



11-2015

Discovery, November 2015

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WMU ScholarWorks Citation

Office of Vice President for Research, "Discovery, November 2015" (2015). *Discovery/Inquiry: OVPR Newsletter*. Paper 24.
<http://scholarworks.wmich.edu/inquiry/24>

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DISCOVERY

OFFICE OF VICE PRESIDENT FOR RESEARCH

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INSIDE THIS ISSUE:

MOVING FORWARD ON MANY FRONTS 1

NIH GRANT GOES TO PSYCHOLOGY 2

DOD ANNOUNCES NEW MANUFACTURING INITIATIVE AT WMU 3

INSTITUTIONAL TRANSFORMATION PART OF FITW GRANT 4

F&A RECOVERY 4

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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 ADVANCE 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.

WWW.WMICH.EDU/RESEARCH

MOVING FORWARD ON MANY FRONTS

It has been a year of Discovery! Academic year 2014-15 was outstanding for many aspects of research and creative activities, with the expertise and value of our faculty, staff, and university being nationally recognized across a wide spectrum. Included was a substantial increase in the amount of externally funded grants awarded.

Many of the grant awards we received acknowledge our innovation and multi-disciplinary talent. Western's outstanding faculty can and do collaborate and compete with the best institutions and experts in the nation in our areas of expertise. Several grants were awarded to teams across the University, colleges, and departments linking our strengths in education, arts and sciences, healthcare, and engineering, among others.

Our office has fostered large collaborative, multi-disciplinary, multi-institutional, multi-national partnerships to compete for large grants and to create and support new and existing centers. WMU has seen recent success with efforts like the Federal Transportation Center for Livable Communities; the First in the World - Broncos FIRST grant; WECAN, the Autism Center for Excellence; and the national coalition for Flexible-Hybrid Electronics of which our regional/thematic node is the Flexible Electronics Applications and Technology (FEAT) Center.

One of our priorities is to acknowledge the fine work of all our faculty and staff. Each summer, the research magazine, is published and distributed nationally to over 60,000 leaders, decision makers, and friends of Western in academia, government, and industry. Our annual report highlights and acknowledges our Distinguished and Emerging Scholars plus every individual who has received grant funding during the preceding year. Last spring, President Dunn and Provost Greene joined our office to recognize recent outstanding research achievements during the year and those spanning the past five years. It was the first of many such recognition events we hope to organize.

In fact, OVPR will coordinate with the provost's office and others to host an event this spring that will include Research and Dessert; recognize the Distinguished and Emerging Scholars; host a recognition luncheon; and feature workshops and awards

from OVPR, EUP, Diversity and Inclusion and the IEC. The purpose of the event is to recognize outstanding scholarship and creative activities. Please reserve February 5, 2016, for this event.

We continue to partner with the Office of Faculty Development on the Discover Discovery workshops offered over the academic year for faculty on the discovery enterprise, including: research plans to help faculty launch research programs; research project leadership, management, and administration; and ways to seek and administer external funding. Workshops are open to all faculty and staff. You may register online at wmich.edu/research.

A new series of contracts workshops is underway for faculty and staff involved in sponsored research, with opportunities to learn more and ask questions about various contract types and negotiations process.

The WMU Discovery Experts Database initiated last year is now being upgraded by Elsevier to the PURE system. Discovery Experts provides faculty and research staff with a powerful tool that automatically analyzes the research and creative activities of our experts and displays a footprint. Faculty and research staff can use the system to organize their portfolio of activities, collaborate with internal and external partners, and to receive funding alerts. The new system goes up this month and provides several enhancements for analysis and support.

As WMU undergoes a new strategic planning cycle, so will OVPR; we will build upon the feedback from the 273 individuals who responded to the *Discovery Activities, Funding and Climate Survey*. Look for more information soon on the survey findings.

As always, if we can assist you with your discovery work, please let us know. We continue to be amazed by the quality of faculty and staff discovery work, be it creative and musical endeavors, books and journals, inventions and grant work. Our goal is to serve in efforts to secure external funding specifically, while augmenting the overall discovery activities of the University.

~Dan Litynski, VP for Research

PSYCHOLOGY PROF AWARDED \$416,385 BY NATIONAL INSTITUTES OF HEALTH

A veteran Western Michigan University psychology professor has landed a three-year, \$416,385 grant from the National Institutes of Health to conduct research along with her students on the behavioral pharmacology of novel stimulant drugs, commonly known as "bath salts."

Dr. Lisa Baker, professor of psychology, will implement animal models of substance abuse to evaluate the abuse potential of various chemical constituents of drugs known on the street as "bath salts." She will conduct her study with the assistance of several undergraduate and graduate students, who will gain valuable research experience.

Recreational designer drugs

Drugs known as "bath salts" have nothing in common with products on the market that are added to bath water. They encompass a variety of recreational designer drugs that were called "bath salts" to get around laws banning their importation and were disguised as true bath salts and were labeled as "not for human consumption."

The drugs are synthetic cathinones derived from a plant in Africa and the Middle East whose leaves people chewed for a boost of energy, similar to cocoa leaves, which are used to make cocaine. They were first synthesized in the 1920s, but remained obscure until they were rediscovered by underground chemists in the first decade of the 21st century and began to be used in designer drugs. Legal in many jurisdictions, the drugs began to appear in Europe and subsequently in the United States. In 2011, synthetic cathinones were classified as schedule I substances in the United States, meaning they have no accepted medical use and they have high abuse potential.

These designer drugs were frequently purchased from dealers on the Internet. Prior to 2011, they were often sold in small independent stores and head shops in the United States. Bath salts have been sold online in small packets under such brand names as "Purple Wave," "Zoom" and "Cloud Nine."

About the grant

Baker's grant is through the Academic Research Enhancement Award—AREA—program sponsored by the NIH. The program supports research projects at educational institutions that provide baccalaureate or advanced degrees for a significant number of the nation's research scientists, but that have not been major recipients of NIH support, excluding big-name schools like Harvard or Yale from applying. The awards are intended to support meritorious research, expose students to research and strengthen the research environment of the institution.

"The AREA grant is meant to encourage faculty research,"

Baker says, "but, more importantly, to engage students in that research. A major goal of Baker's project is to involve students in research and discovery. "Students will participate in the design and implementation of experimental methodology, data analysis, manuscript preparation and conference preparations. Involving students in these research activities will also strengthen and enhance the University's research environment."

Baker's project is titled "Preclinical Abuse Liability of Designer Psychostimulant Mixtures" and will examine the effects of synthetic cathinones in combination with other commonly abused stimulants, like cocaine, MDMA, commonly known as Ecstasy, and methamphetamine.

"People who abuse drugs are likely to engage in polysubstance abuse, using various drugs in combination," Baker says. "We know that concurrent use of multiple stimulants poses a greater risk for toxicities to the brain and cardiovascular system. A major aim of our research is to determine, using animal models, if the abuse liability of psychostimulants is enhanced by concurrent use with synthetic cathinones. For example, if someone were to consume synthetic cathinones concurrently with the prescription stimulant, Adderall, would this person have a greater risk of abusing these drugs?"

To address this question, Baker's laboratory will utilize three different behavioral tests with rodents that are predictive of abuse liability.

Valuable research experience

The outcomes of Baker's and her students' research will expand on current knowledge regarding the behavioral and pharmacological effects of synthetic cathinones and could potentially impact future developments in substance abuse treatment. A more immediate outcome—Baker's students are sure to gain valuable research experience that will help them as they explore future educational and employment opportunities.

"This type of experience will be very beneficial if they want to go to graduate school in a neuroscience-related field," Baker says. "Graduate schools look very favorably on research experience of student applicants. Beyond exceptional course grades and GRE test scores, research experience during undergraduate training can be a deciding factor for admission to a competitive graduate school."

Source: University News

WMU TO PLAY CRITICAL ROLE IN NATIONAL MANUFACTURING INITIATIVE

Faculty experts and a new center at Western Michigan University will play a critical role in a new \$171 million manufacturing innovation initiative announced by U.S. Secretary of Defense Ashton Carter.

Speaking at NASA's Ames Research Center, Carter will help launch the Flexible Hybrid Electronics Manufacturing Innovation Institute as the nation's newest member of the Obama administration's Nationwide Network for Manufacturing Innovation--NNMI--which is intended to scale up advanced flexible hybrid electronic manufacturing technologies and processes. The institute will be centered in California, with Silicon Valley's FlexTech Alliance leading the initiative.

A \$75 million Department of Defense award to FlexTech will be matched by \$96 million in cost sharing from nonfederal sources, including the City of San Jose, private companies, universities, several U.S. states, and not-for-profit organizations.

The institute's activities will benefit a wide array of markets beyond defense, including automotive, communications, consumer electronics, medical devices, health care, transportation and logistics, and agriculture. While the institute will be headquartered in San Jose, existing nodes around the country already have in place an infrastructure ready to solve some of the known manufacturing challenges. The Institute will distribute R&D funds via competitively-bid project calls.

WMU sensor and flexible printing experts are part of the FlexTech team. They helped write the winning proposal and will serve as core subject matter experts for the FHE NNMI. WMU has been identified as a "thematic node," one of four centers around the nation named in the NNMI proposal. The WMU entity will be the Flexible Electronics Applications and Technology--FEAT--Center. FEAT will be directed by Dr. Massood Atashbar, professor of electrical and computer engineering, and Dr. Margaret Joyce, professor of chemical and paper engineering.

"This is not a center for research, it's a center for manufacturing," says Joyce. "The focus of the center will be to assist industry in the scale-up of their technologies and to identify new technology needs in the process. We will be working on technologies that will protect our military and enrich the lives of U.S. consumers."

The national network will work together to scale-up technologies that meet the expressed needs of the military and can be transitioned to consumer markets. They will include new generations of flexible sensors that will have consumer uses for communication, human performance monitoring, health care, energy management and data mining, as well as applications on the battlefield.

"The same technology that might allow physiological or environmental sensors in uniforms, could also be useful to

consumers as a workout monitoring device," notes Atashbar. "There are a variety of industries looking for small, reliable and cost-effective flexible sensors that monitor environmental, physical, chemical and biological parameters."

The global market in flexible hybrid electronics, now at nearly \$13 billion, is expected to top \$77 billion by 2025, the WMU experts say.

The Manufacturing Innovation Institute, announced Aug. 28, becomes the seventh such entity funded since President Barack Obama unveiled the idea during a 2013 State of the Union address. Obama asked Congress to authorize investment--to be matched by private and non-federal funds--to create an initial network of up to 15 institutes. The purpose is to create a competitive, effective, and sustainable manufacturing research-to-manufacturing infrastructure for U.S. industry and academia to solve industry-relevant problems.

Obtaining funding to launch an institute has been an extraordinarily competitive and multi-step, two-year process, the WMU team members say. The prospective winners in the process for this technology came down to FlexTech Alliance and Arizona State University.

Joyce says securing the funding meant building a case that the technology was ready, the infrastructure was in place and industry is supportive with the idea of moving quickly into a manufacturing environment.

"Our role, specifically, will be to work with materials suppliers to build a materials registry," she says, "and to assist companies in the scale-up of their technologies. That will involve developing test forms, establishing testing protocols, creating and documenting standard operating procedures and training educators and the industrial work force as well."

Atashbar notes the WMU role in the initiative has already attracted the support of 10 companies and four other universities. As new projects are launched through the hub organization in Silicon Valley, WMU may also reach out to lead and partner with other members of the national network.

Joyce's work has long revolved around flexible printed electronics. Atashbar has an extensive background in the design and fabrication of sensors. Together, they are integrating ink formulation, printing processes and sensor technology development in a way no other university has replicated.

"We're so pleased we were invited by FlexTech to be part of a broad collaboration of industry, academia and government that will support the state, region and nation in this critical area of advanced manufacturing," Joyce says. "We view this as a recognition of the national presence our departments have built and the strong industry partnerships forged over the years."

Source: University News

INSTITUTIONAL TRANSFORMATION EFFORT PART OF \$3.2 MILLION GRANT PROJECT

Western Michigan University is creating professional learning communities that focus on improving persistence toward graduation for all undergraduate students, particularly low-income students.

The learning communities are being set up through the Broncos FIRST program, which is being implemented by the new Center for Research on Instructional Change, a University-level research center that conducts and supports interdisciplinary research aimed at promoting transformative change in postsecondary education.

Broncos FIRST is looking to connect all of WMU's disparate initiatives aimed at student success and turn them into one strong and successful effort. The effort is getting support from a more than \$3.2 million grant that the University received in 2014 from the U.S. Department of Education's First in the World Grant program.

Co-directing the WMU grant project are **Dr. Andrea Beach**, a professor of education leadership, research and technology, and **Dr. Charles Henderson**, a professor of physics with a joint appointment in the Mallinson Institute for Science Education.

The two wrote the University's grant proposal, and theirs was the only proposal from a Michigan institution to be funded in the First in the World Grant program's initial funding cycle.

That federal grant seeks to create and validate, through ongoing research, student success programs that can tackle the problem of low rates of degree completion. The goal is to create programs that other universities can adopt, knowing there is sound research data behind the strategies embraced and replicated.

Broncos FIRST program

Learning communities for the 2015-16 academic year are being formed for administrators, faculty and staff members who are researching or studying or who have an interest in student persistence. Participants will make a two-year commitment to the project and meet with their groups twice a month during the academic year.

"At WMU, we strive to put students first in everything we do," Beach says. "We want to meet students where they are and help them discover their path to success. We have the opportunity to be a national leader in student retention and success."

For more information about Broncos FIRST or involvement in a learning community visit wmich.edu/changeresearch/broncosfirst/plc.

Source: University News

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 is available on the OVPR website (wmich.edu/research/policies/proposal-submissions).

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