OAKLAND UNIVERSITY » Fall 2011

OU RESEARCH

Volume 4, No.1

Dr. 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.

Message from Virinder Moudgil

Dear Friends,

Consider these numbers: $35 million in total research expenditures; $18 million in federal awards. Those describe the financial investment Oakland University (through internal and external sources) invests each year in research; research that finds the answers to important, impactful questions and solutions to life-changing challenges. Every day in our laboratories, investigations are being conducted that take us one step closer to better health care, safer automobiles and more environmentally sound practices. In this issue of *OU Research* you will read about the achievements of some of the future stars of our faculty, including programs that are helping career-changers become tomorrow's exemplary math and science teachers, research to help slow attrition rates in the health care field, and discoveries to assist auto manufacturers achieve flawless results.

At Oakland University, we are dedicated to this vitally important research, and I am proud to work for a university that continues to balance excellent research opportunities with comprehensive academics. Teaching and research are interwoven throughout this university in the education of our students, the engagement of our faculty and the leadership of the institution. Every single day, we strive for excellence in instruction in the classroom that enhances our laboratory and high-quality academic preparation. Our faculty works with an attitude of teamwork and collaboration to provide innovative teaching and state-of-the-art knowledge for our students. Our departments and units work side-by-side to draw upon our best resources to find solutions.

To help lead this effort, Dorothy Nelson, Ph.D., joined us this fall as vice provost for research and professor of anthropology. Dr. Nelson earned her Ph.D. in physical anthropology at Michigan State University. She began her research career at Henry Ford Hospital in the Bone and Mineral Research program, where she was awarded two grants from the National Institutes of Health (NIH) for her work on ethnic differences in skeletal health during growth and adulthood. Dr. Nelson has notably served as a grant reviewer for NIH, the National Science Foundation, and the Department of Defense, and currently serves on the editorial boards of two scientific journals. We are exceptionally proud to welcome Dr. Nelson to our research team.

Please enjoy this issue of *OU Research*. We are extraordinarily proud of the research accomplishments of our faculty and students. I hope you enjoy reading about some of these achievements, and are equally inspired as well.

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

OURESEARCH

OAKLAND UNIVERSITY » Fall 2011 » Volume 4, No.1

OU Research is published annually as a joint project of the Office of Grants, Contracts and Sponsored Research and the Department of Communications and Marketing.

ISSN: 1944-1487

Oakland University
2200 North Squirrel Road
Rochester, MI 48309-4401

oakland.edu
oakland.edu/research

On the cover: Valerie Scheidemantle, a fourth-grade participant in the Meadow Brook Writing Project. Right, Kris Griffor, MA '05, leads students at Westwood Elementary in Warren, Michigan, in a mini lesson to begin a writing workshop. Read more about the project on page 20.

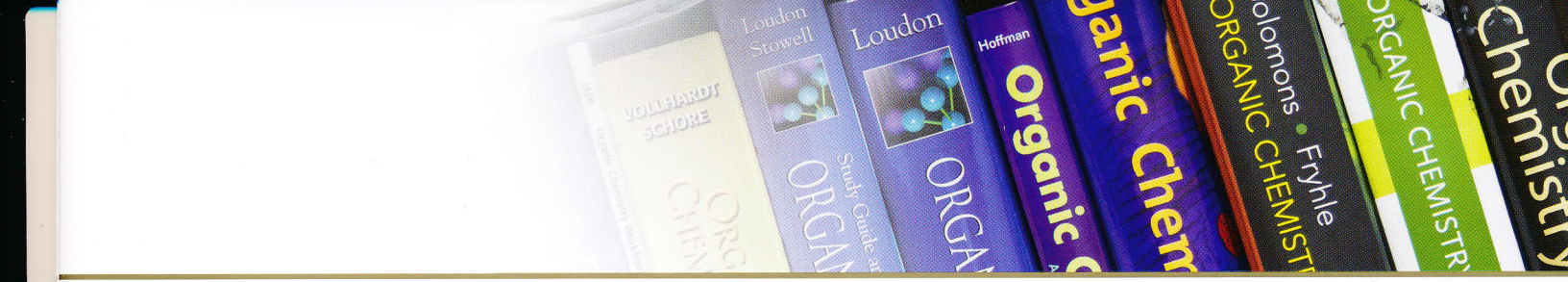


TABLE OF CONTENTS

Eye spy

Envisioning a cure

Susmit Suvas, Ph.D., has his eyes on the future, and his vision has been rewarded.

Dr. Suvas, an assistant professor in Oakland University's Department of Biological Sciences, won a rare National Eye Institute grant for exploratory/developmental research. "Because no one has studied this before, it's considered high risk, but the NIH sees the benefits it might bring," he explains.

He is studying the nerves of the eye and how their secretions and immunology play a role in helping or hurting the cornea of a person infected with herpes simplex virus-1 (HSV-1), the same virus that causes mouth cold sores.

HSV-1 can cause chronic inflammation in the corneal stroma, the thickest of the five layers of a cornea. Left untreated, the inflammation can give rise to herpetic stromal keratitis (HSK), a disease that results in permanent scarring of the cornea and is a leading cause of infection-induced corneal blindness in the United States.

"Right now there is only one form of treatment for the problem and that's with steroids. And if you know steroids, there are significant side effects with long-term use of them," Dr. Suvas says.

Furthermore, Dr. Suvas says studies show 60 to 80 percent of the world population has the HSV-1 virus lying dormant in nerve bundles in their bodies, so the need is great to find a better treatment plan and, ultimately, cure for infection-induced corneal blindness.

"I am very happy with our research," Dr. Suvas says. "I see quite a potential for long-term success."

So, too, does Sally S. Atherton, executive vice president of the Maryland-based Association for Research in Vision and Ophthalmology, who hopes it cuts down on corneal transplants. "Studies such as those being conducted by Dr. Susmit Suvas to decipher the neuroimmunology of HSV-1 keratitis and the underlying mechanisms of corneal damage may lead to therapies that target specific effector molecules, which, in turn, will reduce corneal scarring and preserve vision," she says.

The two-year R21 grant for nearly $403,000 has allowed Dr. Suvas, among other things, to hire two doctorate students, Brandon Twardy and Rudragouda Channappanavar to assist with the research.

With the help of lab mice models, they are exploring how the development of HSK lesions is regulated by corneal neuropeptides (molecules used by neurons to communicate with each other), substance P (SP) and vasoactive intestinal peptide (VIP), and whether targeting these molecules reduces the development of HSV-1-induced corneal lesions.

The idea for this study came to Dr. Suvas while he was reading articles about how nervous system can influence the immune system. "Since the cornea has lots of nerve endings, I asked Brandon to look out for SP and VIP neuropeptides in the corneas with or without severe eye lesions," says Dr. Suvas. It turned out that the corneas with severe lesions had higher amounts of SP, a pro-inflammatory neuropeptide. "Brandon did a great job in conducting the study," says Dr. Suvas.

Dr. Suvas also credits a poor immunology instructor in his final year as an undergraduate in India for giving him the spark to study immunology rather than the business degree he was pursuing. "He would not explain in detail, so he created this curiosity in me because I'd go back to the book and read about it," he says.

Doctorate student Twardy laughed after hearing how Dr. Suvas got into immunology because he also had no interest in the field until speaking with an enthusiastic Suvas. "As soon as we spoke, I knew I wanted to work for him and learn more about immunology," he admits.

Dr. Suvas joined OU in 2007 after completing his post-doc research and serving as a research assistant professor at the University of Tennessee, Knoxville. While he had another job offer in the South, he chose OU because, "It's a growing institute and I saw a lot of potential," he says.

He views the opening of the medical school and the collaboration with Beaumont Hospital as an opportunity to apply his immunology research and help people directly.

His eyes are on the future again.

By Rene Wisely

"I see quite a potential for long-term success."

Susmit Suvas, assistant professor, Department of Biological Sciences received his Ph.D. from IMTECH in Chandigarh, India, in Cellular Immunology. He completed postdoctoral work at the University of Tennessee, Knoxville in Viral Immunology. Dr. Suvas' focus is to understand immunity to herpes simplex virus-1 infection, using a mouse model to study infection-induced corneal inflammation, a cause of corneal blindness. He also studies age-related changes in the immune regulatory network and its effect on reactivation of the latent herpes virus infection in the aged host.

George Martins, associate professor, Physics, received his Ph.D. from Campinas State University in Brazil. He has research interests in the area of strongly correlated electrons. In collaboration with research groups in the United States, Europe and Brazil, he has been applying different numerical techniques to probe and understand the properties of strongly correlated electronic systems. He has concentrated on Exact Diagonalization Methods and the Random Phase Approximation as tools to gain understanding of nano structures, High-Tc cuprates, ladders, spin chains, frustrated spin systems and, more recently, pnictides.

Small world, big minds

Building bridges through physics

George Martins, Ph.D., has built a bridge that connects Oakland University to Latin America, Florida and Ohio, all in the name of science.

Dr. Martins, an associate professor of physics at OU, is collaborating with scientists in Brazil, Chile, Florida and Ohio. Argentina is expected to be added later this year.

The partnership is the heart of a National Science Foundation (NSF) grant and study called Materials World Network — Collaborative Research: Decoherence, Correlations and Spin Effects in Nanostructured Materials.

It aims to create synergy among the brightest minds across the globe in hopes of harnessing matter one atom at a time to create cutting-edge nanotechnology: a new generation of electronic devices that are smaller, faster, better.

"We study properties of very small systems, which can range from the size of an atom to a large molecule, to try to understand how they can be used to produce the electronics of the future," Dr. Martins says.

The ideal outcome from the study is, "that all the researchers involved can learn from each other and develop new ways of understanding these complex systems," he adds.

The NSF gave Martins $168,000 for the four-year study, while the University of Florida received $300,000, and Ohio University $650,000. They recently received a 3-year renewal of this grant, and this time around they invited scientists in Argentina to be involved.

"It's great to see Oakland University participating actively in the nanotechnology revolution," says Christine Peterson, president of Foresight Institute, a nanotech public interest group in California. "This collaboration will enable OU to participate in high-quality international research affecting the electronic industry in the coming decades, helping bring jobs and financial benefits to the U.S. and the OU area, specifically."

Each collaborator is an expert in one area or another. Dr. Martins has three main roles. His networking helped round up the study's brainpower. "Being a Brazilian, with many collaborators in Brazil, Chile and Argentina, it was natural for me to participate on the U.S. side to help establish links," he explains.

Martins' other key role often finds him behind a powerful computer in OU's Department of Physics crunching numbers and testing formulas.

"These are extremely complicated systems, which have pushed the technique I use — numerical calculations, using computers — to the limit," he says. "My challenge was to improve this technique to be able to apply it to even more complex problems."

"I won't say that this happens every day, but almost every other day there is an 'a-ha' moment, and this is *extremely* rewarding," he says.

Dr. Martins also has been instrumental in helping the scattered team work together. He maintains a "wiki" — a web site that allows users to collaborate online. Researchers share content (figures, data and text files), post comments and ideas, and work together on papers.

The grant covers travel expenses, as well, and helps them fund and put on workshops to spread the nuggets they've learned to budding scientists.

"The collaboration will provide exposure to all students, both in the U.S. and Latin America, to global learning environments, including theory and experiments in close connection. This should impart them with a style of research and work that will be extremely useful in their careers," reads the group's original grant application.

Dr. Martins has been awarded seven federal grants throughout his globetrotting career. He earned his bachelor's, master's and doctorate degrees at Universidade Estadual de Campinas in Brazil. After graduating, he worked six years as a post-doctoral fellow in Florida at the National High Magnetic Field Laboratory before returning to Brazil as a visiting scientist. He later returned to the Magnetic Lab in Florida, and finally to OU in 2004, when he became an assistant professor of physics, followed by an associate professorship in 2007.

His interest in physics piqued at age 15. "My curiosity was sparked by reading some college physics books from my older brothers, who were majoring in engineering," he explains. "After reading a few pages, I knew what I wanted to be."

He knew which path to follow.

By Rene Wisely

"... how they can be used to produce the electronics of the future."

A study in contrast

Locating low areas of oxygen

If a high-resolution imaging test is ordered to detect cancer, ideally it finds or preferably rules out cancer. Yet a limitation with a common method, Magnetic Resonance Imaging (MRI), is that it lacks the ability to locate hypoxia, or areas of low oxygen.

That limitation becomes all too relevant, and potentially ominous, if a cluster of hypoxic cells often associated with a tumor goes undetected.

In prefacing his research involving the development of MRI contrast agents, Associate Professor of Chemistry Ferman Chavez, Ph.D., explains that hypoxic cells are rarely found in normal tissue, but are found after a stroke, in vascular diseases and in conjunction with some tumors.

"As certain tumors enlarge, the tissue often outgrows its oxygen and nutrient supply because of an inadequate network of functioning blood vessels and capillaries," writes Dr. Chavez in the introduction of his latest research project. "Although the cells deprived of oxygen and nutrients may ultimately die, at any given time a tumor may produce viable hypoxic cells. These hypoxic cells, although alive, have very low oxygen concentrations because of their remoteness from the blood vessels."

Dr. Chavez says there is a need for new methods of diagnosis that allow for the high resolution imaging of these cell types so they can be treated directly or removed.

"Right now, there is no high-resolution, noninvasive imaging method to detect hypoxia. One current approach utilizes a radioactive compound that under low oxygen binds to cancer cells and becomes a beacon for hypoxia. We are trying to develop agents that do the same thing, but in a reversible manner, so that as oxygen levels begin to increase, we would be able to see that without the need for radioactivity," says Dr. Chavez, a California native who was a postdoctoral associate at the University of Minnesota before joining OU in 2002. He was named associate professor in 2008.

One application for this noninvasive, dynamic method would be in monitoring whether a certain treatment is working. If oxygen increases, that would signal that the cancer is going away. It could also detect areas of low oxygen in the heart or brain, as occurs in heart attack or stroke.

Dr. Chavez says that not too many researchers are focusing on compounds in this area that are useful in noninvasive imaging techniques such as MRI. This specialty niche approach has allowed him to obtain more than a half-million dollars in funding from the National Science Foundation and may garner funding through the National Cancer Institute and private foundations. He will be initially submitting an National Institutes of Health Academic Research Enhancement Award (AREA) grant for the MRI project this fall.

In his lab, Chavez is currently gathering preliminary results for the project with the help of undergraduate and graduate students. This research involves synthesizing water soluble, highly fluorinated liposomes or micelles which can be detected by 19F-MRI. It is anticipated that these well-defined compounds would serve as high-resolution contrast agents compared to compounds currently in use.

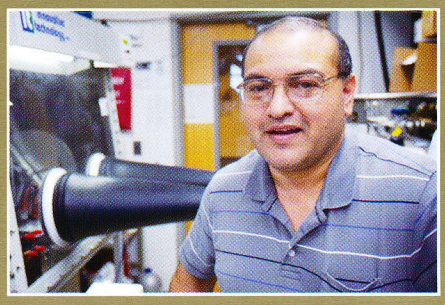
"The starting point of my research is being able to monitor the fluorine and oxygen, but we are going one step further. We are also making a metal-based compound that will more effectively bind oxygen and actually result in a higher contrast because of the magnetic properties of the metal involved," says Chavez, who is collaborating with Professor Yang Xia in the Department of Physics on this project.

Prior to receiving his Ph.D. from the University of California, Santa Cruz, Chavez worked as an analytical chemist for the U.S. Food and Drug Administration. He says his time spent working with the industry helps him better advise students on their course of study. It also instilled a practical approach to research.

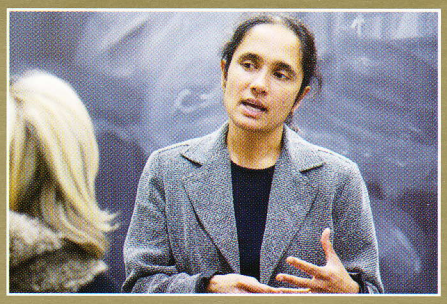
"Whatever students do as research in the lab is potentially publishable," he says, noting that several manuscripts in preparation feature undergraduate co-authors. "What we do here is cutting edge, just on a smaller scale compared to other research-intensive universities. I tell students that if they are working on something important that hasn't been done before, it is publishable. Then they may contribute to something that is fundamental."

By Alice Rhein

"What we do here is cutting edge, just on a smaller scale."



Ferman Chavez, associate professor, Chemistry, received his Ph.D. from the University of California, Santa Cruz and completed postdoctoral work at the University of Minnesota. Dr. Chavez's current research aim is to develop synthetic models for active sites of various metalloenzymes. Such models will be used to probe enzymatic mechanisms and as catalysts for organic transformations and bioremediation. He recently became interested in developing MRI contrast agents for imaging hypoxia and carbon dioxide sequesteration.



Lakshmi Raman, assistant professor of Psychology, received a Ph.D. from Ohio State University. Her research program focuses on the impact of social and cultural factors on children and adult causal attributions in the origins of physical illness. For her dissertation, she conducted a developmental analysis of immanent justice beliefs in children and adults, in which she challenged traditional developmental theories. Raman was awarded an NICHD National Research Service Award (NRSA) to support her research during her postdoctoral fellowship at the University of Michigan.

Manifesting health

The impact of nutrition on biological and psychological processes

"You are what you eat" is a favorite in a mother's canon, but at what point do children really understand the impact of nutrition on health?

That is a question Assistant Professor of Psychology Lakshmi Raman, Ph.D., has been trying to answer in her latest research.

"I am interested in finding out at what age children recognize that the type of dietary intake has an impact on growth and if they think that what we eat can impact our mood states," says Dr. Raman, who completed her doctoral degree at Ohio State University in 2000.

Her current projects that examine this issue include one study that looks at the impact of nutrition on height, weight, and positive and negative mood states. Another project assesses the impact of psychobiological labels such as tasty and not tasty food on growth. She is also working on a project that looks at what kinds of maternal input children receive about the impact of eating different foods.

"This project focuses on mother-child and mother-adult conversations about eating a variety of healthy and unhealthy foods. I am interested in finding out if young children, ages 3 to 5, construct their conceptual ideas about the impact of food from maternal input or if they construct it from other sources," she says.

Dr. Raman joined OU in 2006 and has student researchers working on all phases of the project including constructing questionnaires, recruiting, scheduling and testing participants, and transcribing and coding data. All of Raman's student researchers have presented at Meeting of Minds, the annual OU undergraduate research conference.

Funded by an R15 Academic Enhancement Award from the Eunice Kennedy Shriver National Institute of Child Health and Human Development worth $220,000, Dr. Raman's research on children's understanding of nutrition may provide the data needed to tailor effective nutritional intervention programs in educational and medical settings.

Research she conducted during her postdoctoral fellowship at the University of Michigan showed that it wasn't until fourth grade that children recognized that healthy nutrition results in growing taller, and unhealthy nutrition results in growing fatter.

Dr. Raman and her postdoc mentor, Susan Gelman, also published research on children's understanding of the transmission of genetic disorders and contagious illnesses, and on whether children endorse psychosocial factors in the origins of illness and disgust. She is currently working with Julie Lumeng in the Department of Pediatrics at the University of Michigan on a project that examines maternal feeding practices in low-income populations.

"There is a vast amount of literature that has examined children's understanding of biological processes such as illness, reproduction and death," says Dr. Raman, who also serves as a reviewer for several professional journals. "We are finding that young children know a lot more about these processes than we originally thought they did, but we are also realizing that young children's theories are somewhat rudimentary compared to older children."

Her research is also showing that young children's reasoning is more context dependent, which is relevant to teaching and public heath. In one study, Dr. Raman found that children reasoned that they were more likely to contract a cold from someone they did not know, rather than someone they were related to, or someone they liked or disliked. She also looked at children's views of moral causes behind the contraction of disease. While "what goes around comes around" and "an eye for an eye" are clearly inaccurate from a biological perspective, believing in them could foster the contraction and incidence of illnesses.

"Moreover," says Dr. Raman, "it could result in self-blame when, in fact, there is a biological reason for the contraction of the illness."

Dr. Raman hopes to continue researching children's and adults' understanding of nutrition and illness. She has just started a project that examines if children and adults think the role of ingroup and outgroup factors contribute to the contraction of common childhood illnesses. Do children think that they are more likely to contract a cold from someone who looks like them or from someone who does not resemble them?

"Although these factors from a biological perspective are irrelevant," says Dr. Raman, "My research will uncover the misconceptions children might have about how and from whom they can contract these illnesses, which can have implications for the development and implementation of programs."

By Alice Rhein

"We are finding that young children know a lot more ... than we originally thought they did."

A perfect finish

Helping automotive manufacturers achieve flawless results

When you appreciate the flowing lines of a beautifully designed automobile, you probably don't consider what it took to sculpt the sheet metal into that shape.

Think about it for a moment, though. The metal used to build cars has to be tough and durable, yet it must be stretched and bent into the contours envisioned by designers.

"A very big part of the manufacturing of an automobile panel is determining the forming limits of a piece of sheet metal," says Lorenzo M. Smith, Ph.D., associate dean of the Oakland University School of Engineering and Computer Science and an associate professor of mechanical engineering.

This is something Dr. Smith has studied for many years. But auto manufacturers wanted to learn more. Even when sheet metal doesn't "tear" when stretched, the process can lead to tiny distortions in the sheet metal.

These distortions, which are called skid lines, can be difficult to see until the vehicle is painted with a glossy finish. Consumers and critics notice, though, and the blemishes can negatively impact sales.

Automakers don't have the ability to measure the conditions associated with skid line formation in their manufacturing facilities. Which is why they turned to Dr. Smith for help.

"A group of manufacturers asked me to try to design some kind of machine in the lab that can be used to reproduce what's actually happening in the manufacturing process that causes these skid lines," he explains.

To Dr. Smith, a project like this gets at the heart of what makes most mechanical engineers tick. "If you look back to their childhood, you'll find them playing with Tinkertoys or Lincoln Logs," he says. "Being told 'build a machine' is exciting because it's what most of us love to do."

Manufacturers wanted the ability to pull sheet metal vertically to measure the various forces that come into play during manufacturing. Since no machine like that is available, OU researchers built one using an existing tensile test machine as a foundation.

"This is a really good example of how researchers find themselves up against a brick wall, but use innovation to work within the constraints of what we already have," Dr. Smith explains. "What seems like a barrier can be an opportunity — and possibly lead to a patent."

Dr. Smith and his research assistants have also developed a model which can be applied to solve the problem.

The researchers developed an empirical model to help manufacturers determine at what stretch point the sheet metal might become distorted. The result is what's known as a skid line limit diagram.

Thanks to Dr. Smith's research, which is ongoing, auto manufacturers now have the understanding and a method for adapting existing tensile test machines to check for skid line-inducing conditions during manufacturing. Dr. Smith hopes this may lead to improved computer simulations of sheet metal forming processes.

OU graduate students are working on the research project, including a Ph.D. student who is stationed at Ford Motor Company and assigned to parallel projects. This enriches the learning experience for students, who Dr. Smith says are playing "a significant role" in the project.

This research is being funded in part by a consortium of automakers and steel companies called the Auto/Steel Partnership. Research findings are being shared with the partnership, as well as through journal articles and technical conferences.

Ultimately, the work of OU's researchers might help auto manufacturers save millions of dollars in manufacturing costs, says Dr. Smith. What's more, they'll have the luxury of exploring new vehicle designs that weren't possible before due to skid line concerns.

"Our work is a prime example of how research can immediately be applied to solving a problem for industry," says Dr. Smith. "That's one of our hallmarks at OU: We want our research to be directly and immediately applicable to society."

By Amy Lynn Smith

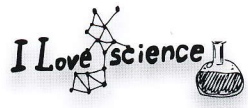
"What seems like a barrier can be an opportunity."

Lorenzo Smith, associate professor and associate dean, Department of Engineering and Computer Science, received his Ph.D. from Michigan State University. Besides his collaboration with the auto industry, Dr. Smith has initiated research in the area of biomimetic tactile sensors using advanced optical techniques, with the goal of improving methods of detecting breast cancer. Ongoing work is aimed toward collaboration with researchers at the University of Southern California and William Beaumont Hospital.

Mark Olson, assistant professor, Teacher Development and Educational Studies, received his Ph.D. from Michigan State University in Curriculum, Teaching and Educational Policy. He also holds a B.A. from Concordia College in Moorhead, Minn., and is an experienced high school science and mathematics teacher. Prior to coming to Oakland University, Olson was an assistant professor at the University of Connecticut. He recently concluded a two-year Knowles Foundation Young Scholar Fellowship, which he used to examine and develop assessments of the relationships between a teacher's content knowledge and how that knowledge is represented in classrooms.

Tomorrow's teachers

Scholarships support math, science career changers



Chemical engineer Brian Debbaudt enjoyed a successful 15-year career that included corporate positions and self-employment, but something was always missing.

That "something," it turns out, was students. Debbaudt had always wanted to be a teacher, but with every career step, he moved further away from the classroom — until a friend heard a radio commercial for a new graduate program at Oakland University.

The ad invited listeners to an informational session about the Robert Noyce Teacher Scholarship Program offering full tuition to science, technology, engineering and mathematics (STEM) professionals interested in becoming teachers. Participants in the 13-month program must commit to teaching in high-need middle or high schools (see sidebar) for two years.

Debbaudt is one of six students who recently completed the first of OU's three consecutive master's in teaching cohorts funded by the National Science Foundation. The condensed program adapted from OU's existing teacher certification program for career changers focuses not on *what* to teach, but on *how* to teach, and, more specifically, on how to teach STEM subjects. For example, the class on instructional design zeroes in on how to do this for math and science subjects.

The instructional staff includes retired educators serving as student teacher mentors.

"Research has shown that while teacher turnover rates in the first five years are generally high, districts that provide strong instructional support in the first two years can significantly reduce such turnover," says Mark Olson, assistant professor of science education in the School of Education and Human Services and the program's teaching methods instructor. "Our instructional coaches will stay with our new teachers during their first two years of teaching so that they have the best chance of success, especially since they will be working in high-need schools."

Figuring out how to better prepare teachers for the unique challenges of those schools is one of the program's goals.

"We have a fairly robust evaluation system in place to help us with this," Olson says. "We'll be interviewing participants and principals at schools where they're student teaching at the beginning and end of the program, as well as observing teachers in the classroom often enough to feel like we have an accurate snapshot of performance. We'll use some of this information to determine what does and doesn't work in preparing teachers for these schools."

Olson is still seeking qualified candidates for the program. He notes that some candidates are reluctant to leave their jobs — and income — behind to attend graduate school full-time, a program requirement. Others accustomed to earning six-figure salaries are surprised to discover that the starting salary for teachers is usually less than $40,000. Some lose interest when they learn that state teaching requirements mean they might need to take more undergraduate classes before they can start the graduate program.

"A mechanical engineer might consider herself to be highly qualified to teach physics, but hasn't taken any undergrad classes about light, optics or electricity, which the state requires," Olson explains. Advisers work closely with applicants to meet requirements.

And while many districts are cutting budgets and eliminating teaching positions, Olson points out that schools need to be prepared for the high number of math and science teachers expected to retire in the next 10 years.

"If new teachers aren't in the pipeline now, there won't be experienced replacements by then, especially for the high-need schools," he notes.

Debbaudt expects to be one of those experienced educators 10 years from now.

"I love it," he says. "I'm very excited about this career change."

What makes a school "high need?"

A high-need school typically has at least one of these characteristics:

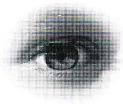
- An unusually high percentage — 40 to 50 percent — of the students qualify for free and reduced lunch subsidies.
- More than a third of the classroom teachers don't have a major, minor or significant course work in the subject they're teaching.
- There's a faculty turnover rate of 15 percent or higher in the past three school years.

By Sandra Beckwith

"If new teachers aren't in the pipeline now, there won't be experienced replacements, especially for high-need schools."

Eyes wide open

A peek into the multidimensional world of eye research



From the moment we open our eyes each morning, we've already begun to lose something.

The retinal photoreceptors (rods and cones) of the eye contain membranous discs that serve as highly sensitive light detectors. These discs are shed on a continual basis.

"As soon as our eyes take in the morning light, the shedding of discs begins," says Andrew Goldberg, associate professor of Biomedical Sciences and principal investigator of the Goldberg Laboratory at OU's Eye Research Institute (ERI). "We can think of the discs like a stack of pancakes. The top disc — or pancake — is being 'eaten' off the top and is then replaced by a new pancake at the bottom of the stack."

The discs, packaged into a compartment called the outer segment, are completely renewed every 10 days throughout our lifetime. But what is it then that causes eyesight to blur or darken — and what can be done to protect the tremendous gift of sight?

About 50,000 Americans lose their eyesight each year. Some vision loss is normal, such as blurred close-up vision that often occurs in the early-to-mid-40s. Due to rapid aging of the U.S. population, age-related macular degeneration — the No. 1 cause of vision loss in the elderly — will rise to almost 3 million by 2020.

What happens to blur the lines for so many?

"If we think of the eye as a digital camera, then the retina is like the light-sensitive chip in the camera," Goldberg says. "The retina contains a layer of photoreceptor cells, and that's where photons are converted into electric impulses that can be interpreted as images in the brain. Much like a camera, pictures generated by the retina are made up of individual pixels ... so when the photoreceptors (pixels) are functioning well, the images are clear. When they're not, vision becomes fuzzy."

A variety of environmental factors, normal aging and inherited conditions all degrade the performance of photoreceptor cells — which cause cell death, retinal degenerations and debilitating loss-of-sight conditions.

The good news is that in the past five years, there has been significant improvement in treatments for age-related retinal degenerations. Medical and surgical procedures can now lower pressure associated with glaucoma, and laser/drug treatments can help slow progression of retinopathies.

What's not yet fully understood is just what "right combination" keeps the photoreceptors alive and well, preventing deterioration and preserving sight.

"It's amazing that the photoreceptor — a single cell — is so complex," Goldberg says. "It's like a little city made up of millions of molecules organized into thousands of interrelated networks. It's not enough to document the individual players. To keep the city running, we must understand the relationships and networks, and we're creating new methods to do just that."

Much of Goldberg's research focuses on peripherin/rds, a protein essential for organizing the "pancake stack" structure of the photoreceptor cell outer segment. Inherited defects in this protein cause a range of human retinal degeneration and blinding diseases, including retinitis pigmentosa and macular degeneration.

The research is designed to discover how this protein interacts with itself, other proteins, and membranes to scaffold and dynamically renew the structure of the photoreceptor outer segment.

As Goldberg continues his innovative work, he credits federal grants for pushing the projects forward.

"We've seen fabulous progress in the advancement of medical technologies in the past 50 years — everything from replacement hearts to gene therapy to pharmaceuticals — and thus far, the United States has led the way," Goldberg says.

As always, these advancements also require courageous researchers.

"Science is not mysterious," Goldberg says. "It's about asking questions. It's about thinking things through in a common sense way and focusing on potential explanations that we can test. But we can't be afraid of ambiguity. It's okay to say we don't know, but we must continue pressing forward for the answers that can bring life-changing new treatments."

By Mary Gunderson-Switzer

"Science is not mysterious. It's about asking questions."

Andrew Goldberg, associate professor, Biomedical Sciences, received a Bachelor of Science degree in philosophy and biochemistry from the State University of New York, University Center at Binghamton. He conducted graduate studies in ion channel biochemistry/biophysics within the Department of Biochemistry at Brandeis University under the tutelage of Dr. Christopher Miller, and received a Ph.D. in 1992. Postdoctoral studies in vision science were conducted at the University of British Columbia and at the University of Washington. Goldberg joined the Eye Research Institute in 1999. Over the past 20 years, Dr. Goldberg has received funding and fellowships from the National Science Foundation, the Grass Foundation and National Eye Institute.

Jia Li, associate professor of engineering, School of Engineering and Computer Science, received a Bachelor of Science degree in electronics and information systems from Peking University, Beijing, China, and a M.S.E. degree and Ph.D. degree, both in electrical engineering, from the University of Michigan. Her research interests are in the areas of statistical signal processing and its applications in communications and biomedical imaging.

Sensory perception

Wireless automotive sensors could drive significant enhancements

Wireless technology has become so commonplace it might surprise you to learn it's not being widely used in cars and trucks. Yet.

Researchers at Oakland University hope to change that. Wireless technology has the potential to transform automotive sensors, which are integral to modern-day vehicles. But the current crop of sensors all require wiring to function properly.

Led by Jia Li, associate professor of engineering in OU's School of Engineering and Computer Science, the research is exploring the use of wireless ultra-wideband technology to replace wired automotive sensors.

Ultra-wideband technology has been used in military applications, including radar, for decades. Made available for commercial use in 2002, ultra-wideband provides higher speed and greater reliability than the narrowband technology used in cell phones, for example.

"The real issue is reliability," explains Li. "For automotive applications, you have to be able to deliver data within the required timeframe."

Automotive sensors are connected to electronic control units (ECUs), which are small computers in the vehicle. Wiring sends data to and from the ECU to sensors that monitor vehicle operations such as vehicle speed, wheel speed, tire pressure and much more.

Li and her fellow researchers, including students, have built a test bed for speed sensors in a lab at OU. "The speed sensor is the most time-critical sensor," says Li. "So if our technique can be used for the speed sensor, it will likely be okay for the other sensors, too."

Over the summer, the researchers used a stationary vehicle to perform network simulations and evaluate how well data is being transmitted wirelessly. Antennas were placed where sensors would be located on a vehicle — such as under the chassis and inside the engine compartment — to test the capacity of network channels to handle input and output from multiple sensors.

So far, the researchers have established that four different sensors can be on the same network and communicate under the chassis.

Once the reliability of their approach has been proven, the researchers will begin validating it on moving vehicles. Li expects the project to go on for at least another two years.

"We haven't yet reached the requirement for the current safety standard, which is a maximum delay of one millisecond," says Li. "In theory, we know it's possible."

The technology needed to implement wireless automotive sensors exists already, although it's not commercially available. Researchers hope their work will encourage technology providers to adapt their designs for automotive applications.

This research is being funded by General Motors and the National Science Foundation (NSF), with additional support from Hughes Research Lab, which is providing antennas for use in the project.

The research team includes a Ph.D. student — whose dissertation is about this project — and a master's degree student. Over the summer, the team was joined by two students from the 10-week Research Experiences for Undergraduates program sponsored by the NSF.

There's no question that this research benefits students and OU, by strengthening the university's partnership with industry. Even more important, however, could be what the research will yield for automotive manufacturers.

"Wireless sensors would have a huge impact on auto design, because they could be placed in locations where wired sensors can't reach, such as inside the engine," says Li.

What's more, replacing a wiring harness weighing between 50 to 80 pounds with wireless sensors would reduce weight, which would improve fuel economy. There's also the potential for improvements in safety. For example, speed sensors could detect if a vehicle is sliding, says Li.

In the future, wireless technology might help vehicles communicate with each other, an even more significant safety enhancement by warning of impending accidents.

By Amy Lynn Smith

"The real issue is reliability."

Striking gold

Uniting teachers, bolstering innovative classroom instruction

When Meadow Brook Writing Project (MBWP) co-director Mary Cox uses the phrase "mining for nuggets," she's not describing how she works her way through a box of McDonald's chicken strips looking for the tastiest ones. She uses this term to explain the actions of the teachers enrolled in a professional development program called the MBWP Summer Institute, where participants devote their time to exploring ways to improve writing instruction in Metro Detroit schools.

Cox brings together a mix of teachers from elementary schools through the university level where they research, identify and explore how to teach writing in their classrooms. Their goal is to leave the four-week session with an inquiry project that will help them gather research on writing instruction.

"The institute is about teachers teaching teachers," says Cox, who retired in 2009 from teaching after 41 years in the Detroit School District.

The MBWP is a branch of the National Writing Project, which began at University of California, Berkley in 1974 as the brainchild of several professors in the university's Graduate School of Education. Today, more than 200 sites exist across the country. The MBWP was established in 2000 and is one of 10 Michigan sites.

"The institute provides a forum for discussion across all levels of teaching, where preschool teachers and high school teachers find value in their conversations," says Marshall Kitchens, director, MBWP and associate professor and chair of the Department of Writing and Rhetoric at OU. "As a group, the teachers begin to push past the part where they complain how students have been taught prior to getting to their classrooms, and what evolves is an understanding of what goes on at all of the levels of teaching."

To start the discussion about writing, the participants spend hours doing just that in their own notebooks. They then concentrate on writing three personal pieces, giving one presentation on strategy and reading the book, *Digital Writing Matters*. They also depart the institute prepared to roll out an inquiry project in their own classrooms.

In late fall, participants schedule meetings to touch base with the institute directors, discussing the project's progress. By winter, the MBWP directors review the results.

A workshop is divided into three parts. It is one-quarter mini lesson; one-half writing and conferencing; and one-quarter sharing. The writing that materializes ranges in genre from personal narratives, essays, memoirs, nonfiction and creative writings, to writings about what students are reading.

"When students begin to see themselves as readers and writers, we can begin to facilitate authentic learning within the classroom," says Kris Griffor, MA '05, who admits that summer institute changed the course of her career.

After teaching for seven years in the Richmond, Michigan, School District, Griffor joined the staff of Warren Woods Middle School as its reading specialist. For the 2010-2011 school year, she became the district's curriculum director, implementing the very research she gleaned from summer institute and introducing it districtwide for Warren Woods Public Schools.

"The MBWP Summer Institute laid the foundation for my career. It helped me see the big picture, and how it connects directly to student achievement," says Griffor.

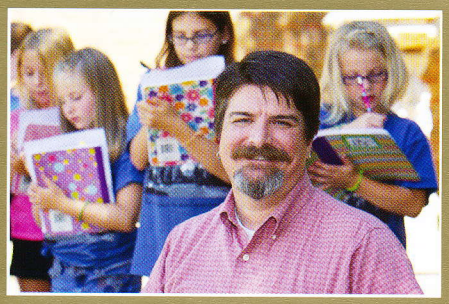
In fact, Kitchens explains that a former institute participant returned from a NWP conference inspiring the launch of the Youth Writing Camps at Meadow Brook. The weeklong summer camps foster the writing bug within children pre-kindergarten through grade 12.

"Depending on the grade level, the students write about a variety of topics such as historical fiction, or science or what they see at Meadow Brook Hall," says Kitchens. "We have had incredibly positive feedback, and every year registration fills up faster and faster."

Much like the gardens at Meadow Brook Hall, the teachers of MBWP nurture their own talents so that they can be the best instructors possible. Knowing that they can spark a student's lifelong interest in writing and reading proves that their time spent mining for nuggets can lead to striking gold.

By Michele Jasukaitis

"...what evolves is an understanding of what goes on at all of the levels of teaching."



Marshall Kitchens, associate professor, Writing and Rhetoric holds a Ph.D. in English with a concentration in Rhetoric and Composition from Wayne State University and is currently serving as the first chair of the department since it was approved by the Oakland University Board of Trustees in May 2008. His research interests include technology, literacy and civic engagement and he has published work on a variety of topics, such as ethnography, the development of critical media literacy through video games, and the use of technology in peer tutoring. Dr. Kitchens also serves as director of the Meadow Brook Writing Project.

Barbara Penprase, associate professor, School of Nursing, received her Bachelor of Science degree in Nursing from Oakland University and went on to receive both her master's degree in Nursing and Ph.D. at Wayne State University. She began her teaching career at OU in 1996 with specializations in medical-surgical nursing, critical care nursing, nurse leadership, organizational change, and hospital administration and management. Dr. Penprase developed and implemented the Accelerated Second Degree Nursing (ASDN) program at OU including collaborative relationships with Beaumont Health System and St. John Providence Health System. She has been involved in or the primary project director for more than $3 million in funding to support the ASDN program. She was also one of four faculty members who developed and implemented the online RN-BSN.

Slowing attrition

Empathizing versus systemizing traits in career satisfaction

Despite the increasingly high demand for nurses and increased enrollment in baccalaureate nursing programs, there is an alarmingly high attrition rate among new graduates. Some studies report as many as up to 70 percent of new nurses leave their jobs within the first year of practice.

An ongoing study at Oakland University is attempting to discover whether certain personality traits have an impact on attrition rates in particular professions, including nursing.

Titled *Understanding Empathizing-Systemizing Characteristics and Their Impact on Attrition of Students*, the study is looking not only at nursing, but at students in social work, engineering and other disciplines. The study specifically compares empathizing attributes, which are common among students who choose a profession like nursing, with systemizing attributes, more common among engineering students.

"Obviously, as the nursing shortage continues to grow, understanding how to match qualified persons to nursing program openings is essential," according to Barbara Penprase, Ph.D., RN, CNOR, associate professor, School of Nursing and co-author of the study. "Understanding factors of students who are at risk of attrition becomes imperative to curtail the nursing shortage."

The study hypothesizes that students self-select major areas of study related to how systemizing or empathizing they are. "The research does support this," Penprase said. "Nursing students have the highest empathizing scores of all students."

Interestingly, the longer a student is educated in nursing the more systemizing the characteristics become, Penprase said. "Another interesting point is that even though student nurses become more systemizing, their empathizing characteristics do not decline significantly — so they maintain empathetic."

The engineering students have the highest systemizing characteristics, Penprase said. And the men in the nursing program record statistically higher systemizing characteristics than their female counterparts. "We are now looking at how these men compare to the larger group," she said, "but it is speculated that they will score higher on empathizing characteristics than other male students.

"Some research has stated that people with higher empathizing characteristics will have higher compassion fatigue (burnout) quicker, so in the future we are hoping to explore that as well," she added.

Working with Penprase on the study as a primary investigator is Dr. Barbara Oakley, associate professor in the School of Engineering and Computer Science. Reuben Ternes from the Office of Institutional Research and Assessment and Dr. Dana Driscoll, assistant professor, Department of Writing and Rhetoric, are also included in the study. Data has already been collected from approximately 2,000 students and the study, which began in February 2011 and will conclude in February 2012, is currently in the analysis stage, Penprase said.

The study focused on whether empathizing and systemizing characteristics are important factors underlying the attrition of students in nursing, engineering and other disciplines. It also studies whether or not those characteristics correlated with the choice of discipline and with satisfaction in choosing that discipline. The subjects were given two different questionnaires: an Empathy Quotient Test and a Systemizing Quotient Test.

There are many reasons why newly graduated nurses choose to leave the practice so early in their careers, from lack of psychological empowerment to the inability to handle the high stress of technology to higher patient acuity work settings, according to Penprase.

The results will help us understand what factors might be important to predicting success in selected fields of study, Penprase said. These results also may prove to be important for more general researchers in trying to understand the human condition, she added.

By Ann Marie Aliotta

"Understanding students who are at risk of attrition becomes imperative to curtail the nursing shortage."

Reading recovery

Successes at helping kids read

For a young child, the love of reading not only unlocks a wonderful world, it can be the key to future academic success. But too many children have difficulty reading, and that can stymie progress in school and even later in life.

Oakland University is part of an important program to help combat this situation, and has received prominent recognition and significant federal funding to continue. A $4 million grant was awarded last fall to the Reading Recovery Center of Michigan at OU. Reading Recovery is a nationally recognized early literacy intervention program. Oakland University houses one of only 22 Reading Recovery university training centers in the United States, and the only one in Michigan.

The grant is part of the U.S. Department of Education's $10 billion Investing in Innovation (i3) initiative, designed to reward school districts, consortia of schools and nonprofit organizations with innovative proposals that focus on improving teacher effectiveness and student achievement in low-performing schools. It was secured by Dr. Mary Lose, associate professor of Reading and Language Arts and director of the Reading Recovery Center of Michigan at OU, along with Dr. Robert Schwartz, professor of education and interim chair of the Department of Reading and Language Arts.

"I am thrilled that the U.S. Department of Education has chosen to fund this national scale-up of Reading Recovery," said Dr. Lose. "The award represents a wonderful opportunity for OU Reading Recovery to build on the 20-year history of our work in Michigan in this important early prevention effort."

Under the i3 grant, Oakland University will receive $4 million over five years to provide post-master's level professional preparation for one educator to become a Reading Recovery teacher leader and graduate level preparation in Reading Recovery for 250 certified teachers. By the year 2015 this will extend the reach of OU's Reading Recovery program to nearly 18,000 children taught in one-on-one training and nearly 140,000 in small group settings across the state. More than 325 schools in rural, urban and suburban areas in the Lower and Upper peninsulas will be served.

"Clearly, training additional teachers to serve children will have a lasting impact on the state and its most challenged learners," Dr. Lose said. "Oakland University will assume an even larger role in its outreach to schools, teachers and children, continuing its service as the state's only resource for the very best in early literacy intervention, teaching and learning via Reading Recovery."

In addition to providing teacher training and professional support, the center is submitting data to a major empirical study of the program being conducted by the University of Pennsylvania. "This positions OU at the state, regional, national and international levels to influence policy and practice concerning programming for struggling literacy learners," Dr. Lose said.

Teachers trained in Reading Recovery develop expertise to provide one-to-one individualized lessons for 30 minutes each day to the most struggling learners in first grade. Most of these students advance to within-average classroom reading and writing levels in only 12-20 weeks, Dr. Lose said.

"A distinguishing feature of the Reading Recovery professional preparation is that teachers begin working immediately with children on day one of their coursework," according to Dr. Lose. "These teachers continually serve children in Reading Recovery in their schools while also applying their newly acquired expertise in their other instructional roles, impacting many more young students."

Lansing-area Reading Recovery teacher leader Dottie Best is passionate about the program. "Teachers become strong advocates for struggling children. They see for themselves that through consistent, expert teaching, all children can learn to read and write," she said. "I am excited to train more teachers under the i3 grant. These teachers will make a difference for a significant number of young learners before they experience failure."

McGregor Elementary School in Rochester, Mich., has participated in Reading Recovery through OU, and principal Sharen Howard is thrilled with the results. "This year McGregor received state recognition as a school that 'Beat the Odds.' If I were going to name what made the difference, I would say, unequivocally, that it was the expertise that the Reading Recovery teachers developed through rigorous professional development."

By Ann Marie Aliotta

"They see for themselves that through consistent, expert teaching, all children can learn to read and write."

Mary K. Lose, associate professor of education, School of Education and Human Services, earned her doctoral, master's and undergraduate degrees at Drake University. She also completed a year of postdoctoral study at The Ohio State University and received accreditation as a Reading Recovery university trainer. In 2002, she was a fellow of the Marie Clay Literacy Trust, studying literacy teaching and learning in New Zealand. Her grant writing experience includes grants totaling more than $4.8 million. Lose has collaborated on a number of projects with children, classroom teachers and teachers of struggling readers and writers and finds this work the most joyful and professionally rewarding of all.

Janell Townsend, associate professor, Marketing and International Business, earned her Ph.D. from Michigan State University in Marketing and International Business. Dr. Townsend's research interests are broadly defined by strategic and international marketing issues, and fall within the nexus of branding, innovation and globalization. Current projects incorporate aspects of product design, "halo" effects, management of global products and brands, and the spillover of country of origin effects in the context of branding and new product launch.

Jorg Hackemann_shutterstock.com

Marketing the world

Global research with local implications

TM

Janell Townsend had a "moment" recently that reminded her of why she loves teaching college students. While in Brazil with Oakland University MBA students who were learning more about what it means to do business globally, the group stopped at a Starbucks near their hotel. One of the students was amazed that she could, without knowing how to speak Portuguese, order her favorite caramel macchiato and get the same drink she could at home. The moment offered the students a lesson about how global companies do business, but it was more than that for Townsend.

"To help create and disseminate knowledge that helps people expand their horizons or broaden the way they look at the world is the most fabulous thing about being an academic," Townsend says.

An associate professor of marketing and international business in the School of Business Administration, Townsend does this both as an instructor and a researcher. Her research, which is usually focused on the nearby auto industry, explores the point where branding, innovation and globalization converge. While past projects have explored the global integration of brands and new-product development as well as brand expansion in international markets, much of her current research deals with domestic branding topics that have global applications.

One current project explores the impact of a product's design on consumer perception and the product's performance. Another is studying how emotional values impact consumer opinions about products. A third study examines how design differences in a product influence consumer opinions and their purchasing intentions. Still a fourth is exploring a product's "halo" effect on consumer opinions — that hard-to-define situation where positive opinions of a particular product seem to influence how people view other products from the same manufacturer.

"In the auto industry, the Corvette has a halo effect on the Chevy brand, and the Prius does the same for Toyota," Townsend says.

On the global front, Townsend is studying how different marketing mix decisions impact sales for global products. For example, she says that to be considered a luxury brand, the product needs a global presence. To get that presence, it needs to be in the same markets as the brand's target customers.

"A luxury brand that's trying to establish prestige in Russia, for example, will need a presence in places like Turkey, Switzerland and the U.K., because that's where wealthy Russians spend a great deal of time," she explains. "If they don't see you in all of those places, they won't consider you a luxury brand."

One of the challenges of doing international research, she says, is the scarcity of data.

"I like to use secondary data from the marketplace — real data — instead of experimental design," she says, "but it's very hard to get data from global sources."

While her research has global implications and applications, Townsend thinks "locally."

"It is really important for people in universities to be involved in the community," says Townsend, who is active in both local and industry business organizations. This underlying philosophy provides the framework for sharing the results of her research with the business community. Believing that while university research is important for extending general knowledge, it is also important that it is applied in practice, Townsend:

- Publishes findings in top-tiered academic journals.
- Shares what she's learned informally, when networking with local business people.
- Coaches business executives one-on-one, helping them discover how to use research results in their global marketing strategies.
- Shares results with industry partners who provide data for her research.
- Teaches students and industry executives to read, interpret, understand and apply what they read in academic journals.

"I help students see how research can benefit their work," she says. "I want them to understand how the conceptual frameworks and theories can help them on the job."

Whether she's working with global marketers or students, Townsend enjoys it when the people she's helping have those "aha" moments of their own. "It's really great when somebody 'gets it,'" she says. "That's why research is so important. If you're not doing research, you're just teaching what somebody else figured out."

By Sandra Beckwith

"I help students see how research can benefit their work."

Americanized

Are some U.S. immigrants paying a price in health?

Florence Dallo immigrated to the United States from Iraq at age 7, and today she's passionate about advocating a healthy outcome for Detroit's largest immigrant population.

Greater Detroit is home to one of the largest, oldest and most diverse Arab-American communities. Unfortunately, it appears that Arab immigrants are becoming less healthy the longer they live in the United States.

"So many Arab Americans — much like other ethnic populations — are developing health problems they didn't have prior to immigrating," says Dallo, who's now an epidemiologist and assistant professor of Wellness, Health Promotion and Injury Prevention in OU's School of Health Sciences.

Dallo, who grew up in the racially and ethically diverse Chaldean (Iraqi Catholic) community, is focused on investigating her community's health concerns, including diabetes, hypertension and coronary artery disease.

For her master's thesis in public health, Dallo interviewed 130 Chaldean American women in Detroit to better understand the relationship between blood pressure and acculturation (the process whereby the attitudes and/or behaviors of people from one culture are modified as a result of contact with a different culture).

"I wanted to know why some people led healthy lives and others did not," Dallo says.

In 2006, Dallo received a Robert Wood Johnson Foundation grant to analyze national data on the quality of health care among immigrants. In 2009, she received a Michigan Center for Urban African American Aging Research grant to analyze American Community Survey (ACS) data to better understand the disability status of Arab, Hispanic and Asian Americans aged 65 or older.

Although there are more than three million Arab Americans living in the U.S. and about half a million in Michigan, health data for this ethnic group is limited. This puts the group's health at risk because rate data on several diseases are non-existent for them. "We don't know a lot about this culture," Dallo says. "One big reason for this is that Arab Americans don't fit into a distinct category."

Unlike other ethnic groups, Arab Americans are not officially recognized as a federal minority group, so there's no box for them to check on national surveys. When asked about race and ethnic identity, Arab Americans can choose to identify themselves as either "white/Caucasian" or "other" in the U.S. Census, the ACS, and the National Health Interview Survey (NHIS). Only recently have these surveys allowed individuals to include their ancestory or place of birth.

Once more accurate health information is available for this population, the next step will be to analyze what factors could undermine the good health that new immigrants enjoy.

There could be a number of factors, Dallo says. Loss of social support — or even perceived lack of social status — can create added stress on them. Cultural/linguistic barriers between immigrants and health care practioners could play a role, as well as their adopting some of the unhealthy aspects of American living.

"Our body mass and blood pressure are rising, along with diabetes risk," Dallo says. "Are immigrants cooking differently? What about other lifestyle changes?"

In her public health classes, Professor Dallo offers students valuable opportunities to connect with the community and promote healthy living. They can participate in "service-learning" research projects and are taught how to conduct their own health-related educational programs, with topics ranging from quality sleep to STD prevention. They present these programs to other OU students and Detroit-area residents.

To this end, a group of Dallo's students recently conducted a program on physical activity at Pontiac's Baldwin Center, a community outreach that helps feed, clothe and educate low-income minorities.

Dallo is also creating connections outside her classroom. She's currently preparing grants through the National Institutes of Health and the National Science Foundation for summer fellowships for junior and senior undergraduates from OU. The fellowship would match the students with community organization research projects.

"For students who want to go into medicine, I'd like them to think about working in public health," Dallo says. "They can make a real difference in the lives of those who truly need them."

By Mary Gunderson-Switzer

"I wanted to know why some people led healthy lives and others did not."

Florence Dallo, assistant professor, Wellness, Health Promotion and Injury Prevention, received her Ph.D. from the University of Texas Medical Branch at Galveston and completed a two-year Kellogg Health Disparities postdoctoral fellowship at the University of Michigan. She served as assistant professor at the University of Texas School of Public Health in Dallas. During her three years in Dallas, and while teaching and mentoring students, she published several manuscripts related to the health of Arab and Chaldean Americans, the area in which her research focuses.

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 Integrated Business Research and Education (CIBRE)

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 (CRAA)

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 made major contributions to SECS and OU, particularly in enhancing, the SECS graduate programs and enrollments.

Center for Social and Behavioral Research (CSBR)

The Center for Social and Behavioral Research (CSBR) embraces an interdisciplinary commitment to promote excellence in social and behavioral research as well as the productivity of social and behavioral researchers across disciplines at Oakland University. CSBR welcomes and promotes collaborations of internal and external partners with social and behavioral researchers at Oakland University, works to strengthen disciplines associated with social and behavioral research, and expands opportunities for undergraduate and graduate students to experience social and behavioral research.

Clean Energy Research Center (CERC)

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.

Eye Research Institute (ERI)

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 Health System.

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.

Institute of Radio Frequency Electronics and Nanoelectronics

The mission of the Institute for Radio Frequency Electronics and Nanoelectronics is the research, engineering, and development of multifunctional, miniature, rapid response signal processing devices for defense and consumer electronics; development of human resources for employment in high-tech electronic industry; and encouragement of small business spin-offs to serve the Department of Defense and private industry.

Institute for Stem Cell and Regenerative Medicine (ISCRM)

The Oakland University Institute for Stem Cell and Regenerative Medicine (ISCRM), a partnership between OU and Beaumont Health Systems, will engage in both basic and translational stem cell research, seeking to generate knowledge and insight with the potential to change human lives for the better.

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, 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.

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 Student Research Awards

UVA Induced Fluorescence in the Rabbit Lens in vivo
Student Researcher: Catherine Fick
Faculty Member: Frank Giblin, professor, Biomedical Sciences, and director, Eye Research Institute

Exercise Intensity and Training Adaptions Following Participation in Workplace Wellness Program
Student Researcher: Tegan Roobol
Faculty Member: Marie Pepin, assistant professor, Physical Therapy

Le Style Enfantin
Student Researcher: Audra Lord
Faculty Member: Dikka M. Berven, special instructor, French/Modern Languages and Literature

Making Meaning with Money
Student Researcher: Wendy Farkas
Faculty Member: John McEneaney, professor, Education

Vocabulary Assessment in Early Childhood
Student Researcher: Ashelin Currie
Faculty Member: Tanya Christ, assistant professor, Education

Study 4310 at NCR2010
Student Researcher: Carmela Gillette
Faculty Member: John McEneaney, professor, Education

Quantitative in situ Correlation Between microMRI, PLM, and FTIRI of Articular Cartilage
Student Researcher: Ji Hyun Lee
Faculty Member: Yang Xia, professor, Physics

Change in Social Participation and Satisfaction with Life for Individuals with Spinal Injury while Participating in an Intense Physical Therapy Program
Student Researchers: Cassandra Ianni and Stefanie Collins
Faculty Member: Kristine Thompson, special instructor, Physical Therapy

"I'm Not that Teacher Anymore": A First-Year Teacher's Narrative of "Then" and "Now"
Student Researcher: Chelsea Otten
Faculty Member: Deborah Blair, associate professor, Music Education

The Relationship between Professional Learning Community Behaviors and Teacher Efficacy
Student Researcher: Sheryl Kennedy
Faculty Member: Julia Smith, associate professor, Education

Modeling Within Host Dynamics Influenza Virus Infection Including Both Innate and Adaptive Immune Responses
Student Researcher: Kasia Pawelek
Faculty Member: Libin Rong, assistant professor, Mathematics

An HIV-1 primary Infection Model with Two Time Delays: Global Stability Analysis and Comparison with Patient Data During the European Conference on Mathematical and Theoretical Biology
Student Researcher: Kasia Pawelek
Faculty Member: Libin Rong, assistant professor, Mathematics

Conference on College Composition and Communication
Student Researchers: Amanda Deschamps and Ryan Blank
Faculty Member: Gregory Giberson, assistant professor, Rhetoric

Contesting CCCC's Spaces: Undergraduate Research at the National Convection
Student Researchers: Jason Carabelli and Jacob Matthews
Faculty Member: Gregory Giberson, assistant professor, Rhetoric

Lean Management in K-12 School District
Student Researcher: Beverly Brown
Faculty Member: Robert Maxfield, associate professor, Education

Breakfast Consumption: Assessing Influence on Academic Abilities
Student Researcher: Erin Pyykkonen
Faculty Member: Jennifer Lucarelli, assistant professor, Health Sciences

"Never to be Performed in Public": Beethoven's Promissory Note in the "Quartetto Serioso, op. 05 in f minor"
Student Researcher: Megan Trewhella
Faculty Member: Melissa Hoag, assistant professor, Music

Honey as an Elixir for Student Engagement
Student Researcher: Roberta Michel
Faculty Member: Karen Markel, associate professor, Management

Unlimited Querying of Unstructured Medical Image Data
Student Researcher: Sarmad Istephan
Faculty Member: Mohammad Siadat, assistant professor, Engineering

Performance Evaluation of CIC Protocols in Resource Constrained Embedded Systems
Student Researcher: Belal Sababha
Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

American Academy of Forensic Sciences Annual Conference in Chicago
Student Researcher: Chivonne Gammon
Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

Using a Wearable Accelerometer Based System to Detect, Characterize and Monitor Impulsive Activity in Adult Patients with Dementia
Student Researcher: Muawea Rawashdeh
Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

Tissue Specific Alternative Splicing Expression of Helitron-captured Genes in Maize
Student Researcher: Allison Barbaglia
Faculty Member: Shailesh Lal, associate professor, Biological Sciences

New Facets for the All Different Olytope
Student Researcher: Elonia Lusha
Faculty Member: Serge Kruk, associate professor, Mathematics

Discovery and Expression Analysis of Helitron-Captured Genes in the Maize Genome
Student Researcher: Katarina Klusman
Faculty Member: Shailesh Lal, associate professor, Biological Sciences

2-Methoxyestradiol Modulation of Estrogen Receptor and Tumor Suppressor p53 in Breast Cancer Cells
Student Researcher: Amy Siebert
Faculty Member: Virinder Moudgil, senior vice president for Academic Affairs and provost

Upton Sinclair's "The Flivver King" and United Auto Worker Organization at Ford Motor Company during the late 1930s
Student Researcher: Adam Hobart
Faculty Member: Jeffrey Insko, associate professor, English

Provost Graduate Student Research Award Winners

Molecular Mechanisms of Serotonergic Potentiation of ET-1's Effects
Student Researcher: Subha Bhaskaran
Faculty Member: Amy Banes-Berceli, assistant professor, Biological Sciences

Reasons for Student Debt Following Physical Therapy Education: A Descriptive Study
Student Researcher: Tracy Frith
Faculty Member: Kristine Thompson, special instructor, Physical Therapy

Design and Fabrication of a Micro Griper Using Metallic V-Shape Electro-Thermal Actuators
Student Researcher: Jay Jamshid Khazaai
Faculty Member: Hongwei Qu, assistant professor, Engineering

Experimental Investigation on Scuffing Behavior of Ferrous Alloys
Student Researcher: Jiman Han
Faculty Member: Qian Zou, associate professor, Engineering

Scuffing Behavior of Stainless Steel
Student Researcher: Rebeca Lumbreras
Faculty Member: Gary Barber, professor, Engineering

Physical Therapists Beliefs of the Role of PT in Sexual Health and Barriers Preventing Addressing Sexual Health Care
Student Researcher: Alyssa Mikulec
Faculty Member: Sue Saliga, assistant professor, Physical Therapy

Role of Substance P in Inflammaging
Student Researcher: Rudragouda Channappanavar
Faculty Member: Susmit Suvas, assistant professor, Biological Sciences

The Effects of Exercise and Donepezil on Cognitive Impairments During Chemotherapy Treatment: A Pilot Study
Student Researcher: Rachael Morrow
Faculty Member: Deborah Doherty, assistant professor, Physical Therapy

Numerical Investigation of the Effects of Flow Pulsations on Drag Over Bluff Bodies
Student Researcher: Eric D'herde
Faculty Member: Laila Guessous, associate professor, Engineering

Parent's Factors Affecting Their Adherence with Physical Therapy Home Exercise Programs for Infants and Young Children with Cerebral Palsy: A Qualitative Study
Student Researcher: Judy Johnson
Faculty Member: Christine Stiller, special instructor, Physical Therapy

The Difference Between Trunk Musculature Endurance in Youth Gymnasts With and Without Low Back Pain
Student Researcher: Priya Pockyarath
Faculty Member: Brian Goslin, associate professor, Exercise Science

ZDDP Molecular Dynamics Simulation
Student Researcher: Chakravathi Mallikarjun Nagolu
Faculty Member: David Schall, assistant professor, Engineering

Correlation of CGRP Expression in Mice with Corneal Immunopathology-Induced by Ocular Herpes Simplex Virus-1 (HSV-1) Infection
Student Researcher: Brandon Twardy
Faculty Member: Susmit Suvas, assistant professor, Biological Sciences

A DEVS Model for Flood Simulation
Student Researcher: Matt Wozniak
Faculty Member: Guangzhi Qu, assistant professor, Engineering

Student research award recipients *continued*

Contrasting the Use of the Perceived Wellness Survey (Pws) with the Eortc Qlq-Br23 in Patients with Breast Cancer
Student Researcher: Meghan Patterson
Faculty Member: Patricia Wren, associate professor, Health Sciences

Utilizing Bayesian Hierarchical Models in Marketing Analysis
Student Researcher: Grzegorz Koscik
Faculty Member: Janell Townsend, associate professor, Marketing

Energy Expenditure and Heart Rate of Post-Stroke Patients During Physical Therapy: A Pilot Study
Student Researcher: Kimlee Bui
Faculty Member: Sue Saliga, assistant professor, Physical Therapy

The Nature of Students' Musical Understanding and Learning in the Context of Two Interactive Online Music General Education Courses
Student Researcher: Phyllis White
Faculty Member: Jacqueline Wiggins, professor, Music, and chair, Department of Music, Theatre and Dance

Does Pre-Cooling Enhance Aerobic Exercise in Individuals with Multiple Sclerosis?
Student Researcher: John Palazzolo
Faculty Member: Charles Marks, associate professor, Exercise Science

Response of Organic-Matter Dynamics to Common Restoration Techniques in Streams and Wetlands
Student Researcher: Anita Baxter
Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

The Effect of Active and Passive Recovery on Blood Lactate and Performance in Elite Male Hockey Players
Student Researcher: Nicholas Siekirk
Faculty Member: Brian Goslin, associate professor, Exercise Science

Enhancing CAPTCHAs
Student Researcher: Hui Wu
Faculty Member: Guangzhi Qu, assistant professor, Engineering

The Mechanistic Road to Replacing Platinum with Iron for Clean Energy Catalysis
Student Researcher: Elizabeth Donovan
Faculty Member: Greg Felton, assistant professor, Chemistry

Detecting Attacks in Opportunistic Networks
Student Researcher: Srikar Mohan
Faculty Member: Guangzhi Qu, assistant professor, Engineering

Proposed Model for a Hamstring Flexibility Test to Improve Training and Reduce Injuries: A Methodological Study
Student Researcher: Kerri Jonas
Faculty Member: Brian Goslin, associate professor, Exercise Science

2-Methoxyestradiol Modulation of Estrogen Receptor and Tumor Suppressor p53 in Breast Cancer Cells
Student Researcher: Amy Seibert
Faculty Member: VirinderMoudgil, senior vice president for Academic Affairs and provost

Developing Standard Sampling Methods for Detecting Invasive Round Gobies (Neogobiusmelanostomus) in Streams
Student Researcher: Joseph Nett
Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

Development of a Novel Radial Nitinol Motor
Student Researcher: Abdullah Al-Refai
Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

Synthesis of Hypoxia Detecting MRI Contrast Agents
Student Researcher: Jia Li
Faculty Member: Ferman Chavez, associate professor, Chemistry

PAMID — (Portable Autonomous Multi-Sensory Intervention Device)
Student Researcher: Chris Luteran
Faculty Member: Hongwei Qu, assistant professor, Engineering

Heliostat Positioning Control System
Student Researcher: Waseem Sa'deh
Faculty Member: Osamah Rawashdeh, assistant professor, Engineering

The Direct and Indirect Effects of the Invasive Earthworm, Lumbricusrubellus, on Organic-Matter Decomposition
Student Researcher: Aileen Johnson
Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

Effects of a Dam Removal on Emerging Aquatic Insects
Student Researcher: Jeremy Geist
Faculty Member: Scott Tiegs, assistant professor, Biological Sciences

Provost Undergraduate Student Research Award Winners

Photovoice as Empowerment: Hamtramck Urban Agriculture Policy Project
Student Researcher: Emily Eisele
Faculty Member: Jo Reger, associate professor, Sociology, and director, Women's Studies

Synthesis and Characterization of Biologically Relevant Iron Coordination Compounds
Student Researcher: Azam Tolla
Faculty Member: Ferman Chavez, associate professor, Chemistry

Synthesis and Characterization of Biologically Relevant Coordination Compounds
Student Researcher: Slavica Stjepanovic
Faculty Member: Ferman Chavez, associate professor, Chemistry

Induced Pluripotent Stem Cells from Multipotent Cord Blood Stem Cells
Student Researcher: Joseph Matti
Faculty Member: Rasul Chaudhry, professor, Biological Sciences

Self-Assembling Scaffold Mediated Growth of Embryonic Stem Cells
Student Researcher: Amr Hamed
Faculty Member: Rasul Chaudhry, professor, Biological Sciences

Building Community Capacity for Faith-Based Health Promotion Strategies
Student Researcher: Ikenna Okeke
Faculty Member: Jennifer Lucarelli, assistant professor, Health Sciences

Effects of Hazardous Metals on Cord Blood Stem Cells
Student Researcher: Nicholas Ciavattone
Faculty Member: Rasul Chaudhry, professor, Biological Sciences

Studies on the Rhetoric of Islam in America: Opinions and Perspectives on the Role of Media
Student Researcher: Samantha Hyrns
Faculty Member: Dana Driscoll, assistant professor, Rhetoric

Comparison of School Nutrition Practices with Written Wellness Policies
Student Researcher: Kate Adams
Faculty Member: Jennifer Lucarelli, assistant professor, Health Sciences

Attitudes on Writing in a Native Language: An Examination of Japanese College Students
Student Researcher: Jessica Tess
Faculty Member: Dana Driscoll, assistant professor, Rhetoric

Hydrogen Production from Organometallic Catalysts: Ligand Substitution of Carbonyls in Cyclopentadienyl Dicarbonyl Iodide
Student Researcher: Sarah Froberg
Faculty Member: Greg Felton, assistant professor, Chemistry

Hydrogen Generation from Weak Acids Using Biologically Inspired Electrocatalysts
Student Researcher: Barrett Povirk
Faculty Member: Greg Felton, assistant professor, Chemistry

Evaluation of 3D Headsets for Delivery of Safety and Health Training
Student Researcher: Steven Fish
Faculty Member: Aaron Bird, assistant professor, Occupational Safety and Health

Comparison of Administrator Reported Physical Activity Practices with Written Wellness Policies
Student Researcher: Andrea Lauoff
Faculty Member: Jennifer Lucarelli, assistant professor, Health Sciences

Role of PARP-1 in UVB-treated Lens Epithelial Cells
Student Researcher: Tenira Townsend
Faculty Member: Frank Giblin, professor, Biomedical Sciences, and director, Eye Research Institute

Water Oxidation Catalysts for Hydrogen Production: Synthesis and Electrochemical Analysis
Student Researcher: Amanda Stahl
Faculty Member: Greg Felton, assistant professor, Chemistry

Modeling the Behavior of Crowds Under Panicked Conditions
Student Researcher: Jake Wendt
Faculty Member: Guangzhi Qu, assistant professor, Engineering

Defining the Role of AML-Derived Endothelial Cells in the Propagation of AML
Student Researcher: Christopher Donnelly
Faculty Member: Gerard Madlambayan, assistant professor, Biological Sciences

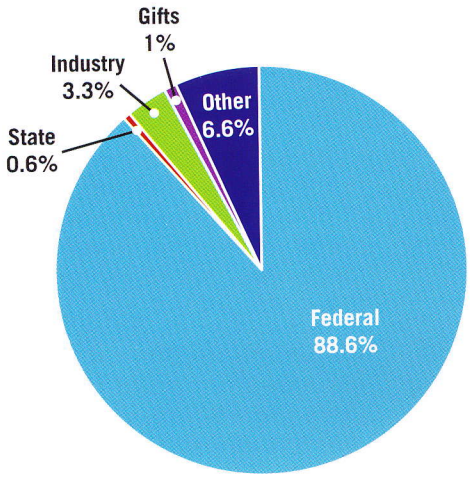
UVA-Induced Fluorescence in the Rabbit Lens in Vivo
Student Researcher: Catherine Fick
Faculty Member: Frank Giblin, professor, Biomedical Sciences, and director, Eye Research Institute

Comparison of Physical Education Practices and Written Wellness Policies
Student Researcher: Jessica Pomaranski
Faculty Member: Jennifer Lucarelli, assistant professor, Health Sciences

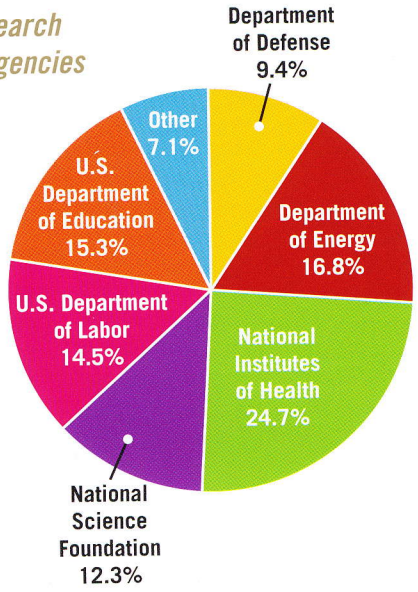
By the Numbers

Fiscal Year 2010

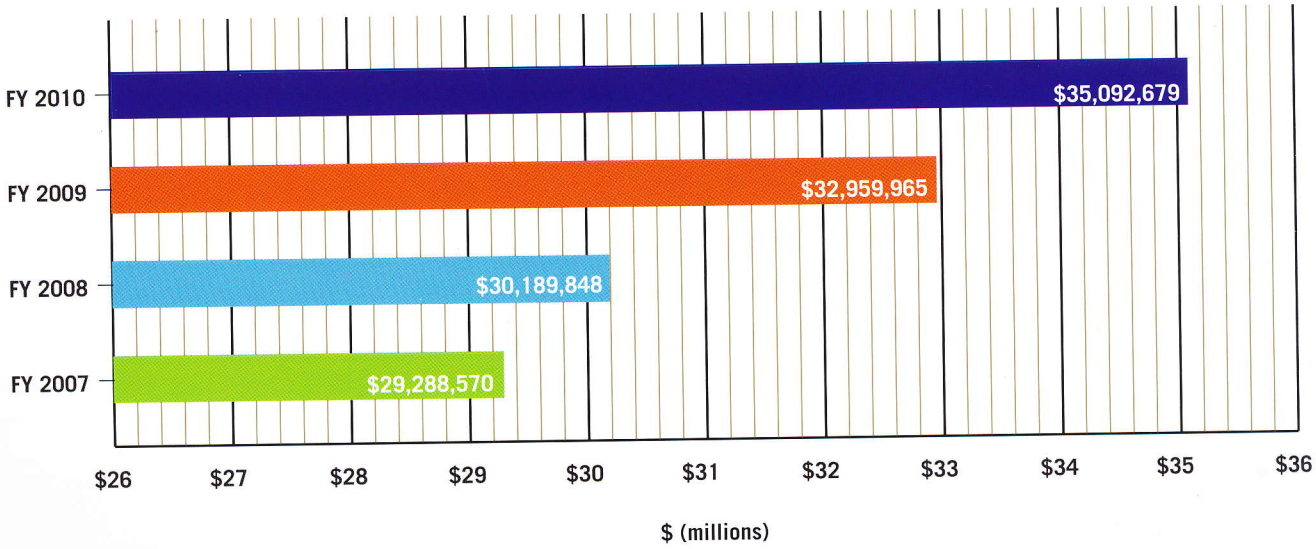
Research Support by Source



Federal Research Awards by Agencies



Institutional Research Expenditures



Grants and contracts agency list — FY 2010

Aastrom Biosciences, Inc.
American Academy of Nurse Practitioners
American Chemical Society
American Federation for Aging Research
Auto/Steel Partnership
Battelle, Pacific Northwest Division
Bayer CropScience
Beaumont Health System
Beta CAE Systems USA, Inc.
Blue Cross Blue Shield of Michigan
Camille and Henry Dreyfus Foundation
Centers for Disease Control and Prevention
City of Detroit
Clinton County Regional Educational Service Agency
Clinton River Watershed Council
Community Foundation for Southeastern Michigan
Continental Teves, Inc.
Chrysler Corporation
Crittenton Hospital and Medical Center
Cummins Technical Center
Defense Advanced Research Projects Agency
Detroit Area Pre-College Engineering Program
DTE Energy
East Michigan Environmental Action Council
Economic Development Administration
Elsa U. Pardee Foundation
Federal Aviation Administration
Fieldstone Alliance, Inc.
Fine-Strong Enterprise Co., Ltd.
Fisheries and Oceans Canada
Ford Motor Company
Foster-Miller, Inc.
General Dynamics Land Systems, Inc.
General Motors Corporation
Great Lakes Commission
Harley-Davidson Motor Co.
Health Resources and Services Administration
Henry Ford Health System
Huron Mountain Wildlife Foundation
Improvement Pathway Systems
Infogation Corporation
Intelligent Automation, Inc.
Intrepid Control Systems
JADI, Inc.
Kellogg Foundation
Knight Foundation
Macomb County Government
Macomb Intermediate School District
Magna International, Inc.
Merck Company Foundation
Michigan Campus Compact
Michigan Council for Arts and Cultural Affairs
Michigan Department of Education
Michigan Department of Labor and Economic Growth
Michigan Economic Development Corporation
Michigan Space Grant Consortium
Michigan Universities Commercialization Initiative
Microstar Technologies LLC
Midwest Campus Compact STEM Consortium
Midwest Eye-Banks
National Inclusion Project
National Institutes of Health
National Science Foundation
National Writing Project
Oak Ridge National Laboratory
Oakland County Community Mental Health Authority
Office of Naval Research
OptimizeRx
Organization for Autism Research
Pharaoh Industries
Procter & Gamble Pharmaceuticals, Inc.
Reading Recovery Council of North America
Rehabilitation Institute of Michigan
Research Corporation
RHK Technologies
RNET Technologies, Inc.
Robert Wood Johnson Foundation
Ropard Foundation
Rose Hill Center
Saint-Gobain Ceramics, Inc.
Science Applications International Corporation
Southeast Michigan Resource Conservation & Development
Spland International, Inc.
SpinDance, Inc.
St. John Health System
State of Michigan
TD Auto Finance
The Fieldman Sims Foundation
The Kresge Foundation
The Lincy Foundation
The Matilda Zeigler Foundation for the Blind, Inc.
The Templeton Foundation
ThromboGenics
Trier University of Applied Sciences
U.S. Army
U.S. Automotive Materials Partnership
U.S. Department of Agriculture
U.S. Department of Education
U.S. Department of Energy
U.S. Environmental Protection Agency
U.S. Small Business Administration
U.S. Navy
Vision Research Foundation
Vistakon Pharmaceuticals
Waltonen Engineering, Inc.