



## Feast of Ideas to feature talks by faculty, librarians

By Kim Clarke  
Bicentennial Office

University of Michigan faculty and librarians will fan out across Ann Arbor to share their expertise in a bicentennial celebration Thursday called Feast of Ideas.

The event is a feature of the UMich200 Spring Festival, with professors from diverse disciplines — from kinesiology to Chinese studies to marketing — presenting 20-minute talks at Ann Arbor shops, restaurants and galleries.

“We want to provide a sampling of what our students experience every day in the classroom,” said event organizer Michelle French, associate director of the Bicentennial Office. “We’re pleased to work with local merchants to connect the campus with the community.”

Throughout the evening and across Ann Arbor, 14 locales will host speakers. For example, at Flipside Art Studio on East Liberty Street, an engineering professor will discuss facets of sustainable technology, while a marketing professor at the Blue Nile restaurant on East Washington Street will explain why and how consumers make decisions based on feelings rather than deep thinking.

Feast of Ideas is supported by Michigan Radio, and all talks are free and open to the public. Participating faculty and their locations include:

■ Stephen E. Feinberg, professor and associate chair of research, Department of Oral and Maxillofacial Surgery, School of Dentistry  
“**The Role of Tissue Engineering/Regenerative Medicine in Facial Reconstruction**”  
6:30 p.m., The Bo Store, 333 S. Main St.

■ Barry Fishman, Arthur F. Thurnau Professor, professor of education, School of Education; professor of information, School of Information  
“**School is a Game ... But is it a GOOD game?**”  
6:30 p.m., 826michigan, 115 E. Liberty St.

■ Margherita Fontana, professor of dentistry, School of Dentistry  
“**Enhancing Oral Health for Children**”  
7 p.m., Sweetwaters Coffee & Tea, 123 W. Washington St.

■ Joel Howell, Victor Vaughan Professor of the History of Medicine, professor of internal medicine, Medical School; professor of history and Honors Program, LSA; and professor of health management and policy, School of Public Health  
“**A Hospital of Our Own: The Origins and Early History of the University of Michigan Hospital**”  
7 p.m., Roeda Studio, 319 S. Main St.

■ Thomas Lyon, Dow Chair of Sustainable Science, Technology and Commerce, and professor of business economics and public policy, Stephen M. Ross School of Business; and professor of natural resources and environment, School of Natural

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L’Amérique septentrionale (North America) by Nicolas Sanson, circa 1700, Clark Library Map Collection, is among the maps available in the portal.

## Geoportal debuts for searching data and maps

By Mary Morris  
University of Michigan Library

Scholars and researchers have a new way to find and compare geospatial data and maps: the Big Ten Academic Alliance Geoportal.

The geoportal allows searching across thousands of records of openly available geographic information system (GIS) datasets, web services, and digitized historical maps from multiple

See Maps, [Page 13](#)

### More online

- **Big Ten Academic Alliance Geoportal:** [geo.btaa.org/](http://geo.btaa.org/)
- **Big Ten Academic Alliance:** [btaa.org/homepage](http://btaa.org/homepage)

## President’s Bicentennial Colloquium to explore societal expectations of U-M

By Kim Clarke  
Bicentennial Office

When economist Harold T. Shapiro stood before a capacity Hill Auditorium crowd in 1980 and delivered his inaugural address as U-M’s 10th president, few could have imagined the longevity of his words.

“The relationship between the modern university and society is a very complex and a very fragile one,” he said. “The complexity and fragility stem from the university’s dual role as society’s servant and as society’s critic.”

Nearly four decades later, Shapiro and all of his presidential successors will gather to discuss the tightrope walked by today’s universities as they increasingly, as he foreshadowed, “balance their responsibilities to the world of scholarship with important responsibilities to the communities that support them.”

The conversation Thursday will bring together President Mark Schlissel and former presidents James J. Duderstadt, Lee C. Bollinger, Mary Sue

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– Karin Arizala

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# Bentley Historical Library digitizes 12 decades of Michigan Daily history

By **Sydney Hawkins**  
Michigan News

The Bentley Historical Library has unveiled 12 decades of Michigan Daily history through a new online database that contains searchable digital copies of the historic newspaper.

The first online search of the digitized Daily was performed by President Mark Schlissel during a reception March 30 at the Gerald R. Ford Presidential Library.

“This effort celebrates and preserves 125 years of editorial history for America’s greatest public university,” said Bentley Director Terrence McDonald. “This database will be a gold mine of University of Michigan and state of Michigan history.”

The digitization has been a collaboration among the Bentley, the Daily and the U-M Library. The digital archive contains issues from the Daily’s founding in 1891 through 2014 — including more than 300 volumes from 23,000 issues.

The new, high-resolution scans will be available via an online database that was designed and developed by the U-M Library.

According to John Weise, associate director of IT at the U-M Library, the database will reduce the need for the handling of the original, fragile materials, making the content browsable and searchable by date and full-text.

“The U-M Library is proud to provide the digital preservation and web infrastructure for this remarkable chronicle of the university,” Weise said. “Bringing this online required a high degree of expertise, collaboration and efficient productivity. It is an exemplary demonstration of the commitment of libraries and archives to ensuring enduring access of the human record.”

Neil Chase, chairman of the board for student publications and former editor-in-chief of the Daily, said that

“The U-M Library is proud to provide the digital preservation and web infrastructure for this remarkable chronicle of the university.”

— JOHN WEISE

before the digitization effort, there were only a couple of ways to search through older issues of the Daily — either in the archives at the Bentley, or in bound volumes at the Daily’s office.

“I think that there will be a lot of interest in this project not only from alums, but also from researchers, or anyone interested in regional, national or world history,” Chase said. “People will be able to search through everything from Tom Hayden’s early work and what he did at the Daily, to coverage of presidential elections of the past, the civil rights movement in the ‘60s, and so much more.”

The digitization was made possible by a gift from the Kemp Family Foundation, which was established by U-M alumnus John B. Kemp, founder and chief executive officer of Lease Corp. of America in Troy, Michigan. The foundation is the philanthropic arm of a family with deep roots in the history of U-M, with four generations of family members having received their education at the university.

“The digitized Daily will help something we feel strongly about, which is history and the study of history,” Kemp said. “The Daily is a significant publication, so many important events are recorded in its pages.”

The Michigan Daily digital archive is free, mobile-friendly and accessible to the public.

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COURTESY OF SHONDA ADAMS

While volunteering for the 2016 Spring Commencement, College of Engineering Admissions Coordinator Shonda Adams, left, was surprised to run into a friend from her high school days, Lisa Ponczek. Ponczek came to Michigan Stadium to watch her daughter, Sarah, graduate.



COURTESY OF SHONDA ADAMS

College of Engineering Admissions Coordinator Shonda Adams takes a selfie with other volunteers during the 2015 Spring Commencement.

## University seeks volunteers for Spring Commencement

By Safiya Merchant  
The University Record

To Shonda Adams, it's the little moments she shares with families that make volunteering at the University of Michigan's Spring Commencement so special.

Adams, a College of Engineering admissions coordinator, has volunteered at the spring ceremony at Michigan Stadium for the last four years.

One of the moments that remains etched in her mind took place her first year, when she was a wheelchair-assistance volunteer and helped an elderly man who had never been to Michigan Stadium get to his seat. It was his birthday, and he came to watch his grandson graduate. He told her he was so proud of his grandson, and that he had seen the Big House on television.

When the grandfather finally got a view inside the stadium, Adams said the sight blew him away. The grandfather and his son — the graduate's father — exchanged smiles and admired the scene together.

"His grandson was graduating. It was his birthday. To share that moment with him was just quite an

**"It was a good thing to do together. It reinforces the good that this place does for the broader community."**

— BECKY MAJESKY

### More online

■ Staff and faculty interested in volunteering at the 2017 Spring Commencement can register online at [commencement.umich.edu/volunteer](http://commencement.umich.edu/volunteer)

honor for me," Adams said. "And that's the stuff that I really look forward to. That's why I keep doing this year after year. To be able to share those little moments with people and interact with families is really something."

For the 2017 Spring Commencement, the university is aiming to enlist the help of 100 volunteers to help pass out programs, assist guests with limited mobility by pushing wheelchairs and driving golf carts, help guests at area hotels, and greet families and friends as they exit

shuttle buses.

Staff, faculty, students and retirees are invited to sign up to volunteer. Volunteers must be available from 7:30 a.m. to 12:30 p.m. April 29. Orientation sessions for volunteers will take place in the week prior to commencement.

Volunteers will receive a T-shirt, parking close to the stadium and a voucher for the concession stand. They also will be entered into a raffle to win a variety of prizes, including two prizes of four tickets to a 2017 home football game.

Those interested in volunteering can register online at [commencement.umich.edu/volunteer](http://commencement.umich.edu/volunteer).

Events Manager Kristen Jensen said the main role of commencement volunteers is to make families feel welcome and to provide a friendly face for guests.

Like Adams, Development Communications Specialist Becky Majesky is returning to volunteer at this year's Spring Commencement.

Majesky, a U-M alumna, volunteered for the first time at last year's commencement with her 13-year-old son because he needed community service hours for the National Junior Honor Society. The two handed out programs to guests.

"It was a very simple thing but then people would strike up conversations and you could see they were excited," Majesky said. "And my son, who is not very outgoing, was put in a position where he had to step outside of himself. And he really enjoyed that."

This year, Majesky will be returning to volunteer with her son, who dreams of one day attending U-M. She said she would recommend to other staff and faculty to volunteer along with their kids.

"It was a good thing to do together," Majesky said. "It reinforces the good that this place does for the broader community."

For more information on volunteering, contact Jensen at 734-647-7906 or email [scvolunteers@umich.edu](mailto:scvolunteers@umich.edu).

### RESEARCH

## U-M findings offer new ideas that could bring vaccines to market faster

By Laura Bailey  
Michigan News

Vaccine development is largely trial and error — which results in years of pricey development and just a 6 percent success rate — but a University of Michigan researcher believes he's found a way to potentially improve those numbers.

Wei Cheng, a U-M associate professor of pharmacy, and his research lab have identified a common molecular feature in existing viral vaccines that if applied broadly at the outset of new development, Cheng believes might shave years off vaccine production time while improving their success rate.

"A major hurdle in vaccine development is the lack of general principles that can be applied in the strategic decision and the formulation of a vaccine," he said. "The development of a successful vaccine remains largely empirical in nature. Even though the vaccines are available, in many cases, the molecular basis that underlines

the successful immune response is not clear."

The Cheng lab attempted to remove some of that guesswork by comparing the molecular features of more than a dozen successful licensed viral vaccines. In doing so, they discovered a commonality among them: All feature a relatively high density of viral proteins on the surface of the vaccine carrier.

Think of the vaccine carrier as the bus, and the protein density on the surface as the number of billboards on the sides of the bus, Cheng said. The more billboards there are, the better and more effective the vaccine could be.

Cheng believes if vaccine development were standardized so that new vaccines were formulated with an eye toward optimizing the density of surface proteins on the carrier, it could shorten vaccine development time and improve their success.

"This perspective may provide

a clear route for the development and formulation of antibody-based vaccines with higher probability of success," he said. "For a new vaccine, the probability of success is only 6 percent. It's very important to have something that can be used as a principal to guide this strategic decisions and also the formulation."

In the short term, Cheng believes that retroactive studies can be implemented on vaccines currently in clinical or preclinical trials in order to take his findings into account.

Cheng's theory about the potential linkage between protein density and vaccines has been fermenting since 2011, he said. The group published a paper in 2014 outlining a new optical technique they'd developed that permitted them to quantify the protein density on HIV particles, and found that different quantities of a key protein enabled virulence in HIV, and the protein-rich HIV particles were more infectious than the others.

The success of the 2014 Ebola outbreak vaccine was a good test of Cheng's theory.

Electron microscopy images of the Ebola virus revealed a very high surface protein density — the same feature that Cheng's lab found in successful vaccines — and about half of all Ebola patients survived and healed.

The Ebola vaccine that was developed also had a very high surface protein density, Cheng said, and that vaccine was deemed 100 percent effective.

"The Ebola outbreak was a good test of my theory," he said. "I was indeed very excited when I saw the patient outcomes reported for Ebola, which is consistent with my theory."

The study, "The density code for the development of a vaccine?" ran in the *Journal of Pharmaceutical Sciences* in November 2016, and was selected by editors for inclusion in the issue featuring the "Most Original and Most significant" findings of the quarter.

# U-M public health leaders visit Bangladesh to explore collaborations

By Mandira Banerjee  
Michigan News

Poverty, infant mortality and chronic health issues are just some of the issues in Bangladesh that researchers at the University of Michigan School of Public Health hope to address with research partnerships.

A group of researchers were in the South Asian nation last month to explore collaborative opportunities.

“The visit to Bangladesh was a study in contrasts,” said SPH Dean Martin Philbert, a professor of toxicology. “Undeniable poverty and its consequences was counterbalanced by the creation and implementation of innovative solutions aimed at the sustainable improvement of health and well-being for the most vulnerable in society.”

Philbert and SPH faculty members Matthew Boulton, Mousumi Banerjee and Elizabeth King visited urban and rural clinics and the International Centre for Diarrheal Disease Research in Bangladesh. They examined pressing public health issues like maternal and child health, rising chronic health problems and the need for a cancer registry.

The group also met with various nonprofit organizations including BRAC, the world’s largest nongovernmental development organization dedicated to empowering people living in poverty. Last year, its founder, Sir Fazle Abed Hasan, received U-M’s Thomas Francis Jr. Medal in Global Public Health for his leadership of BRAC.

The School of Public Health has had deep international ties since the early 1970s when the school started its global partnerships. There are now more than 90 faculty working in 75 countries around the world.

While maternal and infant mortality have been a focus for many health organizations in Bangladesh, malnutrition and lack of timely vaccination also affect maternal and child health, said Matthew Boulton, senior associate dean for global public health at SPH and professor of epidemiology, global public health and preventive medicine.

With high population density,



M. PONIR HUSSAIN

Martin Philbert, dean of the School of Public Health, listens to Afroz Huda, senior adviser for the Foundation for Charitable Activities in Bangladesh, during a February visit to the South Asian nation. U-M researchers were in Bangladesh to explore collaborative opportunities for research partnerships that would study such issues as poverty, infant mortality and chronic health problems.

**“In a country like Bangladesh, there are tremendous public health needs and a little investment goes a long way. We can make a real difference in people’s lives.”**

— MOUSHUMI KHAN

many environmental challenges such as groundwater contamination and flooding are becoming a grave concern for the world’s 8th-most populous nation, he said.

“There are tremendous opportunities for SPH global scholars to collaborate with health organizations in Bangladesh,” Boulton said. “We have a long-standing commitment to assist

our international partners in building public health infrastructure, data collection, analysis and research.”

The team also visited Bagdumur, a village outside of the capital Dhaka. The village has been adopted by Mousumi Khan, a graduate of the U-M Law School. Khan gave up a thriving law career to work in the village in memory of her father

Abdul Majid Khan, who grew up in Bagdumur and was an alum of U-M’s College of Engineering.

Khan’s organization Foundation for Charitable Activities in Bangladesh is striving to turn Bagdumur into a smart village with clean energy, sustainable health and livelihood needs.

Helping her in the quest is Banerjee, a research professor of biostatistics at SPH, who conducted the first public health survey of the village to better understand the health needs of its residents.

“In a country like Bangladesh, there are tremendous public health needs and a little investment goes a long way,” she said. “We can make a real difference in people’s lives.”



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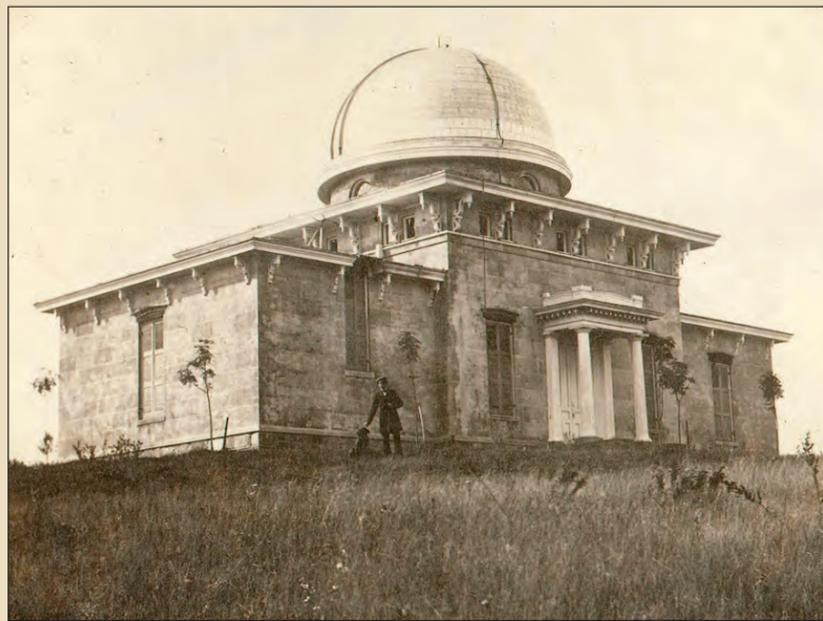
## CAMPUS BRIEFS

### Open houses to be part of bicentennial A-mazing Building Tours

As part of the University of Michigan's bicentennial A-mazing Building Tours, the university will hold open houses at the Detroit Observatory and the Marine Hydrodynamics Laboratory. Open houses for the observatory will take place from 9-10:30 p.m. Friday, and from 1-4 p.m. Sunday, at 1398 E. Ann St. On Friday, tickets will be handed out at the door to guests wishing to look through the Fitz telescope. The open houses at Marine Hydrodynamics Laboratory will take place from 3-5 p.m. Thursday at the laboratory, 1085 S. University Ave. For more information, visit [tinyurl.com/l43hj5a](http://tinyurl.com/l43hj5a).

### College of Pharmacy to host safe medication disposal event

The College of Pharmacy will host its biannual drug disposal event from 10 a.m. to 2 p.m. Tuesday. During the event, members of the university community will be able to drop off unused and expired medications for environmentally safe disposal. Two collection sites will be available: across from Ingalls Mall on North University Avenue and in Room G064, Building 10, at the North Campus Research Complex. Accepted items include prescription and over-the-counter medications, medication samples, vitamins, ointments and lotions, inhalers, antibiotics, steroids,



COURTESY OF BENTLEY HISTORICAL LIBRARY

A historic photo of the Detroit Observatory.

veterinary medicine and controlled medications. Unaccepted items include sunscreen, insect repellent, cosmetics, hair care or personal hygiene products, hydrogen peroxide or rubbing alcohol, aerosol cans, blood or infectious waste, tobacco and sharps containers. More information is available at [myumi.ch/J2voX](http://myumi.ch/J2voX).

### IRWG announces 26 graduate student research awards

The Institute for Research on Women and Gender and the Horace H.

Rackham School of Graduate Studies have awarded funding to graduate students for wide-ranging projects related to women, gender and sexuality. IRWG/Rackham Graduate Student Research Awards and IRWG/Rackham Community of Scholars summer fellowships were granted to 24 students from 16 disciplines, broadly ranging from the social sciences to the humanities and performing arts. Two Boyd/Williams Dissertation Grants for Research on Women and Work were

awarded to Charnan Williams and Patrick Meehan. The graduate students were selected from a highly competitive pool. Their diverse set of projects demonstrates the scope of women and gender studies at U-M. To read more about the Rackham graduate students and their projects, go to [tinyurl.com/lmmzcp](http://tinyurl.com/lmmzcp).

### UM-Dearborn faculty members earn \$240K NSF grant

Two University of Michigan-Dearborn mathematics professors were recently awarded a \$240,000 grant from the National Science Foundation for their Research Experience for Undergraduates summer program. Two years ago, Yunus Zeytuncu, assistant professor of mathematics, College of Arts, Sciences and Letters; and Hyejin Kim, assistant professor of mathematics and statistics, CASL, started the program to make it easier for students to engage in research. Through the program, talented UM-Dearborn students are given the chance to make research their summer job, and are provided a stipend, and room and board. The NSF grant allows Zeytuncu and Kim to double the size of their REU cohort, as well as help them bring in expert guest speakers, offer GRE-focused training and send more students to competitive conferences.

— Compiled by Safiya Merchant,  
The University Record

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# CoE professor Dawn Tilbury to head NSF Engineering Directorate

By Nicole Casal Moore  
Michigan News

The National Science Foundation has selected Dawn Tilbury, a professor and former associate dean for research at the College Engineering, to lead its Directorate for Engineering.



Tilbury

NSF's Directorate for Engineering is charged with supporting engineering research and education critical to the nation's future and fostering innovations to benefit society. NSF assistant directors serve terms of up to four years.

"Throughout her career, Dawn Tilbury has built collaborative relationships across disciplines to make research projects successful," said NSF Director France Córdova.

"I am thrilled to have that kind of leadership for the Engineering Directorate, which makes imagination real and future technologies possible. She is also passionate about mentoring junior faculty, particularly junior women faculty, in their careers — a passion shared across NSF as we seek to develop STEM talent from all sectors and groups in our society."

Tilbury, professor of mechanical engineering, and electrical engineering and computer science, will retain her U-M appointments and intends to return to the CoE faculty when her

**"She is also passionate about mentoring junior faculty, particularly junior women faculty, in their careers — a passion shared across NSF as we seek to develop STEM talent from all sectors and groups in our society."**

— FRANCE CÓRDOVA

term with the NSF is completed.

The Directorate for Engineering provides about 32 percent of the federal funding for fundamental research in engineering at academic institutions. It distributes about 1,600 research awards across the fields of engineering each year.

Research funded by the division has enriched the understanding of natural systems, enhanced electronics, fortified the nation's infrastructure and introduced new possibilities of engineering to the next generation, according to NSF.

The Directorate is home to many of NSF's activities that aim to foster innovation and technology transfer.

The foundation's Small Business Innovation Research program enables companies to undertake research and development with high technical risk and high commercial reward. The Innovation Corps program enables faculty and students to pursue commercialization of technologies based on previous NSF-funded research.

"I welcome the opportunity to work with the engineering and scientific community to address the big challenges that face the nation and world today," Tilbury said. "These challenges require interdisciplinary approaches that must include not only engineering, but also social and computer science, biology and chemistry, physics and the geosciences, and so on."

"As the primary funder of basic research, NSF is uniquely positioned to bring people together to discover new approaches to renewable energy, reliable transportation, enhanced health and safety, and other national challenges."

A professor at U-M since 1995, Tilbury has a background in systems and control engineering. She is the inaugural chair of the Robotics Steering Committee at U-M, and has identified and capitalized on opportunities to advance robotics research at the university.

In 2016, the Board of Regents approved a \$75 million building for

research and teaching facilities, including laboratories for walking and flying robots and autonomous cars. She has written or co-authored more than 60 peer-reviewed papers, reports, book chapters and books, and holds a patent with two other researchers on logic controllers for machining systems.

"We will miss Professor Tilbury's leadership and expertise here at Michigan Engineering. She has been instrumental in the growth of the college's research portfolio in recent years, particularly in the expansion of our robotics program," said Alec Gallimore, the Robert J. Vlasic Dean of Engineering. "At the same time, we are grateful that she has chosen to serve the nation's engineering and scientific enterprise in this important way."

Tilbury has been active in professional society and academic leadership positions, and has received numerous honors and awards for outstanding research and leadership.

She has been a principal investigator on dozens of highly-competitive federal awards, including an NSF Faculty Early Career Development in 1998. She has supervised dozens of graduate students and planned the Big 10 Women's Workshops, a multi-university mentoring and networking workshop series for junior women faculty in engineering, in 2010, 2013 and 2016.

Tilbury will begin her NSF appointment in June.

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## RESEARCH

# Pattern of mammal dwarfing during ancient global warming events revealed

By Jim Erickson  
Michigan News

More than 50 million years ago, when Earth experienced a series of extreme global warming events, early mammals responded by shrinking in size.

While this mammalian dwarfism has previously been linked to the largest of these events, new research has found that this evolutionary process can happen in smaller events known as hyperthermals, indicating an important pattern that could help shape an understanding of underlying effects of current human-caused climate change.

The study was led by researchers at the University of New Hampshire. University of Michigan paleontologist Philip Gingerich is co-author of the study published March 15 in *Science Advances*.

“We know that during the largest of these hyperthermals, known as the Paleocene-Eocene Thermal Maximum, or PETM, temperatures rose an estimated 9 to 14 degrees Fahrenheit and some mammals shrank by 30 percent over time, so we wanted to see if this pattern repeated during other warming events,” said Abigail D’Ambrosia, a doctoral student at the University of New Hampshire and lead author of the study. “The hope is that it would help us learn more about the possible effects of today’s global warming.”

The researchers collected teeth and jaw fragments in the fossil-rich

**“What is important about these findings is that they replicate, extend and hence strengthen observations first made in connection with the slightly older and larger PETM event of global greenhouse warming.”**

— PHILIP GINGERICH

Bighorn Basin region of Wyoming. Their focus was on several early mammals including *Arenahippus*, an early horse the size of a small dog, and *Diacodexis*, a rabbit-sized predecessor to hoofed mammals.

Using the size of the molar teeth as a proxy for body size, the researchers found a statistically significant decrease in the body size of these mammals’ during a second, smaller hyperthermal, called the ETM2. *Arenahippus* decreased by about 14 percent in size, and the *Diacodexis* by about 15 percent.

“We found evidence of mammalian dwarfism during this second hyperthermal. However, it was less extreme than during the PETM,” said D’Ambrosia. “During ETM2, temperatures only rose an estimated 5 degrees Fahrenheit and it was shorter, only lasting 80,000 to 100,000 years, about half as long as the larger PETM.”

“Since the temperature change was smaller, this suggests there may be a relationship between the magnitude of a global warming event and the degree of associated mammal dwarfism.”

U-M’s Gingerich and his students collected some of the fossils analyzed in the study. They worked with other team members to find fossils from the same stratigraphic sections that yielded isotopic evidence of climate change.

The fossils used in the study are part of the U-M Museum of Paleontology’s collections.

“What is important about these findings is that they replicate, extend and hence strengthen observations first made in connection with the slightly older and larger PETM event of global greenhouse warming, showing that many mammals respond to global warming by evolving to be smaller,” said Gingerich, professor emeritus of earth sciences, evolutionary biology and anthropology, and curator emeritus at the Museum of Paleontology.

Researchers propose that the observed change in animal body size could have been an evolutionary response to create a more efficient way to reduce body heat. A smaller body size would allow the animals to cool down faster. Nutrient availability and

quality in plants may have also played a role.

Previous research shows that both the PETM and the ETM2 hyperthermals coincided with increased levels of carbon dioxide in the atmosphere. That could have limited nutrient quality in plants, which may have contributed to the smaller mammal body size.

Hydrological records during the PETM also suggest less precipitation and drought, which could have led to drier soils and even wildfires, which may have affected vegetation growth and, possibly, offspring size in mammals. After both hyperthermal events, body sizes of all mammals rebounded.

The carbon dioxide released during both hyperthermals has a similar footprint to today’s fossil fuels. Researchers hope that developing a better understanding of the relationship between the change in mammalian body size during those events and today’s greenhouse gas-induced global warming may help to better predict possible future ecological changes in response to today’s climate changes.

In addition to D’Ambrosia and Gingerich, authors of the *Science Advances* paper are William Clyde of the University of New Hampshire, Henry Fricke of Colorado College and Hemmo Abels of Delft University of Technology, Netherlands.

Preliminary findings of the study were presented at the Society of Vertebrate Paleontology’s 2013 annual meeting.



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## RESEARCH

# Lasers can detect weapons-grade uranium from afar

By Katherine McAlpine  
Michigan News

A technique for detecting enriched uranium with lasers could help regulators sniff out illicit nuclear activities from as far as a couple of miles away.

It's hard enough to identify nuclear materials when you can directly scan a suspicious suitcase or shipping container. But if you can't get close?

Now, the researchers have shown that a technique often used to identify chemicals at a distance can also distinguish between ordinary uranium-238 and the fission-prone uranium-235. Just three fewer neutrons make a big difference in the element's potential for destruction.

"It's a much harder problem to try to measure different isotopes of the same element," said Igor Jovanovic, professor of nuclear engineering and radiological sciences at the University of Michigan, who conducted parts of the research while at Pennsylvania State University. "Different isotopes are very important in the case of uranium because some of them can be used for the production of nuclear weapons."

With ordinary chemical detection — the approach used by the Mars Curiosity rover, for instance — a laser strikes a surface and causes electrons to jump off the atoms and molecules, forming a plasma. When the electrons jump back into the atoms and molecules, and then come down from

**"Different isotopes are very important in the case of uranium because some of them can be used for the production of nuclear weapons."**

— IGOR JOVANOVIC

higher-energy states within them, they emit light in a particular set of colors that serve as a fingerprint for that atom or molecule.

Jovanovic and his team — Kyle Hartig, assistant professor of nuclear engineering at the University of Florida, and Isaac Ghebregziabher, a postdoctoral scholar at Penn State — showed that this technique can tell the difference between uranium-235 and uranium-238 when the uranium is bonded with oxygen.

"Not only is it possible to make measurements in air, but some constituents of air in fact make this detection more readily achievable," Jovanovic said.

The technique takes advantage of a phenomenon known as laser filamentation. When very short — and very intense — laser pulses run through the air, they create a plasma channel along the beam line. The channel serves as a sort of an optical fiber, keeping the laser pulses focused so that they strike their targets in a small spot, even at distances of a kilometer or more.

The intense laser pulses create a

plasma from the uranium as well as the air, which gives uranium plenty of opportunity to bond with oxygen. When it does, the energy stored in the bond between the oxygen and the uranium-235 or -238 is just different enough to be detectable.

"These molecules radiate just slightly different colors, depending on whether we are looking at uranium-235 or uranium-238," Jovanovic said.

Often, detection systems aim to catch radiation from spontaneous fissions of uranium-235 — or they cause the fissions by shooting neutrons into the suspicious item. These conventional methods can see through packaging and even some shielding intended to keep radiation from getting out.

This new method would need the uranium to be exposed — perhaps in the dust around the loading bay at a secret enrichment facility. But it could be spotted from off site: The system could fit into the back of a truck, a backpack kit, or even a drone, Jovanovic says.

Jovanovic and colleagues had access to weapons-grade nuclear materials right at Penn State, which still runs a research reactor. To find out whether they could tell uranium-235 from uranium-238, they loaded the sample into a chamber with the laser positioned a few meters away. The laser produced a plasma of air and uranium at the surface of the sample. The team picked up light from the plasma from a light-detecting system one meter from the sample.

Jovanovic anticipates that the method would be useful in other scenarios, such as nuclear forensics. If a nuclear bomb were detonated, governments would want to know what was in it and where it came from. For the most accurate analysis, scientists would need samples collected from the blast site. But it would be safer and quicker to run this style of analysis at a distance.

Or it might be helpful at legitimate nuclear facilities, such as monitoring the production of nuclear fuel and ensuring the right level of enrichment.

This study was funded through the Consortium for Verification Technology, a \$25 million project headed by U-M to develop new methods for nuclear nonproliferation. The CVT is supported by the Department of Energy. Funding also came from the Department of Homeland Security.






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# Transparent silver

## Tarnish-proof films for flexible displays, touch screens, metamaterials

By Katherine McAlpine  
College of Engineering

The thinnest, smoothest layer of silver that can survive air exposure has been laid down at the University of Michigan, and it could change the way touchscreens and flat or flexible displays are made.

It could also help improve computing power, affecting both the transfer of information within a silicon chip and the patterning of the chip itself through metamaterial superlenses.

By combining the silver with a little bit of aluminum, the U-M researchers found that it was possible to produce exceptionally thin, smooth layers of silver that are resistant to tarnishing. They applied an anti-reflective coating to make one thin metal layer up to 92.4 percent transparent.

The team showed that the silver coating could guide light about 10 times as far as other metal waveguides — a property that could make it useful for faster computing. And they layered the silver films into a metamaterial hyperlens that could be used to create dense patterns with feature sizes a fraction of what is possible with ordinary ultraviolet methods, on silicon chips, for instance.

Screens of all stripes need transparent electrodes to control which pixels are lit up, but touchscreens are particularly dependent on them. A modern touch screen is made of a transparent conductive layer covered with a non-conductive layer. It senses electrical changes where a conductive object — such as a finger — is pressed against the screen.

“The transparent conductor market has been dominated to this day by one single material,” said L. Jay Guo, professor of electrical engineering and computer science.

This material, indium tin oxide, is projected to become expensive as demand for touch screens continues to grow; there are relatively few known sources of indium, Guo said.

“Before, it was very cheap. Now, the price is rising sharply,” he said.

The ultrathin film could make silver a worthy successor.

Usually, it's impossible to make a



JOSEPH XU, MICHIGAN ENGINEERING

L. Jay Guo, professor of electrical engineering and computer science, shows a “stainless” silver layer that his research group has created.

“The transparent conductor market has been dominated to this day by one single material.”

— L. JAY GUO

continuous layer of silver less than 15 nanometers thick, or roughly 100 silver atoms. Silver has a tendency to cluster together in small islands rather than extend into an even coating, Guo said.

By adding about 6 percent

aluminum, the researchers coaxed the metal into a film of less than half that thickness—seven nanometers. What's more, when they exposed it to air, it didn't immediately tarnish as pure silver films do. After several months, the film maintained its conductive properties and transparency. And it was firmly stuck on, whereas pure silver comes off glass with Scotch tape.

In addition to their potential to serve as transparent conductors for touch screens, the thin silver films offer two more tricks, both having to do with silver's unparalleled ability to transport visible and infrared light waves along its surface. The light waves shrink and travel as so-called surface plasmon polaritons, showing up as oscillations in the concentration of electrons on the silver's surface.

Those oscillations encode the frequency of the light, preserving it so that it can emerge on the other side. While optical fibers can't scale down to the size of copper wires on today's computer chips, plasmonic waveguides could allow information to travel in optical rather than electronic form for faster data transfer. As a waveguide, the smooth silver film could transport

the surface plasmons over a centimeter — enough to get by inside a computer chip.

The plasmonic capability of the silver film can also be harnessed in metamaterials, which handle light in ways that break the usual rules of optics. Because the light travels with a much shorter wavelength as it moves along the metal surface, the film alone acts as a superlens. Or, to make out even smaller features, the thin silver layers can be alternated with a dielectric material, such as glass, to make a hyperlens.

Such lenses can image objects that are smaller than the wavelength of light, which would blur in an optical microscope. It can also enable laser patterning — such as is used to etch transistors into silicon chips today — to achieve smaller features.

The first author is Cheng Zhang, a recent U-M doctoral graduate in electrical engineering and computer science who now works as a postdoctoral researcher at National Institute of Standards and Technology.

A paper on this research, titled “High-performance Doped Silver Films: Overcoming Fundamental Material Limits for Nanophotonic Applications” is published in *Advanced Materials*. The study was supported by the National Science Foundation and the Beijing Institute of Collaborative Innovation. U-M has applied for a patent and is seeking partners to bring the technology to market.

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## STAFF SPOTLIGHT

# CAPS psychologist works at summer camp for kids with disabilities

By Ben Bugajski  
The University Record

Since she was 16 years old, Karin Arizala has volunteered at summer camps. Most recently, however, she has worked at camps for kids with special needs.

With her partner, Scott Arizala, Karin has helped run camp programs that open up the summer camp experience to kids with disabilities, including autism, hemophilia, sickle cell disease and 22Q Deletion Syndrome.

“Especially working with people with autism, I get to see the world in a different way and with very unique perspectives, by pushing myself to put myself in their shoes,” said Arizala, staff psychologist at Counseling and Psychological Services.

Arizala’s path to psychology began her first semester as an undergraduate at Cornell University. She took an introductory psychology class and got the worst grade of her academic career. She decided instead to major in women’s studies and government, and after graduating taught outdoor education at Frost Valley YMCA in the Catskill Mountains of New York.

Her interest in psychology was revitalized while later working as a nanny for two families in Seattle.

“I just got really interested in child development and the effects of parenting styles on development, so that’s what sparked my interest in going to graduate school for psychology,” she said.

She earned her master’s degree and Ph.D. in counseling psychology from the University of Oregon, and conducted post-doctoral study at Stanford focused on gender and sexual identities. It was a perfect fit for an open position at CAPS.

“They were looking for both specialties (LGBTQ and autism), so it was really my dream job,” she said.

Arizala’s work at CAPS is mostly individual therapy, supervising trainees and crisis intervention. She also helps organize campuswide outreach events, such as the Mindful Minute and Play Day. Her favorite part of her job is working with the students, and she’s glad she can work with students who otherwise wouldn’t have access to counseling services.

“There’s a really strong social justice orientation in the college counseling field, valuing diversity, multicultural competency and



SCOTT C. SODERBERG, MICHIGAN PHOTOGRAPHY

Karin Arizala and her partner, Scott Arizala, run summer camp programs for kids with disabilities, including autism, hemophilia, sickle cell disease and 22Q Deletion Syndrome.

## Meet: Karin Arizala

■ **Title:** Counseling psychologist, Counseling and Psychological Services.

■ **At U-M:** Three years.

■ **On her job:** “It’s just my passion to work with young people, so I knew this would be my career path.”

‘walking the walk,’ living that. That’s an important value in my work,” she said.

Arizala continues her social justice work at summer camp. Summer camp is a valuable cultural institution, she said, and opening up that opportunity to more kids who wouldn’t otherwise be able to go makes her work worth it. She currently volunteers at Camp Tall Tree in Michigan, which has programs for both kids and young adults with autism.

“For kids with autism, sometimes they had never spent a night away from their parents, so this really deepens the meaning of the summer camp experience. Plus, there was such a huge need in the autism community, and we’ve had such a positive response from parents and families. Kids have really succeeded,” she said.

In 2009, Arizala helped start the program for kids with autism at Dragonfly Forest, a summer camp outside of Philadelphia focused on children with medical needs. This experience led to her partner Scott founding Camp Tall Tree in Michigan when the Arizalas moved to Ann Arbor in fall of 2013. In the summer of 2014 they hosted their first session of camp in Fenton, Michigan.

At both camps, Arizala has been more of a consultant than therapist. She helps both campers and college-aged camp counselors if they face any psychological distress, however she also likes the kayaking, swimming and archery, anything that brings people together to just have fun.

While summer camp is a big part of Arizala’s life, what drives her in both her camp volunteering and her job is a sense of connection and social justice. Whether she’s creating an accessible environment that allows campers with hemophilia to zip line, or helping students explore their gender identity, connecting with a range of people who are diverse in abilities, backgrounds and identities is important to her.

“It’s just my passion to work with young people, so I knew this would be my career path,” she said.

## Boys secure in their racial identity seek more diverse friendships

By Jared Wadley  
Michigan News

Kids often seek answers from parents, friends and media to better understand their racial identity.

Middle school boys who feel secure about their race during this ongoing information gathering will likely befriend diverse people, according to a new University of Michigan study.

The study’s researchers sought to explain how ethnic-racial identity exploration and resolution might affect friendship networks among youth in a diverse setting, as well as their peers over time.

Exploration expands knowledge of one’s group. The more they learn, the more prepared they are in society,

said Deborah Rivas-Drake, U-M associate professor of psychology and education.

Resolution means having more clarity about one’s belonging to a race.

“Parents need to open these lines of communication if they haven’t already done so,” said Rivas-Drake, the study’s lead author. “It’s just like sex and drugs — you want to be someone your kids can check in with. In this case, the topic is race.”

Rivas-Drake collaborated on the study with Adriana Umana-Taylor and David Schaefer, both from Arizona State University, and Michael Medina of U-M.

About 353 diverse 6th- and 7th-graders at a Midwestern middle school

completed surveys in spring 2014, and six months and year later about their behaviors to learn about their ethnicity and their friends.

Boys who demonstrated greater clarity about their ethnicity or race had more diverse friends at the beginning of the following academic year and in follow-up surveys.

Rivas-Drake said that having more diverse friendships can lead to less prejudice because the boys are able to learn more about — and potentially feel more emotionally comfortable with — other groups.

There were not similar associations for girls, who overall tended to demonstrate higher friendship diversity in their peer group.

The researchers also explored the extent to which early adolescents selected friends who were similar to them. Many did “flock together” along ethnic-racial lines as expected, but they still sought out friends from other racial groups, Rivas-Drake said. When they did so, they drew on these friends to help learn more about their identities later that school year.

“This opens up possibilities for youth from different ethnic-racial groups to form bonds based on their shared engagement in the process of developing their identities,” she said.

The findings appear in a special section of *Child Development* that deals with ethnic and racial identity in youth.

**Feast, from Page 1**

Resources and Environment

**“Using Your Purchasing Power to Support Green Companies and Products”**

7 p.m., The Himalayan Bazaar, 218 S. Main St.

■ Andrew D. Martin, professor of political science and dean of LSA; and faculty associate, Center for Political Studies, Institute for Social Research  
**“The Politics of Judging”**

8:30 p.m., Knight’s Downtown, 600 E. Liberty St.

■ Josh Mergos, clinical assistant professor of kinesiology, School of Kinesiology  
**“Intraoperative Neurophysiological Monitoring”**

7 p.m., The Victors Collection by The M Den, 307 S. State St.

■ Scott Rick, associate professor of marketing, Ross School  
**“Emotion and Consumer Financial Decision-Making”**

6 p.m., The Blue Nile, 221 E. Washington St.

■ Vivek Sankaran, clinical professor of law, Law School  
**“Poverty and the Foster Care System: The Data, Challenges, and A Call to Action”**

6 p.m., Ten Thousand Villages, 303 S. Main St.

■ Justin Schell, associate librarian, Library Learning and Teaching — Connected Scholarship, University Library

**“Building the Bicentennial Bot”**  
6 p.m., Moe Sport Shops,



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Mergos



Rick



Sankaran



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■ Steven J. Skerlos, Arthur F. Thurnau Professor, professor of mechanical engineering, and civil and environmental engineering, and director of the academic program for Mechanical Engineering, College of Engineering  
**“What Does ‘Sustainable Technology Design’ Even Mean?”**  
6:30 p.m., Flipside Art Studio, 255 E. Liberty St.

■ Kentaro Toyama, W.K. Kellogg Professor of Community Information and associate professor of information, School of Information  
**“Geek Heresy: Why Technology is Terrific and Terrible at the Same Time”**  
8 p.m., Conor O’Neill’s, 318 S. Main St.

■ Emily Wilcox, assistant professor of Asian languages and cultures, LSA; and Liangyu Fu, associate librarian, Library Research — Asia, University Library  
**“Creating the Exhibition: Chinese Dance — National Movements in a Revolutionary Age, 1945-1965”**  
7 p.m., Harlan Hatcher Graduate Library, Room 100, 913 S. University Ave.

■ Sebastian Zöllner, associate professor of biostatistics, School of Public Health; and associate professor of psychiatry, Medical School  
**“Using Modern Genetics to Understand Bipolar Disorder”**  
7 p.m., Seva Restaurant, 2541 Jackson Ave.

**UMich200 Spring Festival**

**Thursday, April 6**

- Stumbling Blocks (pop-up art exhibition), Central Campus, Medical Campus and North Campus
- Flag raising ceremony, 8 a.m., Central Campus flagpole
- Welcome Center and Book Station, 10 a.m.-5 p.m., Michigan League Concourse (2nd floor)
- A-maizing Building Tours, 10 a.m.-3 p.m.
- The Research University and Society: Five U-M Presidents on 40 Years of History, 4:30-6 p.m., Rackham Auditorium
- Feast of Ideas, 6-9 p.m., various locations

**Friday, April 7**

- Stumbling Blocks
- Tree planting ceremony, 11:30 a.m., Diag
- Interactive Carillon Concert, noon-12:30 p.m., Burton Memorial Tower
- A-maizing Building Tours, 9 a.m.-10:30 p.m.
- Community of Cultures Festival, 3-6 p.m., Pierpont Commons and Duderstadt Center

**Saturday, April 8**

- Stumbling Blocks, Central Campus, Medical Campus and North Campus.
- True Blue! A Tribute to Michigan, 7 p.m., Hill Auditorium. (Sold out)

**For full details:** [bicentennial.umich.edu/events/calendar/](http://bicentennial.umich.edu/events/calendar/)

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**Colloquium, from Page 1**

Coleman and Shapiro.

Their discussion is part of the second President's Bicentennial Colloquium, "The Evolving Bargain between Research Universities and Society," and a signature event of the UMich200 Spring Festival. It will be from 4:30-6 p.m. at Rackham Auditorium, and is open to the public.

"This is a critical question as we enter our third century: What should society expect from the University of Michigan, and how should the university respond to those expectations?" said Susan E. Alcock, special counsel for institutional outreach and engagement in the Office of the President.

Alcock is joined by Interim Provost Paul N. Courant as presidential bicentennial professors who are organizing the colloquium. They also are co-teaching a graduate course — offered through the Gerald R. Ford School of Public Policy and the School of Education — that explores the future public missions of the research

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university.

"What is the compact between universities and society, and what should it be? We have a strong sense that the relationship is deteriorating," said Courant, the Harold T. Shapiro Collegiate Professor of Public Policy. "The level of support from the state has been falling for decades and there has been a trend of increasing skepticism about whether higher education is 'worth it.'

"How can the bargain between the research university and society be strengthened and renewed? This is the question we are asking of both our students and the presidents who have led our university."

The discussion will draw upon a wealth of leadership experiences.

At age 82, Shapiro is the oldest living

U-M president. His 1980 appointment capped a U-M career that began in 1964 as assistant professor of economics. He chaired the Department of Economics and served as provost under President Robben Fleming. He left U-M in 1987 to become president of Princeton University, from which he retired in 2001 and currently is president emeritus and a professor of economics and public affairs.

Succeeding Shapiro as U-M president was Duderstadt, a nuclear engineer who joined the faculty in 1969. He served as dean of the College of Engineering and provost before being named U-M's 11th president. Today he is president emeritus and University Professor of Science and Engineering. He teaches a graduate-level research seminar in science, technology and public policy at the Ford School, in addition to serving on several major national boards and study commissions.

Bollinger was appointed U-M's 12th

president in 1997 after a brief tenure as provost of Dartmouth College. He first joined U-M in 1973 as an assistant professor of law, honed his expertise as a First Amendment scholar, and rose to dean of the Law School in 1987. He is in his 15th year as president of Columbia University and is the dean of Ivy League presidents.

Before becoming U-M's 13th and first woman president in 2002, Coleman was president of the University of Iowa for seven years. A biochemist, she earlier was provost at the University of New Mexico. She retired from U-M in 2014, and currently is president of the Association of American Universities, which represents 62 leading public and private research universities in the United States and Canada.

Schlissel was named president in 2014 after three years as provost of Brown University. He is the first physician-scientist to serve as U-M president.

**Maps, from Page 1**

data clearinghouses and library catalogs — with an interface that makes discovery easy for experienced researchers as well as neophytes.

"The ease of use is wonderful, but what's really new and different here is a search that allows you to compare contemporary data to old maps," said Mara Blake, spatial and numeric data librarian at the U-M Library.

Blake was part of a multi-institution collaboration that spent the last two years bringing this project to fruition.

The geoportal is managed by team of librarians and geospatial specialists at 10 research institutions from across the Big Ten Academic Alliance.

Participating institutions include University of Illinois at Urbana-Champaign, Indiana University Bloomington, University of Iowa, University of Maryland, U-M, Michigan State University, University of Minnesota (host institution), Pennsylvania State University, Purdue University and University of Wisconsin-Madison.

Local contributions include records from the state of Michigan, the city of Detroit, the city of Ann Arbor, the Southeast Michigan Council of Governments, and scanned maps from the U-M Library's Stephen S. Clark Library.

The service allows enhanced searching — it doesn't host data — but inclusion in the geoportal means time was spent beefing up the metadata — the behind-the-scenes descriptive data — for augmented searching.

"As librarians, we care about access

and data," said Tim Utter, manager of U-M's Clark Library. Making items in the public domain fully accessible is part of what the library does. "I appreciate being able to find relevant data sets by easily clicking on an area of a map."

While the information currently available is primarily from the home states of the institutions that make up the task force, the geoportal will continue to grow and add access to more records.

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## RESEARCH

## Mom's weight in early pregnancy associated with child's cerebral palsy

By Laurel Thomas Gnagey  
Michigan News

Being overweight or obese during pregnancy increases the chance of having a child with cerebral palsy, according to new research led by the University of Michigan School of Public Health and the Karolinska Institute in Sweden.

And the more overweight mom is, the more likely she is to have a child that develops the neurological disorder characterized by a loss or impairment of motor function, said lead author Eduardo Villamor, U-M professor of epidemiology.

"Each degree of obesity severity during pregnancy increased the chances a child would be diagnosed with cerebral palsy," Villamor said. "Compared with women of normal weight, women with overweight had a 22 percent higher rate, whereas women with severe obesity had more than twice (more than 100 percent increase) the rate."

Women with overweight have a body mass index of 25-29.9 and those with obesity have a BMI of 30 or higher.

The study, believed to be the first to show the association between mother's weight and cerebral palsy using data from an entire country, appears in the *Journal of the American Medical Association*.

Villamor and colleagues say that maternal obesity increases the risk of neonatal asphyxia, which most likely explains the development of CP later

in life. This applies only to full-term births.

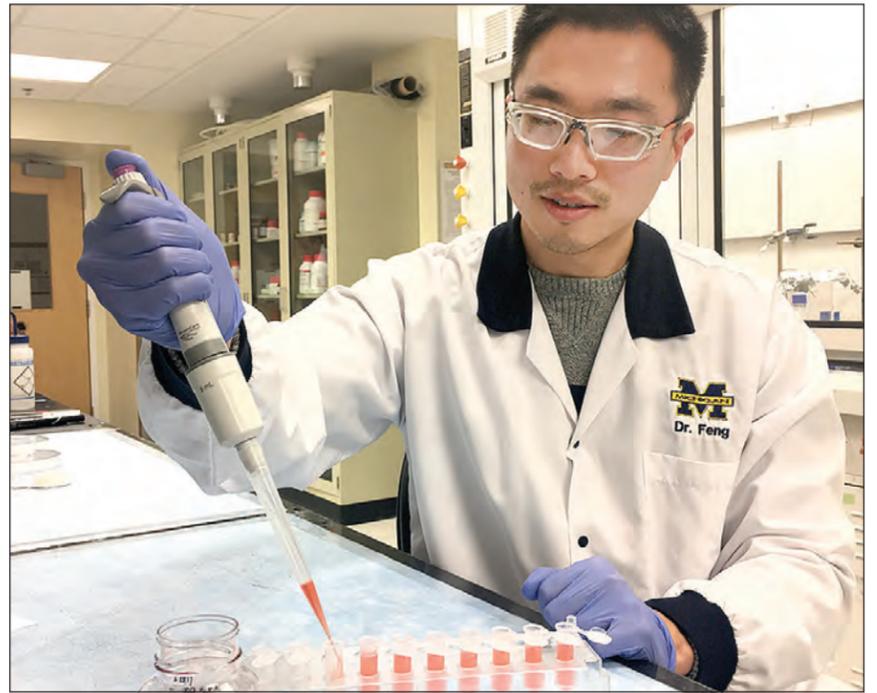
"One reason why it was not seen in children born preterm could be that preterm birth itself hugely increases the chances of CP and, in a way, it may leave little room for other risk factors like maternal obesity," Villamor said.

The team analyzed birth records of more than 1.4 million Swedish children from 1997 to 2011, tracking maternal overweight or obesity in early pregnancy. They then followed the children from birth to the age at which there was a diagnosis of CP, death, or the end of the follow-up Dec. 31, 2012.

Cerebral palsy develops through a series of events before, during or after birth. The cause remains largely unknown but researchers have found that a lack of oxygen at birth has led to the condition in a percentage of children with the diagnosis. Other identified risk factors include premature birth, low birth weight, blood clotting problems, failure of the placenta to deliver oxygen and nutrients, and some infections of the mother or baby.

Previous research by Villamor and colleagues using the Swedish Medical Birth Register has associated maternal overweight and obesity with increased risks of preterm delivery, asphyxia-related neonatal complications, and congenital malformations.

Mark Peterson, U-M assistant professor of physical medicine and rehabilitation, was a co-author on the study.



ZHENGZHI MU, KOTOV LAB, UNIVERSITY OF MICHIGAN

Wenchun Feng pipettes the red nanoparticle solution into small vials with methanol to precipitate the nanoparticles.

## RESEARCH

## Twisted semiconductors for future moving holograms

By Nicole Casal Moore  
Michigan News

A smartphone display that can produce moving, holographic 3-D images will need to be able to twist the light it emits.

Now, researchers at the University of Michigan and Ben-Gurion University of the Negev have discovered a way to mass produce spiral semiconductors that can take that important, light-coiling step.

Researchers at U-M unveiled some of the first holographic images in 1962, made by coaxing waves of light to form an array of bright and dark spots in space. This creates a static illusion of a material object. To make these frozen waves, researchers encoded images onto a material that could control the direction (polarization) and timing (phase) of the fluctuations within the electromagnetic waves.

The new semiconductor helices created by the U-M-led team offer that level of control over light in a format that could work in the pixels of displays. They can be incorporated into other semiconductor devices to vary the polarization, phase and color of light emitted by the different pixels, each of them made from the precisely designed semiconductor helices. This could one day enable moving holograms, projected by smartphones and other screens.

Until now, making semiconductors spirals with sufficiently strong twist — reminiscent of nanoscale fusilli pasta — was a difficult prospect because the twisted state is unnatural to semiconductor materials. They usually form sheets or wires. But Nicholas Kotov, the Joseph B. and Florence V. Cejka Professor of Chemical Engineering, and his team have found a way to guide the attachment of small semiconductor nanoparticles to each other with help from some of nature's twisted structures: proteins and DNA.

"Amino acids are the quintessential building blocks of proteins," said Wenchun Feng, a postdoctoral research fellow in Kotov's lab and lead author of a newly published paper on the work. "The direction of the spiral of proteins is determined by the geometrical property of amino acids. We

found that a common amino acid, cysteine, working together in large numbers, can twist not only proteins but also semiconductors."

The team coated nanoparticles made out of cadmium telluride, a semiconductor capable of emitting light, with cysteine. Cysteine comes in two forms that are mirror images of one another like our hands are, so it is known as a "chiral" molecule. They observed the nanoparticles spontaneously self-assembling into semiconductor "tornadoes" following the rightward or leftward chirality of the amino acid.

The team was surprised by the high fidelity of this self-assembly process and the strength of the twist. Nearly all — 98 percent — of semiconductor helices had the same twisting direction and indeed looked like nanoscale fusilli. Some organic molecules can form natural spirals, too, but the light-twisting ability of semiconductor helices made by Kotov and colleagues is at least five times stronger.

When they shone light through the semiconductors, they recorded the photons swirling through them. Through a combination of experiments and computer simulations, the researchers developed design principles and methods for engineering the optical properties of the semiconductor helices for the different colors in future holography devices.

One of the unexpected consequences of this technology-driven project was getting a peek into mysteries surrounding how life may have arisen on Earth and why many biological molecules reliably follow either a clockwise or counterclockwise spiral. Kotov suggests that amino acids, which are known to form spontaneously in space dust, may have assembled nanoparticles into spirals that twisted the light from the early stars, serving as stable inorganic templates for organic molecules and particles to follow the same pattern.

The work is described in a study in *Science Advances* titled, "Assembly of mesoscale helices with near-unity enantiomeric excess and light-matter interactions for chiral semiconductors."



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EVENTS

Event submissions

■ The University Record's listing of events is compiled from items submitted to the Campus Information Center's online Happening@Michigan calendar, events.umich.edu. For questions about the CIC events site, and how to submit items there, contact Eric Heilmeyer at jeheilm@umich.edu or call 734-764-INFO (4636).

MONDAY, APRIL 3

**"Stumbling Blocks"** exhibition, 6 a.m.-11 p.m. daily through Saturday, various locations. The Future University Community, part of the President's Bicentennial Colloquia, presents a series of outdoor pop-up art installations planned for Central, Medical and North campuses that aims to explore aspirations for a diverse campus community by understanding challenges from U-M's past. For more information, visit myumi.ch/stumbling-blocks.

**"Generations and Genealogies: The 4th Annual Polish Jewish Studies Workshop,"** 8 a.m.-5 p.m., Michigan League, Vandenberg Room. The aim of this workshop is to establish an international forum for communication among scholars working in the growing field of Polish Jewish studies; to identify theoretical and methodological developments and new research; and to create a forum for scholars, educators and activists who rigorously pursue the study of Polish and Jewish cultures more intentionally.

**"The Grandmother Tree Walk,"** 8 a.m.-8 p.m., Nichols Arboretum. Matthaei Botanical Gardens & Nichols Arboretum celebrates the university's bicentennial with a tour of 12 historic trees in the Arboretum. The bicentennial story is told from the perspective of the trees, and key moments of U-M's people and history that occurred during the trees' long lives are revealed. Visitors may pick up a map at the Arb visitor center to take this self-guided tour.

**"Scan the Plan: LSA's 6-Month Progress Report,"** 10:30 a.m.-12:15 p.m., Angell Hall, Angell-Haven Connector (across from Fishbowl). Learn about the LSA's Diversity, Equity & Inclusion Plan 6-Month Progress Report.

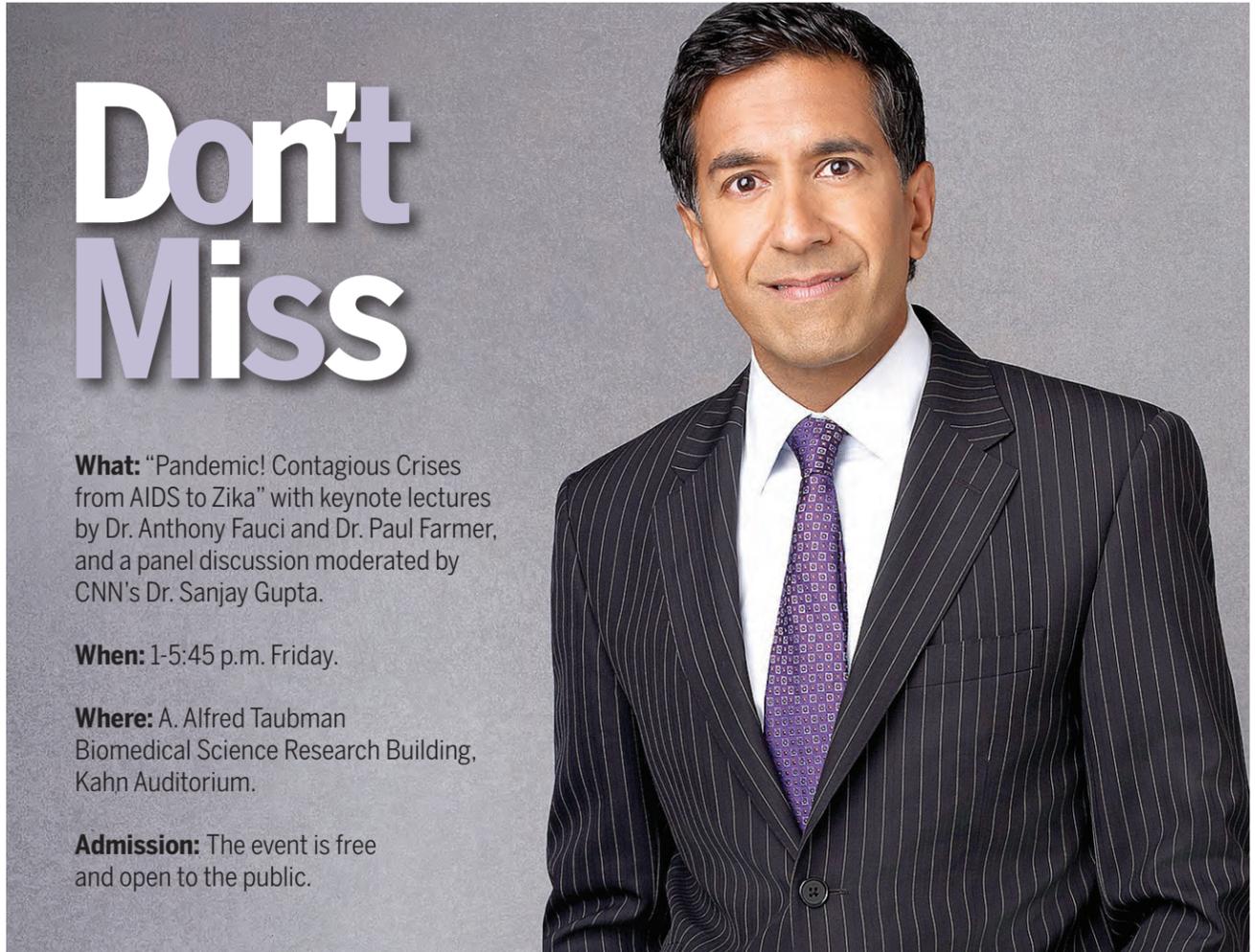
**"Group, Lie and Number Theory: Arithmetic of hyperelliptic curves over local fields"** with Vladimir Dokchitser, King's College London, 3:10-4 p.m., East Hall, Room 4088.

**"Learning and Contagion in Teams"** with David Cooper, Economic Policy Institute, 3:30-5 p.m., Lorch Hall, Room 201.

**"Wall-Crossing via Localization"** with Felix Janda, U-M, 4-6 p.m., East Hall, Room 4096.

**"Integrable Systems and Random Matrix Theory: Integrability, random matrices and Painleve in quantum chaos"** with Vladimir Osipov, Lund University, 4-5 p.m., East Hall, Room 1866.

**"Public Finance"** with Pierre Bachas, World Bank, 4-5:30 p.m., Lorch Hall, Room 301.



**What:** "Pandemic! Contagious Crises from AIDS to Zika" with keynote lectures by Dr. Anthony Fauci and Dr. Paul Farmer, and a panel discussion moderated by CNN's Dr. Sanjay Gupta.

**When:** 1-5:45 p.m. Friday.

**Where:** A. Alfred Taubman Biomedical Science Research Building, Kahn Auditorium.

**Admission:** The event is free and open to the public.

**"Group, Lie and Number Theory: Parity of ranks of abelian surfaces"** with Celine Maistret, University of Bristol, 4:10-5 p.m., East Hall, Room 4088.

**"The Glory and Poverty of the '68 Generation"** with Adam Michnik, historian and editor-in-chief, Gazeta Wyborcza, 5:30-7 p.m., U-M Museum of Art, Helmut Stern Auditorium. Michnik will discuss the different threads that woven together made 1968 the defining moment of his generation, a turning point for Poland, and a dramatic crossroads for Polish Jews.

**"The Unexpected Benefits of Pain, Passion, and Pets"** with the 27th Golden Apple Award winner Edward Cho, 7-9 p.m., Rackham Graduate School, Auditorium. Each year, the winning professor of the Golden Apple Award hosts an "ideal last lecture," in which they construct a lecture on a topic of their choice as if it was to be the last one they will ever give. Admission is free and a reception will follow.

**"University Choir,"** 7:30 p.m., Hill Auditorium.

**"Vibrance Dance Company's Annual Spring Showcase,"** 7:30 p.m., Lydia Mendelssohn Theatre.

**"String Quartet Recital,"** 8 p.m., Walgreen Drama Center, Stamps Auditorium.

TUESDAY, APRIL 4

**"Enriching Perspectives on Middle East and North Africa,"** 8:30 a.m.-5 p.m., Michigan Union, Pond Room. Papers will be presented to an audience of primarily

graduate students, but also undergraduate students and faculty, in an effort to further open the floor for diverse and constructive academic discourse concerning the MENA region.

**"Emergency Medicine: The Good Things Wars Give Us!"** with Gregory L. Henry, professor, U-M, 10-11:30 a.m., Rave Theater, 4100 Carpenter Rd. Henry's presentation will cover how the specialty of emergency medicine was born, what it does and where it is going. This is the eighth in a series of ten lectures held on the second Tuesday of each month. Visit olli-umich.org for fee and other information.

**"Safe Medication Disposal Event,"** 10 a.m.-2 p.m., Ingalls Mall and Room G064, Building 10, North Campus Research Building. Hosted by the College of Pharmacy during which unused and expired medications are collected for environmentally safe disposal.

**"Network Evolution and Synchronization in the Olfactory System"** with Hermann Riecke, Northwestern University, 11:30 a.m.-1 p.m., West Hall, Room 411.

**"Identification and Estimation of Spillover Effects in Randomized Trials"** with Gonzalo Vasquez, U-M, 11:30 a.m.-1 p.m., Lorch Hall, Room 201.

**"Bacterial Manipulation of Ubiquitin Signals"** with Chitta Das, Purdue University, noon-1 p.m., Medical Science Unit II, North Lecture Hall.

**"The Long Embrace: US-China Relations from the Perspective of History"** with John Pomfret, The

Washington Post, noon-1 p.m., School of Social Work Building, Room 1636.

**"Lessons Learned from the Dynamic Genome Program"** with Sue Wessler, University of California, Riverside, noon-1 p.m., West Hall, Room 340. Register at crit.umich.edu/events/FCL.

**"Fictions of Fabric: Art, Literature, Design,"** a panel discussion with Anne Lafont, Megan Sweeney and Courtney Wilder, with an introduction by Martha Jones and comments by Jean Hebrard, Katie Lennard and Susan Siegfried, 12:30-2 p.m., 202 S. Thayer, Institute for the Humanities, Osterman Common Room.

**"Economic History"** with Larry Neal, University of Illinois at Urbana Champaign, 2:30-4 p.m., Lorch Hall, Room 201.

**"Student Geometry/Topology"** with Mitul Islam, U-M, 3-4 p.m., East Hall, Room 3866.

**"At the Cutting Edge: Michigan in 1817,"** 4-5:30 p.m., William Clements Library. Brian Leigh Dunnigan, curator of maps at William L. Clements Library, will describe what Michigan was like when the university first opened its doors to scholars.

**"Ending AIDS: An on-the-ground look at efforts in Africa and the United States to end the HIV/AIDS epidemic"** with Jon Cohen, 4-6 p.m., Michigan League, Hussey Room.

**"U-M Works Because We Do: Graduate Workers and**

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## EVENTS

**GEO at the University of Michigan** with Nora Krinitsky, Scott Schneider and Sandra Silberstein, 4-6 p.m., Tisch Hall, Room 1014.

**"Around Grothendieck's theory of dessins d'enfants"** with Gabino González-Díez, Universidad Autónoma de Madrid, 4:10-5 p.m., East Hall, Room 1360.

**"Food Literacy for All"** with Wayne Roberts, 6:30-8 p.m., Angell Hall, Auditorium B. An evening lecture series, featuring different guest speakers to address diverse challenges and opportunities of both domestic and global food systems.

**"Know The Mother"** with Desiree Cooper, a Michigan Notable Books Talk, 7-8:30 p.m., Harlan Hatcher Graduate Library, Gallery. A conversation with author Cooper about her award-winning book "Know the Mother."

**"SMTD@UMMA: U-M Jazz at Cherbourg,"** 7 p.m., U-M Museum of Art. In conjunction with the UMMA exhibition "Moving Image: Performance," jazz Professor Andrew Bishop combines video presentation with a live chamber jazz ensemble and featured vocalist for a performance dialogue of the 1964 film "The Umbrellas of Cherbourg."

**"String Quartet Recital,"** 7:30 p.m., Stearns Building, Cady Room. Student string quartets perform music by Haydn, Mendelssohn and Beethoven.

**"Orpheus Singers"** with graduate choral conductors, 8 p.m., Walgreen Drama Center, Stamps Auditorium.

## WEDNESDAY, APRIL 5

**"Women, Entrepreneurship & Social Change Conference,"** 8:30 a.m.-2 p.m., Michigan League, Ballroom. This conference brings together female innovators, investors and CEOs to showcase the largely untapped potential of women as leaders, trailblazers and enforcers of social change. You may attend any portion of the conference. Breakfast and lunch are provided; booths showcasing sponsors, speakers and products from local female-owned businesses will be present. Admission is free but registration is required at [eventbrite.com/e/women-entrepreneurship-social-change-conference-tickets-31502356396](http://eventbrite.com/e/women-entrepreneurship-social-change-conference-tickets-31502356396).

**"Spring Break Scientist Spotlight,"** 11 a.m.-2 p.m., Ruthven Museums Building. Visit with U-M scientists and participate in activities related to their research. Scientists will be stationed throughout the museum with unique interactive activities focusing on their own current work. This event is free and open to the public.

**"The Shenzhen Condition: An Anthropology of the Intercultural"** with Mary Ann O'Donnell, independent artist-ethnographer, noon-1 p.m., School of Social Work Building, Room 1636.

**"How Librarians Can Fight for Digital Privacy: Lessons from Library Freedom Project"** with Alison Macrina, 1-2:30 p.m., Harlan Hatcher Graduate Library, Gallery. Macrina talks about how the Library Freedom Project is fighting surveillance and making digital privacy tools mainstream and ubiquitous through the trusted space of the library, followed by a Q & A session.

**"Maximizing Impact with Strategic Course Design,"** 2-3:30 p.m., Palmer Commons, Room 1013. This co-led workshop will offer a hands-on approach to curricular design for faculty either developing new community-based learning courses or transforming existing courses. Those seeking to revise existing courses will share common challenges, explore evidence-based strategies and workshop ways for applying these strategies to their own courses.



The College of Pharmacy will host a Safe Medication Disposal Event from 10 a.m.-2 p.m. Tuesday. There will be two collection sites: across from Ingalls Mall on North University Avenue on Central Campus, and in Room G064 of Building 10 of the North Campus Research Building.

**"Path-dependent Hamilton-Jacobi Equations with Locally Monotone Coefficients in Infinite Dimensions"** with Christian Keller, U-M, 3-4 p.m., East Hall, Room 1866.

**"Enduring U.S. Interests in the Near East"** with: Deborah Jones, U.S. ambassador to Libya, 3-4:30 p.m., Weill Hall, Betty Ford Classroom.

**"Better Angels: Queer Lives and Intimacies on Campus, 1900-1960,"** featuring Cassius Adair, Alex Chow and David Hutchinson, 4-6 p.m., Harlan Hatcher Graduate Library, Gallery.

**"Bicentennial Interfaith Conference,"** 4-6 p.m., Ross School of Business, Rooms B3560, B3570 and B3580. The theme of the event is the history and the future of religious diversity on the U-M campus.

**"Effective Chemical and Enzymatic Methods to Globally Characterize Protein Glycosylation"** with Ronghu Wu, Georgia Institute of Technology, 4-5:30 p.m., Chemistry & Willard H. Dow Laboratory, Room 1640.

**"Effective Risk Aversion in Thin Risk-Sharing Markets"** with Michalis Anthropolos, University of Piraeus, 4-5 p.m., East Hall, Room 1360.

**"You are What You Eat: The Practice of Obtaining and Maintaining Nationalist Identity"** with Jiun Bang, postdoctoral fellow, Nam Center for Korean Studies, U-M, 4-5:30 p.m., School of Social Work Building, Room 1636. What does it mean to treat nationalism as if it were a commodity that can be consumed and (re-)produced on the marketplace? This presentation starts with a short yet instructive tale of Monosodium Glutamate or MSG: despite the discovery of the substance by a Japanese chemist in 1908, it was actually the commodification of Chinese nationalism through MSG by patriotic capitalists in China that, to this day, makes the average consumer associate the flavor enhancer with China rather than Japan.

**"Kodaira-Saito vanishing via Higgs bundles in positive characteristic"** with Donu Arapura, Purdue University, 4:10-5:30 p.m., East Hall, Room 4096.

**"From Diasporic Hebrew to World Hebrew: on the Theoretical Evolution of a 21st-Century Hebrew"**

**"Journal in Ashkenaz"** with Tal Hever-Chybowski, Paris Yiddish Center, 4:10-5:40 p.m., 202 S. Thayer, Room 1022.

**"Inside the Private World of the White House: From the Staffers Who Serve the First Families to the First Ladies Who Run the White House"** with Kate Andersen Brower, 7-9 p.m., Gerald Ford Library. Brower explores the lives of some of the people who surround the president of the United States: the first lady who has stood by his side, and the countless people who work to keep the White House running. Free Admission. Book signing and reception will follow program.

**"Faculty Recital"** with Yoonshin Song, violin, 7:30 p.m., Earl V. Moore Building, Britton Recital Hall. Featuring faculty Richard Aaron, cello; Amy I-Lin Cheng, piano; Caroline Coade, viola; and guest artist from the Detroit Symphony Orchestra Alexandros Sakarellos, violin.

## THURSDAY, APRIL 6

**"Health Infrastructures and Learning Systems Open House,"** 6-8 p.m., Vaughan Victor C House, 204 Victor Vaughn Building. Intended for those interested in HILS interdisciplinary MS and PhD program.

**"Flag-raising Ceremony: Commemorating World War I,"** 8-8:30 a.m., Diag, Central Campus, flagpole. Commemorating the 100th anniversary of the United States' entry into World War I and the service of U-M students and faculty. Students from U-M Reserve Officers' Training Corps units – Army, Navy and Air Force – will participate.

**"Africa-China Conference 2017: Infrastructure, Resource Extraction, and Environmental Sustainability,"** 9 a.m.-6 p.m., Harlan Hatcher Graduate Library, Room 100. First of a two-day conference focusing on sustainability, infrastructural development, cultural practices, resource extraction and new media usage. This conference will provide a space for leading scholars across all disciplines to explore the social and environmental realities of Chinese engagement in Africa.

**"Shenzhen and Skolkovo: Contested Innovation in the Global Silicon Valley"** with Eric Pan, Mary Ann O'Donnell, Olga Aleksakova and Sergei Sitar, 9 a.m.-5 p.m., North Quad

Shared Space (9 a.m.-1 p.m.), Digital Fabrication Studio, Art and Architecture Building (2-5 p.m.). This symposium will bring together guest speakers from Russia and China, Michigan faculty and graduate students to discuss cross-regional and comparative perspectives on innovation and creativity within the specific contexts of government: industry partnerships, political agendas, and cultural settings of Shenzhen in China and Skolkovo in Russia.

**"Central Power Plant Building Tour,"** a part of the A-mazing Building Tours, 10:10-30 a.m., Central Power Plant. The Central Power Plant provides steam for heating and cooling to the Central Campus, as well as the Hospital complex. It also provides approximately 60 percent of the electricity and all the domestic hot water and compressed air to these facilities. The Central Power Plant has personnel generating and maintaining these utility services 24 hours a day, 365 days a year. Register at [bicentennial.umich.edu/events/festivals/a-mazing-building-tours](http://bicentennial.umich.edu/events/festivals/a-mazing-building-tours).

**"Festival Welcome Center and Book Station,"** 10 a.m.-5 p.m., Michigan League, Concourse. Learn about UMich200 Spring Festival events. Current faculty and staff are eligible for one complimentary copy (with their Mcard) of "Always Leading, Forever Valiant," an engaging look at the history of the university. Books also will be for sale at a discounted price by the University of Michigan Press.

**"Freedom? The 13th Amendment 150 Years Later"** with Peter J. Hammer, Wayne State University Law School, 10-11:30 a.m., Rave Theater, 4100 Carpenter Rd. For fee and other information, visit [olli.umich.org](http://olli.umich.org).

**"Unlocking Intracellular Therapeutic Targets through Novel Nanostructured Biomaterials"** with Millicent O. Sullivan, University of Delaware, 11:30 a.m.-12:30 p.m., North Campus Research Complex Building 16, Building 10, Research Auditorium. This talk will highlight ways in which our laboratory has developed and used nanoscale materials to understand and probe cellular "unit ops," with long-term applications including targeted drug delivery for prostate and breast cancer, and gene therapy for wound and tissue repair.

**"Thirty-Six Views of the Eiffel Tower"** with Christopher Bush, Northwestern University, noon-1:30 p.m., School of Social Work Building, Room 1636. Professor Bush's current project, "The Floating World," proposes a revisionist history of japonisme as not only an exoticist representation of Old Japan but also an aesthetic of self-representation informed by, precisely, Japanese modernization. This talk will provide an overview of the book.

**"Policing Black Citizenship: From the Founding to Ferguson"** with Professor Annette Gordon-Reed, Harvard Law School, noon-1 p.m., South Hall, Room 1225.

**"Modern Dance: U-M Freshman Touring Company,"** presented by Gifts of Art, 12:10-1 p.m., University Hospitals, Main Lobby, Floor 1. This 2017 season opening performance features work by New York choreographer and U-M dance alumnus Michael Phillips, U-M dance faculty Missy Beck, Robin Wilson and student choreographers Dee Dee Fattore and Yoshiko Iwai.

**"Marine Hydrodynamics Laboratory Building Tour,"** a part of the A-mazing Building Tours, 3-5 p.m., West Hall, Marine Hydrodynamics Lab. The Marine Hydrodynamics Laboratory is comprised of a suite of labs and facilities that engage in classic naval architecture experiments, such as calm water resistance, seakeeping, propeller tests, and supports education and research at the Department of Naval Architecture and Marine Engineering. More information at [bicentennial.umich.edu/events/festivals/a-mazing-building-tours](http://bicentennial.umich.edu/events/festivals/a-mazing-building-tours).

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<sup>1</sup>Nari Rhee, The National Institute on Retirement Security, "The Retirement Savings Crisis: Is it Worse Than We Think?" June 2013, Page 16.

## WHEN IT COMES TO RETIREMENT, what you don't know can hurt you.

As traditional pension plans decline, the burden for creating retirement income is shifting to the individual.

Unfortunately, not all families are prepared. One study found 67.8 percent of households between the ages of 55 and 64 were at risk of not meeting their retirement savings goals.<sup>1</sup> That means that close to 2/3 of all households nearing retirement are in danger of running out of money.

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### How much money do you need to retire?

EVENTS

**“Molecular evolutionary genetics of the ‘two rules of speciation’ in *Drosophila*”** with Daven Presgraves, University of Rochester, 4-5 p.m., Chemistry & Willard H. Dow Laboratory, Room 1200.

**“Data-Enabled Design for Combustion Dynamics in Propulsion Engines”** with Vigor Yang, Georgia Institute of Technology, 4-5:30 p.m., Francois-Xavier Bagnoud Building, Room 1109. This lecture will address a multi-fidelity modeling strategy to facilitate data-enabled design of combustion devices for propulsion engines.

**“Cultural Property Analysis with the Cultural Heritage Center”** with Allison Davis, cultural property analyst, U.S. Department of State, 4-5 p.m., School of Social Work Building, Room 1644.

**“Muslim Beats in the New Millennium”** with Hisham Aidi, lecturer of international and public affairs, Columbia University, and Su’ad Abdul Khabeer, assistant professor of anthropology and African American studies, Purdue University, 4-5:30 p.m., School of Social Work Building, Room 1636. This Q&A session features Aidi, author of “Rebel Music: Race, Empire, and the New Muslim Youth Culture” and Khabeer, author of “Muslim Cool: Race, Religion and Hip Hop in the United States,” in conversation with Evelyn Alsaltany, associate professor of American culture and director of the Arab and Muslim American Studies Program at U-M.

**“Law & Economics: A Theory of Litigation Signals”** with Avi Tabbach, Tel Aviv University, 4-6 p.m., South Hall, Room 1020.

**“StackPhos: From Structural Curiosity to Enantioselective Catalysis”** with Aaron Aponick, University of Florida, 4-5 p.m., Chemistry & Willard H. Dow Laboratory, Room 1640.

**“Science, society, and metaphors for the Anthropocene”** with Brendon Larson, associate dean, School of Environment, Resources, and Sustainability, University of Waterloo, 4-5:30 p.m., North Quad, Room 2435. This presentation will examine how metaphors interweave science and society as well as their implications for environmental sustainability. Larson will focus on how we may assess novel metaphors proposed in the



As the winner of the 27th Golden Apple Award, Professor Edward Cho will give his “ideal last lecture” titled, “The Unexpected Benefits of Pain, Passion, and Pets,” from 7-9 p.m. tonight (Monday).

environmental sciences, especially in this era of dramatic global change that has been contentiously called the ‘Anthropocene.’

**“Integral etale cohomology of non-Archimedean analytic spaces”** with Vladimir Berkovich, Weizmann Institute of Science, 4:10-5:30 p.m., East Hall, Room 1866.

**“Relief after Hardship: The Ottoman Turkish Model for The Thousand and One Days”** with Professor Ulrich Marzolph, 4:30-6 p.m., 202 S. Thayer, Room 1022, Osterman Common Room.

**“The Research University and Society: Five U-M Presidents on 40 Years of History,”** 4:30-6 p.m.,

Rackham Graduate School, Rackham Auditorium. Former U-M Presidents Harold T. Shapiro, James J. Duderstadt, Lee C. Bollinger and Mary Sue Coleman will join President Mark Schlissel in a bicentennial conversation about the past and future of Michigan and higher education.

**“Heather Dewey-Hagborg: Hacking Biopolitics,”** 5:10-6:30 p.m., Michigan Theater, 603 E. Liberty St. Dewey-Hagborg is a transdisciplinary artist and educator who is interested in art as research and critical practice. Her controversial biopolitical art practice includes the project Stranger Visions, in which she created portrait sculptures from analyses of genetic material (hair, cigarette butts, chewed up gum) collected in public places.

**“Tanwi Nandini Islam: Janey Lack Fiction Reading,”** 5:30-7 p.m., U-M Museum of Art, Helmut Stern Auditorium.

**“Feast of Ideas,”** 6-9 p.m., Ann Arbor restaurants, shops and galleries. An intellectual sampler of U-M’s academic excellence, with faculty from diverse disciplines presenting 20-minute talks at 14 different Ann Arbor shops, restaurants and galleries. All talks are free and open to the public.

**“The Future of American Government is Local”** with Charles C. W. Cooke, 7-9 p.m., Michigan League, Vandenberg Room.

**“In Search of Wang Wei”** with Richard Barnhart, Yale University, 7-8:30 p.m., Michigan Union, Pendleton Room.

**“Arab Folk-Dance Workshop”** with Karim Naji, 7:30-9 p.m., Michigan League, Room 4 (Ground Level). As part of the campus community’s ongoing celebration of Arab Heritage Month, you are invited to join the circle of Arab folk-dancing in this workshop with Egyptian dancer, percussionist, musician, DJ and composer Karim Naji.

**“Masters Recital”** with Carrie Chen, piano, 7:30 p.m., Earl V. Moore Building, Britton Recital Hall.

**“Contemporary Directions Ensemble”** with Oriol Sans, conductor, 8 p.m., Earl V. Moore Building, McIntosh Theatre.

FRIDAY, APRIL 7

**“Chemical Probing of Translational Control in Cancer”** with Amanda Garner, 9-10 a.m., Palmer Commons, Forum

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**TANWI NANDINI ISLAM FICTION**  
 5:30PM-7:00PM  
 BOOK SIGNING & READING @ UMMA • FORUM/APSE  
 FREE & OPEN TO THE PUBLIC

TANWI NANDINI ISLAM, OUR JANEY LACK VISITING WRITER FOR THE 2016-2017 ACADEMIC YEAR, IS THE AUTHOR OF *BRIGHT LINES* (PENGUIN 2015), A FINALIST FOR THE CENTER FOR FICTION FIRST NOVEL PRIZE AND THE INAUGURAL PICK OF NEW YORK CITY’S GRACIE BOOK CLUB. SHE IS THE FOUNDER OF HI WILDFLOWER BOTANICA, A SMALL-BATCH NICHE PERFUME, CANDLE AND SKINCARE LINE. HER WRITING HAS APPEARED IN ELLE.COM, FASHIONISTA.COM, OPEN CITY, WOMEN 2.0, BILLBOARD.COM AND GAWKER. A GRADUATE OF BROOKLYN COLLEGE MFA AND VASSAR COLLEGE, SHE LIVES NYC.

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## EVENTS

## More online

■ For more events listings and details, check out the Campus Information Center's online [Happening@Michigan](mailto:Happening@Michigan) calendar, [events.umich.edu](http://events.umich.edu).

Hall. This talk will detail current approaches used by the Garner Laboratory for developing chemical probes and assays for investigating translational control in cancer.

**"Dancing East Asia: Critical Choreographies and their Corporeal Politics: China, Japan, North and South Korea, Taiwan and Hong Kong."** 9 a.m.-5 p.m., Harlan Hatcher Graduate Library, Gallery. This two-day conference examines the moving body as a medium of artistic experimentation, cultural exchange and political activism in East Asia. Invited scholars from Asia, Europe, and North America will present new research on dance in the East Asian region, including China, Japan, North and South Korea, Taiwan and Hong Kong.

**"Art Historical Art of Song China - Day 1,"** 9:30 a.m.-5 p.m., Michigan League, Kalamazoo Room. This two-day workshop combines connoisseurial debate over the date of a controversial painting, with papers re-thinking the look of the past in the Song imagination.

**"7th Annual UM-Pakistan Conference: Gender & Sexuality,"** 9:30 a.m.-7:30 p.m., School of Social Work Building, Room 1636. Through a conversation between artists, activists and academics, we hope to understand the role of gender for both women and men in shaping, experiencing, negotiating, inhabiting and traversing everyday life, shrines and piety movements, and online spaces.

**"Poets at Michigan, Then and Now: A Symposium,"** 10 a.m.-4 p.m., Michigan Union, Rogel Ballroom. A retrospective of U-M poetry from the Robert Frost era through mid-century poets to the current generation.

**"Fragments Workshop. Interacting with Text in Early Imperial China and Beyond"** with Charles Sanft,

University of Tennessee, Knoxville, 11 a.m.-2 p.m., 202 S. Thayer, Room 1022. This seminar will feature commentators Varuni Bhatia (Asian Languages & Cultures) and Roger Bagnall (ISAW).

**"Bicentennial Tree Planting,"** 11:30 a.m.-noon, Diag, Central Campus. An elm sapling will be added to Central Campus to mark the bicentennial and continue the legacy of plantings started in the 1850s that gave the Diag its physical character. The ceremony, part of the UMich200 Spring Festival, will be on the northwest corner of the Diag, south of the Kraus Building greenhouse.

**"Carillon Concert,"** noon-12:30 p.m., Burton Memorial Tower. A midday performance will showcase the 55 bells of historic Baird Carillon as part of the UMich200 Spring Festival.

**"Digital History @ U-M: Multimodal Scholarship & Publishing"** with Roopika Risam, Salem State University, noon-4 p.m., Tisch Hall, Room 1014.

**"Error Correction in Foreign Language Classrooms: Journey to Ithaca"** with Professor Lourdes Ortega, Georgetown University, noon-2 p.m., Michigan Union, Kuenzel Room.

**"The Mechanisms of Itch Sensation"** with Xinzhong Dong, Johns Hopkins University, 12:15-1:15 p.m., Chemistry & Willard H. Dow Laboratory, Room 1640.

**"Pandemic! Contagious Crises from AIDS to Zika"** with Anthony Fauci and Paul Farmer, 1:55-4:45 p.m., A. Alfred Taubman Biomedical Science Research Building, Kahn Auditorium. Featuring keynote lectures by Fauci, director of the National Institute of Allergy and Infectious Disease at the National Institutes of Health, and Farmer of Harvard Medical School and co-founder of Partners in Health. There will also be a panel discussion of prominent federal, state and local public health leaders and journalists moderated by CNN's Dr. Sanjay Gupta. Opening remarks to be made by President Mark Schlissel. The event is free and open to the public.

**"High Culture/Hard Labor: Looking Beyond the Creatives"** with Andrew Ross, NYU, 1:30-3 p.m., Hutchins Hall, Room 250.

**"200-years and the Law: Title IX and Other Significant Legal Decisions,"** 3-6 p.m., Duderstadt Center, Room 1019. Student Legal Services will present a visual display, outlining significant laws which have impacted the student experience. Of these laws, the feature will be Title IX and its impact on women's sports. The visual display will be accompanied by a speaking presentation by keynote speaker Sheryl Szady, a pioneer that led the fight for equal recognition of women's sports at U-M. The original women's letter jacket will also be on display.

**"Continuum theory of electrostatics with application to biological molecules"** with Bo Li, University of California, San Diego, 3-4 p.m., East Hall, Room 1084.

**"Community of Cultures Festival,"** 3-6 p.m., Pierpont Commons. A celebration of U-M's diversity, with performances, food and presentations by student cultural organizations at Pierpont Commons, the Duderstadt Center and The Grove. The festival is part of the UMich200 Spring Festival.

**"Option Market Making with Competition"** with Martin Herdegen, Warwick, 3-4 p.m., East Hall, Room 1372.

**"Combinatorics: Honeycombs and Kronecker products"** with Stefan Froelich, U-M, 3:10-4 p.m., East Hall, Room 4088.

**"Poverty Solutions Engagement Series: Making Housing More Affordable,"** 3:30-6:30 p.m., School of Social Work Building, Atrium. First in the Poverty Solutions Engagement Series, where we will tackle a poverty-related topic and connect faculty, students and communities to explore ideas, strategies and potential solutions to some of the most pressing challenges of our time. After a keynote speaker, participants will have an opportunity to attend breakout sessions and contribute ideas to real world challenges on affordable housing. Register at [docs.google.com/forms/d/e/1FAIpQLSf0jElr2m1QoNiTnlobUp93bgd0C71WQ4\\_9w3PSvZrU8wYLg/viewform](https://docs.google.com/forms/d/e/1FAIpQLSf0jElr2m1QoNiTnlobUp93bgd0C71WQ4_9w3PSvZrU8wYLg/viewform)

**"Seeing Inside Membraneless Organelles: Structural Biology of Disordered Protein Phase Separation in ALS and Cancers"** with Professor Nicolas Fawzi, Brown University, 4-5 p.m., Chemistry & Willard H. Dow Laboratory, Room 1300.

**"Mannerist Palinode: Art, Empire, and Dispossession in Early Modern Iberia"** with Professor Vincent Barletta, Stanford University, 4-6 p.m., Modern Languages Building, 4th Floor RLL Commons.

**"Performing Arts Technology Seminar"** with Terri Winston, Women's Audio Mission, 4 p.m., Earl V. Moore Building, Chip Davis Technology Studio. Winston founded WAM in 2003 while she was a tenured professor and director of the Sound Recording Arts Program at City College of San Francisco from 2001-2011.

**"Bertini irreducibility theorems over finite fields (following Charles and Poonen)"** with Emanuel Reinecke, U-M, 4-5:30 p.m., East Hall, Room 2866.

**"Success in Multilingual Learning: Continued, Probabilistic, and Beyond Language"** with Professor Lourdes Ortega, Georgetown University, 4-6 p.m., Michigan Union, Kuenzel Room.

**"Statewide Astronomy Night,"** 7-11 p.m., Ruthven Museums Building. Free 30-minute planetarium shows will take audiences through the current night sky and on a brief trip into space to look at far away objects. Various activities designed for kids and families will be available, including building a personal constellation viewer, space puzzles, space storytime, a moon-phase project that kids finish at home by making observations, a short demonstration on comets vs. meteor vs. asteroids, demonstrations on Comets vs. asteroids and the causes of seasonal change and an art project where kids create their own constellations. Museum exhibits will be open. Family activities take place 7-9 p.m.

**"Anton Chekov's The Seagull"** with director Kate Mendeloff, 7:30-9 p.m., Matthaei Botanical Gardens, Conservatory.

**"A Fusion of Art and Astronomy"** with Steve Strom, 8-9 p.m., Angell Hall, Auditorium D. Join scientist and artist Strom as he explores two worlds, Earth and Mars, through the lenses of both art and science.

**"Astronomy Open House,"** 9-11 p.m., Angell Hall. Visit the Student Astronomical Society's Astronomy Open Houses to learn about astronomy, physics and optics.

## FEAST OF IDEAS

Thursday, April 6

An intellectual sampler of U-M's academic excellence, with faculty from diverse disciplines presenting 20-minute talks at Ann Arbor shops, restaurants and galleries.

All talks are free and open to the public.



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[bicentennial.umich.edu](http://bicentennial.umich.edu)



Bicentennial events and activities:  
[guidebook.com/g/umich200](http://guidebook.com/g/umich200)

6:30 p.m. **The Role of Tissue Engineering/Regenerative Medicine in Facial Reconstruction**

Stephen E. Feinberg, Professor of Oral and Maxillofacial Surgery



The Bo Store  
333 S. Main St.

6:30 p.m. **School is a Game ... But is it a GOOD game?**

Barry Fishman, Arthur F. Thurnau Professor of Learning Technologies



826michigan  
115 E. Liberty St.

7 p.m. **Enhancing Oral Health for Children**

Margherita Fontana, Professor of Cariology, Restorative Sciences and Endodontics



Sweetwaters Coffee & Tea  
123 W. Washington St.

7 p.m. **A Hospital of Our Own: The Origins and Early History of the University of Michigan Hospital**

Joel Howell, Victor Vaughan Professor of the History of Medicine



Roeda Studio  
319 S. Main St.

7 p.m. **Using Your Purchasing Power to Support Green Companies and Products**

Thomas Lyon, Dow Chair of Sustainable Science, Technology and Commerce



The Himalayan Bazaar  
218 S. Main St.

8:30 p.m. **The Politics of Judging**

Andrew D. Martin, Dean of the College of Literature, Science, and the Arts



Knight's Downtown  
600 E. Liberty St.

7 p.m. **Intraoperative Neurophysiological Monitoring**

Josh Mergos, Clinical Assistant Professor of Movement Science



The Victors Collection  
by The M Den  
307 S. State St.

6 p.m. **Emotion and Consumer Financial Decision-Making**

Scott Rick, Associate Professor of Marketing



The Blue Nile  
221 E. Washington St.

6 p.m. **Poverty and the Foster Care System: The Data, Challenges, and A Call to Action**

Vivek Sankaran, Director of the Child Advocacy Law Clinic



Ten Thousand Villages  
303 S. Main St.

6 p.m. **Building the Bicentennial Bot**

Justin Schell, Director of the Shapiro Design Lab



Moe Sport Shops  
711 N. University Ave.

6:30 p.m. **What Does 'Sustainable Technology Design' Even Mean?**

Steven J. Skerlos, Arthur F. Thurnau Professor of Mechanical Engineering



Flipside Art Studio  
255 E. Liberty St.

8 p.m. **Geek Heresy: Why Technology is Terrific and Terrible at the Same Time**

Kentaro Toyama, W.K. Kellogg Associate Professor of Community Information



Conor O'Neill's  
318 S. Main St.

7 p.m. **Creating the Exhibition: Chinese Dance: National Movements in a Revolutionary Age, 1945-1965**

Emily Wilcox, Assistant Professor of Chinese Studies



Harlan Hatcher Graduate Library,  
Room 100  
913 S. University Ave.

7 p.m. **Using Modern Genetics to Understand Bipolar Disorder**

Sebastian Zöllner, John G. Searle Associate Professor of Biostatistics



Seva Restaurant  
2541 Jackson Ave.

EVENTS

**“Statewide Astronomy Night at the Detroit Observatory,”** 9-10:30 p.m., Detroit Observatory, Tour this 19th century astronomical observatory and learn about it’s role in the foundation of this University and department of astronomy. Weather permitting, we’ll open the dome over the 1857 Henry Fitz refractor for views of the Moon.

**SATURDAY, APRIL 8**

**“5th Annual Run for the Red 5K,”** 8:30 a.m.-noon, Nichols Arboretum, 1610 Washington Heights. Support the American Red Cross Club at U-M by participating in the 5th Annual Run for the Red 5k in the Nichols Arboretum. Run by yourself or as a group or team, and receive a complimentary event t-shirt. Register at [localraces.com/gobluered/5th-annual-run-for-the-red-5k](http://localraces.com/gobluered/5th-annual-run-for-the-red-5k).

**“Art Historical Art of Song China - Day 2,”** 9:30 a.m.-5 p.m., U-M Museum of Art, Auditorium. This two-day workshop combines connoisseurial debate over the date of a controversial painting, with papers re-thinking the look of the past in the Song imagination. Nine speakers will join in from around the world.

**“Relay For Life,”** 10 a.m.-10 p.m., Palmer Field. Walk the track to support and bring awareness to Cancer.

**“Saturday Morning Physics: Hunting for Evidence of Galactic Cannibalism”** with Sarah Loebman, Michigan Society of Fellows postdoctoral scholar, U-M, 10:30-11:30 a.m., Weiser Hall, Rooms 170 and 182.

**“Yes Means Fest,”** noon-4 p.m., William Monroe Trotter Multicultural Center, Front Lawn. SAPAC will be holding its annual event to raise awareness about consent and bystander intervention. The purpose of the event is to encourage personal expression and dialogue. Various student groups, musicians, artists, performers will be performing at this event and there will be an open mic for the first hour of the event.

**“Family Day: The Art and Science of Healing,”** 12:30-3:30 p.m., Kelsey Museum of Archaeology. Free and open to the public. Fun, hands-on activities take place in Newberry Hall. Kid-friendly tours of the exhibition will take place at 1, 2 and 3 p.m.

**“Masters Recital”** with Evan Zegiel, tuba, 2:30 p.m., Earl V. Moore Building, McIntosh Theatre.

**“Guest Lecture/Recital”** with Karen Walwyn, piano, 5 p.m., Walgreen Drama Center, Stamps Auditorium.

**“The River in Our City, the River in Our Veins: A Preview performance of processional puppetry,”** 5:30 p.m., Earl V. Moore Building, Pond. Presented by Professors Christianne Myers and Michael Gurevich.

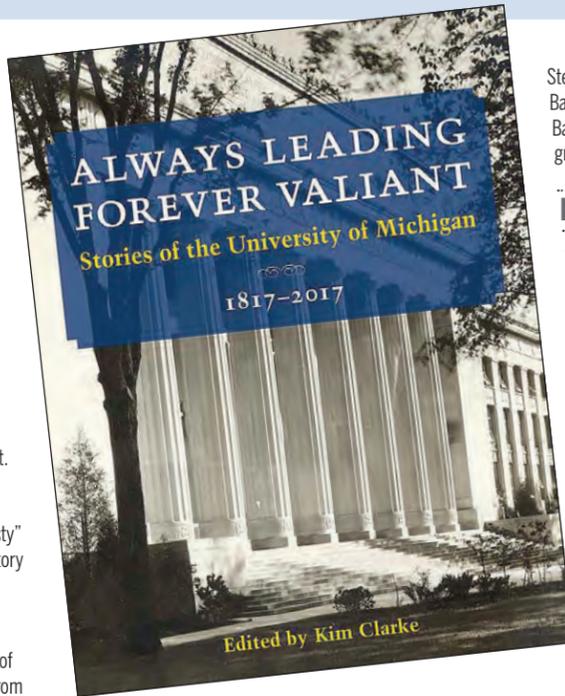
**“Musical Echoes and Reminiscences from Southern Song Dynasty”** with musicians from Wuhan Conservatory of Music, China, 7-9 p.m., Lydia Mendelssohn Theatre, Rackham Auditorium. Free Event. A unique concert of historical and new composition featuring a set of 20 Chinese Chime bells. “Musical Echoes and Reminiscences from Southern Song Dynasty” will be performed by musicians from Wuhan Conservatory of Music Wuhan, Hubei Province, China. In addition to performing contemporary and original compositions on themes and musical materials from Southern Song dynasty, the program will include huaigu performance of historical works preserved in authentic music scores from 13th century China. Four songs from the “Twelve Shijing Songs” preserved by Zhu Xi (1130-1200) will be performed by a male choral group, accompanied by a set of chime bells reconstructed from archeologically rediscovered samples. Reservations at [goo.gl/dhqFJN](http://goo.gl/dhqFJN).

**SUNDAY, APRIL 9**

**“2017 Big House 5K: Trail to the Victors,”** 8:30 a.m.-1 p.m., Michigan Stadium. The race benefits six local non-profit organizations and will begin near the Stephen M. Ross Athletic Campus and finish on the field of Michigan Stadium.

**“Foundations of Cosmology Workshop,”** 9 a.m.-5 p.m., Rackham Graduate School, Rackham Assembly Hall. Speakers include Chris Smeenk (University of Western Ontario), Yann Benétreau-Dupin (University of Pittsburgh, History), Katrin Heitmann (Argonne National Laboratory, University of Chicago) and Katie Freese (U-M).

**“Highlights of the Kelsey Museum”** drop-in tour, 2-3



Faculty and staff (with an Mcard) will receive the book, “Always Leading, Forever Valiant,” an engaging look at the history of the university at the Festival Welcome Center and Book Station from 10 a.m.- 5 p.m. Thursday at the Michigan League.

p.m., Kelsey Museum of Archaeology. Docent-led tour introduces highlights of the museum’s Greek, Roman, Egyptian and Near Eastern collections.

**“Friends of Opera Competition Recital,”** 2 p.m., Earl V. Moore Building, Britton Recital Hall. The 2017 Friends of Opera competition recital features the winner of the Anna Chapekis Award for Graduate Students, bass-baritone David Weigel (DMA '19), and Friends of Opera Undergraduate Award-winner, mezzo-soprano Isabel Signoret (BM '18).

**“University and Campus Bands,”** 3 p.m., Hill Auditorium. Featuring University Band, John Pasquale, conductor and

Stephen Meyer, graduate conductor, Campus “Blue” Band, Andrea Brown, conductor; Campus “Maize” Band, Andrea Brown, conductor and Elliott Tackitt, graduate conductor.

EXHIBITS

**“Blossom by Blossom: Elvish Ceramics”** with Gabrielle Soltis, presented by Gifts of Art, 8 a.m.-8 p.m., A. Alfred Taubman Health Care Center, Gifts of Art Gallery, Taubman Health Center South Lobby, Floor 1. Soltis creates works from the Gyldenstjerne Porcelain Company lineage.

**“Cokeasaurus: Scenes from a Picture Book”** with Marian Short, presented by Gifts of Art, 8 a.m.-8 p.m., A. Alfred Taubman Health Care Center, Gifts of Art Gallery, Taubman Health Center North Lobby, Floor 1.

**“Creating Emotion: Hand Painted Intaglio Prints”** with Dale Osterle, presented by Gifts of Art, 8 a.m.-8 p.m., University Hospitals, Gifts of Art Gallery, University Hospital Main Corridor, Floor 2.

**“Another Country: An exhibition by Shanna Merola,”** 9 a.m.-5 p.m. Monday-Friday through April 21, 202 S. Thayer, Institute for the Humanities, Osterman Common Room. The scenes in “Another Country” emerge from daily images of conflict and uprising.

**“Ernestine Ruben at Willow Run: Mobilizing Memory”** exhibition, 11 a.m.-5 p.m. Monday-Sunday through Aug. 20, U-M Museum of Art. In 2013, artist Ernestine Ruben photographed the once-famed industrial complex Willow Run in Washtenaw County. The exhibition presents Ruben’s photographs of Willow Run in UMMA’s Photography Gallery and an original film — co-created by Ruben and video artist Seth Bernstein and featuring an original score by award-winning composer Stephen Hartke — in the Museum’s Forum.

**“Chinese Dance: National Movements in a Revolutionary Age, 1945-1965,”** in association with the Dancing East Asia conference, 8 a.m.-11 p.m., through May 15, Hatcher Library Gallery & the Asia Library. Opening reception March 6, 4-5:30 p.m. This original, curated exhibit

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## EVENTS

introduces modern Chinese dance history through issues of ethnicity, nation, gender and class. Learn the stories of individual dancers and choreographers, and explore relationships among dance, popular media and global exchange during a time when China and the United States had little direct cultural contact. The exhibit features materials from the University of Michigan Library's Asia Library, the largest resource of materials for Chinese dance research in North America.

**"Victors for Art: Michigan's Alumni Collectors—Part I: Figuration,"** 11 a.m.-5 p.m., U-M Museum of Art. Commemorating U-M's 2017 Bicentennial, this exhibition presents works collected by a diverse group of alumni that represent the breadth of the university and over seventy years of graduating classes. The works themselves are equally diverse, ranging from ancient sculptures to contemporary multimedia works.

**"Constructing Gender: Origins of Michigan's Union and League,"** 11 a.m.-5 p.m. Monday-Sunday through May 7, U-M Museum of Art. Ask students, alumni or fans what symbolizes the University of Michigan, and you'll likely hear the Big House, the Diag, along with the Michigan Union and the Michigan League. Since they officially opened in 1919 and 1929, respectively, the Union and League have been destinations for generations of Wolverines yet few know the rich history of the buildings' origins or about the architects who brought them both to life: brothers and U-M alums Irving K. and Allen Pond.

**"In Focus: Frank Stella,"** 11 a.m.-5 p.m. through April 23, U-M Museum of Art. One of the most celebrated and innovative American artists of our time, Stella is renowned for his early minimalist aesthetic and later expressive abstraction. His investigations into form and materials have led him to continually explore the parameters of 2- and 3-dimensional space.

**"Avant Garden: Weaving Fashion and Nature Together,"** 10 a.m.-4:30 p.m. daily, Matthaei Botanical Gardens. Exhibit explores plants' long-standing role as the versatile source of raw materials for textiles and the inspiration for the designs, colors and shapes that fashion takes, proving that the art of fashion follows the forms of nature.



THOMAS DEXTER

Transdisciplinary artist and educator Heather Dewey-Hagborg will give a lecture from 5:10-6:30 p.m. Thursday at the Michigan Theater.

Plants in the conservatory at Matthaei Botanical Gardens are highlighted along with their historical and cultural roles as they relate to cultivation, sustainability, textiles, colors and design.

**"Clements Library: A Century of Collecting, 1903-2016"** is presented from 10 a.m.-4 p.m. Fridays in the newly

renovated William L. Clements Library. For more information about the library, go to [clements.umich.edu](http://clements.umich.edu).

**"Dental Hygiene, A Century of Progress"** highlights the growth and development of the dental hygiene profession and education. It is on display in the Sindecuse Museum of Dentistry in the School of Dentistry.

**"Evolution of the Trumpet Exhibition"** presents a Stearns Collection exhibit of trumpets across the ages in the lower lobby of Hill Auditorium.

**The Gerald R. Ford Presidential Library and Museum** at 1000 Beal Ave. on North Campus presents documents and photos that celebrate the lives of Gerald and Betty Ford.

**The Museum of Natural History** offers educational programs and exhibits for campus and community. For a list of events, go to [lsa.umich.edu/ummnh](http://lsa.umich.edu/ummnh).

**U-M Detroit Observatory**, 1398 E. Ann St., houses exhibits and collections that recall the observatory's role in introducing scientific research to campus and the significant discoveries made by its astronomers.

**The U-M Museum of Art's** expanded Collections Galleries present Western, Asian, African and modern and contemporary works of art. They are open 11 a.m.-5 p.m. Tuesday through Saturday and from noon to 5 p.m. Sundays.

### Museum of Natural History tours and children's programs

**Free Dinosaur Tours** are available at 2 p.m. Saturdays and Sundays at the Museum of Natural History. For more information, call 734-764-0480.

### Workshops/support

**MHealthy's Alcohol Management Program** is designed to help people with mild to moderate alcohol problems. Call 734-998-2017 or go to [mhealthy.umich.edu/alcohol](http://mhealthy.umich.edu/alcohol).

**The Faculty and Staff Assistance Program** provides support and assistance to university staff and faculty in resolving personal or work related concerns. FASAP seeks to enhance the emotional health, well-being and job performance of members of the university community. Current support groups include Parenting Teens, Dealing with Divorce and Break-Up and Stress Relief for Caregivers. For more information, call Tina at 734-936-8660.

— Compiled by Steve Culver  
The University Record

# PANDEMIC!

## CONTAGIOUS CRISES FROM AIDS TO ZIKA

With keynote lectures by **DR. ANTHONY FAUCI**,  
Director of the National Institute of Allergy and Infectious Disease  
at the National Institutes of Health, and **DR. PAUL FARMER**, Harvard  
Medical School and Partners in Health, and with a panel of prominent public  
health leaders and journalists moderated by **DR. SANJAY GUPTA** of CNN.

**Friday**  
**April 7, 2017**

**1:00 p.m. - 5:45 p.m.**  
with open reception to follow.

**Kahn Auditorium, Biomedical Science Research Building**  
109 Zina Pitcher Place, U-M Campus



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