Research with Impact

- HeroRats fight TB
- Commercializing technology
- Combatting MSA
Dear Friends:

The mark of a great research university is the impact it has on the constituents it serves—students, businesses, communities, cultural organizations and citizens at the local, state, national and international levels.

Impact can be felt in the discovery of a life-saving drug or the promotion of best practices in the laboratory or the classroom. It can be experienced when faculty and students tackle and solve a problem plaguing industry or when innovative thinking helps set public policy or finds new ways to save energy and build our economy.

Impact also comes when a superb piece of writing or the creation of a work of art or music stirs the soul or contributes to moments of quiet contemplation and reflection.

I’m proud that Western Michigan University is able to accomplish all of that and so much more. In these pages, you’ll find information about a small but representative sample of the research and creative energy that abounds at WMU. There’s so much more. Please don’t hesitate to contact me to learn more. Email me at john.dunn@wmich.edu.

Warmest regards,

John M. Dunn
President

Making an impact with research and scholarship

As a dynamic, student-centered research University with more than 25,000 students, Western Michigan University has a reputation for generating knowledge that has an impact in its surrounding communities—research that effectively improves the economics and quality of life.

Our University’s role has long been focused on the intersection of the research arena and the private business sector. Our partnerships with community, industry, funding agencies and sister institutions enhance our efforts to define and remain on the cutting edge, allowing us to create and share new knowledge.

WMU research with an impact includes the following, to name but a few:

- Medical research aimed at reducing errors in health care delivery
- Development of satellite technology for global remote sensing
- Commercialization of promising pharmaceuticals and life science technologies
- Assessment of the effectiveness of programs in education, health care and engineering
- Research to help improve service to families with autistic children
- Efforts to track weather forecasts to aid crop growers
- Use of printed electronics with a revolutionary multidisciplinary approach

The year ahead brings many new opportunities for our University, especially as we move forward with the establishment of a medical school. With this new venture, the ways in which Western Michigan University can engage in research that has an impact will grow exponentially.

As you read about WMU research and creative work that impacts the lives of others, I hope you are impressed. As one of fewer than 200 research universities in the nation, we are proud to discover, transform, and transfer knowledge that makes a difference in the lives of others.

Best wishes,

Daniel M. Litynski
Vice President for Research
Research with impact

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$100 million gift will launch med school that leverages area’s life sciences resources

An anonymous $100 million gift will help launch a medical school at Western Michigan University envisioned to be part of a regional Health Sciences Center that will blend the very best of medical education, clinical care, research and service.

The gift, announced on campus in March, is the largest cash gift ever given to a Michigan college or university and the 15th largest in the history of American higher education. It provides foundation funding for a school of medicine that WMU is developing in partnership with Kalamazoo’s two major hospitals, Borgess Health and Bronson Healthcare.

In announcing the news, WMU President John M. Dunn called the gift historic. “With their gift, these generous donors are endorsing the vision we’ve developed with our partners,” he said. “It’s a vision that will transform this community by leveraging its legacy and unique resources.”

Dunn said key strengths upon which the new medical school will build are the community’s long commitment to higher education, its 125-year history in the life sciences and its 35-year track record of providing third- and fourth-year medical education through two world-class teaching hospitals.

The vision for the medical school calls for it to be part of a regional Health Sciences Center that will maximize synergies involving Kalamazoo’s biomedical and educational assets and make the community more than it is today. Research will play a major role in the effort to ensure that Southwest Michigan is always positioned to participate in the future of medicine, wherever science and technology lead.

Visit www.wmich.edu/medicine for more information.
China studies center bears name of noted Sinologist

The new Timothy Light Center for Chinese Studies officially opened its doors at WMU in fall 2010. The center is designed to further the work of WMU faculty members and graduate students who have expertise in some field of Sinology or teaching or research interests in China. It also aims to enhance teaching and understanding of Chinese studies through programs accessible to undergraduate students and the public. Dr. Wei-Chiao Huang, WMU professor of economics, has been named the center’s first director.

The idea for the center came from the family of Dr. Timothy Light, WMU professor emeritus of comparative religion and a former provost of the University. Family members wanted to honor Light’s lifetime achievements and commitment to Chinese studies, and they also provided a generous endowment to fund the center and its activities.

Huang says the Light Center will co-sponsor activities and work closely with WMU’s Confucius Institute as well as area partner organizations such as the Kalamazoo Institute of Arts, which opened its new Joy Light Gallery for Asian Art last year.

The center’s name honors Light, a Kalamazoo native and expert on Chinese language, religion and culture. Light joined the comparative religion faculty in 1991 and retired in 2003, serving as provost from 1996 to 2000. His 50-year academic career included teaching and administrative roles related to East Asian language and cultural studies at the Chinese University of Hong Kong and several other institutions, as well as publication of numerous scholarly books and articles.

Colorectal cancer is target of virologist’s research

The National Cancer Institute within the National Institutes of Health has awarded a three-year $400,000 grant to WMU to develop a new, cutting-edge treatment for colorectal cancer using viruses to attack cancer cells without harming normal cells.

The grant to Dr. Karim Essani, a WMU virologist and professor of biological sciences, will fund the Experimental Oncolytic Virotherapy Project. The new virotherapy, as opposed to chemotherapy and other conventional cancer treatments, holds great promise in treating colon cancer and not harm healthy cells, thus avoiding nausea and other undesirable side effects common with other treatments.

“This is not a new idea, but it has generated new interest in the last 10 years,” Essani says. “What we’re doing is really in the beginning, doing it on a small scale. The basic experimental stage.

Hybrid electric technology is focus of Eaton/WMU lab

Battery and hybrid electric vehicle drive testing in West Michigan took a significant leap forward in October, when Eaton Corp. and Western Michigan University officials formally opened the new Hybrid Electric Applied Research—CHEAR—Lab in WMU’s College of Engineering and Applied Sciences.

The unique new lab is designed to be one of Michigan’s premier battery and hybrid electric vehicle drive testing facilities. The total cost for the lab’s development and first year of operation is just over $1 million, with the majority of that support coming from Eaton.

The facility provides a location where the hybrid electric drive business group at Eaton and WMU’s engineering college can collaborate to promote innovative ideas and research solutions for challenges associated with commercial and military hybrid drives. The focus of the lab is on systems integration.

Reducing impact of violence is goal of Children’s Trauma Center work

WMU’s Southwest Michigan Children’s Trauma Assessment Center, in partnership with New Genesis, the Kalamazoo Hispanic Council and several other community agencies, has been awarded a $1 million, four-year grant through the Office of Juvenile Justice and Delinquency Prevention’s Safe Start Promising Approaches Initiative.

The grant funds Project Partnering to Effectively Reduce the Impact of Violence to Children in Kalamazoo—Project PERK for short. Partners in the project first identify children exposed to violence in Kalamazoo County. They then use a tiered-intervention approach to reduce the impact of that violence on the children’s neurodevelopmental, relational and emotional progress.

Partners or other caregivers and community agencies are involved and being trained in trauma-informed practices to provide services to children and their families. In addition, key leaders from the primary agencies that serve Kalamazoo children participate in community board meetings to plan, develop, and implement strategies and new policies to better serve children exposed to violence.

Educators win $3.5 million to work with principals

Two WMU researchers have been awarded a five-year, $3.5 million grant from the U.S. Department of Education to collaborate with 12 high-need school districts in Michigan, working with principals and aspiring principals to improve education.

With the help of the grant, Drs. Van Cooley and Jianping Shen, the chair and John E. Sandberg Professor, respectively, in WMU’s Department of Educational Leadership, Research and Technology, are conducting the Learning-Centered Leadership Development Program with 50 practicing and 50 aspiring principals. Each pair of practicing and aspiring principals were recruited from the same school to facilitate project activities.

Assessment of the districts and schools involved in the project, they say, shows an urgent need to improve the leadership of both practicing and aspiring principals. Improving leadership will, ultimately, raise student achievement, they predict.

Health care IT improvement is at core of new center

An interdisciplinary partnership has resulted in the creation of a new center at WMU aimed at improving health care information technology.

The Center for Health Information Technology Advancement—or CHITA—is a joint project by the Bronson School of Nursing and the Department of Business Information Systems.

The center’s overall focus is to facilitate better health care by providing solutions to today’s health care information technology needs, says Dr. Bernie Han, center director.

“Through joint course projects under a collaborative learning environment, both nursing and computer information systems students will gain a better understanding of health care and use of information technology to improve business practices,” Han says. “As a result, they can offer ways to more effectively and efficiently organize and deploy information technology for better health care.”

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WMU moves technology into commercial arena

In recent years, WMU has invested in not only increased research activity, but also in the development and dissemination of that research which can have commercial and/or industrial benefits. The University has experienced dramatic increases, on the order of five to ten times historic levels, in both the production and commercialization of these new technologies. This activity has obvious benefits, not only for WMU and its researchers, but also for the general public and for those people who benefit directly from new products, processes and services. Further, in the current economic crisis, this activity can also have benefits for the local and state economy in terms of job and wealth creation. In the end, this shows the practical impact that WMU research can have.

The following are just a few examples of some recent WMU research commercialization projects that are gaining commercial interest:

- **Remote sensing tool**
- **iManageHealth™**
- **Computer based multi-media treatment for depression**

### iManageHealth™: An Innovative Approach for Managing Health and Chronic Diseases

An Internet-based behavior change diagnostic system that incorporates a virtual counselor to help move, or “triage,” clients through a process to improve their direct selection of behavioral interventions and resources. The brainchild of Dr. Robert Bensley and his eHealth Group Innovations team at WMU, the technology will be commercialized with funding from prospective investors to fully develop and market the system to health-resource intensive industries.

The technology is designed to combat the weaknesses of current health promotion Web programs that are static and simply provide a list of “one-size-fits-all” resources that are spread across numerous departments or physical locations. Such resources, the developers say, simply put a new Web face on material that doesn’t focus on the specific characteristics of the participant or such important factors as readiness for change and motivation.

In contrast, Bensley says, iManageHealth provides a more systematic approach for moving participants toward resources that are tailored to their specific behavioral needs. Central to this system is the virtual counselor who both personalizes the session and provides an interactive and dynamic interface. This vastly increases the likelihood that clients will move through the behavioral change process.

iManageHealth was originally conceived (in the form of wichealth.org) to address nutrition-related behaviors among clients associated with the U.S. Department of Agriculture’s Women, Infants and Children (WIC) program. Since 2003, more than 500,000 WIC clients across the U.S. have benefited from using the system. Extensive evaluation has determined consistent positive impact.

For more information, contact Dr. Robert Bensley, professor of health, physical education and recreation, at robert.bensley@wmich.edu.

### Remote sensing tool opens world of satellite data to scientists

As researchers around the world turn to satellite imagery to gather data for disciplines like hydrology, forestry and oceanography, WMU’s new Remote Sensing Data Extraction Model—RESDEM—is emerging as a tool that simplifies the tedious manual steps needed to process that information.

Intended for use by government agencies, universities and consulting firms, RESDEM allows scientists to retrieve, assimilate, and analyze satellite data in the public domain by selecting adequate hardware to enable processing and archiving of these large data sets.

Such remote sensing data can potentially present cost-effective alternatives or supplements to extensive and costly field campaigns. Throughout the past two decades, there has been a dramatic increase in the number and types of space-borne sensors deployed, enabling new and enhanced applications in various scientific disciplines.

The use of public domain global remote sensing data sets like TRMM, SSMI and AVHRR to assess complex environmental and hydrologic problems worldwide is hampered by the effort, time, and expertise needed to extract and process such data sets, and the technical obstacles that users face in attempting to retrieve and process them. Such obstacles range from computing time requirements to image calibration and quality control issues.

Dr. Adam M. Milewski, a WMU geoscientist who is part of the RESDEM development team, points to global precipitation data as a good example of the kind of information that has been difficult for researchers to obtain in the past because of the limited number of rainfall data stations available. Now, with free data available through NASA’S Special Spectral Measuring Imager, RESDEM will help researchers overcome format and processing issues that prevent researchers from making full use of the data.

“We have developed RESDEM to simplify the tedious manual processes needed to process raw satellite data for users demanding larger spatial and temporal coverages,” Milewski says. “RESDEM will increase the utility of global satellite data sets.”

For more information, contact Dr. Adam Milewski at adam.milewski@wmich.edu.
New startup offers computer-based multi-media treatment for depression

CompTherapeutics LLC, a new company started from research performed at WMU, is focused on providing interactive computer-based treatment of clinical depression, a worldwide behavioral health concern that often goes untreated. Founded by Dr. Richard Spates and Dr. Amy Naugle, professors in the Department of Psychology, CompTherapeutics offers professionals in the field an interactive tool to treat people suffering with mild-moderate depression. The treatment provides a cost- and time-effective treatment alternative to medication and can be prescribed by physicians who wish to utilize a psychological intervention along with or instead of medications.

The treatment program is called BAML—Building a Meaningful Life Through Behavioral Activation. The model is based on the idea that depression can effectively be addressed by changing what one does and how one responds to life stressors. The interactive computerized program consists of 10 sessions, with each session 35-60 minutes in length. The individually administered outpatient therapy is designed to be provided in a professional office, medical center or employee assistance practice. Each session requires only 5-10 minutes of supervision by clinical professional or office staff. In the treatment sessions, patients learn to: identify and record activities and identify what gives them a feeling of pleasure, mastery, and accomplishment; keep consistent regular routines and schedules; build into their lives activities and interactions that are more consistent with their stated values; and avoid pessimistic thinking. BAML offers patients a non-medication option without the side-effects associated with medicine and provides a way for patients to be treated at their own pace.

In a series of studies, behavioral activation therapy has proved to be a successful treatment option for people with depression. The WMU-based firm was established in October 2010 for the purpose of worldwide marketing, sales, distribution and servicing of its computerized product.

For inquiries about CompTherapeutics, contact baml-depression@sbcglobal.net.

Predicted to be a $300 billion industry by 2025, printed electronics holds the promise of being the next high-impact new technology to come of age, and a new center at WMU has the University on the cutting edge.

WMU, in partnership with Daetwyler R & D, is at the forefront of the printed electronic research field with its highly touted Center for the Advancement of Printed Electronics. Unique to CAPE is its focus on multidisciplinary approaches to research.

CAPE research sits at the intersection of green manufacturing, energy efficiency and the quest in Michigan and the United States to explore new technology and grow jobs.

“The application of the technology is so revolutionary it holds the promise of changing the world as we know it today,” says Dr. Margaret Joyce, director of CAPE. “Though the benefits of printed electronics are global and broadly based, research in this area is currently too expensive for any institution or company to take it on itself. This has led to the need for industry/university partnerships.”

CAPE originated with a 2006 grant from Michigan’s 21st Century Jobs Fund initiative, which brought together a multidisciplinary research team to tackle multiple challenges which could not be solved by any one engineering or science discipline. With a multitude of problems being faced with chemistries and materials being incompatible with each other and the process, it was quickly realized that WMU could become a national center where industry and University researchers could work together to bring needed technologies closer to commercialization.

As a result of CAPE’s teamwork, WMU has come to hold printed electronic expertise and facilities unique to any facility in North America. Through its partnership with Daetwyler R & D, CAPE acquired an AccuPress high-precision Gravure press for the sheet-fed, layer-to-layer printing of electronic materials. The AccuPress has the many features needed to maintain the high-accuracy registration required for printed electronic use.

According to Joyce, the future for the technology is unlimited. “It will be integrated throughout our lives, from displays, lighting, solar cells, packaging and sensors in clothing to packaging and point-of-care diagnostics. The possibilities are only for us to dream,” she says. “This state-of-the-art press secures WMU’s position among the leading institutions in printed electronics. It supports CAPE’s mission to evolve printing as a low-cost manufacturing process for printed electronics applications.”

In edging out other institutions, CAPE situates printing technology at its core. WMU is unique in its focus on printing. Where others have the materials, WMU has printing as the core, which is the delivery piece that enables the technology—be it printing RFIDs on packages or printing heated battery packs between layers in clothing. Printing, Joyce says, is the conduit by which to bring the technology out of the labs to commercial practice.

The future looks bright for printed electronics, and the call to advance the technology will require students graduating with a multidisciplinary degree, like a degree in engineering with a specialty in printed electronics.

For more information, contact Dr. Margaret Joyce at margaret.joyce@wmich.edu.
‘HeroRats’ detect landmines, tuberculosis

Rodents rarely come to mind when people think of superheroes, but a Western Michigan University psychologist is hoping that will change.

Dr. Alan D. Poling, WMU professor of psychology, is part of a team of specialists working with the non-governmental organization APOPO, which has had considerable success using large African pouched rats to sniff out landmines and tuberculosis bacteria. Poling says the rodents, dubbed HeroRats, have an acute sense of smell and do well at detecting explosive devices and the live TB bacterium. They’re also cheaper to train and maintain than dogs, making them a valuable alternative for landmine detection in developing countries.

“Product developers, not scientists, founded APOPO. They asked me to get involved because of my expertise in animal learning,” Poling says. “On the one hand, I thought their work was innovative and interesting. On the other hand, I thought it was kind of counterintuitive—rats don’t come immediately to mind when one thinks of diagnosing diseases.”

APOPO, which is headquartered in Tanzania, is an acronym for what in Dutch means Anti-Personnel Landmines Detection Product Development. The NGO was founded by Belgian Bart Weetjens in the mid-1990s in response to the global landmine problem.

The organization has been garnering national and international attention, with stories about its work being featured recently by MSNBC and CNN as well as appearing over the past two years in the United Nations publication Freedom from Fear and numerous scholarly journals.

In addition, Poling has been interviewed by media outlets such as “CBS News” and “Voice of America.” He also was the lead author of a study published in the December issue of the American Journal of Tropical Medicine and Hygiene titled “Detecting Human TB in Five Tanzanian Hospitals Using APOPO’s HeroRats.”

A psychopharmacologist and behavior analyst, Poling joined APOPO and the HeroRat team in August 2009 to increase its research capacity, improve the scientific rigor of that research and further streamline rat-training processes. Among the specific activities he’s involved in are developing research protocols, analyzing data and writing grants and articles.

Poling says HeroRats are saving lives across Tanzania or to donate to the HeroRATs Campaign.

Visit apopo.org for more information about how HeroRats are saving lives across Tanzania or to donate to the HeroRATs Campaign.

A unique aspect of APOPO is that it’s dedicated to coming up with local solutions to local problems. This is a real team effort, and the rats are already doing a good job of detecting landmines,” he says. “The real challenges come from working in the developing world. Tanzania is one of the poorest countries on earth, and it’s a tough place to work. For me, this has certainly been a life-changing experience and a great opportunity to do humanitarian work.”

Landmines kill and maim thousands of people around the world every year, in addition to hindering agriculture, reconstruction, repatriation of refugees, and other aspects of social and economic development.

Poling says rats can clear landmines for about $1.25 per square meter (roughly a square yard), which is well below the $2-to-$2.50-rate typical of most clearance projects. Their highly sensitive and accurate sense of smell can identify the presence of both metal and plastic-cased landmines, while their size and weight make it highly unlikely they would set off a pressure-activated mine. In fact, the trained animals are far too precious to be treated with anything but great care and attention.

Although a wild species, the African giant pouched rats have proved to be a perfect species to breed as HeroRats. A widespread and indigenous animal, they’re comparatively calm, docile and easy to tame. They’re also adapted to the local environment and able to live up to eight years in captivity, optimizing the return on training investment.

“Wild rats are really nasty,” Poling admits, adding that APOPO has procedures to socialize and gentile them. “Trainers play with the rats, take them for rides and get them used to different sounds, places and people,” he explains. “It takes about 175 days to socialize and train them to find landmines, less time for TB detection.”

With landmine detection going well, Poling says the real potential of HeroRats right now is in screening for tuberculosis. The early signs are promising, and trained rats already have increased TB detection rates in five Tanzanian hospitals by more than 44 percent.

“Two billion people around the world are exposed to TB—it’s just a scoure in the developing world,” Poling says. “There’s no cheap and accurate method to detect it, so if we can improve screening, it will be hugely beneficial to humanity.”

Health officials report that Africa has the highest number of lethal cases per capita. Poling says a lot of people are exposed to TB, and one in 10 becomes clinically ill.

But skin or blood tests don’t identify people who have the active TB bacteria in them, just people who have been exposed to it. To detect the active bacteria, sputum samples typically are prepared and examined under a microscope or are cultured to see if any bacteria will grow.

“Microscopy misses 60 to 70 percent of active infections and is slow—a technician can only do 30 to 40 smears per day. Cultures allow for accurate detection, but take six weeks to grow,” he says. “Rats can analyze hundreds of samples in a day, and we’re reasonably sure that they’re as accurate as microscopy, and probably substantially more accurate. The next step is to study how rats do compared to culturing.”

Poling says that when he joins his doctoral students in Tanzania, he works on that type of comparison and moves ahead with other experiments and projects. He’s particularly interested in investigating how detection rats can be adapted to screen for explosives in cargo shipments and whether their natural burrowing talent can be harnessed by fitting them with miniature cameras so they can search for survivors in the rubble of disaster sites.

Visit apopo.org for more information about how HeroRats are saving lives across Tanzania or to donate to the HeroRATs Campaign.
Lost in a world of pink bows and walks for a cause, one woman continues her battle with a deteriorating body and an agile mind. Susan Summers suffers from a rare disease that ravages her body and cynically spares her mind. The battle Susan fights is not with the disease, it is to create awareness and promote needed research.

Multiple System Atrophy is lethal and incurable—and a rare degenerative neurological disorder that causes problems with movement, balance, and automatic functions of the body, such as blood pressure. MSA is really three diseases in one: Parkinson's disease, cerebellar ataxia, and autonomic failure. Few drugs exist to provide symptomatic relief for patients as they eventually lose motor control over basic bodily functions.

In February of 2005, Sue spoke her last words. She lost control of her vocal muscles and began communicating with her eyes. Bob Summers, Sue's husband and caregiver, said that after 42 years of marriage it is not hard to understand each other. “Our data is like a magic mirror, we can see inside the patients' cells to determine what's wrong, and then, hopefully, find natural compounds and/or drugs that can restore healthy gene and protein expression,” says Ide.

In 2007, Ide, Langerveld, and their colleagues published the findings in their first paper, “Gene Expression Changes in Post-Mortem Tissue from the Rostral Pons Multiple System Atrophy Patients,” in Movement Disorders, the flagship journal for neurodegenerative motor diseases. The paper reports that genes involved in energy production and those involved in removing toxic waste, were not working properly in MSA patients, resulting in brain cell death.

“We also are determining the role immune-system cells play in neurodegeneration, with an eye toward shutting down their misdirected activities to save brain cells that may be victims of collateral damage,” Ide says. These significant findings intrigued another MSA researcher, Dr. David Robertson of the Vanderbilt University Medical Center. Robertson proposed a collaborative research project to characterize gene expression in blood cells from living patients.

To help fund the study, Bob Summers organized “Miracles for MSA,” a charity event involving 2009 Super Bowl champion Pittsburgh Steelers cornerback Fernando Bryant. Bryant hosted the event in March 2009 at the request of Summers, his high school football coach. Sue joined the research efforts by allowing her blood to be used in the study.

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This study compares how gene expression patterns differ among three disease types: Parkinson's disease, MSA, and Pure Autonomic Failure. These diseases are similar and present some overlapping symptoms. The initial data from the study produced intriguing results. For the first time in MSA research, the data implicates over-expression of genes that also pose a problem in other neurological disorders. MSA and Parkinson's disease share some of the same expression patterns, while Pure Autonomic Failure presents different problems.

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Research also discovered another potential target for drug development: a protein that appears to aid in the decision of cell death. New drugs could prevent this protein from working in MSA patients, thereby slowing or halting the neurodegeneration process. Ide hopes to publish these findings soon.

Meanwhile, Sue’s optimistic attitude and continual effort “to do something,” inspires the people in her life. With little awareness in the medical community about MSA, patient support groups and information are scarce. WMU provides hope for the 100,000 people affected by MSA and their families. For Sue, the cure cannot come soon enough, but for those who follow, perhaps her courage and dedication will be an inspiration.

For more information, contact Dr. Charles Ide at charles.ide@wmich.edu.

Article reprinted by permission and written by Kaitlyn Gaymer, ’09.

Sue and Bob Summers are united in fight to raise MSA awareness and find a cure.
Dr. Matthew S. Mingus, professor of public affairs and administration, recently traded in his textbooks for body armor as he spent a year working in Iraq to help instill a sense of local democracy in a rural, agricultural region northwest of Baghdad.

Mingus is an active researcher in democratic reform, cross-border networks, borders and the changing nature of sovereignty. His earlier research focused extensively on U.S.-Canada comparative administration, and in 2005-06, he was the inaugural Fulbright Research Chair in Public Policy, Governance and Public Administration at the University of Ottawa Centre on Governance. He has published research on the U.S.-Canada Pacific Salmon Treaty, financial scandal in Canada’s public sector, North American perimeter security, and the dangerous concentration of trade flowing over Detroit’s Ambassador Bridge. He has presented at more than 30 national and international conferences, is a lifetime member of the American Society of Public Administration, and serves on the editorial boards of Public Administration Quarterly and the International Journal of Organization Theory and Behavior.

However, Mingus took a hiatus from his North American research and took an unpaid leave from WMU to spend much of 2009-10 in Iraq as a senior governance specialist for the U.S. Department of State. He served on an Embedded Provincial Reconstruction Team—called an ePRT—embedded with the U.S. Army and operating in the northern and western areas of Baghdad Province. This area included the infamous Abu Ghraib prison; al-Taji, which was the core of Saddam Hussein’s military-industrial complex; and Tarmiyah, which was the core of the insurgency in 2006-07. Unlike Baghdad, which is the largest city in Iraq, these areas contained numerous small villages and large swaths of rural, agricultural land.

“Don’t think desert, think fertile crescent with a strong tinge of industrial rust belt,” he says.

In that yearlong role, Mingus provided governance advice to his team leader, U.S. Embassy personnel and army commanders. His primary function was to mentor local public managers and town councils to help them develop a sense of local-level democracy, which does not come naturally to a nation that has survived literally thousands of years of dictatorships.

“It was clear fairly early in my deployment that local elections were not going to take place in 2009 due to national-level political issues,” he says. “Therefore, we had to stress the day-to-day aspects of democracy that Americans take for granted—developing consensus before and during meetings, representing the voices in the community, serving as an active conduit between the local and the national, and so forth.”

In addition, he adds, these governments needed to develop basic systems to keep track of the status of America and Iraqi projects within their jurisdictions.

“It is difficult to understand how centralized everything is in Iraq,” he explains. “The best way to help Americans understand this is to explain that the trash in Iraq is picked up by employees of a national ministry, while most local governments in the U.S. privatized this service a decade or more ago.”

This also means all significant projects such as building schools, reconstructing health clinics, and repaving roads that have been destroyed by years of IED explosions, are not under the control of the local officials.

“We had to start them with pencil and paper and slowly introduce computer systems as they had enough electricity to make this an option. They have amazing technical knowledge, but the systems and resources have suffered from decades of war and neglect.”

By working hand-in-hand with local public managers and politicians, Mingus’s ePRT was in an excellent position to provide advice to the Army on how to use American dollars on infrastructure development and when to push the Iraqis to get the job done by working through their own system.

“Much of this involved a judgment call on where the local governments had developed strong enough vertical relationships as well as when project ideas with local support also were aligned with national priorities,” he says. “When push came to shove, however, the needs and interests of the Army ground commanders always ruled the day.”

Because of Camp Taji’s proximity to the U.S. Embassy, his ePRT was called upon frequently to host Congressional delegations and other senior officials. He supported an Easter break visit by Senate Minority Leader Mitch McConnell and three other U.S. Senators; was able to meet Vice President Joe Biden while grounded at the U.S. Embassy due to a sandstorm; and helped arrange for numerous local leaders to meet Secretary of State Hillary Clinton at a “town hall” meeting in Baghdad.

According to Mingus, his biggest learning challenge in Iraq was the reality that the tribal structures in these fairly rural areas have long been involved in all aspects of governance. Tribal sheikhs are the dispute settlement mechanism in many cases that would go to trial in the United States, and they are expected to be the social support system for the downtrodden.

“Local level elections would help straighten out this competition for power by generating legitimacy for the local structures, but only time will tell if they ever take place,” he notes.

Nevertheless, he clearly believes that the main hope for a successful democracy to take root in Iraq rests on these efforts to legitimize and decentralize governance.

For more information, contact Mingus at matthew.mingus@wmich.edu.
Media stereotypes influence girls’ interest in science

Why do middle school-aged girls lose interest in science courses and doubt their ability to succeed in science? The answer may be found among the popular images of scientists on television. Dr. Jocelyn Steinke, professor in the School of Communication with a joint appointment in the Gender and Women’s Studies Program, and Dr. Lisa Ryan, a science educational consultant and science teacher at Calhoun Community High School in Battle Creek, Mich., launched a website, www.stereotypetompers.com and recently published an article in ScienceScope focused on helping middle school science teachers better understand how popular images of scientists influence middle school students.

Based on their research findings, funded by the Research on Gender in Science and Engineering Program of the National Science Foundation, the website and accompanying instructional materials were designed to provide information on the popular images of scientists seen by middle school students and promote understanding of how these images might influence middle school students’ interest in science. Other members of the research team working on this effort were WMU’s Dr. Brooks Applegate, Dr. Marilee Long of Colorado State University and Dr. Maria Lapinski of Michigan State University.


“We found some images of women scientists portrayed in positive ways and in lead roles in some of the programs, particularly in the drama programs like ‘CSI,’” Steinke says. “However, most of the images of scientists were of male scientists, and they also appeared more frequently on screen than female scientists.”

But one concern related to this finding is that many of the images of stronger, intelligent and attractive women scientists appeared in television programming that includes violent and mature content.

After documenting the images of scientists in these popular television programs, Steinke and her research team set out to determine how middle school students reacted to the scientists they see on the television screen.

The research team showed short clips of some of the television programs they had previously examined to seventh-graders from local middle schools. They asked students to rate the scientists they saw in these clips who were portrayed with several different attributes—showing them as intelligent, caring, dominant, respected and able to work alone. These attributes were selected because they represented the attributes most often found in the portrayals of scientists in the programs examined by the researchers.

Most of the students indicated a preference for scientists in television drama programs like the “CSI” shows. Boys showed more identification with male scientist characters than with female scientist characters across all character attributes examined, while girls showed more identification with both female and male scientist characters as well as with female scientist characters portrayed as dominant or intelligent.

“These findings suggest that both boys and girls of middle school age are most likely to identify with or want to be like the scientists they see in drama television programs, like the popular ‘CSI’ forensic-science programs,” Steinke says. “These findings also indicate that girls, in particular, may be more likely to identify with female scientist characters on these programs shown as smart and competent and cast in lead roles as scientists.”

More images of successful women scientists on television may be critical in dispelling the long-held popular stereotype of science as masculine that has long been deep-rooted in television programming. Showing attractive images of women scientists on television may encourage more girls to identify with scientists, possibly leading to their future interest in science as a career.

“Images and stereotypes from television and movies are frequently all the prior knowledge that students have of scientists,” Ryan says. “Many of them do not know anyone who works in a science, technology, engineering, or mathematics—STEM—field or anything about the vast variety of STEM-related careers.”

To counter popular television stereotypes of scientists, Steinke and Ryan developed the instructional resources featured in the ScienceScope article and the Stereotype Stompers website.

The instructional materials were developed in consultation with national and state benchmarks for the seventh-grade science curriculum. Ryan also consulted with several middle school science and math teachers to ensure the materials met with the Grade Level Content Expectations. Discussion starters, mini-lessons, and classroom activities to provide information about stereotypes of scientists on television were published in the September 2010 issue of ScienceScope, which is a publication of the National Science Teachers Association for middle school science teachers. The material also can be found on the Stereotype Stompers website.

Along with these instructional materials are some interactive activities for middle school students. Under the student section of the website, one tab invites students to vote for their favorite TV scientist and another tab leads students to a page that asks: “Can you spot the scientist?”

The profiles represent a wide array of scientists, some from WMU and local companies, with diverse backgrounds and interests at different stages of their professional careers. The photographs that accompany the profiles show scientists outside the office and laboratory pursuing their personal hobbies or spending time with family, friends or co-workers.

The images and stories of these scientists are presented to help middle school teachers guide their students to a better understanding of science and scientists—an understanding that may be critical for building a broader and more diverse STEM workforce.

“As secondary teachers, we need to constantly think about how we can make our content relevant to our students’ lives and their futures,” Ryan says. “These materials can be used to help students examine more deeply what they know and feel about science characters on television, as well as real-life scientists.”

For more information, contact Dr. Jocelyn Steinke at jocelyn.steinke@wmich.edu or visit the website at www.stereotypetompers.com.
WMU-based team minimizes crop-disease risks for farmers

Dr. Kathleen Baker is leading a national team of researchers from a variety of disciplines and five research universities whose goals are preventing millions of dollars in damage from crop disease and minimizing the impact of global climate change. Baker, an associate professor of geography at Western Michigan University, says agriculture has emerged as one area in which complexity and economic uncertainty are driving the research of multidisciplinary teams. The multiuniversity, multidisciplinary project she leads is funded by the USDA with a $1.2 million grant aimed at using sophisticated weather forecasting methods to help reduce the risk of crop disease.

Baker and her colleagues are developing models that tailor these forecasts to specific crop diseases. The models have the potential to save crop growers real money even as they help the environment.

According to Baker, growers already use weather data to adjust their spraying schedule for pesticides. “We hope to provide growers forecast models that allow for sufficient lead time to make decisions,” Baker says. “With better long-range forecast models and warning systems, which we hope to develop with this project, we can aid growers in the timing of pesticide application and in the assessment of disease risk.”

Baker’s research project has WMU as the lead institution to four land grant universities—Michigan State University, South Dakota State University, University of Georgia and the University of Idaho. Additionally, Baker relies on WMU subcontractors, partners at Indiana University’s School of Informatics and the San Diego Supercomputer Center, to assist in the development of the cyberinfrastructure that will make forecast updates available to growers on a daily basis.

A preliminary model for forecasting potato late blight in Michigan went online in summer 2010. Growers access forecasts through the late blight website at MSU—lateblight.org. Twitter was also used by agricultural extension personnel to spread information about disease conditions—twitter.com/lateblight. Similar forecasts will go live in 2011 in South Dakota for fusarium, which causes widespread head blight of barley.

In addition to potato late blight and fusarium, leaf spot disease on peanuts is targeted by this particular grant. The potential financial impact for the research for each of these commodity crops is huge. In 2005 alone, leaf spot disease on peanuts caused $6.3 million in damage for growers as well as an additional $35 million to contain the disease spread. Similar work in soybean diseases has shown an $11 million savings with soybean rust can be realized with a 20 percent reduction in uncertainty through risk modeling.

“If we can help limit uncertainty of forecasts, we can save the growers money lost on crop disease,” asserts Baker. “With more accurate forecast models, growers can time when they spray more efficiently, using less fungicide and less fuel when the risk for disease is lower.”

When is crop disease risk higher? Being able to predict when risk is higher is the key to helping farmers increase their productivity and save valuable resources.

The genesis of Baker’s research was her experience working with Michigan potato farmers while she was at MSU doing her doctoral research in geography. By working extensively with plant pathologists and agricultural extension, she began to understand the devastation that came with crop disease and changing weather conditions, which increased grower uncertainty about what to expect in a given year.

At that point, all the growers had available to them was an estimate of current disease risk and past growing season records. The problem with past growing season records, she says, is that the global climate changes usher in new weather conditions that increase uncertainty among growers and often increase the risk for crop disease. Her dissertation reported that weather in Michigan has become more conducive to potato late blight development over the past 50 years.

With the potato growers in Michigan, for example, more accurate long-term forecasting models will allow growers to know when to spray well in advance to offset the risk of potato late blight disease. With cooler conditions and wetter conditions occurring earlier in the growing season and more often during the summer, the risk for potato late blight increases. To reduce the damage to growers’ crops, the development of more accurate models help growers determine when and how much to spray.

Baker’s prediction models for crop-specific disease can be informed by more accurate weather forecasting methods, and the available forecast and risk assessments can be accessible via the Internet to farmers to help them decide when and where to combat specific crop disease. So, for example, in the northern Great Plains area, growers can determine their risks on any given day for fusarium.

“This project will be proof of a concept that similar systems could work for multiple crops, at multiple scales, in multiple regions of the United States,” remarks Baker. “We are excited to see what results from our research.”

For more information, contact Dr. Kathleen Baker at kathleen.baker@wmich.edu.
A renowned Western Michigan University mathematics educator has been awarded a three-year, $3.5 million grant from the National Science Foundation to develop a mathematics course for high school seniors that will prepare them for college-level courses in majors that do not require calculus.

Dr. Christian Hirsch, who is nationally known for his work in leading the successful Core-Plus Mathematics Project at WMU, is leading a new effort called Transitions to Core-Plus Mathematics Project at WMU, and bringing to publication a fourth-year mathematics course that can be used in high schools around the nation, regardless of the type of curriculum. Hirsch is leading a new effort called Transitions to Core-Plus Mathematics Project at WMU, and bringing to publication a fourth-year mathematics course that can be used in high schools around the nation, regardless of the type of curriculum.

Hirsch says. “If they don’t take mathematics during their final year of high school mathematics courses when they enter college and more remedial mathematics courses when they enter college. The problem is universal for students who are not going into college calculus, there have been few or no alternative courses for students that do not plan to take a precalculus course during their final year of high school.

“The problem is universal for students who are not going into mathematics, engineering or the physical sciences in college,” Hirsch says. “If they don’t take mathematics during their final year, they are removed from the ideas, thought processes and skills of the subject and they don’t do well when they take the placement tests that determine their freshman-year courses.”

The data, he says, clearly show that students who are not enrolled in mathematics courses during their senior year are much more likely to be placed in remedial, non-credit courses when they enter college. And, he notes, college-bound students are overwhelmingly headed to majors that do not require calculus.

In 2009, for instance, a College Board survey revealed that a full third of college-bound seniors planned to enter the health professions or business management, marketing and related fields.

Hirsch also notes that, in 2012, 36 states and the District of Columbia have adopted the new Common Core State Standards for Mathematics developed under the auspices of the National Governors Association Center for Best Practices and the Council of Chief State School Officers. Those standards call for all students to complete four years of high school mathematics.

Since 1992, Hirsch has led development of the Core-Plus Mathematics Project. That NSF-funded effort has just been published in its second edition and has been named an exemplary curriculum by the U.S. Department of Education. Most recently, the CPMP curriculum was recognized by the research arm of the Business-Higher Education Forum as one of 35 education-related programs that increase student achievement and improve college readiness. The program is in use in nearly 900 school districts around the nation.

CPMP is a four-year curriculum that features interwoven strands of algebra and functions, statistics and probability, geometry and trigonometry, and discrete mathematics. The first three courses in the NSF-funded series provide a common core of broadly useful mathematics for all students. The fourth-year course, Preparation for Calculus, continues the preparation of students intending to study mathematics, engineering or the physical sciences in college.

The new fourth-year course will be designed for use both with CPMP and with a variety of other high school curricula. The project plans call for development of both a print and digital version of the new course as well as software tools that can be used by teachers and students.

“The new course can be used as a capstone course with many different high school mathematics programs,” Hirsch says. “We plan to make the software freely available to students, teachers and teacher educators across the country to help meet the equity and access challenges that have delayed significant incorporation of such technology tools in high school mathematics.”

For more information, contact Dr. Christian Hirsch at christian.hirsch@wmich.edu.
WMU changing lives of Kalamazoo children with autism

With autism now said to affect one out of every 100 American children, Kalamazoo families are reaping the benefits of a University/public school partnership that gives them access to some of the world’s first public school classrooms to provide the kind of help previously available only to the nation’s wealthiest families.

Recent reports say one in every 100 children is now considered on the autism spectrum. And the U.S. Surgeon General’s most comprehensive recommendation for helping these children is early, intensive behavioral intervention, an approach coming from the field of behavior analysis.

But early, intensive behavioral intervention is too expensive for all but the wealthiest families, costing in the range of $60,000 to $100,000 per year. The high cost stems from the fact that such intervention requires one-on-one work with well-trained, well-supervised behavioral tutors—ideally for about 40 hours per week. In other words, few children are able to receive this expensive, early, intensive behavioral tutoring.

For the children in the nine school districts of the Kalamazoo Intermediate School District, though, an early, intensive behavioral pre-school classroom was begun 15 years ago at Croyden Avenue School under the supervision of Carmen Jonaitis, thereby creating one of the world’s first public-school classrooms to provide intensive, behavioral tutoring.

The Croyden location became one of the first public school classrooms to offer such tutoring. Fortunately for the children involved, one of the world’s best behavior analysis academic programs was located nearby in Western Michigan University’s Department of Psychology. The WMU program has one of the two or three best behavior analysis programs in the world, at the bachelor’s, master’s and doctoral levels.

Demand met supply as the psychology department was able to provide skilled practicum students who could serve as the behavioral tutors and tutorial supervisors for the children in the classroom. The work under the overall supervision of Dr. Richard Malott, professor of psychology, and the match-up made the classroom economically feasible.

Malott, who has been teaching at WMU since 1966, helped develop the behavior analysis tracks in the University’s bachelor’s, master’s and doctoral programs, as well as the early, intensive behavioral classrooms for children with autism.

“I’m not sure who benefits more,” says Malott, “the children or the WMU undergraduate and graduate students.”

“Our goal is to provide affordable early, intensive behavioral tutoring to the children with the help of WMU practicum students. The parents only pay the cost of attending the preschool that houses the Kalamazoo Autism Center and about $4 per hour for the one-on-one behavioral tutoring. The work also has been facilitated by charity benefits the parents have sponsored for the center. Because the difficulty of finding intensive behavioral tutoring services is so great, children have come to the programs not only from Kalamazoo County but also from communities as far away as Marshall, Mich. The intense behavioral tutoring is designed to help the children achieve a more normal life. The tutors are careful not to reward undesirable behavior, such as tantrums and aggression, which can include external aggression such as biting hard enough to draw blood and self-aggression such as repetitive head banging hard enough to produce a permanent contusion. The tutors achieve this by teaching the children appropriate ways to get what they want, like using picture icons, sign language and vocal English language, rather than aggression. In fact, a major focus of the behavioral tutoring involves teaching the children to
attend to and understand spoken language and teaching them to use language expressively to describe their environment and to ask for what they want.

The behavioral tutors also work on activities of daily living, such as using toilets, hand washing and dressing as well as appropriate solitary play and social play. In addition, the tutors work on reducing stereotypic self-stimulation such as hand flapping.

But none of this comes easily. It requires hundreds of hours of tutoring, each hour packed with a hundred learning opportunities that are recorded and evaluated. Throughout the sessions, they take care never to reward inappropriate behavior, gradually raising the bar for the appropriate behavior—for example, moving from and always to reward appropriate behavior, gradually raising the single syllable to a complete word to a complete sentence. Tutors also take care to gradually reduce the amount of carefully structured support, with the goal of preparing the children for more traditional instruction.

Though the children rarely progress as far as desired or as quickly as desired, the lives of the children and the lives of their families, Malott says, are always greatly improved by these early, intensive behavioral interventions.

“This may be one of the few opportunities undergraduates have to gain enough skills in a single content course that the next semester they can do a practicum where they have a significant impact on the lives of others—a powerful experience,” Malott notes. “And with only their B.A. degree, they can get a good job doing important work, actually using what they’ve learned in their psychology major, a benefit graduates from most psychology departments don’t receive.”

However, he says, many of undergraduates go on to get master’s or doctoral degrees, either at WMU or in one of the nation’s other behavior-analysis graduate programs, because the University’s well-trained students are in demand around the country. The only down side, he says, is that there’s little educational or insurance funding in the state of Michigan for hiring his graduating students to help children with autism.

The great majority of graduates must move to other states where funding is available to support early, intensive behavioral interventions for children on the spectrum.

“In addition to this practicum work,” says Malott, “my doctoral students and I are developing a practitioner model of research at the thesis and dissertation level where the first goal is to help the children who participate in the research. The second goal is to help the classroom where we’re doing the research. The third goal is for the student researchers to get their Ph.D. degrees, and only the fourth goal is to publish the studies in peer-reviewed journals—a reversal of the usual model.”

“As for me, working with the children, and the undergraduate and graduate students, and the research projects is the most intellectually, culturally, emotionally and spiritually rewarding work I’ve been involved with in my 47 years of teaching and research,” reflects Malott. “My students and I joke that our goal is to ‘save the world with behavior analysis,’ and though we know it’s only a joke, that’s what we’re trying to do.”

For more information, contact Dr. Richard Malott at richard.malott@wmich.edu.

The words of Western Michigan University’s Jaimy Gordon—and her name—were on the lips of book lovers nationwide, as the longtime WMU faculty member took her place in the publishing world’s winner’s circle by winning the 2010 National Book Award for fiction.

Gordon’s novel, “Lord of Misrule” was selected for the coveted annual prize that USA Today calls “publishing’s version of the Academy Awards.” She accepted the award after it was announced Nov. 17 at the gala 61st National Book Awards Benefit Dinner and Ceremony in New York City. The prize in fiction has been won previously by such literary giants as William Faulkner, Saul Bellow and John Updike. The prize came with a $10,000 cash award and bronze statue, but literary prestige and increased book sales are among the benefits as well.

Gordon’s novel, her fourth, was published by McPherson & Co. Set in the world of West Virginia horse racing in the early 1970s, the book was praised by the judges as a “vivid, memorable and linguistically rich novel” about the rock-bottom end of the sport of kings.

An English faculty member at WMU since 1981, Gordon based the novel on a world she learned about fresh out of college in the late 1960s when she took a series of jobs intended to boost her life experience. She worked for a period as a groom and hot-walker at Charles Town Race Track in West Virginia. That experience served as background as well for her short story about horse racing, “A Night’s Work,” which was chosen for “Best Horse Racing Stories” in 1993.

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This is the second time in as many years an author with WMU connections has been among the National Book Award finalists. Kalamazoo native Bonnie Jo Campbell, a student of Gordon's in the 1990s who earned three degrees from WMU, was named a finalist last fall for her book of short stories, "American Salvage."

Gordon, a Baltimore native, earned degrees from Amtrak College and Brown University. She has published three other novels—"Bogeywoman," "Shamp of the City-Sole" and "She Drove Without Stopping."
Classroom favorite tackles neutron stars with fellow physicists. When he’s not teaching basic physics, WMU’s Dr. Michael Famiano can be found tackling the mysteries of neutron stars with his colleagues at Michigan State University’s National Superconducting Cyclotron Laboratory. He’s shown here at the MSU facility working on a project examining the outer crust of such stars.