity of crashes.

In 1996, Michigan passed legislation to increase the speed limit along certain segments of interstate highways from 65 to 70 mph, Kwigizile says. A study by Michigan State University shortly after that found the marginal increase in speed did result in an increase in accidents.

"Since it has been a long time, the Michigan Department of Transportation wants to conduct another study to see whether those findings are still valid," Kwigizile says. "And since we have more segments where speed limits have changed, they want to expand the study that was done by MSU and get better results."

The research team began gathering data in March and hopes to complete the study by December 2017. One would expect that raising the speed limit would result in more accidents, Kwigizile says. But that isn't necessarily so.

"Different studies have shown different results," Kwigizile says. "There are some studies that have shown that increasing speed does not increase the number of crashes. However, there is one finding that is consistent throughout studies, which is increasing speed increases the severity of crashes."

The team will study different freeways, but has not completed the site selection process. Sites will be spread throughout the state to capture different geographical characteristics. Researchers will look at crash data and speed profiles both before and after the speed limit was raised in 1996.

"We hope to see if there was an increase right after the speed limit was changed and then, after that, if they went down," Kwigizile says.

The three researchers are being assisted in their project by two graduate students, but more will be added later, especially to collect field data and determine how fast cars are actually going. The team also will be sifting through data archived by MDOT.

The first objective will be to determine if the findings of the original MSU study in 1997 still hold true. The other objective is to see what the real impact is of changing speed limits.

"My own opinion is that it's going to have an impact on operational speed, it's probably going to have an impact on crashes, maybe not on the number of crashes but on the severity of those accidents, and it has an economic impact," Kwigizile says. "That economic impact is coming from the fact that if you are raising the speed limit, you have to modify the infrastructure to accommodate the increased speed. If you have a roadway curve, you have to adjust the way that curve is designed."

Another economic impact results from the reduced travel time with higher speeds, Kwigizile adds.

"Since time has a value, instead of spending two hours on the road, maybe the users are going to spend one-and-a-half hours," Kwigizile says. "The half-hour that they saved is money."

The team will do an economic analysis to assess the cost of increasing speed limits, including the cost of crashes and the cost of infrastructure changes, but also the benefits of shorter travel time. Other aspects of economic analysis will include emissions, noise impacts, pavement impacts and fuel consumption.

"The state is interested in knowing if what they are doing is cost beneficial," Kwigizile says.

Source: University News

SPYBROOK AWARDED NEARLY \$800,000 FROM NATIONAL SCIENCE FOUNDATION

Education researcher, Dr. Jessaca Spybrook, has received a \$799,665 grant from the National Science Foundation to develop resources to plan studies that can better assess how well professional development initiatives for science teachers are working.

Spybrook is heading a team of researchers from WMU, the Biological Sciences Curriculum Study and Abt Associates that will mine a treasure trove of large-scale data sets, analyze them and come up with ways to inform the design of large evaluations of teacher development initiatives.

"In education, we're always asking and trying to answer questions about what works," Spybrook says. "What science program is most effective? What professional development program for teachers is going to be most effective and thereby lead to better student achievement? This study will help us to more completely answer those questions."

Studies inconclusive

Too often, such large-scale teacher development randomized trials are inconclusive, she notes. So it's unknown how well efforts to improve teaching are actually working.

A major impediment to analyzing professional development program effectiveness is designing studies that have the capacity to determine "what works." Her research will give guidance about how many schools need to be studied and how many teachers should be tested within those schools to answer those questions with greater confidence.

"In this particular study, the outcomes of interest are actually teacher outcomes," Spybrook says. "So we're interested in science teacher practice and science teacher content knowledge, because we know that by improving these things, ultimately that will lead to improved student achievement."

In order to figure out how many schools and teachers need to be studied, researchers will examine how much teacher content knowledge varies from one school to the next. Does it vary a lot? Do teachers with a high amount of content knowledge tend to be clustered in one school or is there a lot of variation within schools?

"We're going to analyze these data sets to get an idea of what that variation looks like," Spybrook says. "After we analyze those data sets, we're going to write papers and disseminate them so that if you were a researcher and wanted to test the curriculum you set up for teachers, you would then go to our resource and pull these parameters out so you could design your study with the right number of schools and the right number of teachers."

Researchers don't have time to study every school district in

advance of conducting a teacher development study, she says. By taking the data sets and analyzing them, researchers have the tools to design their study effectively.

More accurate prediction

By performing a meta-analysis of studies of science teacher professional development, Spybrook's project will also allow researchers to more accurately predict how big an impact the teacher development intervention should have.

"What we're trying to figure out is, what's a reasonable threshold to design these teacher studies at," she says. "You need to have a sense of what the true effect is going to be. So combined, someone who is going in to conduct one of these studies would have everything they need to design a good study."

Measuring the effectiveness of professional development programs is a gray area, Spybrook says.

"We're not sure how much growth is going on for teachers during the year and how much difference one of these PD programs could make," she says. "So if there's a big difference, it's easier to detect and we don't need as many schools. But if the difference is small, but still important, we're going to need more schools in order to determine that difference."

Too often, researchers go into a study expecting to find a large difference in teacher outcomes, recruit too small a sampling of schools and detect no difference, Spybrook says.

"At the end of the day, the difference may have been small," she says. "So you will have invested this money in the study, but you didn't actually have the capacity to detect the difference. We want people to be designing studies with the capacity to be able to say, 'Yes, this program works,' or 'No, it doesn't.' If the study is underpowered, if they can't detect a meaningful effect, then it's really a waste of money."

Spybrook's latest project builds off a previous one, also funded by the NSF, that was aimed at science student achievement. Her most recent NSF grant is her third from agency.

"So, basically, when we got done with that study, we said, 'We've done this part, but now we need to do the same type of thing, only looking at teacher outcomes.'"

Source: University News

NEW STATE FUNDING WILL HELP WMU'S AVIATION PROGRAMS SOAR

WMU has received authorization from the state to begin work on a 67,000-square-foot addition and renovation that will allow its celebrated College of Aviation to prepare more students for the future demands of the aviation industry.

The WMU project is expected to cost \$20 million, with \$15 million from the state and the balance raised by the University. The project is focused on a complete renovation and addition to the college's Aviation Education Center, which is located on the college's W.K. Kellogg Airport campus in Battle Creek.

With a target completion date of summer 2019, the enlarged and renovated space will allow the college to grow enrollment in a way that will meet predicted job demand for aircraft pilots and avionics equipment professionals. When complete, the facility will include additional classroom space, upgrades to existing composite and paint labs, a state-of-the-art simulation facility and a cutting-edge research center, as well as student briefing rooms and faculty office space.

"Our aviation college has long enjoyed a reputation as one of the nation's top collegiate aviation programs," says President Dunn. "This thoughtful decision by the Legislature means we will be able to continue to expand our facilities to meet the growing needs in the industry for well-prepared professionals. The entire southwest Michigan delegation collaborated on this effort to ensure WMU remains Michigan's best resource to prepare students who will lead the industry for years to come."

College of Aviation

WMU's College of Aviation is among the oldest such academic units in the nation, beginning in 1939 and evolving from a single program to its

current status as a full academic college. It has been located at the Battle Creek air field since 1997 and has been the site of nationally recognized flight teams and state-of-the-art flight and technical training initiatives and important research undertakings. The college offers majors in Aviation Flight Sciences, Aviation Science and Administration and Aviation Maintenance Technology. The WMU College of Aviation is the only comprehensive collegiate aviation program in the state.

The college is focused on helping to meet an explosive demand for new industry personnel. With current industry professionals retiring and the FAA predicting that flight travel will double by 2032, the industry is faced with the need for more than a million highly skilled new professionals by 2034.

According to the U.S. Bureau of Labor statistics, Michigan ranked fourth in the nation for aerospace job growth in the years 2007 to 2012. Aviation jobs represent some of the highest paying jobs in Michigan, with pilots' median annual income at \$111,680. WMU's program was the first in the nation to become part of an American Airlines pilot-hiring program to provide a steady stream of well-qualified pilots to the airline.

The approved expansion will allow the college, now at capacity with more than 870 students, to continue to turn out much-needed young professionals. The renovation and 67,000-square-foot addition to the Aviation Education Center also will address current energy use deficiencies, improve safety initiatives, address accessibility issues and meet new technology needs.

Construction design and planning will begin immediately. The completed project is expected to meet the LEED Silver certification standards.

Source: University News

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A complete list of constituency areas is posted at wmich.edu/research

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FACILITIES & ADMINISTRATIVE COST RATES (F&A)

The work of WMU faculty, staff, and students on externally-funded projects includes direct and indirect costs. Direct project costs are usually straightforward and easily attributed to a specific project. Indirect costs, termed Facilities and Administrative Costs (F&A), are also real costs that are essential for a project's implementation, but would take much time by faculty and staff to attribute and track in relation to specific projects.

F&A costs include such expenses as research space and equipment, utilities, custodial services, security, payroll, purchasing, fiscal management and tracking, and department administration. To relieve the burden on researchers, F&A costs are agreed upon through formal negotiations every four years with our cognizant agency, the U.S. Department of Health and Human Services. They are based upon data presented by the University via a cost analysis and are expressed as a percentage of total direct costs minus exclusions.

Having such a rate helps the university reduce the costs of having to determine how much of these resources each individual project uses or consumes. In early 2016, WMU staff will begin collecting data relevant to our next round of negotiations. The current rate is 51% of modified direct costs.

Project budgets are required to include full recovery of F&A costs at the appropriate negotiated rate. More information about specific rates and F&A policies are available on the OVPR website (www.wmich.edu/research/policies/proposalsubmit).