



MIZZOU'S
**CHART
TOPPERS**

Our **newest hits,**
firsts and **discoveries**
Story by Dale Smith &
Laura Roloff

We wondered: **What magic has Mizzou made lately?** Sure, Tigers have churned out accomplishments steadily since 1839: Faculty member Charles V. Riley helped save the French wine industry from a vine-ravaging aphid in 1876. Journalism graduate Jackson Scholz won an **Olympic gold medal** in the 200-meter dash in 1924. Medical graduate Hugh Stephenson invented the **cardiac crash cart** in 1950. But what about now? We scanned the recent past for MU's notable **firsts, leaps forward, moments of discovery and acts of courage.** The upshot: Mizzou's heyday just might be today.

MIRACULOUS MEDICINE

We're attracting major grants.

Fiscal 2016 grant awards rose \$12.2 million over the previous year to \$238.8 million. Since fiscal 2011, **MU has won more than \$750 million in new grant funding for research and development.** A handful of highlights: \$5 million for translational research from the Coulter Foundation; \$5.5 million for alternative energy; \$4.5 million for patient-centered care; \$45 million to study American constitutional and democratic principles, history and traditions; and \$15 million to integrate new technologies into teacher instruction.

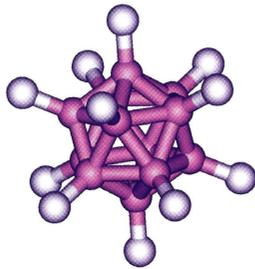
We're making life better for older adults.



The Sinclair School of Nursing is on a gerontology research roll. The school received nearly \$20 million in funding from the U.S. Department of Health and Human Services to expand a program led by Professor Marilyn Rantz that helps reduce avoidable hospitalizations for nursing home residents. **Finding ways to help seniors "age in place" has been a major focus for more than a decade.** For example, Rantz and colleagues have developed

sensor technologies that alert health care providers when seniors have emergencies, such as falls, and detect subtle changes in sleep patterns that signal nascent problems.

We're battling cancer in groundbreaking ways.



Mizzou cancer researchers are making great progress on several aspects of diagnosis and treatment. Decades of cancer research by Curators Professor M. Frederick Hawthorne led to a **breakthrough in radiation therapy** using boron that put cancer into remission in mice. What's more, this innovative treatment produced none of the harmful side effects of conventional chemotherapy and radiation treatments.

MU researcher Salman Hyder has found that luteolin, a natural compound found in herbs such as thyme and parsley, and some vegetables, could **reduce breast cancer risk** for women who have taken hormone replacement therapy. Hyder also discovered that a drug initially developed to lower cholesterol not only halts the progression of breast cancer but also kills cancerous cells.

A promising **new diagnostic approach** in the research stage might someday save lives by locating recurrences or metastases early. The new diagnostic "probe," a nanoparticle package, developed by Raghuraman Kannan and Amolak Singh, includes an antibody or peptide that latches on to the surface of breast cancer cells, plus a molecule that's easily visible on a PET scan or CT scan. In less than two hours, the probes can travel throughout the body, attach to any breast tumor cells, and be spotted by scans.

Researcher Silvia Jurisson and her team received a U.S. patent for a new delivery method that uses **nuclear isotopes to target, diagnose and treat cancer.** The patented method, highlighting

Jurisson's more than 30 years of research work, could prove invaluable in battling prostate, pancreatic, breast and small-cell cancers.

MU's Ellis Fischel Cancer Center is the first academic health center to join the renowned **MD Anderson Cancer Network** as a certified member. The affiliation allows Missouri patients to benefit from Anderson's experts, treatment regimens and best practices.

A recent MU study shows that resveratrol, a compound found in grape skins and red wine, can make **melanoma cells** become more susceptible to radiation.



THE ARTS

We're harnessing the arts and unleashing creative vigor.

True Son of the small screen **Jon Hamm**, BA '93, won the Golden Globe for best performance by an actor in a TV series drama for his portrayal of *Mad Men* protagonist Don Draper. Also honored was **Chad Hamilton**, BA '98, executive producer of USA's *Mr. Robot*, which took home the Golden Globe for best TV series.

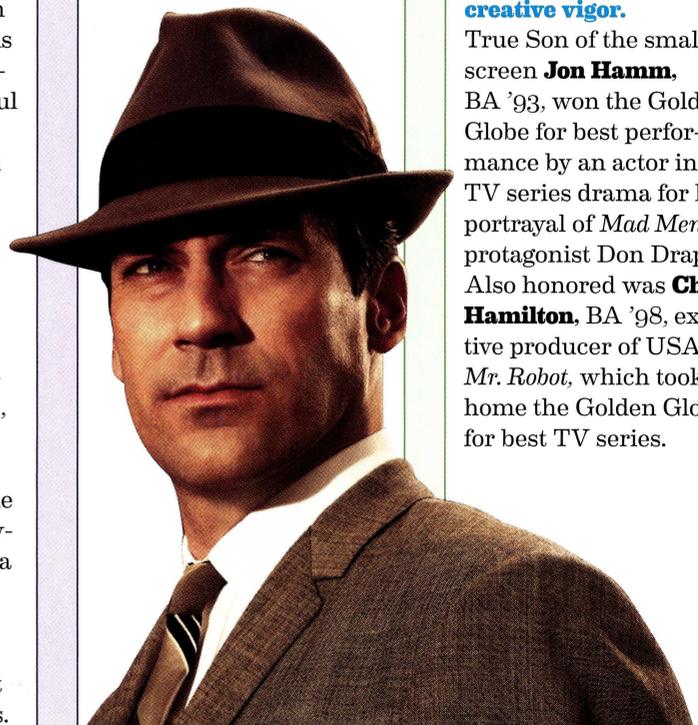


Chart Toppers



Stephanie Berg

↑ **Stephanie Berg**, BM '08, MM '12, made history of a sort when the renowned St. Louis Symphony performed a piece she wrote — “Ravish and Mayhem” — while a student at Mizzou.

★ MU scholar Frances Dickey is part of a team collecting, editing and digitally publishing approximately 1,000 pieces of **T.S. Eliot's prose**, including some previously unpublished works. Eliot, a Missouri native most widely known as the author of “The Love Song of J. Alfred Prufrock,” was a major poet and critic of the 20th century.



T.S. Eliot

↑ MU is the first university selected for the “**Hidden Treasure of Rome**” project, which brings heretofore unstudied artifacts to U.S. universities for research and restoration.



★ In 2014, Anna Bridgman became the latest MU student to capture the prestigious **national collegiate vocal championship** of the Music Teachers National Association. Four other Mizzou students have won the competition since 2000.

↑ Three of Missouri's four poets laureate have been Mizzou graduates or faculty. In 2008, Walter Barga, BA '70, M Ed '90, became the state's inaugural **poet laureate**, followed in 2012 by William Trowbridge, BA '63,

MA '65, and in 2016 by Alike Barnstone, professor of English.

DIET & NUTRITION

★ **We're helping people eat better.**

Obesity is a deadly problem in the U.S. The MU Nutritional Center for Health (MUNCH) and the MU Physical Activity and Wellness Center (MU PAW) merge expertise in agriculture, medicine, food science, journalism, exercise, dietetics and other disciplines into a **holistic approach** to control the problem. For instance, researchers discovered that when young adults eat high-protein breakfasts, they increase the levels of a brain chemical associated with feelings of reward, which may reduce food cravings and overeating.

AUTISM

↑ **We're unraveling autism spectrum disorder.**

With the incidence of autism on the rise, Gov. Jay Nixon, BA '78, JD '81, budgeted \$5 million to expand the **MU Thompson Center for Autism and Neurodevelopmental Disorders**. The investment will help more people receive diagnosis and treatment. Clinicians and researchers are doing their part. Some recent work:

• Ye Duan and Judith Miles have found that **3-D facial imaging** could help detect autism at

younger ages, which can improve outcomes.

• David Beversdorf led the first study to show that a single dose of propranolol — a medication created to control blood pressure — can **improve the conversational skills** of individuals with autism.

• Nancy Cheak-Zamora highlighted the need to support teens with autism and their caregivers so the teens can **transition into adulthood** successfully and independently. “As health care providers, we cannot only help them take care of their health care needs,” she says. “We also need to ensure they're connected to resources necessary to live independently and succeed in employment and education.” New studies and programs are underway. *Read the latest on Page 10.*

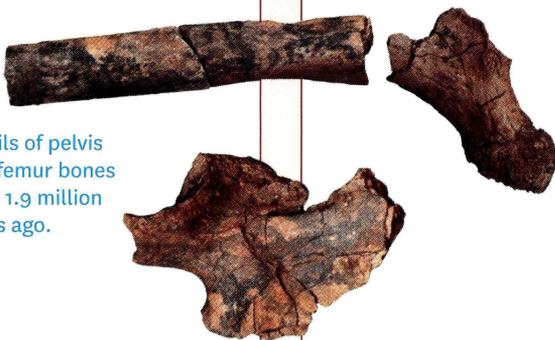
HUMAN ORIGINS

★ **We're finding out where we came from.**

MU researcher Carol Ward is part of an international team dealing with **new fossil finds** that are revising our understanding of human evolution. These include 1.9 million-year-old pelvis and femur fossils from an early human ancestor in Kenya that reveal greater diversity in human species than scientists previously realized. Ward also analyzed a 1.42 million-year-old fossil hand bone, which signals the presence of the modern



Fossils of pelvis and femur bones from 1.9 million years ago.



human hand 600,000 years earlier than previous evidence.

HUMAN HEALTH

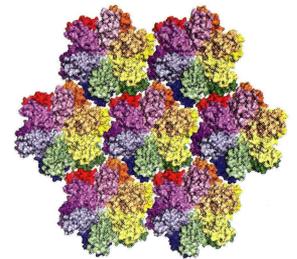
We're building world-class medical centers. To meet growing patient needs, MU Health Care began construction

on a \$40 million, four-story expansion of the **Missouri Orthopaedic Institute**. Opened in 2010, the institute is the largest and most comprehensive freestanding orthopaedic care center in central Missouri. The expansion will increase clinical space for surgi-

cal, inpatient, outpatient and physical therapy services to almost 200,000 square feet. The fourth floor will be dedicated to research, including that of Jimi Cook, who has made breakthroughs in joint replacements. *More on Page 16.*

For the fifth year in a row, University of Missouri Health Care ranks as one of the nation's **"most wired" health systems**, according to the 2015 Most Wired Survey. The survey results appear in the July issue of the *American Hospital Association's Hospitals and Health Networks* magazine.

We're tackling serious diseases.



MU virologist Stefan Sarafianos and his team have advanced our understanding **how the body combats HIV** and other viruses. They showed that EFdA, a compound that stops HIV from spreading, is 70 times more potent against HIV that resists Tenofovir — one of the most commonly used HIV drugs. Their research on

ILLUSTRATION: JUSTIN WOOD; BONES: MU NEWS BUREAU; VIRUS: COURTESY STEFAN SARAFIANOS

Chart Toppers

EFdA led pharmaceutical giant Merck to license the drug in 2012.

★ University Hospital's **Missouri Stroke Program** received national recognition from the American Heart Association and the American Stroke Association for rapid, top-quality care of stroke patients. "The majority of our patients who qualify for the clot-busting drug TPA receive the medication within 45 minutes of arriving at the hospital," says Niranjn Singh, who directs the Missouri Stroke Program.



↑ Research by Habib Zaghouani has brought existing research threads together in a new way, and he has **cured diabetes in mice**.

★ A team of Mizzou researchers has successfully treated dogs with **Duchenne Muscular Dystrophy**, which damages muscle tissue in boys, who lose their ability to walk and breathe as they get older. "This discovery took our research team more than 10 years, but

we believe we are on the cusp of having a treatment for the disease," says researcher Dongsheng Duan. Human clinical trials are being planned in the next few years.

INNOVATION

↑ **We're inventing — and launching — new technologies.**

Engineering researchers Jae Kwon and Baek Hyun Kim have created the **first water-based nuclear battery**. It can generate electricity at low temperatures and has the potential for next-generation energy applications such as powering automobiles and spaceships. Jae Kwon also developed a way to control and confine the movement of oily liquids in water. The technique could **protect sea life from oil spills**.

★ A tiny device designed by Scott Kovaleski and his engineering research team provides a controlled source of radiation, with an on/off switch, that can be used for **portable X-ray machines** and scientific fieldwork.

↑ MU engineer Hao Li and his company, Nanova Biomaterials Inc., recently received approval from the Food and Drug Administration to sell a nanofiber-reinforced dental composite that creates **stronger, longer-lasting fillings** to decrease the number of dental procedures.

★ Biotech startup EternoGen, founded by MU researcher Sheila Grant, is preparing collagen-based **dermal fillers**. The new products could revolutionize the aesthetic medicine market.

↑ The **National Academy of Inventors (NAI)** named Mizzou one of 2015's top 100 worldwide universities granted U.S. utility patents.

★ Seven faculty members are **NAI fellows**, a

distinction bestowed upon academic inventors who have demonstrated innovations that improve quality of life, economic development and the welfare of society. The faculty members are:

Gabor Forgacs, partly for his research using modified ink-jet printers to produce human tissues and organs.

Shubhra Gangopadhyay, for her engineering inventions that make the



process of studying DNA more mobile and portable, giving greater flexibility and faster analysis in the field.

M. Frederick Hawthorne, for creating boron cluster compounds that target tumor cells for drug delivery and imaging.

Jerry Atwood, who studies molecules and how they interact in the physical world. His discoveries have led to new ways of developing drugs more efficiently and better fuel storage capabilities.

Hank Foley, interim chancellor, who helped pioneer the study of nanoporous carbon, or tiny membranes and systems that allow energy sources to pass through or become stored in these structures.

Silvia Jurisson, who has worked for more than three decades developing radioactive materials that provide diagnostics and treatments for cancer.

Krishna Sharma, who studies how peptides in the eye that cause problems such as cataracts also can be beneficial.

Our patents pay off. Gross **licensing income** increased to \$11.8 million in fiscal 2016 from \$7.4 million the previous year, an increase of 59 percent.

MU is one of 16 universities recognized as innovation centers by the Association of Public and



Michael Sam

Land-Grant Universities for exceptional entrepreneurship and workforce development. Areas of success include licensing products to companies, as in the production method of **Beyond Meat's** Chicken-free Strips; developing homegrown companies through faculty collaboration, such as the biotech firm **EternoGen**; and focusing collaboration on strength areas through the **Mizzou Advantage** program.

MU Professor Kattesh Katti was named **India's 2016 Person of the Year**

in Science by *Vijayavani*, the leading daily newspaper in the Indian state of Karnataka. Katti conducts research in nanomedicine and green nanotechnology.

VETERANS

We support military veterans.

To help make higher education more accessible, MU offers a 10 percent **tuition award** for military veterans and personnel, including their spouses and children. The award reduces base tuition

for undergraduate and graduate credits toward a distance degree or certification program through Mizzou Online. Since its founding in 2008, Victory Media has named Mizzou a **Military Friendly School** seven consecutive times. In 2012 center staff members won the **Outstanding Public Service Award** from the Department of Defense. In 2015 student Traci Howells was named 2015 **Air Force Military Writer of the Year**.

DIVERSITY

We welcome Tigers of all stripes.

In 2014 Mizzou football player **Michael Sam** made history as the first openly gay athlete in the NFL.

Marching Mizzou's new leader, **Erin Cooper**, is the SEC's only female athletic band director.

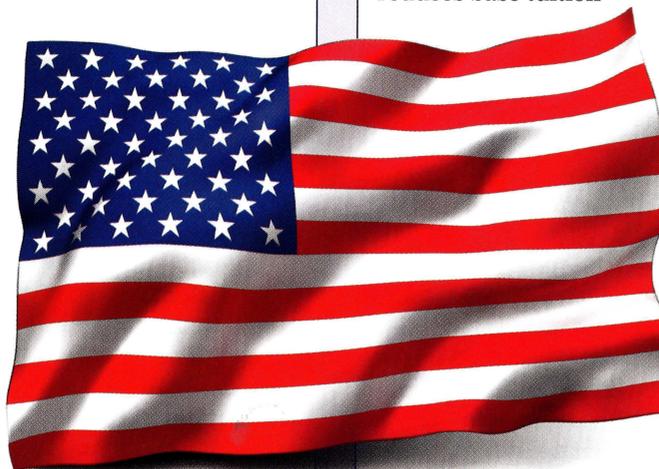


Chart Toppers



MizzouThon



In fall 2015 we welcomed the **most diverse and most accomplished first-year class in the university's history** into the largest student body in our history. Enrollment included 5,567 minority students who made up 17.1 percent of the student body, up from 11.3 percent in 2005. Mizzou consistently has the largest international student enrollment of any Missouri higher education institution.



In 2014, **gender identity** and expression were added to Mizzou's nondiscrimination policy, and in 2015 Residential Life began offering gender-neutral housing and bathrooms.



Student **DeShaunya Ware** was invited to the White House to meet with President Barack Obama and renowned civil rights activists.



ESPN awarded the **2015 Mizzou football team** a Stuart Scott ENSPIRE humanitarian award.

STUDENTS

We have some super-impressive students.

Maria Kalaitzandonakes (*Page 8*) is one of only 54 students across the country selected for a prestigious \$30,000 Truman Scholarship. Since 1987, 17 Tigers have been **Truman Scholars**, most recently Kalaitzandonakes (2016), Emily Waggoner (2015) and Kam Phillips (2011). Several Mizzou students also won Fulbright scholarships (*See page Page 14*).



The **Goldwater Scholarship Foundation**, a top national award for undergraduates who excel in mathematics, natural sciences and engineering, has recognized four MU students.



In 2015, leaders of **MizzouThon**, a student-run fundraising campaign with a 13.1-hour dance marathon, pledged \$1 million over five years to help fund the recent renovation of the Neonatal Intensive Care Unit at Women's and Children's Hospital. In 2016, participants raised a record \$276,000.

NEW ACADEMIC PROGRAMS



We're constantly creating new programs.

The School of Journalism, perennially top-ranked for its hands-on educational approach, now offers undergraduate and graduate degrees in

documentary filmmaking. Reality-TV pioneer Jon Murray, BJ '77, founded the new program with a \$6.7 million gift. Murray created MTV's *The Real World*.

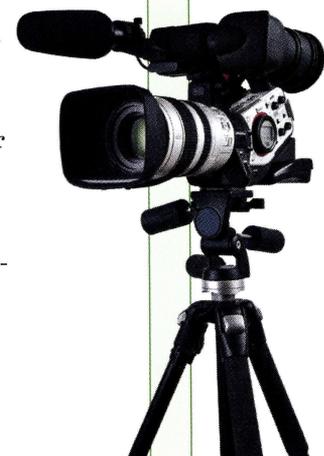


With gifts from the Kinder Foundation totaling \$27 million, the departments of history and political science established the **Kinder Institute for Constitutional Democracy**, which supports the teaching and study of American constitutional and democratic traditions.

SUSTAINABILITY

We're green.

The University of Missouri is one of 76 higher education institutions to receive a **gold rating for its sustainability efforts**. MU and the University of Georgia were the only Southeastern Conference universities to achieve the designation. The 2012 launch of a biomass boiler at Mizzou's power plant and the addition of solar and wind energy technologies are helping achieve campus sustainability goals. In fact, the U.S. Environmental Protection Agency listed MU in 2016 as the nation's No. 1 university for generation of on-site renewable energy.





The college directory WorldWideLearn.com named Mizzou's Bioengineering Department one of "**15 Environmental Programs That Just Might Save the World.**" The department focuses on conserving natural resources, preparing people to adapt to environmental disruptions and repairing some of the impact of climate change.

ATHLETICS

★ **We dominate on the field — and the mat, the court, the track...**

With 32 players from Texas on Mizzou's roster and numerous alumni from the Lone Star State playing in the NFL, the **AT&T Cotton Bowl Classic** in Arlington, Texas, was an appropriate setting for Missouri Coach Gary Pinkel's school-record 102nd victory Jan. 3, 2014. Mizzou senior defensive end Michael Sam sacked Oklahoma State quarterback Clint Chelf with about a minute left in the game, forcing a fumble. Missouri sophomore defensive lineman Shane Ray scooped it up and rumbled 73 yards for a touchdown, clinching the Tigers 41-31 win.

↑ In its second year of Southeastern Conference membership, **Mizzou's undefeated volleyball team** claimed the university's first SEC championship title.

★ Mizzou Wrestler J'den Cox officially secured a spot in the **2016 Summer**



Olympic Games with a first-place finish in the freestyle 86 kg weight class at the World Games Qualifying Tournament in Mongolia. Cox dominated throughout the competition, outscoring the opposition 36-3 in five matches.



★ **Chelsea Thomas** had a Mizzou career record 1,174 strikeout victims and 111 wins. Her fierceness earned her consecutive Big 12 Pitcher of the Year awards, an SEC Pitcher of the Year award, three-time first team All-American honors, and spots on Team USA in 2011 and 2012. She holds Mizzou records for career no-hitters (11), and strikeouts and wins in a season (397 and 32 in 2011).

J'den Cox



Chelsea Thomas

CELEBRATIONS

↑ **We sing happy birthday.**

Mizzou's history of accomplishments produced banner anniversaries. In 2014, the university popped a cork on its **175th anniversary.** The University of Missouri was founded in 1839, when 900 Boone County residents donated land and cash to establish the first public university west of the Mississippi River. Also in 2014, Mizzou partied at the centennial of (1) the business school, which is now home to 4,300 students in accountability, finance, management and marketing programs ranked in the top 10 percent nationally and (2) MU Extension, which brings university research and

services to citizens in such areas as agriculture, community development, human environmental sciences, business development, youth and continuing education.



★ The university celebrated the **centennial of Ellis Library** in 2015. The library, which opened with enough space for 520,000 books, now includes 4.6 million volumes, 1.4 million e-books and many rare treasures, including a leaf of a Gutenberg Bible.



↑ In the realm of Mizzou spirit, the **Golden Girls** dance squad celebrated its 50-year anniversary in 2015, and **Truman** will blow out 30 birthday candles this fall. (See Page 42). **M**