

OAKLAND UNIVERSITY » Fall 2010

OU RESEARCH

Volume 3, No.1





Moudgil is an OU professor of Biological Sciences whose more than 30 years of research has focused on steroid hormone action and breast cancer. The research in his laboratory has been supported by funding from the National Institutes of Health. His laboratory was the first to report a link between differential actions of ovarian hormones (estrogen and progesterone) and induction of p53 in T47D breast cancer cells. Along with his team of graduate and undergraduate students and a faculty colleague, Moudgil is currently investigating hormonal regulation of tumor suppressor proteins, p53 and retinoblastoma, in human breast cancer cells.

Roth is an OU professor of Physics. He holds a doctorate from Vanderbilt University and is widely published, highly cited and recognized for his work in researching bioelectrical and biomagnetic phenomena. He was a research fellow at the National Institutes of Health before joining Oakland University.

Message from Virinder Moudgil

Dear Friends,

At Oakland University we believe in discovery and creativity. The more information we have, the closer we are to making solid, impactful, life-changing decisions. That is why Oakland University is actively participating in the national agenda to create new knowledge, new breakthroughs, new technology and new jobs. As you will read in this edition of *OU Research*, our centers of research reach into all areas of our lives — from biomedical, to engineering, to health care, to the arts. Our facilities and staff support these efforts beyond measure.



Research at OU is at an exceptional level. A major reason for this is our ability to attract and retain outstanding investigators by providing state-of-the-art facilities and a rich, collaborative environment. We recently renovated our science and engineering instructional labs to provide state-of-the-art facilities for our faculty and students in support of their educational experience. We will soon have a new 160,000-square-foot Human Health Building equipped with expanded instructional and research capabilities for our School of Nursing and School of Health Sciences faculty and students. Our departments and units work side-by-side to draw upon our best resources in order to find solutions. Multi-department efforts include our Mathematics Department working with Biology to find an effective treatment for HIV, and our Facilities Management team joining forces with the Engineering Department to create campuswide solutions for clean energy.

We reach out externally as well. Partnering with NASA, OU's Fastening and Joining Research Institute (FAJRI) is making space exploration safer; working with school systems across the state, the Pawley Lean Institute is helping schools trim their budgets in these tough economic times without sacrificing a quality education for their students; and so much more.

Ahead of us are a growing number of opportunities for advancement in our quality of life. And public support for OU's continued investment in research is strong.

Our faculty and staff work extremely hard to acquire the resources they need for scientific and technical works. This year we received an all-time high of \$19 million in external funding. The research expenditures included nearly \$15 million from grant support and an additional institutional commitment of \$30 million dedicated to research and scholarship. OU is recognized by the Carnegie Foundation for the Advancement of Teaching as one of the nation's 83 doctoral research universities because of our expansive, impactful research. In fact, the publication and grant records of Oakland University faculty working in biomedical research are, on a per-capita basis, among the top in Michigan.

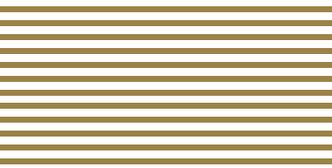
We are exceptionally proud of the vast spectrum of research conducted at Oakland University. Its impact has the potential to save lives, improve education and help rebuild our economy.



Virinder K. Moudgil, Ph.D.
Senior Vice President for Academic Affairs and Provost



Brad Roth, Ph.D.
Interim Vice Provost for Research



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RESEARCH AT OAKLAND UNIVERSITY

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The big picture

Strengthening the North American automotive industry



The Center for Integrated Business Research and Education (CIBRE) at Oakland University's School of Business Administration (SBA) brings together the integrative thinking of researchers, students and business leaders to address organizational issues and help businesses succeed while meshing the students' experiential learning and global understanding needs with the business community's needs.

Having already focused initiatives on industries in areas such as health care, marketing, finance and information systems with success, it's not surprising that CIBRE has turned its attention to one of the region's core industries: automotive.

CIBRE is looking to engage in focused research in support of Automotive Futures, a component of CIBRE that is intended to help the automotive industry evolve successfully in an economy that is more technology-driven and service-oriented than ever before.

"The automotive industry has traditionally looked at things in a segmented way (design, manufacturing, service and disposal), which has contributed to some of its problems in the past," says Mohan Tanniru, Ph.D., dean of the SBA and professor of Management Information Systems (MIS). "For the industry of the future, they need to take a more holistic view and focus on the entire product life cycle, but with a service-centric view. In other words, the industry needs to get away from 'product thinking' to 'service thinking.'"

Seeing the big picture, however, often calls for an understanding of details and how they work together first. Based on input from industry experts, CIBRE identified four key phases of the automotive industry: design and development, manufacturing, service and disposal/environmental issues — each working together to make the industry "service-centric." Faculty and students are collaborating with the industry to study each phase, working toward CIBRE's goal of merging the four into a single area of study in the future.

To explore the customer's role in design and development, CIBRE partnered with companies and industry groups to host Ignite Automotive events. The goal of these events is to generate innovative and out-of-the-box thinking to develop ideas that are transformational in nature.

The manufacturing phase is being explored through having greater customer input along the supply chain. By working with small manufacturers, like tool-and-die companies and their customers, the goal is to identify opportunities that will make all segments work collaboratively to support customers. This led to a formal program called the Tool and Die Futures Initiative, and it is bringing companies and students together for networking, knowledge sharing and training.

To study the role of the customer in the service phase, students were engaged in projects at General Motors dealerships in the United States and in China and compared how dealer service varies across cultures. Students are also working with other companies to make dealer service become an integral part of customer service over the life of the automotive product.

As for the environmental issues, students and faculty are creating an energy management program, in partnership with engineering, to examine critical issues regarding the way energy is consumed in vehicle manufacturing, and how materials could be recycled more effectively. Eventually, Tanniru hopes this will evolve into a joint master's program in Sustainability, offered by both the business and engineering schools.

The projects discussed under each phase of the automotive product life cycle are a by-product of true collaboration, where everyone is sharing a single goal: help the automotive industry develop new strategies for continued success.

"Anything you do with students and faculty related to research has to be linked to the success of the community we live in," Tanniru says. "By working with the industry, the students' education and real world learning is embedded in the economic development efforts of the region."

By Amy Lynn Smith

"Anything you do with students and faculty related to research has to be linked to the success of the community we live in."



Gary Barber, professor and chair of the OU Department of Mechanical Engineering

Gary Barber received his Ph.D. from the University of Michigan in 1987 and joined Oakland in 1990. His research has focused on the tribology of engine cylinder kits, engine valve wear and the effect of tool wear on the surface topography of machined surfaces.

Driving research

OU Automotive Tribology Center impacts U.S. economy



As we drive our cars down the highways and byways of our cities, unless we are automotive engineers, we don't think much about the inner workings of the vehicle. We care about how it gets us from point A to point B while singing along with satellite radio. We care about how it allows us to hold our coffee mugs without spilling, tether the child safety seats securely and keep our golf clubs snug in its cargo hold.

However, before the car becomes an integral part of the family and a reflection of our personalities, its parts are assembled with precision based on decisions made by highly trained mechanical engineers. Some of these professionals get their start at Oakland University as graduate students of mechanical engineering working in the Automotive Tribology Center in the School of Engineering and Computer Science (SECS). In particular, they test the science of lubrication, friction and wear on a vehicle's engine, analyzing materials so that automakers can lower friction to improve fuel efficiencies in vehicles.

In conjunction with the General Motors Powertrain division, OU students co-developed important test machinery that determines how a piston and bore interact with each other.

"By lowering the friction and wear, we enhance durability, which leads to longer life spans on cars," explains Gary Barber, a professor in the department of Mechanical Engineering and director of the OU Automotive Tribology Center. "We consider the development of this new machinery one of our biggest accomplishments."

It is a partnership that pays off for the consumer. "Over the years, we have been working with many professors, research staff and students at Oakland University on many automotive tribology projects for lower friction and wear, improved fuel economy, lower emissions and higher power output. Many results and commercial applications have been achieved," said Yucong Wang, manager, Department of Material Technology, General Motors.

Detroit-based automakers Chrysler Corporation and Ford Motor Company also team up with OU students. The experience results in benefits for both groups. The students learn what it's like to operate in the corporate world and begin to network beyond the classroom, making contacts that could lead to a career. The auto engineers are grateful for the students' enthusiasm, dedication and motivation to succeed.

Together, the engineers and the students have built several machines that test the wear and scuffing resistance at the interfaces of the piston ring and cylinder bore, piston and cylinder bore, and piston ring and ring groove. The tests involved using different coatings on the piston, piston ring and the cylinder bore so that when they slide more smoothly, the amount of scuffing wear to the bore is minimal, helping the bore last longer and contributing indirectly to improving fuel economy.

"The tests reveal the effects of wear and scuffing when the pistons and bores rub together. Too much wear is not good as it breaks down the surface over time," says Barber. "Scuffing causes surfaces to roughen, which stops the engine from working. The more scuff resistant we can make an engine, the more durable it becomes."

For his entire career, Barber has either worked as an engineer or instructed university-level classes on tribology. He is a fellow of the Society of Tribologists and Lubrication Engineers and is currently serving the U.S. Army as a subject matter expert in the area of enhanced fuel economy of army vehicles. Barber has published more than 70 articles in academic publications in the area of tribology.

This fall, Barber's expertise will be utilized as he oversees an expansion of the center made possible by a \$1.3-million government grant. The new technology will expand research support from the military, government and industrial sectors.

For the center's newest clients, TARDEC (Tank and Automotive Research Development and Engineering Center), ConocoPhillips and Argonne National Laboratory, OU students will investigate alternative methods of engineering technology involving lubricants and lubricant additives that will improve vehicle performance, lower pollution and meet stringent emission requirements.

"What we do is quite specialized," says Barber. "We are one of the only tribology centers in the country dedicated to automotive tribology research and uniquely positioned to advance the reliability, mobility and efficiency of automotive components."

So, the next time you rev up your car's engine, think of the OU students who likely had a hand in getting you that smooth ride and better gas mileage.

By Michele Jasukaitis

"By lowering the friction and wear, we enhance durability, which leads to longer life spans on cars."

Going 'clean'

Research center harnesses renewable sources



When Oakland University's 160,000-square-foot Human Health Building — which will house both the School of Nursing (SON) and the School of Health Sciences (SHS) — opens in 2012, it promises to be the first “green,” or Leadership in Energy and Environmental Design (LEED) platinum certified system of its kind in any educational facility in the state.

LEED is an internationally recognized building certification system, providing verification that a building was built using energy savings, water efficiency, CO² emissions reduction, improved indoor environmental quality and stewardship of resources and sensitivity to their impacts.

It will be just one of the ways in which OU will create methods for a cleaner, more environmentally friendly campus. The School of Engineering and Computer Science is now home to the new Clean Energy Research Center (CERC), a \$500,000 Department of Energy (DOE)-sponsored program in alternative energy education focusing on researching combined heat and power, biomass energy and energy efficient systems.

“The CERC will be the home for multiple, clean energy research, development and educational activities,” explains Krzysztof Kobus, Ph.D., associate professor of engineering and director of CERC. “The center will be an umbrella that will coordinate the three main facets on campus: academic, research and facilities. CERC will tie them all together to accomplish one mission: clean energy.”

In addition, the CERC will create an environment to foster commercial partnerships, provide an educational platform for student research and clean energy curricula development, while providing an entrepreneurial atmosphere within the OU research and development community to allow technology transfer and commercialization of new technologies.

Students and management associated with the CERC will also provide commercial and industrial energy audits, assessments and feasibility studies for local partners.

This fall, the CERC will install a biomass boiler on campus to research the most effective ways to densify renewable sources such as wood chips, switch grass, corn and other agricultural waste. The boiler was funded through the DOE grant.

Kobus sees the CERC as a “living laboratory where researchers

and students can record real world data. Using resources such as wood chips, switch grass and corn could provide an annual energy savings of \$1.5 million.”

The center will also focus research on using wind power. The CERC already conducted a two-and-a-half-year feasibility study investigating the technical and economic merit of installing utility scale wind turbines.

Bringing environmentally friendly alternatives to campus is not entirely new for OU. In 2003, the university installed a 10kW photovoltaic (PV) demonstration project in the community building of the University Student Apartment complex. The system uses 550 building-integrated PV shingles manufactured by Uni-Solar, Inc. Funded by a State of Michigan grant and OU, the project is demonstrating the technical feasibility of using solar power.

“There are times during sunny days when the building produces more electricity than it needs and supplements the campus grid, while other times it takes energy from the grid,” Kobus says. “The goal is to balance energy use so that over the course of the year the building is a zero net-energy user.”

Currently, multiple projects have been completed or are in various stages of development. These projects include:

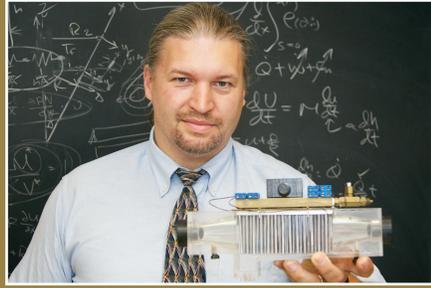
- Geothermal heat pump research and demonstrations
- Smart grid / smart metering demonstrations
- LED and emerging lighting technologies
- Solar thermal systems
- Solar photovoltaic systems
- Biomass heating and biomass CHP systems
- On-site solid fuel biomass densification
- On-site biodiesel production and process optimization
- On-site ethanol production and process optimization

Kobus says CERC will also reach out to the community to inspire the next generation of researchers. “We plan to offer summer camps for area students to get them excited about clean energy. They’ll participate in experiments, field trips —they’ll learn about wind turbines and renewable resources,” he says. “We would like to inspire them to make clean energy a career option and carry on the mission.”

He adds, “CERC will not just be a pure research center, but a fundamental part of OU’s mission to become a green university.”

By Susan Thwing-McHale

“The goal is to balance energy use so that over the course of the year the building is a zero net-energy user.”



Krzysztof Kobus, associate professor of Engineering

Krzysztof Kobus received his Ph.D. from Oakland University in 1998. His research interests include alternative, renewable and sustainable energy systems. He has published extensively on these subjects and is a recipient of an ASME Heat Transfer Division "Certificate of Appreciation for Valued Service," as well as a two-time recipient of the Oakland University Research Fellowship.





Diane Norris, interim dean,
School of Nursing, assistant
professor of Nursing

Norris specializes in the care of children, ethics, professional role development and research. Her areas of research include nurses' job satisfaction and ethical nursing practice. She holds a BSN and MSN from Wayne State University and a Ph.D. from the University of Michigan.



Nursing research

Stressing its importance in the field and in the classroom



Just as the movie industry has its Oscar, and the journalists have their Pulitzer Prize, on par with the importance attached to these awards, is the nursing industry's Nightingale Award that proudly recognizes outstanding work by its nurses. Named after Florence Nightingale, who in the late 1800s founded the first nursing school in the world, the award recognizes the work of nurses who perform beyond expectations in these areas: administration, education and research, long-term care and rehabilitation, nursing in the community, advanced nurse practices and staff nurse practices. Winners of the prestigious award take pride in their honor knowing that they have been nominated by their peers and then overcome an intense selection process to achieve this status.

Clinical Nurse Specialist NICU (Neonatal Intensive Care Unit) Kristen Pelshaw received the 2010 Nightingale Award in the category of education and research for her ability to evaluate, educate and implement her research.

"I see myself as a teacher," says Pelshaw, who enjoys thinking out of the box. "It's not about yourself, it's about helping others and making (the medical experience) better and safer for them."

One of Pelshaw's successes includes her invention of a positioning device she calls a Cal-Prone, named after Calvin, a patient she cared for after an eye surgery. She reconstructed a tabletop ironing board, complete with a hole cut into it for the patients to peek their heads through, to keep babies face down for 24 hours after an eye surgery.

Diane Norris, interim dean for the School of Nursing at Oakland University, explains that research is an important part of the professional job description.

"With any field, program or profession, research provides a sense of legitimacy," says Norris. "Nursing education has been modified to reflect a solid research base to foster future nurse researchers."

Research can be as simple as Pelshaw's "Chocolate Taste Test." Staff and bedside nurses joined forces to collect 40 hours of data by having participants at Beaumont Hospital in Troy, Mich., taste five milk chocolate M&Ms and five dark chocolate M&Ms, identifying which five they liked better.

Using the chi-squared testing method, which is a statistical test used to compare observed data with the data that is expected,

Pelshaw's team predicted that the younger generation would prefer dark chocolate.

Of the 527 testers, the 18-to 28-year-olds preferred milk chocolate while the groups categorized as 29-to 45-year-olds and 46-to 85-year-olds showed more testers who liked dark chocolate. The conclusion revealed that none of the between-group comparisons showed statistically significant differences in chocolate preference.

"The main reason for 'The Chocolate Taste Test' was to involve nurses in the basics of research and encourage them to initiate their own studies," says Pelshaw.

When the School of Nursing faculty members pursue their own projects, they impart the message to students that nurses need to engage in evidence-based research. Some even involve their students so that they gain the experience.

To fulfill their requirements in the master's in nursing program, three OU students will be assisting Associate Professors Karen Dunn and Cheryl Riley-Doucet with their research on how music affects adults suffering from dementia and whether it decreases their agitation.

Meghan Harris, assistant professor, proved the value of research when she and Laura Pittiglio, assistant professor, collaborated with Fatma Mili from the OU School of Engineering and Computer Science (SECS) to create a virtual hospital unit that could be accessed remotely by students. It is a video game where the student playing the game comes into a patient's room, reviews the patient's chart then proceeds to treat the patient. The game, called VI-MED, is programmed with patients who have various medical conditions and has the potential for professors to use it in tandem with the coursework.

Together with John McEaney, School of Education and Human Services, and Chris Wagner, SECS, they applied for funding from the National Institute of Health and hope to find out by fall 2010 whether or not they will receive a grant to implement the virtual game.

Pelshaw plans to uphold the reputation that comes with being a respected Nightingale Award recipient by seeking out more research projects. She says her gears are turning for a topic pertaining to neonatal patients.

By Michele Jasukaitis

"It's not about yourself, it's about helping others and making (the medical experience) better and safer for them."

Joining Forces

Helping NASA run a tighter ship



On Thanksgiving Day in 1996, aboard the U.S. space shuttle Columbia, astronauts Tammy Jernigan and Tom Jones were preparing to make the first of several spacewalks aimed at testing tools and refining techniques for the assembly of the International Space Station, which was scheduled for launch the following year.

As they prepared to exit the spacecraft, the astronauts found themselves struggling with Columbia's airlock outer hatch. The door simply refused to open.

"Houston, we have a problem."

What no one knew was that a single screw had come loose during the mission and was jamming the hatch. The tiny fastener had been designed without any locking feature and — in typical Murphy's Law fashion — had worked loose during the spacecraft's ascent and was now lodged in the handle locking mechanism.

Ultimately, the spacewalks had to be scrubbed, at considerable cost and to the great consternation of the National Aeronautics and Space Administration (NASA).

The Columbia's loose screw was not an isolated occurrence, however. In fact, NASA files contain a litany of other fastener-related incidents or failures that have created expensive headaches for the space program.

To help combat such problems, NASA has enlisted the help of Oakland University's Fastening and Joining Research Institute (FAJRI). The only known facility of its kind in the world, FAJRI pursues fundamental and applied research to develop and disseminate new technologies for the fastening and joining of metals, composites and polymers.

"Most people treat fasteners as an afterthought, when we really should be seeing them as the weak link in almost every design," says FAJRI founding director and OU professor Sayed Nassar, Ph.D. "I've always found it to be a fascinating research niche that has a wide range of applications in almost every industry."

Founded in 2003, FAJRI has been playing an important role in boosting the safety and reliability of products in both the military and civilian sectors of the American economy. At FAJRI, a team of about 20 faculty, post-doctoral students and graduate researchers at the Ph.D. and master's levels is fully engaged in fundamental and applied research. In 2008, it was designated

a National Center of Excellence, which enables it to receive core research funding from the U.S. Army.

From small businesses to the automotive and nuclear power industries, the institute aims to help ensure the safety, quality and reliability of many mechanical and structural systems, machinery and equipment.

Now NASA's Engineering and Safety Center (NESC) is tapping the expertise that resides with FAJRI as it attempts to craft a consistent set of technical standards and requirements for the use of threaded fasteners in spacecraft hardware. Nassar and his FAJRI team are actively serving on four special teams to develop NASA-wide standards for current and future space programs.

"The assets that Nassar and FAJRI bring to the table are key to meeting our goal of developing a nationwide document on space flight hardware," says NESC's Michael J. Dube, Ph.D., Discipline Deputy-Mechanical Systems. "The FAJRI team is widely recognized as experts and provides us with insights and recommendations that we hope will improve the reliability and safety of our space missions."

Along with other U.S.-based NASA centers, suppliers Boeing and Lockheed-Martin, as well as the University of South Florida-Tampa, FAJRI is currently engaged in developing a threaded fastener standard for the U.S. space program. The new standard will develop requirements for installation, analysis, design and verification of fasteners used in space flight hardware.

Once approved, the standard will be used across NASA for its space projects. Nassar says the knowledge gained through these studies may be practical for wider use outside the space program.

While other academic institutions may focus on specific aspects of fastening or joining — the effects of vibration, for example — Nassar explains that FAJRI takes a consolidated approach, examining a broad range of variables. That philosophy has paid off in the amount of outside funding that the center has attracted, he notes.

"FAJRI has a unique core area of competence," he observes. "That continues to give us a distinct advantage as we look to expand both our research output and our academic offerings at OU."

By Kevin Knapp

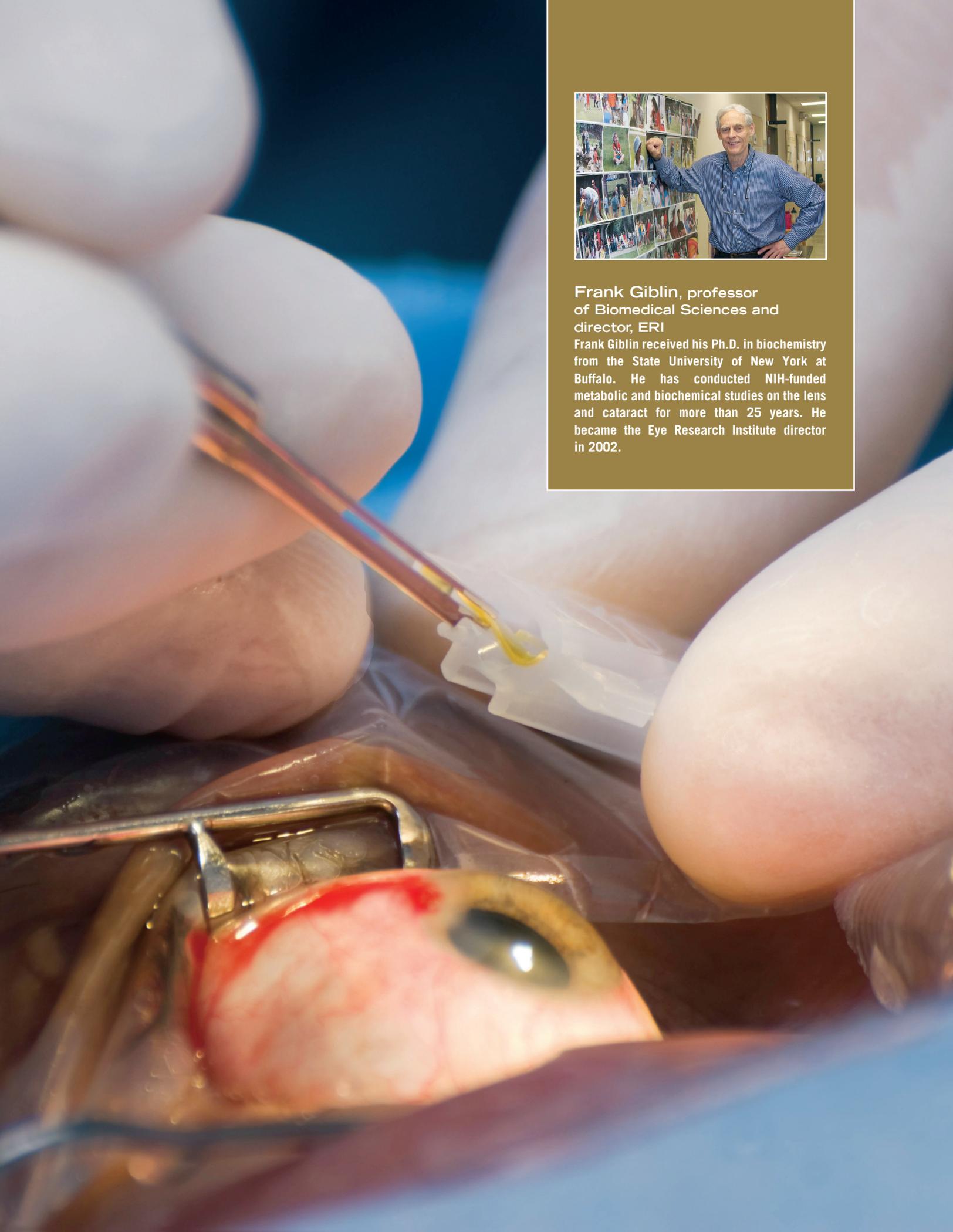
"Houston, we have a problem."



Sayed Nassar, professor of Mechanical Engineering and founding director of FAJRI

Sayed Nassar earned his Ph.D. in aerospace engineering from the University of Cincinnati. A world-renowned expert on fastening and joining materials, he is a frequent guest lecturer for academia and industry worldwide. He has published more than 150 technical articles and presentations.



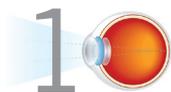


**Frank Giblin, professor
of Biomedical Sciences and
director, ERI**

Frank Giblin received his Ph.D. in biochemistry from the State University of New York at Buffalo. He has conducted NIH-funded metabolic and biochemical studies on the lens and cataract for more than 25 years. He became the Eye Research Institute director in 2002.

A SUPER decade

Eye Research Institute impact far-reaching for new scientists



Formalized a decade ago, Oakland University's Summer Undergraduate Program in Eye Research (SUPER) has a tradition that began in the early 1970s when Eye Research Institute (ERI) director and co-founder Everett Kinsey provided summer research opportunities to two undergraduate students.

In the 40 years since, the program has provided mentorship and laboratory experience for more than 200 students, many of whom have gone on to highly successful careers in science.

Allan Rinke, M.D., an ophthalmologist in Alpena, Mich., was an undergraduate research student from 1994 to 1997, and says he was able to perform experiments that many students just read about. "One of my experiments included dissecting mouse eyes. This helped me develop the skills and confidence to become an eye surgeon," says Dr. Rinke, who credits the ERI program with helping him get into medical school at Wayne State.

As ERI director, Frank Giblin, Ph.D., is proud of its research accomplishments over the years, and of its undergraduate researchers. "Being accepted into the program and doing well in it helps a student with the next phases of his or her career," he says. "Having worked on research projects helps students during interviews for medical school and graduate school. They are able to talk enthusiastically about the type of research they did as a student."

That's certainly true for Sara Pelliccia, BS '04, now a second year resident in Emergency Medicine at Henry Ford. While interviewing for medical school, she was able to demonstrate her knowledge of real time PCR analysis, an instrument she learned to use during her SUPER summer, which was new to the interviewer. During the summer of 2002, Pelliccia published two papers with Giblin and his postdoctoral fellow, Vanita Padgaonkar, concerning the role of an enzyme called thioredoxin reductase and a protein called metallothionein IIa in the lens epithelium.

"The SUPER program helped me learn all the steps of research and what is involved. It put me in the right direction," she says.

For junior Tenira Townsend, the 2009 SUPER program was a major step toward her educational goal of being accepted into the doctoral program in biochemistry at the University of Michigan. This summer, she participated in a highly competitive

summer research program at U-M and returned to Giblin's lab this fall.

"Working in a lab was the best way to determine whether or not this field would be right for me," says Townsend. "I also had the opportunity to create a poster and present it at the Sigma Xi Scientific Research Society annual conference. Without participation in this program, I may not have had the opportunity to gain such valuable experience."

In one year, Townsend presented a fifteen-minute talk, presented her research at the student conference in Houston and received a student research grant from OU's provost.

"Our student researchers learn the basics of research including how to keep a notebook, problem solving, critical thinking, literature searches, preparing a scientific talk, and hopefully, how to have fun doing research," says Giblin.

Acceptance into the SUPER program is limited to OU students and is based on grades, a narrative, career goals, a reference letter and an interview with the ERI faculty including the program's managers, Ken Mitton, Ph.D., an expert in the new field of epigenetics, and Paulette Realy, assistant to the director and research administrator. Typically there are 20 applications for five to seven slots.

Each year since formalizing the summer student eye research program, the OU Center for Biomedical Research, under the direction of Brad Roth, has provided funds for five student fellowships of \$3,500. Other expenses for student research, such as supplies and equipment repair, are paid through faculty NIH grants. Weekly lectures by ERI faculty or Beaumont ophthalmologists lead to the student symposium at end of the 12-week program.

"Our long relationship with Beaumont Hospital Department of Ophthalmology is very important, and that includes collaborative research with Beaumont retinal fellows who conduct clinical vision research studies here," says Giblin.

Giblin says with 200 graduates and counting, undergraduate research in the ERI is going strong and helping the next generation see the future of eye research.

By Alice Rhein

"Working in a lab was the best way to determine whether or not this field would be right for me."

In the pink

Fighting breast cancer inside and out



Faculty from Oakland University's Prevention Research Center are working on opposite ends of the breast cancer research spectrum to promote community health and connect research more directly to patient care.

While scientist Sumi Dinda conducts research at the cellular level, behavioralist Robert Jarski works with cancer patients. Both are involved in projects with the potential to improve the quality of life for those afflicted with one of the leading causes of cancer deaths among women. The Prevention Research Center is designed to promote community health through education and translational research.

"Both of these research projects are examples of how the center works to connect our experts with the community in a way that makes a difference in peoples' lives," says Kenneth Hightower, center director and dean of the School of Health Sciences. "While we work to prevent disease, we also strive to improve outcomes, as well."

Dinda, assistant professor in the School of Health Sciences and adjunct assistant professor in the Department of Biological Sciences, along with OU colleague Virinder Moudgil and doctoral student Amelita Sanchez, recently completed research that validated physicians' off-label use of a drug commonly prescribed for osteoporosis. Raloxifene (Evista) is a chemically-synthesized estrogen — also known as a SERM, or selective estrogen receptor modulator — that mimics estrogen in some tissues but acts as an estrogen blocker in others. In post-menopausal women, Raloxifene strengthens bones by acting as estrogen, but it also inhibits the growth of breast cancer cells by blocking the effects of estrogen in breast tissue. (Estrogen accelerates breast cancer growth.)

"Ours was the first study that provided a scientific basis for what doctors were already seeing in their practices when they prescribed Raloxifene to their breast cancer patients," Dinda says of the research that took place from 2003 to 2009. "Twenty years ago, physicians could offer their breast cancer patients mastectomies, chemotherapy, and radiation. Thanks in part to this research, they can now help save a patient's breasts by prescribing Evista in certain situations."

Results of OU's research studying the molecular mechanism of Evista in breast cancer usage were recently published in the

highly competitive peer-reviewed journal *Hormone Molecular Biology and Clinical Investigation*.

Dinda believes the research shows that while Oakland University is a small school, its work is comparable to that of institutions with far more resources. "This compares to research at universities like Harvard and Johns Hopkins," he says. He is now focusing on the effects of hormones and anti-hormones on stem cell differentiation and proliferation into breast and uterine cells. This will provide a better understanding of how breast cancer develops.

While Dinda's research focuses on breast cancer prevention and treatment, Jarski helps breast cancer patients who are enduring the effects of diagnosis and treatment. Jarski, a professor in the School of Health Sciences and the Oakland University William Beaumont School of Medicine and director of the school's complementary medicine and wellness program, is one of the architects of the Silver Linings Workshop for Breast Cancer Survivors. The eight-week program, which is free to participants at William Beaumont Hospital, teaches cancer "veterans" how to use yoga, meditation, mindful eating, writing, and other tools to adopt healthy habits and enjoy each day more fully. Based on pioneering work by Ruth Lerman, M.D., a staff physician at the William Beaumont Breast Care Center in Royal Oak, Mich., it is the only program of its kind in the state for breast cancer patients.

Current research with Silver Linings participants, which began in October 2009 and ended in September 2010, compares the progress made by 60 participants with a comparable "control" group of women who are on a waiting list for the program. Both groups complete questionnaires about their quality of life at the beginning and end of the program period. Jarski expects that those who participated in the mindfulness-based stress reduction process of Silver Linings will rank their quality of life as higher than those in the control group.

"There are scientific explanations for why people who have positive attitudes often have more positive medical outcomes," Jarski says. "The mind and body aren't separate — they work together. This program has helped nearly 200 women make the choice to look at their cancer experience differently and see themselves not as 'survivors,' but as 'veterans' who have learned a great deal from it."

By Sandra Beckwith

"While we work to prevent disease, we also strive to improve outcomes, as well."



Kenneth Hightower, dean of the School of Health Sciences

Kenneth Hightower is director of the Preventive Research Center. He received his Ph.D. in Biophysics/Molecular Science from Southern Illinois University. Joining OU in 1974, he has spent more than 25 years on research focused on pathological aging mechanisms of degenerative diseases whose primary risk factor is age. He now focuses on initiatives outside the laboratory in the “real world of people’s lives.”



Carol Swift, associate professor of education and chair of the Department of Human Development and Child Studies
Carol A. Swift earned her Ph.D. in special education from the University of Arizona. She received both her bachelor's and master's degrees in speech pathology from Southern Methodist University. She is an associate professor in and chair of the Department of Human Development and Child Studies, which houses OUCARES.

The best life

Looking beyond the puzzle of autism



Of autism, at least this much is known: about one in 110 children born each year in the U.S. will be diagnosed with it. Among male children, the rate of incidence spikes to one in 70, according to a recent report by the Centers for Disease Control and Prevention.

While the cause of Autism Spectrum Disorder (ASD) remains a mystery and may take years before consensus on its cause or causes can be reached, some researchers are investigating the ways that lives are impacted by this condition, which can be significantly improved.

At Oakland University, studies are underway to determine the factors that lead to an improved quality of life for individuals with ASD and their immediate families. While normal (or “neurotypical”) people are readily able to articulate what they find essential to live satisfying and productive lives, those with ASD are often unable to do so.

Discovering what constitutes an acceptable quality of life for those with ASD — and how to measure progress toward that goal — has been the focus of two symposiums sponsored by Oakland University’s Center for Autism Research, Education and Support (OUCARES).

The most recent, held last May, brought together parents and family members, educators, researchers, practitioners, students and policy makers, with the aim of exploring the crucial role played by interventions to those living with ASD.

According to Carol Swift, Ph.D., associate professor of education and department chair for Human Development and Child Studies, the symposium draws upon much of the expertise gained at OU in its 25 years of autism research and education.

“OU is well positioned to bring quality of life-related issues for greater discussion,” she says.

A prominent speaker at this year’s symposium was Luke Tsai, M.D., currently a visiting professor at OU. A world-renowned expert on medical interventions for individuals with ASD, Tsai joined OU’s faculty last year to help develop a multi-disciplinary Ph.D. program with a concentration on autism and related developmental disorders.

Dr. Tsai joined fellow autism experts, Drs. Gary Mesibov and Richard Simpson, in outlining how intervention can lead to

better outcomes in the lives of those who live with the condition and their family members.

“People are desperate to find a cure for autism, but my perspective is that we should be looking for ways to improve the lives of those who have ASD, through early intervention by therapists and educators,” he says.

Dr. Tsai, who retired two years ago from the University of Michigan School of Medicine and Medical Center, where he taught and provided medical services for 20 years, says he was attracted to OU by its holistic approach to special education, involving academics, research and community outreach programs.

“OU is a step ahead of other academic institutions in realizing the importance of how medicine and education should and can work together to help improve the lives of those with ASD,” he explains. “It’s a cutting-edge approach that I think should be promoted on a much broader scale.”

He cites the research of Janet Graetz, Ph.D., associate professor, Human Development and Child Studies, whose studies into quality-of-life issues influenced the content of the ASD symposium, as an example of how OU is breaking new ground in autism studies.

“It starts with the premise of ‘how can we help them?’ which is what the ultimate goal should be,” Dr. Tsai says. “The results we gain from that research can be taken home by parents or used in the classroom and workplace.”

Through OUCARES, its support arm and community outreach program, the university has access to a large family base from which to draw feedback and volunteers, says department chair Swift, adding that OU has offered extensive programming since 2004 and has served more than 750 families in southeastern Michigan.

OUCARES recently was the recipient of a \$120,000 gift by an anonymous donor to help support the work of improving the quality of life for people impacted by autism. In addition, the center was awarded more than \$30,000 last June from the Autism Society/Oakland County Chapter to support its programming, such as Family Fun Day and programs that build social skills among teenagers and adults with ASD.

By Kevin Knapp

“OU is well positioned to bring quality of life-related issues for greater discussion.”

High-tech information

Library's research resources at your fingertips



As an institution of public higher education, Oakland University's mission includes advancing knowledge and promoting research and scholarship. At the heart of these endeavors is Kresge Library, which supports students, faculty and researchers in their pursuits.

Last year, Kresge Library was transformed into a centralized resource for all of these constituents. Within the Technology Learning Center (TLC) at the library, advanced technology is combined with the personal expertise of librarians.

The convergence of technology and hands-on support is vividly demonstrated by services available to researchers who are members of the OU faculty.

There is the *Ask a Librarian* service, which allows researchers to request research assistance via instant messaging, telephone, email, or in person. Librarians also offer a Research Consultation Service, meeting with researchers to provide individualized assistance with conducting library research for their papers or projects, including conducting background literature searches to supplement applied and laboratory research.

The ever-expanding digital collections at Kresge Library are a significant benefit to researchers, says Julie Voelck, dean of the University Library and the OU William Beaumont School of Medicine Library. "The information is readily available whether they're in the classroom or the lab — essentially wherever they are, 24-hours, 7 days," she explains. The library provides access to thousands of ebooks and online journals from major scientific publishers, all available from the library's website and online catalog.

The Information Commons (IC) provides a centralized space where faculty and researchers can work alone or in collaboration with their students and colleagues. The IC features multimedia workstations, PCs and Macs, laptops, breakout rooms, and staff who can assist with information technology questions. In addition to the IC, connection to a wireless network is available throughout the entire library, and on every floor researchers will find state-of-the-art computer workstations for conducting research and accessing digital collections that supplement the library's significant print resources. Near the IC may be found the Helpdesk of University Technology Services (UTS). The UTS

Helpdesk is the first point of assistance for faculty researchers who are experiencing technical issues with their university computers.

Faculty benefit from the presence of e-Learning and Instructional Support (known as e-LIS), which was moved onto Kresge's 4th floor as one of the library's building partners.

"Assistant Vice President for e-LIS Catheryn Cheal and her staff provide faculty with support and assistance in creating online courses and programs. Librarians provide expertise in incorporating digital collections and information literacy into these online courses," Voelck says.

She emphasizes the importance of teaching students information literacy, which she describes as "critical" in today's world, no matter what subject students are studying. Information literacy helps students identify, access, apply and evaluate information effectively, use information ethically and become successful lifelong learners.

"Information literacy skills are paramount to a successful education," Voelck says. "They're as important as writing, mathematics, history and the sciences."

Kresge Library provides extensive information literacy instruction to students, a service that many professors use to their advantage when planning courses. During an academic year, librarians provide Information Literacy instruction to one-third of the students attending Oakland University.

Moving forward, Voelck believes that digital services and resources will become increasingly central to Kresge Library. A good example, she says, is the new library to support the OU William Beaumont School of Medicine. She expects that 90 percent or more of its collections will be online and most will be available to the entire OU community.

"The School of Medicine gives us an opportunity to build a new, exciting, digital library model," Voelck says. "Print collections will always be important, but digital collections will be a significant aspect of our collection development throughout Kresge Library as we move into the future."

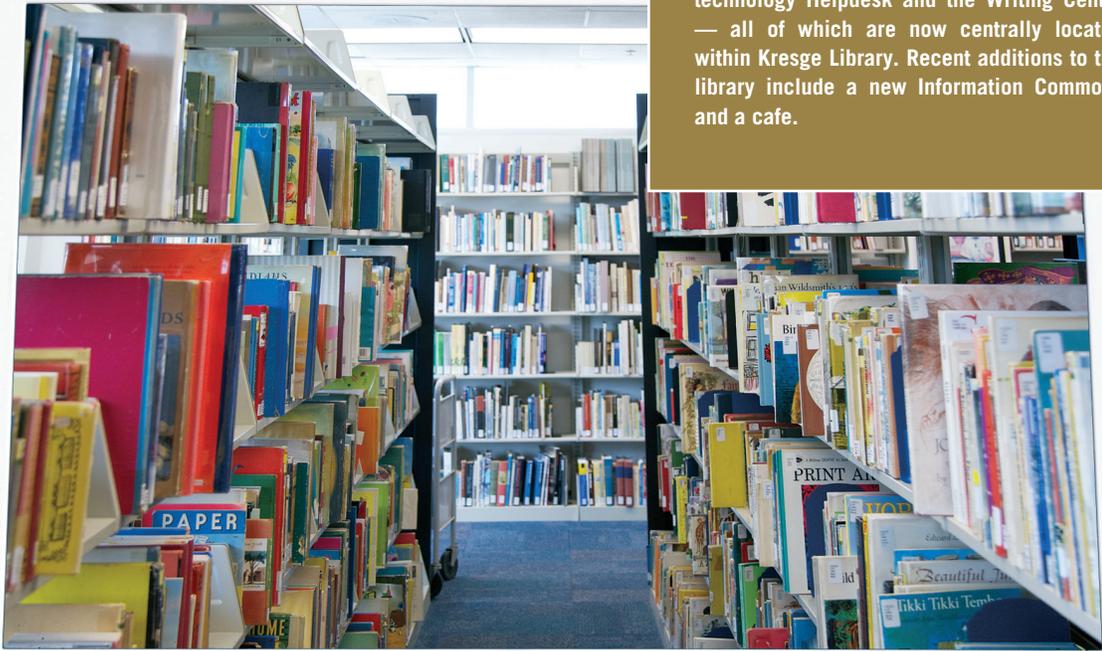
By Amy Lynn Smith

"The information is readily available whether they're in the classroom or the lab — essentially wherever they are, 24-hours, 7 days."



Julie Voelck, dean of Kresge Library and the Oakland University William Beaumont School of Medicine Library

Julie Voelck was named dean of Kresge Library in 2004. Since then, the library has become known as a “teaching library” where librarians teach all OU students the information literacy skills required for critical thinking and lifelong learning in the digital age. In addition, the library has strengthened partnerships with e-Learning and Instructional Support, the technology Helpdesk and the Writing Center — all of which are now centrally located within Kresge Library. Recent additions to the library include a new Information Commons and a cafe.





**Jackie Wiggins, chair of the
Department of Music, Theatre
and Dance, and professor of
Music Education**

Known for her work in constructivist music education theory and practice, children's musical creativity, and technology in the music classroom, Wiggins has been an active clinician, presenter and author in local, state, national and international settings. As a researcher, she studies the nature of children's musical thinking as reflected in their creative processes and the role of the music teacher. Wiggins also is the program coordinator for the Ph.D. in Music Education program.

Another way to listen

Teaching music outside the box



How can we teach in ways that empower learners to use what they know about music to explore new ideas? How can we teach music in ways that learners will perceive as relevant and important to their lives?

Oakland University offers an exciting resource to music education students and professionals who seek answers to such questions: the Center for Applied Research in Musical Understanding (CARMU).

CARMU is led by OU Music Education faculty Joseph Shively, associate professor and director of the center; Jackie Wiggins, professor; and Deborah Blair, assistant professor. Members include music education faculty from universities in various parts of the U.S. and from Australia, Norway and Hong Kong. Fifteen K-12 music teachers are also members of the center.

The center hosts a biennial Conference on Music Learning and Teaching at which students, practicing music teachers and music teacher educators, and music education scholars and researchers come together to share their research and applications to practice. “The focus of the conference is to explore music learning and teaching processes,” says Blair.

“For example, qualitative studies of music learning experiences show that music learning is essentially a holistic, contextual, learner-driven process. Many prevalent music education approaches could be characterized as the opposite: atomistic, isolationist and teacher-controlled,” she explains. “When confronted with research studies that make it clear that prevalent approaches oppose learners’ natural learning processes, music teachers begin to question, seeking new ideas and answers.”

About half the attendees are K-12 music teachers who seek a deeper understanding of their work than they might be able to get at a curriculum workshop. “Conversations extend well beyond the three days spent together in the meeting rooms. The relationships that develop bring the practitioners back to campus for consultation, coursework, exploration, professional support and friendship,” says Wiggins.

Shively adds, “What has set these conferences apart from other music education conferences is the interaction between researchers and K-12 teachers. The event has established OU as an internationally known center for innovation in music education practice.”

CARMU also supports researchers on campus and in the region by bringing highly respected leaders in the profession to work with students and faculty. Experts present talks and teach intensive graduate courses as guest professors.

The work of the research center is rooted in a constructivist approach to music education, which emphasizes teaching in real world cultural and historical contexts and incorporating the influences of technology. Relevance is a key issue.

“For students, music is what they listen to on iPods or hear on TV,” Wiggins says. “If teachers ignore the music that is so central to students’ lives, school music can seem disconnected from what they perceive to be real music.”

Students in a constructivist music classroom perform, listen, analyze, compose and improvise. As they engage with music of a wide range of styles, genres and cultural and historical contexts, they broaden and deepen their understanding of “how music works.” It is important for them to have ample opportunity to create original music — to learn to use music as a means of personal expression.

“I remember the day after the Berlin Wall came down, and one of my fourth-grade classes ran into the room insisting, politely, that they needed to write a song to commemorate this very important day,” says Wiggins. “Twenty minutes later, they had produced a song that was every bit as good as many published for children to sing, perhaps better, certainly more sophisticated in the content of its lyrics.”

The members of CARMU are recognized worldwide as innovators in constructivist music education. Wiggins has developed her ideas through her 22 years in K-12 music education and 16 years in higher education. Shively and Blair also bring extensive public school and higher education experience to the program and center, as do the national and international members.

“Music education may seem like a small aspect of school experience, but because of the centrality of musical experience to the lives of our nation’s youth, honoring what students bring to a music classroom can transform their identity,” says Wiggins. “Learning is about making connections, on so many levels. A constructivist approach to music education can foster connections that enable students to seek new experiences and value learning.”

By Mary Gunderson-Switzer

“If teachers ignore the music that is so central to students’ lives, school music can seem disconnected from what they perceive to be real music.”

Math + Science = Cure

Mathematicians and biologists collaborate to find solutions to medical puzzles



Oakland University has enlisted an unconventional weapon in the fight against AIDS: math.

Thanks to a major grant from the National Institutes of Health, OU's Center for Biomedical Research (CBR) has created a Core Center in Quantitative Biology, with the goal of building bridges between biological and mathematical scientists to lead to great medical discoveries.

Bringing the two disciplines together "is like speaking French and English at the same time," says Brad Roth, director of CBR, who conceived of the Core Center. "The result of the collaboration is worth learning this new language, though."

The heart of this Core Center is new faculty member Assistant Professor Libin Rong, who began in the Department of Mathematics and Statistics in January 2010. Picked from a field of 65 applicants, he previously worked at the Los Alamos National Laboratory in New Mexico and is a graduate of Purdue University.

His specialty is using mathematical modeling to predict the success or failure rate of drug treatments for HIV infections and the immune system. He works directly with biological scientists.

"One of the reasons we selected Rong was because of the potential medical applications of his work," Roth explains. "With the establishment of the Oakland University William Beaumont School of Medicine, there's never been a more opportune time for the Core Center."

The Core Center's \$700,000 P30 grant, received under the American Recovery and Reinvestment Act, funds Rong's position for two years and allows him to hire a postdoctoral research associate, a Ph.D. student and undergraduate research assistants to help with his research.

But it does more than create jobs, explains Roth. "By establishing the Core Center, we are making Oakland University a more competitive school in the field of biology," he says. "Biology is becoming increasingly quantitative, with fields such as 'system biology' and 'bioinformatics' growing at a rapid rate. We recently established the engineering biology undergraduate major and hope to create a Ph.D. program in quantitative biology and, of course, the new School of Medicine. We are taking advantage of existing strengths at Oakland University."

OU's commitment to biomedical research is one of the reasons Rong accepted the Core Center position. Since doing so, he often spends time explaining to outsiders how math can help save lives.

"HIV is a success story for mathematical modeling and quantitative methods," Rong explains. "Since HIV takes about 10 years, on average, to progress from initial infection to full-blown AIDS, its replication was thought to be a slow process."

Rong says a simple mathematical model was developed in 1995 by Alan Perelson, his postdoctoral adviser at Los Alamos National Lab, to interpret data from HIV clinical trials.

"Surprisingly, the modeling result showed that HIV is produced and cleared rapidly ... More importantly, the result predicts that drug resistance will develop during therapy. Thus, monotherapy with a single drug will not work," Rong says. "These results provide the reason for treating HIV patients with multiple drugs (now widely known as the 'cocktail therapy'). It is this treatment strategy that has significantly reduced HIV/AIDS-related morbidity and mortality since the mid-1990s ... Mathematical modeling has led to a revolution in thinking about HIV and formed the basis for combination therapy that has made HIV a treatable disease. In this respect, math has helped save human lives."

Rong's Core Center research is continuing that revolution. He's developing mathematical models to help biologists eliminate the strain of HIV virus that often hides a latent infection in a subpopulation of cells.

This is where working with scientists becomes tricky, he confesses. "I'm learning that the biologists don't care about the equation at all," he says. "They don't want the numbers, but only the explanation of how it can help in the fight against AIDS."

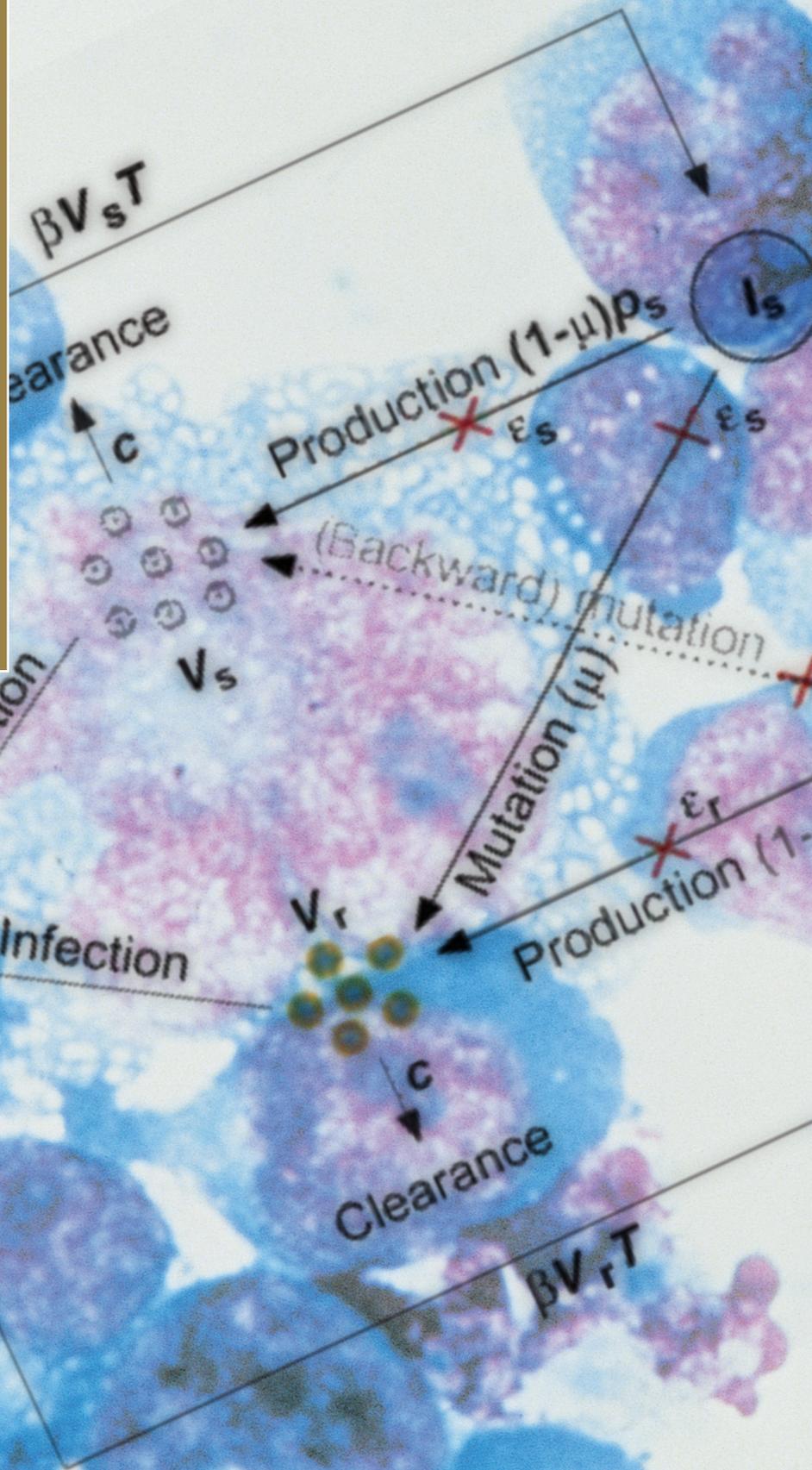
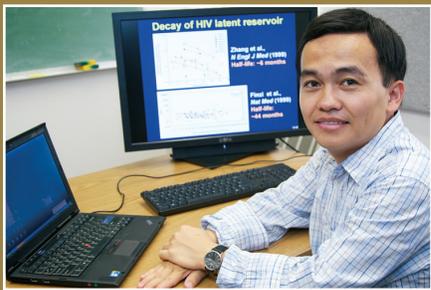
While he believes finding a cure is still far away, he knows math is the solution to the problem. "I believe mathematical modeling will continue to provide valuable information for future research of this deadly virus infection," he says. "There is hope."

By Rene Wisely

"They don't want the numbers, but only the explanation of how it can help in the fight against AIDS."

Libin Rong, assistant professor of Mathematics

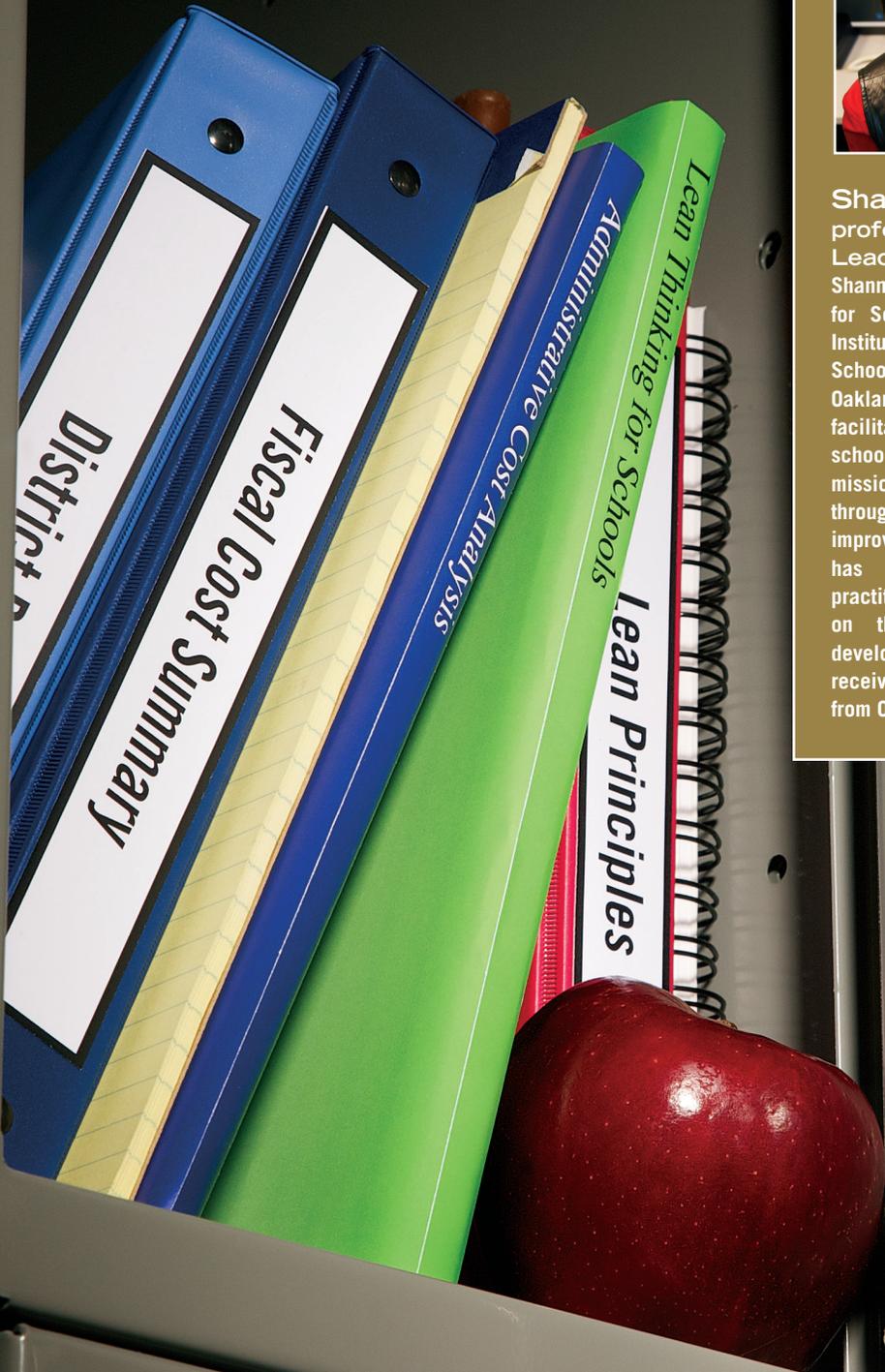
Libin Rong received his Ph.D. in Applied Mathematics from Purdue University. His research interests are mathematical biology, specifically virus dynamics, theoretical immunology and epidemiology. He has published in the journals *Science Translational Medicine*; *PLoS Computational Biology*; *Journal of Viral Hepatitis*; and the *Journal of Theoretical Biology*. Some of his research was highlighted in the publications *Science Translational Medicine* and *Science*, and have generated considerable attention in the press, including *Bloomberg Businessweek* and *Science Daily*.





Shannon Flumerfelt, associate professor of Educational Leadership

Shannon Flumerfelt directs the Lean Thinking for Schools initiative at the Pawley Lean Institute and is an associate professor in the School of Education and Human Services at Oakland University. Her work focuses on facilitating the use of lean tenets and tools by school executives to better carry out core mission, strategic vision and operational goals through the dynamics of continuous improvement and the elimination of waste. She has published numerous scholarly and practitioner publications and presents widely on the topics of lean, organizational development and leadership development. She received her Ph.D. in Educational Leadership from Oakland University.



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Going lean for schools

Research tool assesses strengths, weaknesses



OU's Shannon Flumerfelt hopes to put more public schools on a lean diet, but what she has in mind doesn't involve counting calories. Flumerfelt is working to introduce schools to lean thinking — a practice common in manufacturing — so that they can learn how to do more with less.

The lean thinking method involves providing services as efficiently as possible. “Lean” organizations follow specific steps to improve processes and eliminate waste. Toyota introduced the approach to manufacturing during the 1950s; it has since been institutionalized by manufacturers and service providers of all sizes around the world.

While Flumerfelt believes that schools should be able to benefit from the improvements that lean thinking introduces to an organization, most school administrators either aren't familiar with the concept or believe it applies only to manufacturing. Working as director of lean thinking for schools at OU's Pawley Lean Institute, Flumerfelt is introducing the concept to public schools looking for a new way to deliver the best education possible to students.

“Our school systems are in trouble,” says Flumerfelt, whose background includes public school administration and teaching. “They know they can't get better by depending on more funding. The only way to improve is by figuring out a way to do it with current human and social capital.”

“This is a paradigm shift for many educators,” adds Julianne Leigh, director of the institute. “Current practices are ingrained. We hear, ‘This is the way we've always done it.’ But we can't keep doing the same things and expect different results.”

The institute's Lean Thinking for Schools™ seminars and professional certification program help educators learn how to do this by training them in the lean philosophy and how to implement it. Flumerfelt has also developed a unique lean assessment resource for schools, the “CX Tool.” It allows school administrators and others to evaluate their processes for strengths and weaknesses so that they can make improvements.

“The tool is based on my experience that shows that whenever people are working together in a school, they're either ‘thinking’ or ‘doing,’” Flumerfelt says. “The goal is to get these two activities connected on an organizational level.”

The CX Tool helps identify the connections between thinking (the organizational intelligence) and doing (performance management). It is a highly structured grid that incorporates the plan-do-check-adjust organizational learning loop used in lean thinking. When the grid is filled in, it provides a visual representation of the current state of a system or process. The visual helps users identify areas that need improvement or those that are working well.

Schools implementing Flumerfelt's tool as part of their lean indoctrination are seeing firsthand how it helps them uncover process gaps or waste in their systems. One administrator used it to help him understand why the school's international baccalaureate program was successful. He discovered that the six elements required for success were not only present in the IB program, but they were strong without dominating — each of the elements functioned equally. In lean terms, the elements were all “congruent.”

To help validate the tool's reliability, Flumerfelt is using research funding to implement a survey instrument that will help measure progress by identifying a school's process congruency before and after using the CX Tool.

Leigh is excited about the potential for the CX Tool and the institute's training programs to generate improvements.

“This could help schools sustain themselves over the long term,” she says. “It will help them find areas where they can recover costs and save money, putting those savings back into areas that need it.”

Thanks to Flumerfelt's research, the Pawley Lean Institute will help schools grow while becoming lean.

By Sandra Beckwith

“It will help them find areas where they can recover costs and save money, putting those savings back into areas that need it.”

The best of both worlds

OU, Beaumont foster research partnership



The old adage that “two heads are better than one” is perfectly suited to the research partnership of Oakland University and Beaumont Hospitals through the Beaumont Research Institute.

Working closely together through the Oakland University William Beaumont School of Medicine, the two organizations are able to take the best resources from each institution and focus on highly original research that includes the biomedical sciences and extends beyond the laboratory to all disciplines that impact the health of patients and their communities. In addition, the partnership allows for an extensive student research program that matches the creativity, energy and dedication of the School of Medicine students with society’s health care needs.

“We are taking OU’s incredible applied and basic research expertise and combining it with Beaumont’s clinical expertise for an outstanding partnership,” says David L. Felten, M.D., Ph.D., associate dean for Research and clinical professor of Anatomy and Cell Biology at OU. Felten also is vice president for research and medical director of the Beaumont Research Institute.

“Our physicians at Beaumont work very closely with their patients. ...They come to know the areas where research is most needed and most important to their patients, so our research is investigator-initiated,” he says. “Our physician researchers turn to OU to determine the fundamental mechanism for the research and then work together to establish how to apply the results directly for the patients’ benefit.”

Dr. Felten adds that much of the initial research on projects help researchers later secure funding from external sources. “Together we can invest in the preliminary data and essentially ‘prime the pump’ with a foundation of solid information before pursuing external sources of funding for the larger research endeavor.”

Among the current research interests are: the administration of autologous muscle-derived stem cells by injection into the muscles that control urination as a treatment for urinary stress incontinence; the use of cells for attempted retinal regeneration;

and effects of selective percutaneous myofascial lengthening, or “perc,” surgery on cerebral palsy patients.

Research is a key component of every School of Medicine student’s education. Each student will engage in a four-year long Capstone Project that includes: a six-week introduction to medical literature; a four-week introduction to the electronic medical record as a research tool to develop evidence-based decisions; an eight-week introduction to the clinical trial; and rotations through advanced research laboratories.

Students will then choose research focuses, many of which can be linked to one of the more than 800 ongoing clinical trials at Beaumont Hospitals. Other projects will go beyond the lab and the hospital, working in conjunction with OU departments to meet society’s needs.

“For example, medical students can design projects with Oakland’s faculty in the School of Health Sciences and School of Education and Human Services to design educational approaches for K-6 students in economically distressed areas to prevent childhood obesity,” explains Robert Folberg, M.D., dean of the School of Medicine. “Other students can work with Oakland faculty members in journalism and with local media outlets to design public service campaigns to increase the level of childhood vaccinations.”

In addition, through the Capstone Project, successful third-year students will have the opportunity to be awarded a supplemental research scholarship for the fourth year of study.

“We believe that if our students spend four years of their medical education invested in research activities with high impact, they will likely continue on these paths,” says Dr. Folberg.

Dr. Felten adds, “The Capstone Project, while clinically related, will also look at ways our students and future graduates can have an impact economically, environmentally and biomedically ... OU and Beaumont have a natural affinity, a natural ability for collaboration — this is an extremely important partnership.”

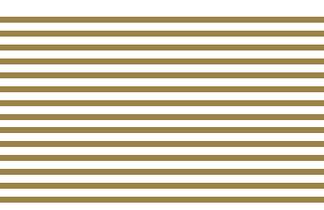
By Susan Thwing-McHale

“We are taking OU’s incredible applied and basic research expertise and combining it with Beaumont’s clinical expertise for an incredible partnership.”



David Felten, vice president for research and medical director of the Beaumont Research Institute. Dr. Felten also serves as a clinical research professor of Anatomy and Cell Biology at Oakland University. Prior to joining Beaumont, he was dean of the School of Graduate Medical Education at Seton Hall University, founding director of the Center for Integrative Medicine at the University of California Irvine College of Medicine, and professor and chair of the Department of Neuroscience and director of the Markey Charitable Trust Institute for Neurodegenerative Disease and Aging at the University of Rochester School of Medicine. He is the recipient of a John D. and Catherine T. MacArthur Foundation Prize Fellowship, and two simultaneous 10-year MERIT Awards.





Research centers and institutes

The Automotive Tribology Center

The Automotive Tribology Center in the School of Engineering and Computer Science (SECS) tests the science of lubrication, friction and wear on a vehicle's engine. Faculty and student researchers analyze materials so that automakers can lower friction to improve fuel efficiencies in vehicles. Research partners include General Motors Powertrain Division, Chrysler Corporation, Ford Motor Company, the Tank and Automotive Research Development and Engineering Center (TARDEC), ConocoPhillips and Argonne National Laboratory. The center is one of the only tribology centers in the country dedicated to automotive tribology research and uniquely positioned to advance the reliability, mobility and efficiency of automotive components.

Center for Applied Research in Musical Understanding (CARMU)

The mission of the Center for Applied Research in Musical Understanding (CARMU) is to build and advance a research-based pedagogy of teaching for musical understanding, as well as support pre-K-12 music educators in Michigan, the United States and internationally. The center seeks national and international eminence in applied research in musical understanding and supports faculty, graduate and undergraduate research in musical understanding.

Oakland University Center for Autism Research, Education and Support (OUCARES)

OUCARES integrates academic coursework, knowledge and research with hands-on work to prepare professionals to be leaders in the autism community. Through these academic and service programs, OU also provides supportive individual and family programs. OUCARES encourages the exchange of ideas relating to the education and support of individuals with autism spectrum disorder as well as providing services and support needed to improve daily living.

Center for Biomedical Research

The mission of the Center for Biomedical Research is to vigorously promote and support biomedical research and education at Oakland University and allied institutions, to recruit and retain outstanding biomedical scientists, to facilitate collaborative biomedical research projects and to develop gift, grant, and contract support for biomedical research programs, graduate and undergraduate training, as well as core facilities and equipment.

Center for Creative and Collaborative Computing

The mission of the center is to provide an environment for students, faculty and participating industry professionals to collaborate and create novel information technology applications to keep our industry competitive and at the forefront of technology. The center is seen as an integral component of the future success of the computing and information technology-related undergraduate and graduate programs.

Center for Integrated Business Research and Education

CIBRE at the School of Business Administration connects business professionals, students and academics to address and shape the future of business research and business education locally, regionally and globally. CIBRE provides a place where business leaders, researchers, professionals and students can share resources and ideas and identify actions to address organizational issues, educate current and future professionals, and support economic development in the community and the world.

Center for Robotics and Advanced Automation

The Center for Robotics and Advanced Automation (CRAA) in the School of Engineering and Computer Science (SECS) was established in 1981 and is at the forefront in research and development in the areas of automatic controls, robotics, automotive engineering, machine vision and related fields. CRAA has, to date, made major contributions to SECS and OU, particularly in enhancing SECS's graduate programs and enrollments.

Clean Energy Research Center

The School of Engineering and Computer Science is home to the new Clean Energy Research Center (CERC). The CERC engages in multiple, clean energy research, development and educational activities. The CERC also will create an environment that will foster commercial partnerships and provide an educational platform for student research and clean energy curricula development, while cultivating an entrepreneurial atmosphere within the OU research and development community to allow technology transfer and commercialization of new technologies.

Counseling Center

The School of Education and Human Services Counseling Center is a teaching and research facility for the Counselor

Education program that offers personal and career counseling to the community at no cost.

The English as a Second Language Center (ESL)

The ESL Center is charged primarily with monitoring and implementing the English Proficiency Requirement on campus. The center offers a full range of ESL courses at all skill levels and supervises the ESL Endorsement Program, the ESL Institute Programs, the Individual ESL Instruction Program, and the Hispanic Outreach Program (HOP). During its eight years of operation, HOP has received financial support from the College of Arts and Sciences, local corporations and Michigan government agencies.

Eye Research Institute

The ERI has a 40-year history in vision research and has received more than \$50 million from external funding sources, mainly the National Eye Institute (NEI). Each year the ERI in conjunction with the Center for Biomedical Research, awards competitive Summer Vision Research Fellowships to OU undergraduates. In addition to conducting vision research, the ERI is also formally associated with the Department of Ophthalmology at Beaumont Hospitals.

Fastening and Joining Research Institute (FAJRI)

FAJRI is the only known facility of its kind in the world: an academic, nonprofit research facility dedicated solely to the fastening and joining of materials. This one-of-a-kind facility pursues fundamental and applied research to develop and disseminate new technologies in fastening and joining engineering. Through its research, FAJRI helps improve the safety and reliability of equipment, machinery and mechanical structures. The research conducted also significantly improves the mobility and combat-readiness of military vehicles.

Galileo Institute for Teacher Leadership

The Galileo Institute for Teacher Leadership is dedicated to improving the learning of all students, elevating the education profession, enhancing the leadership skills of teachers, and fulfilling the vital role of public education in achieving a civil, prosperous and democratic society. The commitment to the concept of developing teacher leaders, to defining what teacher leadership is and why it is so important is at the heart of the institute.

Ken Morris Center for the Study of Labor and Work

The Ken Morris Center for the Study of Labor and Work is a division of the Department of Human Resources Development. Founded in 1972 as a Labor Education Program, the center was renamed in 1983 for Ken Morris. Its primary goal is to help develop potential leaders who possess the analytic, interpersonal and organizational skills to respond to human needs in an era of rapid social change. The program seeks to join education, skill development and service in the pursuit of this goal.

Lowry Center for Early Childhood Education

The Lowry Center offers early childhood education programming to children from 18 months to 5 years old using the newest innovative equipment, materials, and practices to cultivate the development of young children. The center's mission is to provide an exemplary laboratory center for early childhood education for the university and the neighboring communities.

Prevention Research Center

The Prevention Research Center is designed to promote community health through education, promotion and translational research. Translational research discovers which strategies work in the community: the community of youth, or the community of women, or the community of senior citizens — all at high risk. The center brings experts from OU and the community together to make a difference in people's lives.

Reading Clinic

Dedicated to helping children between the ages of 6 and 17 with any type of reading or writing difficulties including learning disabilities, dyslexia, Attention Deficit Disorder and Attention Deficit Hyperactive Disorders, the clinic diagnoses the nature and extent of a child's reading and writing capabilities and works to improve them.

OU SmartZone Business Incubator (OU INC)

Oakland University's SmartZone Business Incubator (OU INC) provides entrepreneurial resources and strategic business solutions to develop intellectual property. The incubator supports existing and grows new technology-based and life science businesses with university resources, decision support technology, business counseling services and financial/capital acquisition assistance.

Student research award recipients, 2010-11

Student award recipients receive financial assistance to support their research as well as the opportunity for travel support to present their research at a professional conference. The program is sponsored by the Office of the Provost.

University Research Committee Graduate Student Research Awards

The Voiced Emphatic Stop in Arabic: Variation in Articulation and Its Sociolinguistic Significance

Student Researcher: Saeed Alqarni

Faculty Member: Helena Riha, special lecturer, Linguistics

The Voiced Emphatic Stop in Arabic: Variation in Articulation and its Sociolinguistic Significance

Student Researcher: Hamed Altairi

Faculty Member: Helena Riha, special lecturer, Linguistics

Self-Reported Frequency and Importance of Measuring Heart Rate and Blood Pressure at Physical Therapy Clinical Sites: A Descriptive Study

Student Researcher: Sara Arena

Faculty Member: Kristine Thompson, special instructor and program director, Physical Therapy

Accessing the Transcriptional Activity of Helitron Captured Genes in Maize

Student Researcher: Allison Barbaglia

Faculty Member: Shailesh Lal, associate professor, Biological Sciences

Energy Expenditure and Fatigue During Radiation Treatment for Breast Cancer: A Pilot Cohort Study

Student Researcher: Emily Battle

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Agreement of Armband Energy Expenditure Measures to Indirect Calorimetry for Activities of Daily Living: A Reliability Study

Student Researcher: Michelle Bieniek

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Maximal Heart Rate Prediction Equation for Women Undergoing Treatment for Breast Cancer: A Methodological Study

Student Researcher: Lisa Birkmeier

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

American Water Works Association (AWWA) 2010 Annual Conference and Exposition (ACE10)

Student Researcher: Jenny Borowitz

Faculty Member: Linda Schweitzer, associate professor, Chemistry

An Investigation of Leadership Development Among Women in Mid- and Upper-Levels of Leadership

Student Researcher: Beverly Brown

Faculty Member: Eileen Johnson, assistant professor, Educational Leadership

Fundamentals of Ecosystem Ecology (FEE) Course

Student Researcher: Timothy Campbell

Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

To attend AAI annual conference presenting an abstract entitled "*Interleukin-2 inhibits programmed death-1 receptor expression on CD4+ Foxp3+ T cells*"

Student Researcher: Rudragouda Channappanavar

Faculty Member: Susmit Suvas, assistant professor, Biological Sciences

Structural Profiling of Amyloid Proteins by FRET

Student Researcher: Jyothi Digambaranath

Faculty Member: John Finke, assistant professor, Chemistry

Development of Bio-Inspired Organometallic Catalysts for Hydrogen Generation

Student Researcher: Elizabeth Donovan

Faculty Member: Greg Felton, assistant professor, Chemistry

MRI Measurement of Ischemic Brain Penumbra Using an Inelastic Collision Model

Student Researcher: Hassan Bagher Ebadian

Faculty Member: James Ewing, adjunct associate professor, Physics

Associated Factors in Perioperative Hypoglycemia in Patients with Diabetes

Student Researcher: Seth Fisher

Faculty Member: Barbara Harrison, assistant professor, Nursing

Maximal Heart Rate Prediction Equation for Women Undergoing Treatment for Breast Cancer: A Methodological Study

Student Researcher: Kristy Jones

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Utilizing Bayesian Hierarchical Models in Marketing Analysis

Student Researcher: Grzegorz Kosciak

Faculty Member: Gary McDonald, adjunct professor, Statistics

Establishing Identity: LGBT Studies and Music Education

Student Researcher: Miroslav Manovski

Faculty Member: Jackie Wiggins, professor and chair, Music

Maximal Heart Rate Prediction Equation for Women Undergoing Treatment for Breast Cancer: A Methodological Study

Student Researcher: Shanna Miller

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Associated Factors of Perioperative Hypoglycemia in the Surgical Patient

Student Researcher: Keri Nowakowski

Faculty Member: Barbara Harrison, assistant professor, Nursing

Optimization of Conductive Fillers of a Composite Material for PEM Fuel Cell Bipolar Plates

Student Researcher: Elaine Petrach

Faculty Member: Xia Wang, assistant professor, Engineering

Nonlinear Control of a Heartbeat Model

Student Researcher: Thanawit Pornthanomwong

Faculty Member: Robert Loh, professor, Engineering and director, Center for Robotics and Advanced Automation

Auto-Preview Camera Orientation for Environment Perception on a Mobile Robot

Student Researcher: Micho Radovnikovich

Faculty Member: Ka C. Cheok, professor, Engineering

Reliability of Armband Kilocalorie Measures: A Meta-Analysis

Student Researcher: Amanda Ryde

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Checkpointing in Reconfiguration-Based Fault-Tolerant Embedded Systems

Student Researcher: Belal Sababha

Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

Energy Expenditure and Fatigue During Radiation Treatment for Breast Cancer: A Pilot Cohort Study

Student Researcher: Kathryn Slevin

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Embedded System for Wind Resource Evaluation

Student Researcher: Damien Sommer

Faculty Member: Darrin Hanna, associate professor, Engineering

Correlation of Traditional and Segmental Bioelectrical Impedance to Hydrodensitometry for Body Composition Analysis in Indian Participants

Student Researcher: Dipen Soni

Faculty Member: Charles Marks, associate professor, Exercise Science

Herpetic Stromal Keratitis (HSK) Lesion Severity Correlates with the Amount of Pro-Inflammatory Neuropeptide Substance P in the Cornea

Student Researcher: Brandon Twardy

Faculty Member: Susmit Suvas, assistant professor, Biological Sciences

Model Reference Adaptive Control for Actuators of a Biped Robot Locomotion

Student Researcher: Pavan Vempaty

Faculty Member: Ka C. Cheok, professor, Engineering

Energy Expenditure and Fatigue During Radiation Treatment for Breast Cancer: A Pilot Cohort Study

Student Researcher: Emily Wilson

Faculty Member: Jacqueline Drouin, associate professor, Physical Therapy

Rapid Prototyping of Quadrotor Controllers using MATLAB RTW and dsPICs

Student Researcher: Hong Chul Yang

Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

University Research Committee Undergraduate Student Research Awards

1) *Domains of Post-traumatic Growth Correlates with Changes in Alcohol Use*

2) *Faith, Age, and Stress Associates with Spirituality of Post-traumatic Growth*

Student Researcher: Melanie Phillips

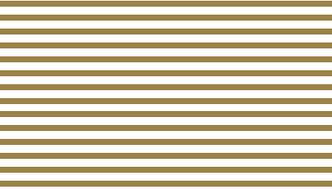
Faculty Member: Kanako Taku, assistant professor, Psychology

1) *Frequencies of Post-traumatic Growth Experiences Among Japanese University Students*

2) *Assessing Concordance Between Student and Teacher Ratings of Post-traumatic Growth in Japanese Youth*

Student Researcher: Melanie Phillips

Faculty Member: Kanako Taku, assistant professor, Psychology



Student research award recipients *continued*

Service and Solidarity Trip to Guatemala

Student Researcher: Jarret Schlaff

Faculty Member: Fay Hansen, associate professor, Biological Sciences

To attend the Conference on College Communication and Composition in Louisville, Kentucky

Student Researcher: Jessica Tess

Faculty Member: Greg Giberson, assistant professor, Rhetoric

Embedded System for Wind Resource Evaluation

Student Researcher: John Virga

Faculty Member: Darrin Hanna, associate professor, Engineering

Findings from a Cancer Knowledge Survey Among Arab and Chaldean Americans in Michigan

Student Researcher: Tabitha Zakar

Faculty Member: Florence Dallo, assistant professor, Health Sciences

Provost Undergraduate Student Research Awards

*What Effects Does the Presence of Parasites Have on the Behavior of the Invasive Paper Wasp *Polistes dominulus* (Hymenoptera, Vespidae)?*

Student Researcher: Christopher Donnelly

Faculty Member: George Gamboa, professor, Biological Sciences

Marginalizing Julius Streicher: How Aberrant was Der Stürmer?

Student Researcher: Jonathan Fouch

Faculty Member: Derek Hastings, associate professor, History

Pursuit of Happiness Project – Phase II

Student Researcher: Jennifer Kelley

Faculty Member: Robby Stewart, associate dean, CAS/professor, Psychology

Gene Capture in Helitrons in the Maize Genome

Student Researcher: Katarina Klusman

Faculty Member: Shailesh Lal, associate professor, Biological Sciences

*Extraction and Evaluation of *Lactobacillus Bacterium Lipid Fractions**

Student Researcher: Alicia Sawdon

Faculty Member: Kathleen Moore, associate dean of CAS/professor, Chemistry

The Role of Thioredoxin Reductase-1 in the Lens Epithelium

Student Researcher: Tenira Townsend

Faculty Member: Frank Giblin, director, Eye Research Institute/professor, Biomedical Sciences

Role of PD-1 in Regulating the Proliferation of Cancer Cells

Student Researcher: Nicholas Vietto

Faculty Member: Susmit Suvas, assistant professor, Biological Sciences

Findings from a Cancer Knowledge Survey among Arab and Chaldean Americans in Michigan

Student Researcher: Tabitha Zakar

Faculty Member: Florence Dallo, assistant professor, Health Sciences

Provost Graduate Student Research Awards

Reliability of the Sensewear Armband to Measure the Metabolic Cost of Low-Level Activity in Individuals with Chronic Stroke: A Methodological Study

Student Researcher: Lindsay Battle

Faculty Member: Sue Saliga, assistant professor, Physical Therapy

Hydrogen Generation from Bio-Inspired Catalysts: Novel Green Catalyst Synthesis Methods

Student Researcher: Elizabeth Donovan

Faculty Member: Greg Felton, assistant professor, Chemistry

*Round Goby (*Apollonia melanostoma*): Habitat Preference, Distribution, and Competition with Native Fishes in Great Lakes Tributaries*

Student Researcher: Timothy Campbell

Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

Individual Adherence to Manufacturer's Application Guidelines of Knee Braces Six Months After Introduction to Proper Donning: A Descriptive Case Series

Student Researcher: Jeffrey Cook

Faculty Member: Brian Goslin, program director of Exercise Science/associate professor, Health Sciences

Measurement of PEM Fuel Cell Membrane Electrode Assembly Temperatures Using Phosphor Thermometry

Student Researcher: Kristopher Inman

Faculty Member: Xia Wang, assistant professor, Engineering

Impact of Road Salt Application on Trace Element Behavior in an Heavily Urbanized Area (metro Detroit, SE Michigan, USA)

Student Researcher: Andrea Jones

Faculty Member: Edith Chopin, assistant professor, Chemistry

Evaluating Variable Valve Timing Strategies for Controlling HCCI Combustion

Student Researcher: Yen Chung Liu

Faculty Member: Brian Sangeorzan, associate professor, Engineering

*A Comparison of Parasites Between Two Michigan Species of Paper Wasp: Native *Polistes fuscatus* and Invasive *Polistes dominulus**

Student Researcher: Gary Miller

Faculty Member: George Gamboa, professor, Biological Sciences

20th Century American Music in Performance

Student Researcher: Kevin Naeve

Faculty Member: Gregory Cunningham, associate professor, Music

Development of an Elastomeric Composite Bipolar Plate Material for Polymer Electrolyte Membrane Fuel Cell for Improved Mechanical Strength and Lower Electrical Resistance

Student Researcher: Elaine Petrach

Faculty Member: Xia Wang, assistant professor, Engineering

Effect of Compression Stockings on Blood Lactate Levels in Division III Collegiate Cross Country Runner During a Treadmill Test

Student Researcher: Brian Rider

Faculty Member: Brian Goslin, program director of Exercise Science/associate professor, Health Sciences

Development of Pore Scale Network Modeling for Gas Diffusion Layers of Proton Exchange Membrane Fuel Cells

Student Researcher: Zhongying Shi

Faculty Member: Xia Wang, assistant professor, Engineering

Enzymatic Oxidation Products of Linoleic Acid and Caspase Activation in HT-29 and HCT-116 Colon Cancer Cells

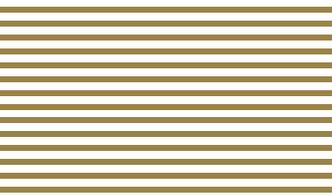
Student Researcher: Bharvi Soni

Faculty Member: Arthur Bull, department chair/professor, Chemistry

Effects of Native and Exotic Plant Litter on the Development of Rapid Frog Larvae

Student Researcher: Jeff Stephans

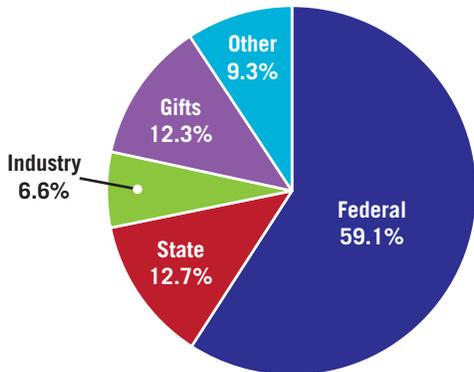
Faculty Members: Scott Tiegs, assistant professor, Biological Sciences and Keith Berven, associate professor, Biological Sciences



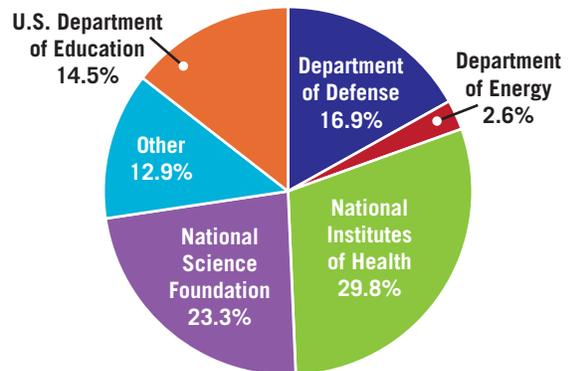
By the Numbers

Fiscal Year 2009

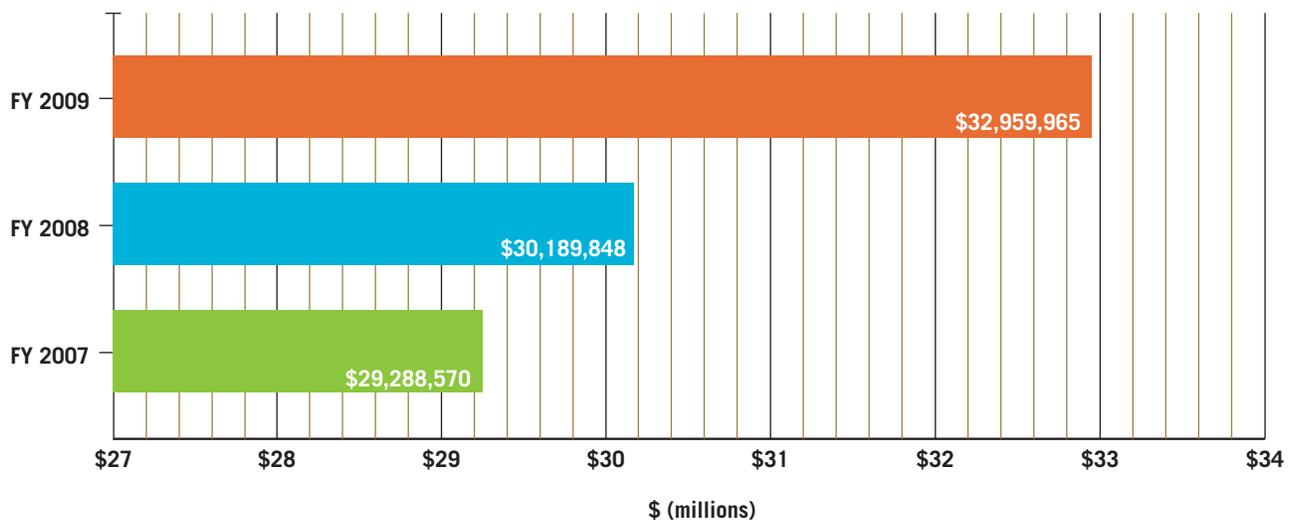
Research support by source



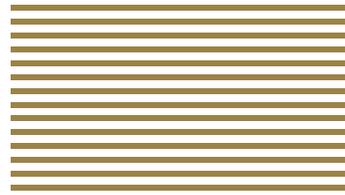
Federal Research Awards by Agencies



Institutional Research Expenditures



Grants and contracts agency list — FY 2009



American Federation for Aging Research	Michigan Universities Commercialization Initiative
Battelle, Pacific Northwest Division	Microstar Technologies LLC
Bayer CropScience	National Institutes of Health
Beaumont Hospitals	National Science Foundation
Beta CAE Systems USA, Inc.	National Writing Project
Blue Cross Blue Shield of Michigan	Oak Ridge National Laboratory
Centers for Disease Control and Prevention	Oakland County Community Mental Health Authority
City of Detroit	Octillian Corporation
Clinton County Regional Educational Service Agency	Office of Naval Research
Continental Teves, Inc.	OptimizeRx
Chrysler Corporation	Reading Recovery Council of North America
Defense Advanced Research Projects Agency	Research Corporation
Detroit Area Pre-College Engineering Program	RHK Technologies
Fieldstone Alliance, Inc.	Saint-Gobain Ceramics
Ford Motor Company	Science Applications International Corporation
Foster-Miller, Inc.	SpinDance Inc.
General Motors Corporation	St. John Health System
Health Resources and Services Administration	State of Michigan
Henry Ford Health System	The Kresge Foundation
Infogation Corporation	The Lincy Foundation
Intelligent Automation, Inc.	The Matilda Zeigler Foundation for the Blind, Inc.
Macomb Intermediate School District	Trier University of Applied Sciences
Magna International, Inc.	U.S. Army
Michigan Council for Arts and Cultural Affairs	U.S. Department of Education
Michigan Department of Education	U.S. Department of Energy
Michigan Department of Labor and Economic Growth	U.S. Navy
Michigan Economic Development Corporation	United States Automotive Materials Partnership
Michigan Space Grant Consortium	Vision Research Foundation



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