University of Missouri researchers have received patents from many different countries, some of which appear on the back cover of this report. Patents are a common legal method for protecting inventions. MU’s Office of Technology Management & Industry Relations (OTMIR) begins the patenting process on behalf of faculty and staff by filing an application with the U.S. Patent and Trademark Office and, when appropriate, foreign patent offices.

Mizzou is recognized internationally as a higher education leader in technology transfer. In November 2016, OTMIR Director Chris Fender was invited to join the prestigious International Technology Transfer Network, a professional organization that promotes cooperation in technology transfer and innovation around the world. In addition, MU has been among the top 100 universities worldwide for the number of U.S. utility patents granted since 2013 when the National Academy of Inventors and the Intellectual Property Owners Association began compiling the annual ranking.
OUR MOST PRODUCTIVE YEAR YET

University of Missouri inventors and researchers generate new knowledge and original ideas that educate students, benefit citizens and serve the public good. Their work is often the basis for new jobs and emerging businesses that fuel economic growth and prosperity.

The Office of Technology Management & Industry Relations (OTMIR) acts as a conduit between companies seeking innovations, investors in high-tech/high-growth firms, entrepreneurs and MU’s scientific advances.

Mizzou’s intellectual property is the raw material that sparks commercial ventures. OTMIR manages this valuable asset, which we transfer to industry through the negotiation and execution of license agreements. In exchange, our partners pay royalties, create jobs, offer equity shares and provide other benefits for MU, the community and beyond.

This report briefly explains OTMIR’s role and features recent endeavors. I am proud to say that FY2016 was our most productive year yet thanks to our hard-working staff and excellent support from university leaders and industry partners. Some highlights:

- MU received $14.99 million in revenue from more than 40 different technology licenses.
- Faculty submitted 104 new invention disclosures.
- OTMIR executed 42 technology agreements with businesses that licensed the rights to MU inventions.

During the last five years, companies commercializing MU technologies have secured hundreds of millions of dollars in investments and grants to advance their efforts. This shows the confidence investors have in our technologies and the teams that have assembled to commercialize them.

Please read on for more details. We welcome your questions and feedback at 573-882-6013 or tmir@missouri.edu.

Chris Fender, OTMIR Director

CHRIS FENDER has worked in the technology-transfer profession since 2002. He became director of MU’s program in 2009 and currently oversees the work of 16 staff members and seven student assistants. A member of the Association of University Technology Managers, the Licensing Executives Society and the International Technology Transfer Network, Fender is a sought-after speaker at national and international conferences.

Previously, Fender conducted plant-breeding research at Monsanto and Asgrow Seed Co. and worked as an agronomic consultant for Servi-Tech Inc. Fender earned a bachelor’s degree in plant sciences and a master’s degree in agronomy from MU. He is a co-inventor of a patented method used to compare genotypes in soybean tissue samples.
WHAT IS TECHNOLOGY TRANSFER?

According to the Association of University Technology Managers, technology transfer — often called “tech transfer” — is the process of transferring scientific findings from one organization to another for further development and transformation into products, jobs and businesses. The Office of Technology Management & Industry Relations (OTMIR) manages technology transfer functions at MU under the direction of the Office of Research, Graduate Studies and Economic Development (research.missouri.edu).

OTMIR professionals identify, assess and protect inventions and innovations resulting from MU’s world-class research. They also create and facilitate pathways for the transfer of innovations to the marketplace, where research truly benefits society.

Commercializing inventions and research discoveries in partnership with companies, entrepreneurs and investors is central to fulfilling the university’s research and economic development missions. In addition, OTMIR’s partnerships advance MU’s teaching and service missions by providing experiential learning for students, creating jobs, helping companies succeed and by bringing real-world solutions to our local community and beyond.

**DID YOU KNOW?**

OTMIR staff manage more than 800 technologies in different stages of development. Their work makes it possible for OTMIR to generate 100 percent of its own budget and financially support other campus programs. Search tech.missouri.edu for technologies.

OTMIR’s Intellectual Property Licensing Units (IPLUs) are strategically embedded within colleges, schools and research centers that generate the majority of inventions and new technologies.

They are staffed by scientific, business and legal experts based in the following locations:

- **Life Sciences & Agriculture**
  440 Bond Life Sciences Center
  573-882-5016

- **Health Sciences**
  NW503 Health Sciences Center
  573-882-0470

- **Engineering & Physical Sciences**
  223 Engineering North
  573-884-3302

- **Software & Copyright**
  W1039 Lafferre Hall
  573-882-1046

See pages 8-13 for more information about each unit.
Fu-Hung Hsieh, professor of biological engineering and food science, notices that people are seeking healthier foods, including high-protein, vegetable-based options that resemble meat. But the offerings lack meat’s taste, texture and consistency.

Hsieh has an idea for a process to create a soy-based food that will appeal to consumers.

Hsieh and researcher Harold Huff develop a specialized food processing method and determine the right combination of vegetarian ingredients. They create a soy-based food that has the texture and consistency of chicken.

With the help of MU’s Office of Technology Management and Industry Relations, Hsieh and Huff’s innovation is licensed to Savage River Farms and commercialized as Beyond Meat™.

Beyond Meat™ employs more than 200 people and manufactures products that are available in 10,000 stores nationwide. The company recently launched The Beyond Burger™, the world’s first plant-based burger that looks, cooks and tastes like a fresh beef burger. beyondmeat.com
OUR IMPACT AT A GLANCE
MU Office of Technology Management & Industry Relations

FY2016 SYNOPSIS

365 DAYS OF MU RESEARCH CONDUCTED
104 NEW INVENTIONS DISCLOSED
77 U.S. PATENT APPLICATIONS FILED
42 LICENSE & OPTION AGREEMENTS EXECUTED
3 STARTUP COMPANIES CREATED
$14.99 MILLION IN REVENUE GENERATED

NEW INVENTION DISCLOSURES

MU researchers notify the university when they have inventions and innovations. Tech-transfer professionals then assess these disclosures for patentability and marketability.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DAYS CONDUCTED</td>
<td>365</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INVENTIONS</td>
<td></td>
<td>104</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PATENTS</td>
<td>93</td>
<td>82</td>
<td>85</td>
<td>71</td>
<td>104</td>
</tr>
<tr>
<td>OPTIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPANIES</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REVENUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$14.99M</td>
</tr>
</tbody>
</table>

DID YOU KNOW?

The University of Missouri is consistently in the top 25 percent of higher education institutions nationally for total income received from licensed inventions.*

MU generated $46.3 million in licensing income from FY2012 - 16.

U.S. PATENT APPLICATIONS FILED

Mizzou's tech-transfer professionals file U.S. and foreign patents to legally protect inventions and other intellectual property.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>APPLICATIONS</td>
<td>91</td>
<td>97</td>
<td>109</td>
<td>73</td>
<td>77</td>
</tr>
</tbody>
</table>

* Ranking based on annual U.S. Licensing Activity Surveys, Association of University Technology Managers
ACTIVE LICENSE & OPTION AGREEMENTS

Startups and established businesses license the rights to MU inventions via contracts called license and option agreements.

STARTUP COMPANIES CREATED

Startups are new companies that were formed specifically to further develop the technologies licensed from MU.

GROSS LICENSING INCOME

Revenues from commercialization activities are distributed to MU inventors and the university.
Wayne McDaniel, OTMIR Associate Director & Engineering Lead

Since Wayne McDaniel entered the technology transfer field in 2001, he has negotiated licenses for many engineering technologies and has helped faculty startups become successful businesses. He also teaches courses as an adjunct engineering professor at MU.

Wayne performed research in cardiac electrical stimulation for more than 30 years and studied Tasers and other Electronic Control Devices before they were released to the public. He was an investigator on more than $1 million in research funding and is an inventor on two U.S. patents. Wayne earned his bachelor’s degree in biology and a master’s degree and doctorate in electrical engineering with a biomedical focus — all from Mizzou.

K. Brian Matlock, Licensing Associate

Brian Matlock came to OTMIR in 2017 with a wealth of experience as an intellectual property transactions attorney specializing in engineering, material and physical sciences, software and computer science technologies.

Brian worked as a patent attorney for several law firms in California and was corporate director for licensing and intellectual property at Sanmina-Sci. He also directed business development for Astracon in Colorado. Brian received his bachelor’s degree in chemical engineering from MU, an MBA and a master of laws degree from Washington University in St. Louis, and a law degree from the University of the Pacific in Sacramento, Calif.

Brett Maland has handled engineering, software and copyright disclosures since joining OTMIR in 2010.

Previously, Brett was an assistant attorney general at the Missouri Attorney General’s Office. Before that, he worked for the Halliburton Co. in a management program for engineers. Brett began his career as a chemical engineer for Jacobs Engineering, where he worked with Intel, Motorola, Eli Lilly and other clients.

Brett is a registered patent attorney. He earned his bachelor’s degree in chemical engineering from the University of Arizona, an MBA from Arizona State University and his a law degree from MU.
VITAL SIGNS
MU faculty Marilyn Rantz (left) and Marjorie Skubic collaborated across their respective fields of nursing and engineering to pioneer a suite of monitoring technologies for seniors. The innovations, licensed through Foresite Healthcare, use wireless sensors to detect early signs of illness and functional decline by tracking heart and respiratory rates, bed restlessness, gait changes and falls. The St. Louis-based company has received more than $2 million in investments so far. foresitehealthcare.com

REASON TO SMILE
MU engineering faculty Hao Li and Qingsong Yu first applied nanofiber composite technology in the fields of dentistry and orthopedics to develop products with improved strength and biological properties. Their company, Nanova Inc., and its subsidiaries, now have 39 employees and $19 million in investments. Newly developed products include a dental plasma brush, a coronary stent and novel antimicrobial compounds. nanovabio.com

KEEPING IT COOL
ThermAvant Technologies offers thermal solutions to help satellites and other equipment work more efficiently. The firm uses oscillating heat pipes developed by MU Professor Bill Ma, left. ThermAvant International, a subsidiary, produces products based on Ma's phase change heat-transfer technology. The company's newest offering is the LEXO tumbler, which quickly cools hot drinks to an optimal temperature, holding it steady for hours. thermavant.com

SPEEDY SCIENCE
ImpeDx Diagnostics licensed rapid bacteria detection technology developed by MU Professor Shramik Sengupta and his team. The Kansas City company's aim is to reduce the mortality rate of septic patients by greatly compressing the time clinicians must wait for blood culture results. So far, ImpeDx has secured more than $3 million through the U.S. Small Business Innovation Research program. impedx.com

PASSION FOR PATIENTS
Universal Research Solutions has more than 50 employees and locations in Columbia, Kansas City and St. Louis. The company developed the OBERD software system based on the work of former MU researcher Ali Hussam. The system enables physicians and hospitals to collect the data they need to make better patient-care decisions, ultimately improving health outcomes. oberd.com
Staff in OTMIR’s health sciences Intellectual Property Licensing Unit evaluate inventions, negotiate agreements, file patents and arrange legal and business development assistance for inventors from medicine, nursing and health professions and from interdisciplinary initiatives like the university’s Coulter Translational Partnership Program and the Dalton Cardiovascular Research Center.

**BRIAN BUNTAINE**  
**SENIOR LICENSING & BUSINESS DEVELOPMENT ASSOCIATE**

Before joining OTMIR in 2016, Brian Buntaine worked for more than 15 years in the life sciences industry. He began his career as a lab manager at Washington University in St. Louis. In 2003, Brian joined Sigma-Aldrich where he worked as a research and development scientist. After six years, he joined Sigma’s New Ventures team and focused on leveraging technology to create opportunities for the company in new markets. When he left the St. Louis-based business, now a subsidiary of German company Merck KGaA, Brian was a senior manager of licensing and business development in genomics, proteomics, food safety and clinical diagnostics.

Brian earned a bachelor’s degree in biology and an MBA from the University of Missouri-St. Louis and a master’s degree in molecular and cellular biology from Washington University.

**CHARLES HANFORD**  
**LICENSING & BUSINESS DEVELOPMENT ASSISTANT**

Charles Hanford has worked in technology transfer at MU for five years and is a member of the Association of University Technology Managers.

Before working with health sciences inventors in his OTMIR role, Charles was a quality control chemist for Whisk Products Inc., a soap manufacturing company in Wentzville, Mo. His responsibilities included troubleshooting production issues and running gas and liquid chromatography and titrations to ensure the active ingredients in Whisk soaps were within safe ranges.

Charles is licensed to practice law in Missouri and in front of the U.S. Patent and Trademark Office. He earned his bachelor’s degree in chemistry from Truman State University in Kirksville, Mo., and his law degree from Mizzou.
A BURNING QUESTION
Heartburn sufferers find relief from Zegerid, a medicine that combines a proton-pump inhibitor acid blocker with an antacid to treat heartburn and stomach ulcers. Thanks to the work of former MU researcher Jeffrey Phillips, Zegerid does not require an acid-resistant coating, which makes it available in liquid form for those with swallowing difficulties. Since MU licensed the technology to Santarus Inc., sales have exceeded $1.25 billion. In 2013, Salix/Valeant Pharmaceuticals bought Santarus for more than $2.5 billion. salix.com

HOW REJUVENATING
MU Professor Sheila Grant and her colleagues discovered that gold nanoparticles extend the life and stability of collagen. EternoGen Aesthetics, a company that is developing collagen-based products for minimally invasive surgical applications, licensed the technology. Eternogen has secured $8.5 million in funding for European commercialization of Rapid Polymerizing Collagen, the first in a line of new bio-dermal restoration treatments. eternogen.com

BACTERIA SLEUTHING
Nanopore Diagnostics, based in St. Louis, is developing a rapid, 30-minute test for diagnosing bacterial infections, which will help doctors correctly prescribe antibiotics for their patients. The nanopore-based sensor technology pioneered by MU bioengineer Andrew Gu is the underlying platform that allows portable, rapid detection of more than 50 distinct bacterial, viral, fungal and parasitic targets. nanoporedx.com

WIRED FOR HEALTH
MedSocket licensed health information technology was invented by former MU physician Karl Kochendorfer, who sought user-friendly solutions to the complexity of electronic medical records. Located in Columbia, the company is improving the efficiency and quality of patient care through advanced clinical decision support, information-retrieval and knowledge-management technologies. medsocket.com

GENES FOR A CURE
Solid Biosciences is using a gene-delivery technology and animal models from an MU team of researchers led by Professor Dongsheng Duan, left. The company is developing new gene therapies to treat patients with Duchenne muscular dystrophy, which affects about 250,000 people in the U.S. Mizzou researchers have successfully treated dogs with the disease. Human clinical trials began in 2017. solidbio.com
Staff in the life sciences and agriculture OTMIR Intellectual Property Licensing Unit evaluate inventions, negotiate agreements, file patents and arrange legal and business development assistance for inventors from biological sciences, plant sciences, agriculture, natural resources, veterinary medicine and interdisciplinary centers like the Bond Life Sciences Center and other campus departments, centers and institutes.

**SAM BISH**

**SENIOR LICENSING & BUSINESS DEVELOPMENT ASSOCIATE**

Sam Bish has more than nine years of technology transfer experience. Before joining OTMIR, Bish was a senior licensing and patenting manager in the cancer branch of the Office of Technology Transfer at the National Institutes of Health (NIH) in Maryland. Before working for NIH, Sam was a technology transfer specialist in the Technology Transfer Center of the National Cancer Institute, also in Maryland. He is a member of the Association of University Technology Managers and has been a guest columnist for Bio Careers, a professional service for life scientists with doctorates or medical degrees.

Sam earned his bachelor’s degree in microbiology from Duquesne University in Pittsburgh, Pa., and his doctorate in cell biology and molecular genetics from the University of Maryland in College Park.

**NANCY PARKER**

**LICENSING ASSOCIATE, AGRICULTURE**

Nancy Parker spent 25 years with Monsanto Co. before joining MU’s tech-transfer staff. She began her career in product development in North Carolina, Minnesota, Wisconsin, Nebraska and Missouri and was the federal and state regulatory manager for acetanilide chemistry in the U.S. and internationally. Nancy also spent several years in sales and marketing and played a key role in the introduction of BT corn and Roundup Ready® soybeans while managing the Asgrow and Dekalb product lines in central Missouri.

Nancy earned a bachelor’s degree in plant sciences from Mississippi State University, a master’s degree from MU in horticulture and a doctorate from North Carolina State University in weed science with an emphasis in horticultural crops. Her research focused on analyzing residue levels of new post-emergence herbicides in several vegetable crops.
FINE PRINT
MU Professor Gabor Forgacs and his team developed technology, licensed by Organovo, that uses “bioink” made from cells to build living tissues with applications in toxicology, preclinical drug testing and regenerative medicine. Organovo is listed on the NASDAQ Stock Market, has raised nearly $100 million and employs 115 people in California. organovo.com

MAKING ENDS MEAT
Professor Forgacs, left, further developed his Organovo technology for use in culturing meat and creating leather without slaughtering animals. His innovation is licensed to Modern Meadow, a New York company led by CEO Andras Forgacs, right. They have raised more than $50 million in investment funding so far. modernmeadow.com

VIRUS-RESISTANT PIGS
MU scientists Randall Prather, Kevin Wells and Kristin Whitworth have produced several lines of genetically modified pigs, including one resistant to the incurable Porcine Reproductive and Respiratory Syndrome virus. MU has signed an exclusive global licensing deal with the Pig Improvement Co. picgenesis.com

CHEWS LIKE CHICKEN
MU Professor Fu-Hung Hsieh and his team developed a soy-based meat substitute that replicates the taste, texture and appearance of chicken. Their technology is commercialized under the brand Beyond Meat, which now has over 200 employees, sells products in 10,000 stores and has attracted investors, such as Microsoft billionaire Bill Gates, Twitter co-founder Biz Stone and Tyson Foods. beyondmeat.com

PICKING UP SPEED
Scientists George Stewart, Chung-Ho Lin and Brian Thompson discovered a bacterial system that produces enhanced enzymes, proteins and peptides for agricultural products. This discovery is the foundation of Elemental Enzymes, a company located in Columbia and St. Louis that is now partnering with BayerCropScience. elementalenzymes.com

BUN IN THE OVEN
IDEXX Laboratories Inc. provides veterinarians with a broad range of diagnostic products and services. The company uses pregnancy-associated glycoprotein technology developed by Curators Professor Michael Roberts and colleagues for early pregnancy tests used with livestock. idexx.com
U.S. PATENTS ISSUED TO MIZZOU RESEARCHERS, FY2016

9,107,385 ANIMAL KENNEL FOR SCIENTIFIC EXAMINATION — Joan R. Coates, Teresa E. Lever, Mitchell Allen and Laila Al-Khashti

9,119,769 METHOD FOR TRANSFORMING PHARMACEUTICAL CRYSTAL FORMS — Jerry L. Atwood, Jian Tian and Scott John Dalgarno

9,132,175 BACILLUS-BASED DELIVERY SYSTEM AND METHODS OF USE — George C. Stewart, Brian Matthew Thompson and Chung-Ho Lin

9,133,251 BACILLUS BASED DELIVERY SYSTEM AND METHODS OF USE — George C. Stewart and Brian M. Thompson

9,133,519 COMPOSITIONS AND METHODS FOR DIAGNOSIS OF GENETIC SUSCEPTIBILITY, RESISTANCE OR TOLERANCE TO INFECTION BY MYCOBACTERIA AND BOVINE PARATUBERCULOSIS USING PROMOTER VARIANTS OF EDN2 — Holly L. Neibergs, Ricardo Zanella, Jeremy F. Taylor, Zeping Wang, Erik Scruggs, Stephen N. White, Robert Schnabel and Curtis P. Van Tassell

9,151,709 MULTIPLE-PHASE FLOW SYSTEM FOR DETECTING AND ISOLATING SUBSTANCES — Christine Mary O’Brien, Sagar K. Gupta, John Andrew Viator, Shramik Sengupta, Jeff Mosley and Kyle Rood

9,173,693 APPARATUS AND METHOD FOR STERNAL CLOSURE — Wayne C. McDaniel, Joseph T. Walls and Janet L. Rettenmaier

9,181,571 REUSABLE PCR AMPLIFICATION SYSTEM AND METHOD — Venumadhav Korampally, Shubhra Gangopadhyay, Keshab Gangopadhyay, Sheila A. Grant, Steven B. Kleiboeker, Shantanu Bhattacharya and Yuanfang Gao

9,195,891 METHOD OF PREDICTING CROP YIELD LOSS DUE TO N-DEFICIENCY — Peter Clifton Scharf and Victoria Cacnio Hubbard

9,198,365 METHOD TO DEVELOP HIGH OLEIC ACID SOYBEANS USING CONVENTIONAL SOYBEAN BREEDING TECHNIQUES — Kristin D. Bilyeu, James Grover Shannon, Jeong-Dong Lee and Anh Tung Pham

9,204,603 SOYBEAN VARIETY S05-11482 — James Grover Shannon, David Alan Sleper and James Allen Wrather

9,204,606 SOYBEAN VARIETY S06-4649RR — James Grover Shannon
<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Title</th>
<th>Inventors</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,217,002</td>
<td>CLUSTER BORON COMPOUNDS AND USES THEREOF — George R. Kracke,</td>
<td>Yulia Sevryugina and Marion Frederic Hawthorne</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,220,258</td>
<td>TISSUE PRESERVATION SYSTEM — James L. Cook, Clark T. Hung, Eric</td>
<td>Lima and Aaron Stoker</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,242,016</td>
<td>GOLD-COATED LANTHANIDE NANOPARTICLES — John David Robertson,</td>
<td>Mark F. McLaughlin and Paul H. Pevsner</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,266,844</td>
<td>SUPPRESSION OF SARS REPLICATION BY SARS HELICASE INHIBITORS — Stefan</td>
<td>G. Sarafianos, Adeyemi O. Adedeji, Kamlendra Singh</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,314,157</td>
<td>DEVICE TO MEASURE PUPILLARY LIGHT REFLEX IN INFANTS AND TODDLERS</td>
<td>Gang Yao, Judith H. Miles and Dinalankara M.R. Dinalankara</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,329,223</td>
<td>DEEP LEVEL TRANSIENT SPECTROMETER — Daniel E. Montenegro, Jason B.</td>
<td>Rothenberger, Mark A. Prelas, Robert V. Tompson and Annie Tipton</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,338,874</td>
<td>SYSTEMS AND METHODS TO GENERATE A SELF-CONFINED HIGH DENSITY AIR</td>
<td>RANDY D. CURRY</td>
</tr>
<tr>
<td></td>
<td>PLASMA — Randy D. Curry</td>
<td></td>
</tr>
<tr>
<td>9,345,688</td>
<td>KCNQ CHANNELS AS THERAPEUTIC TARGETS — Jianmin Cui, Ira S. Cohen</td>
<td>and Xiaonq Zou</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,351,966</td>
<td>COMPOSITION COMPRISING A COMBINATION OF OMEPRAZOLE AND LANSOPRAZOLE,</td>
<td>AND A BUFFERING AGENT, AND METHODS OF USING SAME — Jeffrey O. Phillips</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9,358,310</td>
<td>EGCG STABILIZED GOLD NANOPARTICLES AND METHOD FOR MAKING SAME —</td>
<td>Kattesh V. Katti, Raghuraman Kannan, Kavita K. Katti, Satish Kumar Nune,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cathy S. Cutler, Charles Caldwell, Ravi Shukla, Nripen Chanda, Ajit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Zambre and Anandhi Upendran</td>
</tr>
<tr>
<td>9,360,429</td>
<td>SERS SUBSTRATES — Hao Li, Mengshi Lin and Qingsong Yu</td>
<td></td>
</tr>
<tr>
<td>9,371,541</td>
<td>GENES IMPLICATED IN RESISTANCE TO SOYBEAN CYST NEMATODE INFECTION</td>
<td>AND METHODS OF THEIR USE — Melissa Goellner Mitchum, Pramod Kaitheri</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kandoth, Greg Yeckel and Nagabhushana Ithal</td>
</tr>
<tr>
<td>9,173,693</td>
<td>APPARATUS &amp; METHOD FOR STERNAL CLOSURE</td>
<td></td>
</tr>
<tr>
<td>9,133,519</td>
<td>COMPOSITIONS &amp; METHODS FOR DIAGNOSIS OF GENETIC SUSCEPTIBILITY,</td>
<td>Resistance or Tolerance to Infection by Mycobacteria &amp; Bovine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paratuberculosis (9,133,519)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DID YOU KNOW?**

Thirty-five percent of issued U.S. patents in MU’s portfolio are licensed and in various stages of the commercialization process.
PROGRAMS & SERVICES

OTMIR professionals Harriet Francis and Amos Angelovici assist MU faculty and staff who collaborate with external partners and those with startup companies.

HARRIET FRANCIS
SENIOR CONTRACTING OFFICER

Harriet Francis is responsible for drafting and processing nondisclosure and material-transfer agreements for the Office of Research, Graduate Studies and Economic Development. Her work enables university researchers to share materials and confidential information with outside collaborators.

Previously, Hattie worked at Van Matre, Harrison and Volkert P.C., specializing in business and environmental law, and was a partner at Abbott, Schappe & Francis LLC. She conducted research focused on farm animal reproduction at Mizzou for seven years before becoming an attorney. Francis earned a bachelor’s degree in animal sciences, a master’s degree in reproductive physiology and a law degree - all from MU.

AMOS ANGELOVICI
ENTREPRENEUR IN RESIDENCE

Amos Angelovici is an entrepreneur and executive with more than 17 years of managerial experience at large and small companies. In his current position, Amos identifies MU-based startups with high-growth potential. He connects them with resources, helps them develop business strategies and mentors inexperienced entrepreneurs. He also evaluates companies seeking university funding.

Amos has worked with over 25 companies as a founder, board member or consultant in finance, media, mobile, IT, health care and clean tech. In 2009, he established Amoraz Ltd., a management company that invests in and provides consulting services for technology-based startups. Amos earned a bachelor’s degree in electrical engineering from Technion, Israel Institute of Technology, and a master’s degree in operational management from Tel Aviv University.

Amos and Hattie are both located at the MU Life Science Business Incubator, 1601 S. Providence Rd., Suite 124, Columbia, MO

OTMIR HELPS FUND ENTERPRISES THAT CULTIVATE SUCCESS

MU’s Coulter Translational Partnership Program accelerates the translation of biomedical innovations into products that improve patient care. The program bridges the gap between academic research and industry by providing engineer-clinician teams with the funding and resources needed to de-risk their technology and attract more funding to continue the commercialization process. coulter.missouri.edu

The Mizzou Venture Mentoring Service is an educational program and consulting service that recruits successful business and community members to provide confidential mentoring to aspiring entrepreneurs within the MU community. The goal is to create a culture that helps Missouri retain the best and brightest entrepreneurial minds. mizzouvms.missouri.edu

MU’s Biodesign and Innovation Program provides an in-depth training experience in health innovation. Fellows from engineering, medicine and business work together in interdisciplinary teams to observe and identify unmet needs and collaboratively create products to solve them. medicine.missouri.edu/biodesign
Industry and university leaders learned about game-changing licensing opportunities and heard from new companies poised to become the “next big thing” at the seventh annual Missouri Tech Expo at the Bond Life Sciences Center, Oct. 13, 2016. Inset, bottom right: Bill Turpin, president and CEO of the Missouri Innovation Center, and Elizabeth Loboa, dean of MU’s College of Engineering, were among the attendees who networked with investors, entrepreneurs and inventors at the event.

DID YOU KNOW?
The Association of Public and Land-Grant Universities designates MU as an “Innovation and Economic Prosperity University” for spurring economic development through innovation, entrepreneurship and workforce development.
“New & young companies are the primary source of job creation in the American economy.”

— Ewing Marion Kauffman Foundation

Since 1995, U.S. universities have formed nearly 11,000 startup companies. 1,012 were launched in 2015.

879 new products based on university innovations entered the marketplace in 2015.

80,000+ U.S. patents have been issued to research institutions in the last 20 years.

UNIVERSITY RESEARCH

generates new knowledge & jobs

yields discoveries with commercial potential

gives students hands-on experience & prepares them to be scientific leaders & innovators

creates a foundation for major advances in health, food, energy, communication & national security

Sources: Association of American Universities, Kauffman Foundation & the Association of University Technology Managers
MIZZOU’S ENTREPRENEURIAL ECOSYSTEM

LEARN THE ROPES

Education
• Academic courses, certificates & entrepreneurship minor
• Allen Angel Capital Education Program
• Center for Intellectual Property & Entrepreneurship
• Entrepreneurship bootcamp for veterans with disabilities
• MU Extension Continuing Education courses

Training
• Missouri Training Institute
• Small Business & Technology Development Centers
• The Entrepreneurship Project for farmers & ranchers

Student Programs
• CLIMB (Collaboration Leadership & Innovation for Missouri Business)
• Entrepreneurship Alliance
• Entrepreneurial Scholars & Interns Program
• MU Student Unions Entrepreneurial Program

START & GROW YOUR BUSINESS

Support Services
• Entrepreneurship Legal Clinic
• Environmental Assistance Center
• International Trade Services
• Mid-America Trade Adjustment Assistance Center
• Missouri Procurement Technical Assistance Centers

Assessment & Coaching
• Grassroots Entrepreneurs
• Missouri Innovation Center
• Mizzou Venture Mentoring Service
• Small Business & Technology Development Centers

Partnerships & Licensing Opportunities
• Office of Technology Management & Industry Relations
• Economic Development office
• Corporate Giving office

INVESTIGATE MORE RESOURCES

Funding
• Allen Angel Capital Education Program
• Coulter Translational Partnership Program
• Missouri Innovation Center Accelerator Fund
• Mizzou Advantage
• Reynolds Journalism Institute Fellowships
• University of Missouri System Fast Track Awards

People Power
• Student interns
• Highly skilled graduates
• 300,000+ alumni network

Research & Development
• College & school collaborations
• Engineering Prototype Development Facility
• Interdisciplinary research centers, including Bond Life Sciences Center, Institute for Clinical and Translational Science and the MU Research Reactor

Facilities
• Life Science Business Incubator
• Core Research Facilities
• Discovery Ridge research park

CONTACT US FOR DETAILS

MU Office of Economic Development: 573-882-3087 or economicdevelopment.missouri.edu
Mid-Missouri community resources: missouriinnovation.com/mid-mo-ecosystem