Summer 2012

Changing lives through research

• WMU modernizes fossil discovery
• Student entrepreneurs design new product
• WMU grooms tomorrow’s science educators
Changing lives through research

Life is about change.

Western Michigan University encourages change by creating an environment for its students, faculty members, researchers and staff that is learner-centered, discovery-driven, and globally engaged. Students working with faculty on research projects, staff enrolled in courses to enhance their credentials, and faculty engaged in collaborative research and commercialization ventures—all are the hallmarks of a vibrant academic environment committed to serving the global community.

Between the covers of this magazine, you will find stories that highlight the opportunities our students have to engage in research with faculty members and explore the entrepreneurial world. We hope you'll reflect on how such opportunities can enhance the learning experience for students in STEM careers, help young scientists learn to become tomorrow's educators and change lives through the generation of new knowledge.

Our last research magazine detailed how WMU is working to understand multiple system atrophy. Today, graduate students work alongside our chief MSA researcher Dr. Chuck Ide to enhance the discovery taking place in that arena as they work to change the lives of families around the world who are affected by this neurological disease. Our talented student researchers are engaged in cutting-edge laboratory practices which prepare them well for careers of scientific investigation and discovery. We expect to share such stories about how WMU research may change lives for many years to come.

We invite you to read about our scholarly successes, not merely because they represent the broad spectrum of knowledge generation going on at WMU, but because they also represent the tangible ways WMU faculty and students continue to advance the research reputation of this great public research university and contribute to the public good.

We hope when you finish reading, you share our pride and understand the esteem in which we hold Western Michigan University.

John M. Dunn, Ed.D.                          Daniel M. Litynski, Ph.D.
President                                      Vice President for Research

To learn more about Western Michigan University and our research, visit us at www.wmich.edu/research.
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WMU dancers in Washington, D.C.

WMU dancers performed recently at the Kennedy Center for Performing Arts for the national conference of the American College Dance Festival Association.

The troupe performed Lauren Edson’s dance, “Foreground,” in the matinee at the May 25-27 event. WMU dancers won the coveted performance slot by participating in a rigorous adjudication process for four days in March. Adjudicators described WMU dancers as “fierce, with committed brilliance” who “fully physicalized the material.”

“Foreground” choreographer Edson won the first WMU Great Works Dance Project National Choreography Competition. The work premiered at the dance department’s 2012 Winter Gala Dance Concert.

Foreign languages professor wins award

Dr. Jeffrey Angles received the prestigious 2011 Harold Morton Landon Award for the translation of poetry. An associate professor of foreign languages, Angles is the author of “Forest of Eyes: Selected Poems of Tada Chimako.”

It is the first translation from Japanese to receive this prestigious honor, which recognizes the best book translated from any language into English.

This is the second major prize Angles has won for “Forest of Eyes.” In 2009 the work earned him the Japan-U.S. Friendship Commission Prize for the Translation of Japanese Literature, presented by Columbia University’s Donald Keene Center for Japanese Studies.

Angles is the director of WMU’s Michitoshi Soga Japan Center and serves as co-director and adviser for the Japanese language program. He primarily teaches Japanese literature, culture, and translation studies.

WMU joins other Michigan research universities to establish business-response network

A collaboration involving Western Michigan University, Michigan State University, Michigan Technological University, Wayne State University and the University of Michigan’s campuses in Ann Arbor and Dearborn will create the first statewide university network in the country to provide a critical new tool for business growth and attraction.

The Michigan Corporate Relations Network—M-CRN—creates partnerships that will connect state industry to critical university assets in a way that will help the Michigan economy grow and prosper.

Collectively, the universities in the network represent more than $1.8 billion of research expenditures, which in 2009 amounted to 98 percent of the academic research done in Michigan and 99 percent of all patent activity among Michigan universities. The schools enroll more than 160,000 students across the state.

“All of Michigan’s research universities are actively engaged in economic development,” says Bob Miller, WMU associate vice president for community outreach, who has been working on the M-CRN since its inception.

“This new effort will help our research universities work more closely together and develop tools like a statewide database on faculty expertise that will ensure business requests for assistance are funneled to the researchers who are best equipped to assist them,” he says.

The M-CRN will use more than $1.8 million from the Michigan Economic Development Corp. and the Michigan Strategic Fund Board. The overall program funding will exceed $3 million after realizing an industry match of more than $1 million.

Each of the research universities involved have established a local business engagement office. At WMU, the M-CRN unit led by director Lisa Garcia is designed to be a one-stop shop for businesses looking to access University expertise and student talent. The University’s Business Connection website—wmich.edu/businessconnection—outlines the type of research and business services available to businesses through WMU and links to the statewide network.

The new WMU website provides a mechanism for local businesses to contact WMU to find faculty experts, get help with business or marketing plans, obtain research assistance, or hire an intern or regular employee. Among other resources outlined on the site are startup assistance, technology transfer tools and advice on navigating legislative and community affairs.
NSF I-Corps grant awarded to Patten and Ravindra for machining innovation

The National Science Foundation recently awarded Dr. John Patten and Dr. Deepak Ravindra an Innovation Corps grant to pursue commercial applications for their research related to Micro Laser Assisted Machining.

The NSF developed the prestigious I-Corps Program as a means to “nurture a national innovation ecosystem” that builds on existing research and moves it along the pipeline from discovery to technology development that helps society.

Patten’s project will focus on reducing the time, cost and effort associated with machining hard and brittle materials.

“The technology benefits the manufacture of materials that are hard and brittle,” says Patten. “The Micro Laser Assisted Machining process results in a 50 percent decrease in the material hardness, thus extending the tool life and doubling of machining productivity.” This process has been patented by WMU, and WMU has further supported its development for commercial use through its Technology Development Fund program.

The NSF I-Corps grant is reserved for projects previously or currently funded by the agency. The purpose of the innovation grant is to give the project team access to resources to help transition the technology to a commercial "startup" venture and to train the team on starting and managing the new venture.

Patten will serve as the principal investigator for the I-Corps grant and Ravindra will function as the entrepreneurial lead. Patten is chair of the Manufacturing Research Center and professor in the manufacturing engineering department and Ravindra is a post doctoral student in manufacturing engineering.

Patten and Ravindra will work with Stanford University’s company startup experts and several Silicon Valley venture capitalists, through the I-Corps program. They will be part of select minority of university scientists and engineers to be trained to become entrepreneurs through this innovative program.

WMU and the University of Michigan are the only two research universities in Michigan to receive an I-Corps grant.

Aviation College works with commercial carriers to advance students’ career path

An agreement between the College of Aviation and two closely allied commercial air carriers will put WMU students on a clear pathway to careers as commercial airline pilots.

The WMU/ExpressJet Airline Pilot Pathway Program—AP3—will allow WMU aviation students to begin a pilot screening process early in their academic careers that will prepare them for and guarantee jobs as first officers with ExpressJet.

Successfully meeting all the screening requirements will also guarantee participating students an interview for a position as a pilot with Delta Air Lines. Atlanta-based Atlantic Southeast Airlines merged with ExpressJet Airlines in 2011. The new ExpressJet is the world’s largest regional airline, operating an average of 2,200 daily flights as Delta Connection, Continental Express and United Express.

The agreement makes WMU just the fourth collegiate aviation program in the nation selected to participate in the AP3 program. It is designed to provide the airline with a reliable source of top-quality pilots. Airline officials have indicated they are reaching out to college programs that already have an established track record for producing top-quality pilots.

The agreement will benefit both students and the airline sponsors of the effort who are looking at a skyrocketing demand for new pilots in the next decade. Nationally and internationally, all signs point to what an aviation association executive calls “the longest and largest pilot-hiring boom in the history of the industry.”

After a period of slow industry personnel growth, the industry is now faced with a wave of pilot retirements, growing international travel routes, proposed changes to Federal Aviation Administration rules about the time pilots must rest between flights and an improving U.S. economy.

The first WMU students have already begun the process. Students involved will be monitored throughout their academic careers and they must pass six screening measures and complete WMU’s Advanced Jet Training course. They also must earn the appropriate flight certifications, including that of becoming a certified flight instructor.
Space-based technology uncovers earthen fossil caches

Gut instinct and good luck have led to some startling finds for WMU paleontologist Dr. Robert Anemone, a researcher who’s unearthed the remains of 18-million-year-old fossilized apes in Kenya and 2-million-year-old primates in South Africa.
“It is legendary in our discipline how much of a role luck plays in discovering fossils,” says the researcher, who spends a month nearly every summer in Wyoming’s Great Divide Basin, hunting for mammal fossils.

In 2009, Anemone says a wrong turn down a grassy two-track road turned up, “the richest fossil locality that we had ever found in our 15 years searching the GDB,” a large sedimentary basin containing the fossils of mammals dating back some 50 million years.

But this lucky turn in the basin also led to another startling discovery and one that’s garnered international attention in the field—employing space-based technology to uncover caches of fossils in the earth.

‘Game-changer’
It turns out that modern paleontologists work in much the same way as their forebearers.

But the 2009 find prompted Anemone to rethink his fossil-sleuthing techniques in favor of more rigorous and scientific-based methods to locate the remains of animals that walked the earth long ago.

One of the first problems paleontologists face working in places such as the Great Divide Basin—which spans 10,000 square kilometers—is knowing where to search for fossils within such a huge expanse.

Using geological and topographic maps, they choose areas where fossil-bearing rocks are thought to be exposed at the Earth’s surface and then survey these areas on foot, hoping to come across fossils.

Using the traditional approach, Anemone has successfully located and established 100 fossil localities in the Wyoming basin, from which he and his teams have recovered nearly 10,000 mammal fossils.

To pioneer a better way, “I knew that I needed to work with someone with a background in geography and apply the tools and techniques of the geographic sciences to my problem,” says Anemone, a professor in the anthropology department.
Anemone began working with Dr. Charles “Jay” Emerson, an associate professor of geography and a remote-sensing specialist. The two scientists combined their talents to develop a predictive model for finding fossil concentrations and came up with a method Anemone characterizes as a “game changer” for the field.

“Changing lives through research”

“The model can now help isolate potential sites to explore, thus saving time, money and resources. While paleontologists will no doubt still rely on ‘gut instinct,’ they now have a way to verify they are on track,” he says.

Proving grounds

Anemone says his colleagues across the globe have been interested in the model.

“I was invited to be part of a (National Science Foundation-funded) crew searching for human fossils in South Africa last summer, and Jay and I are now involved in applying our neural-network approach to the location of fossil-rich caves in South Africa,” he says.

Anemone and Emerson recently submitted a proposal to the NSF seeking $200,000 to fund the ground-truth initiative and to further develop their predictive modeling approach to finding fossils.

This summer Anemone and a team will test the model in Wyoming.

“We will take a crew of eight to 10 with us to Wyoming, including three to four undergraduate and graduate students from WMU, to see if the sites the computer predicts as fossil-rich are indeed fossil-rich,” he says.

Two aspects of this research are of particular interest. First is the interdisciplinary nature of the research in which anthropology and geography complement each other to further the age-old science of fossil finding.

Second, much evidence suggests that about 55 million years ago, during the time that these mammals were roaming the Great Divide Basin of Wyoming, the Earth was experiencing one of its most extreme global warming events. Temperatures increased 6 degrees Celsius over 20,000 years, resulting in transcontinental migrations and increased extinction of a number of mammalian lineages.

“Many of the fossils that we find in Wyoming have also been found at the same time in western Europe and in China, suggesting that major transcontinental migrations were enabled by the warm temperatures in the early Eocene period,” Anemone explains.

“In addition to learning about early primates and mammals, we can study the biological effects of climate warming by charting what happened 55 million years ago in that global warming event.”

Eye in the sky

Using imagery from the Landsat 7 satellite, the two researchers trained an artificial neural network, or ANN, to recognize the spectral signature of promising fossil sites along with four other types of land cover—wetlands, barren soil, forest and scrubland.

In essence, the team provided the GPS coordinates for a list of known places in the Wyoming basin and identified them as one of these five land cover categories.

The computer then analyzed the five categories using six different bands of electromagnetic radiation in the visible and infrared spectra recorded by the Landsat 7 satellite.

The neural network software then determines the particular combinations of spectral data that identify each of the five land cover categories.

The computer then searches the entire basin and picks out the areas that are most similar to the known localities, highlighting these areas as having high potential to also yield fossils.

Since the researchers used 75 of their 100 known fossil sites to train the ANN, they tested the model on the remaining 25 known fossil-bearing sites, and the model has proven to be 90 percent accurate.

“This is a game changer,” Anemone says.

“Changing lives through research”
Phenomenal response

Anemone presented a paper on the neural network predictive model in Las Vegas at the annual meetings of the Society of Vertebrate Paleontology.

The paper was one of 10 "featured abstracts" at the conference, which resulted in a number of interviews with science journalists and other media.

“There has been an explosive interest in the research,” Anemone says.

“Several of my colleagues have already inquired about collaborating with us to apply our approach in their research areas. We seem to have really hit a nerve by openly discussing the important role that chance and good luck have traditionally played in finding fossils, and in pointing out a more rigorous and efficient way to go about searching for fossils in the field,” he says.

Anemone and Emerson recently published three papers in peer-reviewed journals documenting this work, and they have been invited to present their results to colleagues at several universities.

They will present a joint talk to the math and computer science faculty at Denison University in Ohio, and Anemone will speak about his research to the anthropology department at Harvard University.

For more information, contact Dr. Robert Anemone at robert.anemone@wmich.edu.

A team from WMU works to uncover fossils at the Great Divide Basin in Wyoming.
Health education specialist Dr. Robert Bensley has developed an online diagnostic system that provides users with a virtual health counselor, along with tools and information designed to improve personal health decision-making.

The product, iMangageHealth, has wide application, and Bensley hopes to market it to various industries and domains—including universities—that view health promotion as a part of their work.

It’s currently in use at the University’s Sindecuse Health Center as a pilot project focusing on sexual health. But the software has also been used by the federally funded Women, Infants and Children program to assist parents in child-feeding practices.

In the Sindecuse project, iMangageHealth offers all the existing sexual health materials and resources available on campus through a single online entry point.

But Bensley says the Bronco Health Advisor is more than simply a repository of information.

“Students acquire skill sets that lead to behavioral change,” says the professor, who created the system with his eHealth Innovations Group in the Department of Health, Physical Education and Recreation.

Students log onto the site—broncohealthadvisor.org—and are able to ask questions, access lessons related to sexual health, and with the help of a virtual advisor, learn behavioral intervention tools for better health.

“This is one-stop shopping at its best,” he says.

After early analysis of the data, Bensley is pleased with the program’s performance. Nearly 5 percent of the students who completed a session indicated that they had never received any health care services at Sindecuse.

“That’s significant and it points to the commercial value this technology may have in other university health promotion systems,” Bensley says.

“It’s another tool for bringing needed skills to assist in moving students along a readiness-to-change continuum,” he says.

Of the students who completed a session, 95 percent felt the information was easy to use and understand, and 87 percent felt better equipped to make healthy changes in their lives.

The health professor says that 75 percent of the students indicated that they would like to see other college health topics addressed by the advisor.

Bensley’s team plans to continue expanding the Bronco Health Advisor with lessons related to alcohol use and abuse, and other campus-related health issues.

“Because the product is easily adapted by university health centers for their own student populations, it offers an innovative tool for health promotion providers to use to reach their students with behavior-change experiences,” he says.

For more information, contact Dr. Robert Bensley at bensley@wmich.edu.
Online suicide prevention course will be publicly available

When it comes to preventing suicide, one WMU researcher isn’t worried about long-considered refinements to a tool that’s successful on campus. She just wants it widely used.

Dr. Karen VanDeusen believes the University’s online suicide prevention course is too beneficial to limit its use to campus.

The associate professor of social work says the course has been redesigned and will be made available free to the general public.

Eventually, it will also be offered as a fee-based, professional development class for mental health professionals, first responders, nurses and others.

The revamp is being funded by an internal WMU Technology Development Fund, which “provided us a great opportunity to offer the course to a wider audience,” VanDeusen says.

The original online course, developed with federal funding from the Substance Abuse and Mental Health Services Administration and the Garrett Lee Smith Memorial Act, is one of a number of suicide prevention activities offered by WMU’s campuswide Suicide Prevention Program.

“Our original goal for the Technology Development Fund included taking the course we had designed for faculty, staff and administrators and obtaining technology support to rework and revamp the online administration of the course,” she says.

During the grant period, VanDeusen led a work group focused on revising the course content even as another team reworked the online course design.

The modified course content includes updated statistics and best practices related to suicide prevention and response. The quality of the course’s online training materials has also been improved.

A number of people across campus and in the greater community contributed to the content of the course, including project co-directors Drs. Delores Walcott and Kathy Lewis Ginebaugh.

They worked with WMU technology consultants, Kevin Abbott and John Mackenzie from WMU’s Office of Information Technology with graphic support from Jesse Thompson. The trio created an improved online course that includes video clips with important suicide prevention education.

The vision is eventually to use the course to provide mental health professionals and others with continuing education credits.

“We are closer to our goal,” VanDeusen says. “We now have an online suicide prevention course that is commercially appealing—with modules that can be accessed easily and video clips that help in content delivery.”

VanDeusen says eventual proceeds from the class professionals take for continuing education credits would go to more programs for suicide prevention and awareness on campus.

“The commercialization of the course would also assist with research and technology development related to suicide,” VanDeusen adds.

For more information about the OSPC, contact Dr. Karen VanDeusen at karen.vandeusen@wmich.edu.
WMU students don’t simply attend classes

They engage in research. They ask questions.

They design products and start their own businesses.

The University’s industrial engineering program turns students into entrepreneurs

It’s no secret that the nation’s recovering but still shaky economy has fundamentally affected the American workforce and that Michigan has been one of the hardest hit states.

Gov. Rick Snyder has often spoken of the state’s economic recovery as a reinvention.

WMU’s Industrial Engineering and Entrepreneurship program in the College of Engineering and Applied Sciences has undergone its own reinvention to better equip students and spark their entrepreneurial spirit on the way to entering the job market.

Industrial engineering professor Dr. Tycho Fredericks says he and colleagues noticed a shift a few years ago in the type of industries students were migrating toward following their graduation.

Instead of the manufacturing sector, many were landing jobs in service-related industries such as health care.

“We quickly realized that for these students to succeed in these non-traditional IE jobs, they needed to be equipped with problem-solving skills, people skills, and marketing skills in order to sustain their abilities to adapt to changing market environments,” he says.

To foster entrepreneurship in students, Fredericks says they also needed their curriculum “to be flexible enough to allow engineering students the opportunity to minor in economics, marketing, finance, or even health care.”

Program leaders determined that by learning to create products that meet industry needs, students would be well-positioned to design and develop innovative products and services when they became professionals.

In a product design and development class, advanced-level engineering students work in teams overseen by a group of engineering professors—Fredericks, Steven Butt, Bob White and Azim Houshyar, along with industrial designer David Middleton—to develop a working prototype of a product.

Butt says it doesn’t matter what the students design.

“What matters is that they learn through the various iterations of that design process how to problem-solve and respond to the needs of the product users,” he says.

In other words, they’re learning to think like entrepreneurs.

One team of students in particular has seen great success with their prototype. They placed
WMU STUDENTS DON’T SIMPLY ATTEND CLASS

Getting a head start on an entrepreneurial career

Dan Panozzo came to Western Michigan University with a clear career path in mind—earn an engineering degree focused on innovation and use it to become an entrepreneur. Today, he’s on track to earn his degree in 2013, but his entrepreneurial career has already begun.

Panozzo and two of his fellow students recently took their design for an original product to a statewide competition called Accelerate Michigan Innovation. Competing against 297 other student teams, they captured third place and a $10,000 check. Today, they’re using that money to form a company, secure a patent and plan the launch of their product.

They will market a product called Quick Hitch, a simplified trailer hitch Panozzo conceived after watching his family members struggle with the occasional boat and snowmobile hauling tasks that go with owning a lake home. The hitch telescopes and rotates 180 degrees, making it a much less challenging task to connect to a vehicle. The team’s design does this without losing any of the strength of a regular hitch.

The WMU team—Panozzo, Joe Fodo and Evan Maltas—began working together in an entrepreneurial engineering class in 2011. In addition to getting a great grade—4.0—for their design project, they also got the feedback and support they needed from faculty in WMU’s engineering and business colleges to realize they had developed a marketable project.

Panozzo, a Downers Grove, Ill., native, selected WMU’s Industrial and Entrepreneurial Engineering major after he visited WMU and fell in love with both the campus and the feeling of individual attention he found in talking with faculty. He also liked knowing the program he chose was on the cutting edge and was the first and only such engineering program in the nation accredited by ABET—the Accreditation Board for Engineering and Technology.

“This program is the reason I came to Western,” Panozzo says. “I’m excited to be here at the beginning of this.”

Panozzo highly in a state competition and have filed for a provisional patent for their creation.

WMU seniors Dan Panozzo and Evan Maltas along with junior Joe Fodo came in third place out of 298 entrants in the second annual Accelerate Michigan Innovation Competition, winning $10,000 for their product prototype, the “Quick Hitch.”

Quick Hitch is an improved trailer hitch designed for a single person to connect their vehicle to a trailer.

Typically, a driver trying to attach a trailer needs the assistance of a second person to guide them back and forth, maneuvering for the connection.

Quick Hitch telescopes in and out and rotates 180 degrees to make it easier for a driver to connect to a trailer without another person’s help. It’s also designed to be as strong as a regular trailer hitch.

But the students didn’t stop with the product design for Quick Hitch. They worked closely with a student marketing team from the Haworth College of Business to create a marketing campaign and used that as the basis of their product pitch at the competition.

The collaboration between disciplines is intended to prepare both the engineering students and the business students for what they might experience as professionals.

The intention is to get students looking for market gaps, to pursue technological solutions to fill those gaps and to develop the acumen to successfully commercialize those solutions, according to Butt.

The Quick Hitch student team continues to move forward with its product and IEE professors are witnessing the birth of a company founded in Michigan with the potential to create jobs here one day.

Panozzo, Fodo and Maltas formed a limited liability company and have filed for a provisional patent.

“These students are in the third year of their engineering program,” Butt says. “When the Industrial Entrepreneurial Engineering program was formed, we wanted a student-group to succeed in launching a company from their class design project.”

For more information on the Quick Hitch team or the Industrial Engineering and Entrepreneurship Program, contact Dr. Steven Butt or Dr. Tycho Fredricks

steven.butt@wmich.edu or tycho.fredricks@wmich.edu.

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Undergraduate award leads WMU student toward career in research

A campus visit persuaded Allyson Doyle that she would pursue an undergraduate degree in the Speech Pathology and Audiology Program while at WMU.

But it was her experience working alongside a WMU researcher that convinced Doyle during her senior year that she, too, would be a researcher.

During that senior year, Doyle received an Undergraduate Research Excellence Award. The award, given semi-annually, provides undergraduates with an opportunity for hands-on research with a faculty member engaged in externally funded research.

Students earn a stipend in exchange for their work on a faculty member's research project and can have a small budget for materials. In the process of taking part in that research, students are offered an educational research experience unique to their field.

Doyle says that Dr. Nickola “Nicki” Nelson approached her about working on a research project to validate the Test of Integrated Language and Literacy Skills—TILLS—funded by a four-year, nearly $2 million grant from the U.S. Department of Education. To identify potential learning disorders, TILLS assesses children’s speech, language and literacy.

The undergraduate research award offered Nelson an opportunity as a faculty member to include an undergraduate student on her research team.

“Undergraduates learn from working on a research project how to ask questions, formulate new questions, and ultimately, it encourages them to do more of their own research—be it an honors thesis or a classroom project,” Nelson says.

“The students have good ideas and contribute to the process from their own perspectives.”

It was all new to Doyle, whose research assistantship involved data collection and data entry processes for TILLS.

“I had no real concept of research,” Doyle says. “I certainly did not fully appreciate the amount of time that goes into it, the collaborative effort that it takes, nor how important demographic diversity is for test development.”

Nelson says that Doyle brought skills to the task that a researcher needs.

“She had an interest in research, took care to attend to details, and recorded the data accurately. All these are important to research,” Nelson says.

Doyle’s first introduction to WMU was through being awarded a volleyball scholarship from the University. A friend’s mom, who is a speech-language pathologist and mentor to Doyle, recommended she check out the Speech Pathology and Audiology Program at the University, pointing to the program’s reputation.

After visiting campus and researching the SPA program, Doyle decided speech-language pathology was what she wanted to do for a career.

“I enjoy working with children, and when I job shadowed my mentor and observed her work with children ranging in age from 0-18 years,” shares Doyle, “I knew speech-language pathology would give me the flexibility to work with people of various ages.”

After working on her research assistantship, Doyle realized something else.

She wanted to continue her education and engage in research. Doyle is currently in her first year of graduate studies at WMU in SPA, and she continues to work with Nelson on her research.

Doyle “rose to the occasion as an undergraduate research assistant. She knew when to ask questions and when to solve the problems herself,” confirms Nelson.

As a result of her research experience, Doyle says she has learned to be open to what the future brings her.

“My (undergraduate research) experience was eye-opening,” Doyle says. “I now know I want to do more research, to continue to question things, and to build a better foundation so that, whether I continue with my doctoral studies or choose to be a clinician, I am ready to be the best I can be.”

Doyle was named the SPA presidential scholar in 2011, and she is concluding the first year of her master’s program studies. For more information on the Undergraduate Research Excellence Award, visit www.wmich.edu/research/internal. For information on Dr. Nickola Nelson’s research, contact her at nickola.nelson@wmich.edu.
Professors train the next generation of health information technology managers

Responding to emerging needs in health care and a federal push for reforming the use of health information technology, Western Michigan University has created the Center for Health Information Technology Advancement.

The center, also known as CHITA, integrates the talents of WMU faculty and students to conduct research projects and develop education programs.

The center’s advisory council has determined that preparing the future workers and leaders in the industry is a top priority among the pressing issues surrounding health care and the use of technology.

“We know this is an opportunity for WMU to get involved with the live challenges facing health care providers,” says Dr. Bernard Han, founding director of the center and a professor of business information systems.

Han and the center’s associate director, Dr. Sharie Falan, a nursing professor, worked with WMU faculty and crafted a new cross-disciplinary undergraduate curriculum, Health Informatics and Information Management.

For example, in fall 2010 a pilot classroom project had graduate-level nursing students working with undergraduate students from the business college on actual health care issues identified by local area hospitals.

Students contributed knowledge from their respective disciplines to develop solutions to the problems they were given.

Demonstrating the pilot project’s success, two of the students involved in the project were hired by a regional hospital and an industrial company as a result of their experience gained in the project.

In the coming years, CHITA will explore the creation of a consortium that includes local health care providers, health information technology consulting firms and information technology vendors. The hope is that the consortium will also be expanded to include international members to jointly address issues that have global implications.

“By working with local health care providers, at least initially, students will be given the chance to assess and solve real problems in their community, and that experience is vital,” Falan says.

For now, however, WMU-CHITA is in the process of securing funds to fully launch the Health Informatics and Information Management program.

Because health information technology is an emergent area of study, some observations and trial practices will need to be implemented. If a three-year grant can be secured, the directors of CHITA plan to provide more definite services to students through partnerships with the community. That will help grow the program.

For more information on CHITA or to view the articles submitted at ICHITA-2011, visit www.wmich.edu/chita, or contact Dr. Bernard Han at bernard.han@wmich.edu and Dr. Sharie Falan at sharie.falan@wmich.edu.

Han  Falan

The program recognizes the convergence of health care processes and business information technology. The center’s leaders expect that undergraduate students will be able to enroll in the program as early as this fall, following approval from the Presidents Council, State Universities of Michigan.

The program offers students the chance to train and mentor with faculty members in a variety of disciplines and graduate with a major or minor.

This fall, the major and minor are offered at both the Haworth College of Business and the College of Health and Human Services.

“We find that the opportunity to put our students from nursing and business information systems together to solve real client problems presents optimal learning experiences,” Falan says.

“These students also learn the cultures of health care and business,” she adds.
Two highly competitive grants awarded to Dr. Edmund Tsang have proven to be a shot in the arm for student achievement in STEM disciplines—science, technology, engineering and mathematics.

With a special initiative supported by the first nearly $2 million National Science Foundation grant Tsang won, the College of Engineering and Applied Sciences saw a rise in graduation rates.

Through that five-year grant, Tsang, associate dean of the college, designed and tested student- and faculty-learning communities to increase retention and graduation in STEM disciplines. That effort is called STEP, or the STEM Talent Expansion Program.

Based on the success of the first STEP grant, the University was awarded a second grant, also about $2 million. WMU was one of just two universities to receive a second round of funding.

This second STEP grant, which is funded through 2015, expands the scope of the first and partners with the Division of Student Affairs to enhance student success, Tsang says.

STEP is designed to allow the engineering college to implement various tools and interventions to determine which ones resonate and effectively promote STEM careers as viable options for students.

The program is also set up to empower faculty members to remain engaged with the students from their first year through graduation.

Data from the first STEP project revealed the learning communities established in the college were successful, boosting retention and graduation rates, according to Tsang.

“We raised our six-year graduation and continuation rates by approximately 1 percent,” Tsang says.

The success rate for the STEP awards is about 8 percent, and we are pleased our work at supporting and retaining engineering students is being recognized.”

Tsang worked to identify which populations most needed help to be successful in engineering. To that end, the college implemented three strategies.

First, all freshmen were placed into cohorts of 24 students, with the students registered for the same three to five courses in the fall semester and the same classes in spring, usually a combination of two to four courses.

As a result, students in a cohort with the same schedule evolved naturally into study groups.

Second, each cohort works with a faculty mentor.

“Faculty are aware more than ever of first-year students and the need to support them academically and socially;” Tsang says. “It fosters a stronger relationship between freshmen and the faculty engaged in the mentoring process.”

Third, freshmen engineering students are offered the option to live on campus in the Engineering House in Bigelow Hall through collaboration with the Office of Residence Life.

“This aids with the study groups and a series of Student Success Centers, one of which is located in Bigelow,” says
Anetra Grice, STEP director. “This provides the freshmen access to tutoring right where they live on campus.”

The second NSF grant expands on the programs implemented in the first grant to include more target populations: minorities, transfer students, women and sophomores.

“We find that transfer students, for example, enter the engineering college with transitional needs,” Grice says. “We want to help these students adjust successfully to our engineering program.”

With the target populations for STEP expanding, success centers have opened in locations beyond the Engineering House in Bigelow Hall.

In addition to the original SSC in Bigelow, centers have been opened in Ackley/Shilling Hall and French Hall. Off-campus students may access these tutoring sites as well.

A new swipe card program offers students access to the centers which in turn provides STEP administrators data to analyze—who is using the services, how often and at which locations.

This information helps the project coordinators adjust the deployment of support programs and track the progress of students as they move through various classes during their freshman and sophomore years.

Another important component with STEP is career advising and planning, which is open to all engineering students.

A dedicated career and student-career specialist works closely with STEP administrators to help promote STEM careers and to help students learn the importance of co-op and internship experiences.

Freshmen and sophomores participated in a Michigan Industry Road Trip over spring break, for instance, to network with employers in engineering as well as applied sciences.

The trip also provided students with the chance to explore various professions in the field, analyze corporate cultures and witness the array of opportunities that exist in Michigan.

One early key component of STEP, which in many ways is the entry point for some engineering students, is the Summer Bridges program.

“To help our freshmen hit the ground running their first semester at WMU, the Summer Bridges program was implemented,” Tsang says.

“This is an intensive crash course in algebra, offered three times a week for three weeks, to prepare incoming students to take the pre-calculus and calculus placement tests.”

Tutoring is also offered during the summer program.

One of STEP’s latest measures is an intervention initiative in which a graduate student mentor meets with first-year and transfer students who posted lower grade point averages in the first semester.

“The graduate student identifies what is missing – study habits or time-management challenges – and then works with the students to access a success center and rethink how they study,” Tsang says. “Our STEP director follows up with the students on a weekly basis.”

Other initiatives include an alumnae mentoring program for women and a transfer student host program. Both of these programs focus on student engagement and student support in transitioning to the engineering college.

For more information about STEP, contact Dr. Edmund Tsang at edmund.tsang@wmich.edu.
Prestigious Hughes grant helps University inspire a new generation of science teachers

WMU is one of only 50 research universities across the country awarded a $1 million grant from the Howard Hughes Medical Institute. The four-year award was the only HHMI grant awarded in Michigan to a research university.

Research grants enable scholars to generate knowledge and to conduct cutting-edge research. However, when a research grant motivates the researchers to change the way educators teach, it has the added benefit of impacting both the scholar and the educator.

WMU responded to Hughes Institute’s call to research universities across the country to apply for funds to help strengthen undergraduate and precollege science education. The award from the HHMI preservice teacher program—the first HHMI grant to WMU—is a team effort.

The team created an HHMI-funded preservice teacher program at WMU to inspire educators to think of themselves first as scientists. Program directors believe that once teachers understand the dynamics of being a scientist, they will bring to their own students the sense of excitement that comes with inquiry-based learning.

Stapleton says that to teach science well, teachers must know how to ask a good scientific question, create a hypothesis, design an experiment and then test the hypothesis and interpret the results.

“Science is everything around us,” Stapleton says. “We need to understand the world, and to do so, we need an understanding of scientific principles.”

The teacher preservice program has three components. The first component was completed in summer 2011 when participants each spent 10 weeks working with a WMU faculty mentor on a research project in a laboratory on campus.

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Those chosen for this HHMI fellowship were selected based on their motivation to teach, not because they were scientists.

Lauren Miller, one of 13 initial grant participants, was a family and consumer sciences major with a minor in biology. Her intention was to teach. For Miller, participation in the HHMI grant solidified her interest in teaching and in science. The second component required the participants to attend a spring semester class at WMU to learn how to teach the lessons they learned in the lab. In essence, the participant teachers had to learn how to translate their research experience into a learning experience for their students. They did this by designing classroom lessons or modules that are inquiry-based laboratory exercises. They will then put these lab exercises into practice with real students during a summer camp program during the third component of the preservice teacher program.

The success of this experiment will be gauged this summer when the preservice teachers “test” their lessons during WMU’s Way 2 Go Summer Science Camp, a camp designed for middle school students. In effect, the experiment continues in a real classroom environment.

“This grant is unique in its focus in that it is designed for preservice teachers,” Stapleton says. The goal was to bring an element of discovery to the participant teachers in the labs, encourage them to think of teaching as a way to discover and to engage them in inquiry teaching.

According to Stapleton, HHMI liked the piece in WMU’s grant proposal that focused solely on preservice teachers and funded the effort for four years to assess the impact not only on the preservice teachers but also on student learning.

“We were able to offer a complete package to HHMI,” explains Stapleton. “We could teach teachers how to engage students in the laboratory and the classroom, then we had the tools to allow them to assess how it all works.”

Receipt of the HHMI grant recognizes the University’s stature in science and teacher training. While HHMI invited all research universities to apply, WMU received one of only 50 grants awarded.

Along with a strong national reputation in producing secondary-education teachers, the University also has great math and science teaching expertise, Stapleton says. And WMU has 13 years of experience administering summer research programs for middle school students.

The grant has put WMU in the spotlight nationally.

The Association of Public and Land-Grant Universities, with the support of the Howard Hughes Medical Institute, has convened a focus group to help guide future efforts in biology/life sciences teacher education through the Science and Mathematics Teacher Imperative. Stapleton has been invited to join in this national effort to assist public universities to increase the number and improve the quality and diversity of science and mathematics teachers. The goal is to identify the most essential attributes of an effective science and mathematics teacher-education program.

“Teacher preparation—we’ve done that well for years,” Stapleton says. “What we are now doing with this HHMI-funded preservice teacher program enhances that preparation.” The take away from this grant: research engagement is a puzzle that researchers work to solve in teams, if need be. It takes time to make a discovery and it involves meticulous work.

“Science is fun, and teachers can teach this to their students in tangible ways to get them excited to learn science. We are raising up a new generation of science teachers—scientists who want to be teachers,” she says.

For more information, contact Dr. Susan Stapleton at susan.stapleton@wmich.edu.
Imagine life as a youth in the U.S. without access to education and few options to learn a trade as an adult. Imagine a system in which people with disabilities do not have the concerted effort of teachers, administrators, parents and policy makers to address and advocate for their needs. At one time, this wasn’t left to the imagination. Prior to the Individuals with Disabilities Education Act, some young people were deprived of the support programs they needed as they grew to adulthood. That’s where advocates and researchers like Dr. Paula Kohler stepped up to champion the need for transitional programs to aid these special populations in living independently and successfully as adults.

Today, Dr. Paula Kohler is a WMU research officer and a noted authority in higher education in effective transition practices that prepare youths with disabilities for college, careers, and other post-secondary experiences.

Her highly regarded text, “Taxonomy for Transition Programming,” is referenced nationwide for planning, developing and evaluating secondary education and transition services for youth with disabilities.

Though Kohler began her professional life on a different path, educated in business and marketing as an undergraduate, she became involved in addressing the needs of people with disabilities motivated by a passion to serve the disenfranchised in her community.

“I wanted to save the world,” says Kohler who, in addition to her work as a researcher, is associate vice president for research at WMU.

“For me, my grandiose plans to ‘save the world’ slowly evolved into an action plan to take the concepts I learned in business and marketing and apply them to help those less-advantaged move out of poverty and into the mainstream of their communities,” she says.

Examples of this ambition came early in Kohler’s career. Working as superintendent of administrative affairs for the Regional Transit System in Gainesville, Fla., she promoted access to public transportation for underserved populations.

In addition to all fiscal matters, Kohler was responsible for developing and coordinating marketing and public relations for the system. In this role, her job was to increase overall ridership on buses and promote use of public transit.

As part of her ridership campaign, she created a slide show for fifth graders designed to teach them how to use the transit system. At the same time, advocates across the country were engaged in a movement to de-institutionalize people with sensory, physical and intellectual disabilities.

Advocates sought to get this special population into community-based settings for work and for other activities. Appointment-based buses were a primary

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means of transport but this had the unintended effect of limiting their use of the service to workday hours, Monday through Friday.

Kohler decided to improve the system. She used the slideshow she created for schools to teach individuals with significant disabilities how to navigate mass transit.

In so doing, Kohler helped them gain access to the community on weekends to shop or go to the movies, just like anyone else. Her task, as she saw it, was to improve ridership overall while also serving this special population.

“Through education, I was able to expand the ridership base to include marginalized groups,” she says.

Her experience in Gainesville led to her next professional role, this time specifically focused on meeting the needs of young people with disabilities.

As a job-placement specialist for the Brevard County School District in Florida, Kohler was responsible for developing an on-the-job training program for students with mild and moderate disabilities, through which they earned graduation credits. The program included new employment approaches supported by transportation.

In this role, she worked with faculty members, students, families and employers to help ease the transition for students from school to the workplace.

“At last, educators were attending to the outcomes of one’s right to a free and appropriate education, as well as their access to it. Importantly, this work is not about sympathy or patience—it’s about civil rights and self determination,” Kohler says.

As a result of her work with the school district, she served on state advisory committees that focused on transition issues and in turn, provided technical assistance and training for districts that implemented innovative programs.

Meanwhile, she pursued a master’s degree in educational leadership at the University of Central Florida. Her thesis focused on understanding what works for students in transition from school to community.

From there, she earned a Ph.D. from the University of Illinois at Urbana-Champaign where her research and dissertation focused on students with disabilities and college success.

Kohler went on to serve as a senior research associate at UI’s Transition Research Institute, gaining valuable grant and research experience as a co-principal and principal investigator.

Through her work at the institute, she developed the aforementioned “Taxonomy for Transition Programming” that is widely referenced in the field. Over her years in the profession, Kohler has developed a research agenda regarding evidenced-based practices for youth with disabilities associated with positive post-school outcomes. She further extended this work to focus on career development theories and practices of women and
This work has been supported by a six-year, $2 million grant from the U.S. Department of Education and a subsequent three-year grant from the department for $1.5 million.

The focus of this recent funding is to continue identifying evidenced-based practices for youths with disabilities and facilitating implementation of the practices through a capacity-building model directed at state departments of education.

The transition center’s evidence-based practice information is online at www.nsttac.org, accessible to anyone.

A teacher in special education, for example, is able to access lesson plans as a means to improve curriculum in a local school.

The center also works with state teams to help them build capacity within the state through strategic planning that applies data-based decision-making, professional development, technical assistance, and policy analysis.

The center has worked intensively with New Mexico, Colorado, Arkansas and Oklahoma. For the next three years, the grant team will identify five new states in each of the three years—for a total of 15 states—to receive in-depth assistance from the center.

“In each of these states, we work down to the school level, modeling for the state how to facilitate implementation of evidence-based practices. It’s exciting work and keeps you connected to the local reality of education, which differs within and across the states,” she says.

Our model creates a positive “ripple-effect,” says Kohler. “Better services and programs will reach students with disabilities who ultimately achieve better outcomes and successfully transition from school to adult life—a win-win for both individuals and communities.”

For additional information on the National Secondary Transition Technical Assistance Center, go to www.nsttac.org. For more information, contact Dr. Paula Kohler at paula.kohler@wmich.edu.

With more than 90 publications—including journal articles, monographs and books, chapters and reports—Kohler’s research portfolio is immense.

To date, she has brought in nearly $6.8 million in research support to WMU and co-directs the National Secondary Transition Technical Assistance Center.

Kohler’s recent research on transition programs for people with disabilities focuses on how to extend research to practice; that is, how to affect what happens each day in schools.
Now a part of WMU, the Michigan Geological Survey boosts the state’s economy and enhances quality of life

A formerly state-run survey providing geological data important for Michigan’s economic health is now being run by the University’s Department of Geosciences.

Geosciences professor Alan Kehew and his colleagues have studied Michigan’s glacial deposits for years and continue to discover the various mineral deposits that exist in the subsurface. The department holds the largest collection of subsurface samples and well data in the state.

Knowledge of these highly complex deposits in Michigan is so essential because they contain most of our groundwater and aggregate resources, researchers say.

Current information is critical for developers, says Kehew who serves as director of the MGS, which was transferred to the geosciences department last fall.

Well-known to scholars in the field, the department and its Michigan Geological Repository for Research and Education (MGRRE) actively help industry partners and corporations by mapping and identifying Michigan’s rich geological resources.

“Every project needs to use water, avoid natural hazards, safely dispose of waste, and to sustainably use natural resources so future generations can enjoy them,” Kehew says.

Instrumental in WMU’s selection as the new home of the MGS is the Department of Geoscience’s long-term commitment to addressing critical geologic and environmental issues like freshwater aquifer pollution, lakeshore erosion and the preservation of precious resources.

Geologists at WMU work to educate about the importance of making decisions rooted in geologic data so that short-term needs do not preclude future generations from using precious land resources.

When MGS was a state-run office, its director approached the University to discuss transferring it to take full advantage of the available expertise and technologies at WMU, and to apply for federal grant programs.

Some 30 years ago, Dr. William Harrison, director of MGRRE, began amassing the wealth of materials now in the University’s holdings.

“These huge collections remain the cornerstone for student education and ongoing research programs in petroleum geology, carbon sequestration and geothermal energy,” Harrison says.

“Companies examine these cores and data to locate additional sources of domestic energy in Michigan.”
Since last October, MGS has secured more than $100,000 in funding through the U.S. Geological Survey’s STATEMAP and Great Lakes Geologic Mapping Coalition programs.

“We couldn’t apply directly for those funds in the past because they are available only to state surveys,” says Kehew. “That’s one big advantage we have now.”

**Building on the past**

The survey has played an important role in the identification of critical resources in the state and in accessing those resources for economic use.

For example, earlier in its history, the MGS published reports of geological resource assessment.

One of those reports was key to a major discovery in the Upper Peninsula—that the Yellow Dog Peridotite might be a favorable host rock for copper-nickel mineralization.

As a result, Kennecott Exploration Co. began to explore in northern Michigan and discovered the “Eagle” deposit, located near Big Bay.

The Eagle mine is expected to produce 300 million pounds of nickel and 250 million pounds of copper. That mine will be the only primary nickel mining operation in the United States.

Knowing where to look for the minerals allowed Kennecott to successfully mine the materials in a cost-effective and responsible way.

In its role as the manager of the survey, WMU will work to ensure that Michigan’s rich resources are used wisely and available for future generations. And the University will continue to educate and assist in research endeavors with its expansive holding of data and samples.

Created a dozen years ago, WMU’s Children’s Trauma Assessment Center has become nationally known for gauging the impact of traumatic events on children’s physical, emotional and behavioral well-being.

The focus of the University’s Children’s Trauma Assessment Center, which has attracted more than $5.5 million in federal grants since its inception, has expanded from addressing the impact of trauma at the individual level to facilitating systemic change.

“We started the assessment center initially to include professionals and caregivers,” says Dr. Jim Henry, the center’s director and a professor of social work.

“But with the federal grants, the center has taken the developmental aspect of individual assessment to the systemic level—criminal/court system, mental health, schools—to develop systems to understand the developmental impact of trauma on children,” he says.

The center engages in cutting-edge research. It offers communities and health care providers the most-advanced tools to examine and assess the effect traumas such as sexual abuse, neglect, physical abuse and other forms of violence have on young lives.

**Statewide reach**

The work is not limited to the Kalamazoo area. Staff members evaluate children from across the state. Demand for services is demonstrated by its six-month waiting list for assessments.

Henry says the center’s model for assessing child trauma is rare in that it evaluates youngsters from a neurodevelopmental or brain-based perspective.

“What we study is how exposure to trauma physically changes the brain—the impact of that trauma surfaces in the brain’s physiological structure,” he notes.
He says that they assess how the trauma—and the child’s perception of what happened—affects his or her brain and cognitive skills, including language, memory, attention and information processing.

In this work, Henry directs an interdisciplinary team of 12 professionals. The team consists of faculty and staff members from medicine, occupational therapy, speech pathology and audiology, social work and nursing.

Their mission is to provide neurodevelopmental trauma assessments and to distribute trauma-informed and evidence-based practices across Michigan.

To date, more than 300 WMU students have been trained in trauma assessment and how to understand the effects childhood trauma has on behavior. Across the state, the CTAC has trained more than 35,000 people and is actively involved in changing the paradigm of serving maltreated children to being trauma-informed through training, consultation and support.

The CTAC also leads in cutting-edge national research on child trauma and systemic change.

**Trauma research**

Currently, the center has four key trauma research projects, including “Project Perk.” This program, which began in December and is funded through a four-year grant awarded through the federal Office of Juvenile Justice and Delinquency Prevention, identifies and provides services to children and families exposed to violence in order to create better outcomes for these victims.

CTAC has partnered with the Christian Life Center of Kalamazoo and the Boys and Girls Club of Greater Kalamazoo to identify children and families in need of services.

Project Perk is expected to serve between 250 and 400 children. It’s also one of 10 grant awards to be appraised by an evaluator contracted by the juvenile justice office to determine if services are effective in reducing the symptoms associated with exposure to violence.

In February, the center also launched a program funded by a Field Initiated Research and Evaluation, or FIRE, grant.

Operating in five counties across the state, FIRE will focus on studying the impact of trauma-focused assessment and treatment on youths in the juvenile justice system.

With an overlap between trauma and delinquency—more than 90 percent of youths in the system have had a traumatic experience in their past—this project screens for trauma and compares outcomes for youths who have received trauma-focused services to those who have not.

The CTAC will use findings to challenge current juvenile justice systems across the nation to identify and treat the impact of trauma for this population of youth.

Another of the center’s initiatives, the Developmental Trauma Disorder Research Project, is gathering data to better describe the experiences and needs of children who suffer from complex trauma, which is a new diagnosis in the Diagnostic and Statistical Manual of Mental Disorders. The manual officially outlines the parameters of mental disorders.

The center is one of seven sites around the country interviewing children ages 8 to 17 years to gather information regarding potential traumatic exposure, history of emotional and behavioral reactivity, and symptomology used to describe children’s mental health problems.

The center has twice been funded by the Substance Abuse and Mental Health Services Administration. The CTAC is one of 60 member sites of the National Children’s Traumatic Stress Network.

This research focuses on developing a child welfare system that recognizes how trauma impacts children. Initially working with professionals from the state Department of Human Services, the courts, schools, and mental health in nine communities, the initiative has spread to other areas across Michigan.

Screening, assessment, resource parent training, and casework-practice change are all provided to participating communities.

Outcomes of the system-level initiative are measured through a CTAC-developed trauma-informed system change instrument.

**Improving child welfare**

“We started CTAC so we could explain the impact of trauma and what’s important. CTAC now is involved in advocating for individual children within agencies and courts, building trauma-informed systems, and conducting research of national significance,” Henry says.

“We challenge systems to provide better services for our state’s most vulnerable children so they can recover and reach their potential,” he says.

For more information on the Children’s Trauma Assessment Center, contact Dr. Jim Henry at james.henry@wmich.edu.
Banded iron ore from the Upper Peninsula. Iron, one of the most vital resources of our economy, has been mined in Michigan for many years. These vibrant hues are the rock’s natural colors. Its shiny grey layers, mostly hematite, alternate with red layers of iron-stained chert, commonly called jasperite. Mapping and assessing Michigan’s vital resources is a priority for the Michigan Geological Survey, now at WMU.