



MSU INNOVATION CENTER

2018 Annual Report



The **MSU Innovation Center** combines corporate research relationships, technology commercialization, new company startup support, and a portfolio of dedicated business and community partnerships to bring cutting-edge innovation to the marketplace. It's the place where MSU creates commercial value from the innovation engine of the university. Composed of Business CONNECT, MSU Technologies, and Spartan Innovations, the MSU Innovation Center stewards faculty, student, and commercial partner ideas, bringing more than 150 discoveries annually into a pipeline of patents, products, and startup businesses. Together, these solutions help build a diversified economy and jobs for Michigan.

The **MSU Foundation**, established in 1973 as an independent non-profit corporation, fuels economic development initiatives through the financial support of commercialization of cutting-edge technologies invented by MSU faculty, staff, and students. At its core is an extensive program that focuses on the support of research, invention, and entrepreneurship.

MSU Innovation Center + MSU Foundation Staff

Above, left to right: Jamie Binger, Kathleen Chalker, Nate Yenor, Ray DeVito, Weian Ou, Brice Nelson, Jeff Wesley, James Kevin McCurren, Amber Shinn, Gabriela Allum, Janet Foreman, Frank Urban, Lori Fischer, Janelle' Flores, Tom Herlache, Marta Sinclair, Jen Folger, Jeff Smith, Richard Chylla, Jessica Olive, Paul Jaques, Anne DiSante, Reanee Unger, Chris Sell, David Washburn, Brad Shaw, Traci Cannon, Charles Hasemann, Aaryn Richard, Angelia VanWoert, Su Jun Lim, Erik Klink, Susan Bukovcik, Brian Copple, Randy Sheets, Marcia Fittro, Jean Zwier, Kay O'Berry, Jeff Myers, Karen Cronk, Charlene Fortin, Guangming He

An intentional center of gravity for collaboration and commercialization, the MSU Innovation Center merges corporate research engagement, technology transfer, and startup company formation with experiential student entrepreneurship support. We strive to help MSU reach new firsts, delivering novel and practical solutions to the world's problems.

In the pages that follow, you'll see a diverse array of snapshots, from food to cars to medicines, depicting our growth and success over the year in the MSU Innovation Center.

This year marks the 40th anniversary of the "gold standard" of cancer treatment drugs, discovered here at Michigan State University. The discovery of Cisplatin set a strong foundation for future health research at MSU, such as the important advancement in vaccine development described on page 10. Also on the health front, 2018 brought the announcement of a \$450M health care park partnership on campus.

Through the 1,000+ agreements managed by MSU Technologies in 2018, we set into motion horticultural trials, improving food crops around the world (see page 21-22), deployed new facial recognition technology (page 9), and even improved agricultural soil with microbes (page 14).

We supported partnerships with companies of all sizes--from our collaborations with Ford Motor Company on advanced automotive technology to a project with Rim Guard, a small business with new ideas about beets (page 11 & 12).

It's been a record-breaking year of working with students too, helping to grow student endeavors that focus on providing both business and social solutions. Read more about student teams that both participated in the Innovation Celebration and were members of the Conquer Accelerator this year (pages 17-18) and the scholarships and philanthropy that help student startups on pages 19 & 20.



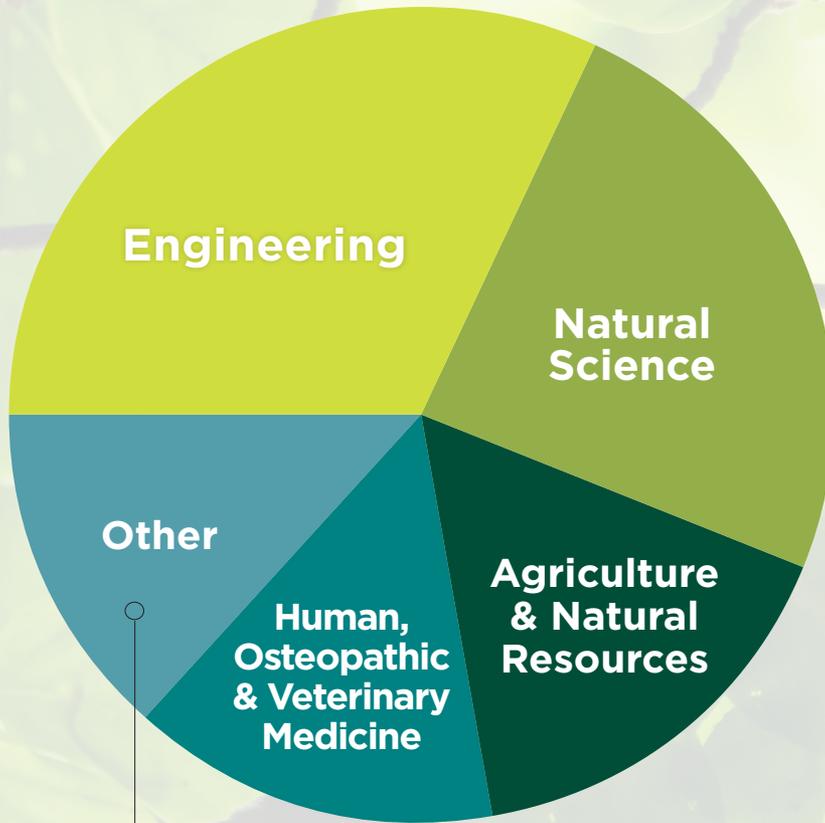
But the most important story is the strong Innovation Center team you see assembled on the facing page. Together with outstanding MSU faculty, they launch university innovations into companies that create jobs, products that help consumers, and solutions that make life better around the world.

I hope you enjoy these selected highlights, and encourage you to watch for great things in the year to come.

A handwritten signature in black ink that reads "Charles A. Hasemann, PhD". The signature is fluid and cursive, with a large initial "C" and "H".

Charles Hasemann, PhD
Assistant Vice President for Innovation
& Economic Development

INVENTION DISCLOSURES BY COLLEGE



Arts & Letters | Communication Arts & Sciences | Education
| Infrastructure Planning & Facilities | Music | National
Superconducting Cyclotron Laboratory | Nursing

\$1.9M

ROYALTIES
DISTRIBUTED
TO INVENTORS &
DEPARTMENTS

**NEW
PATENTS
FILED**

66

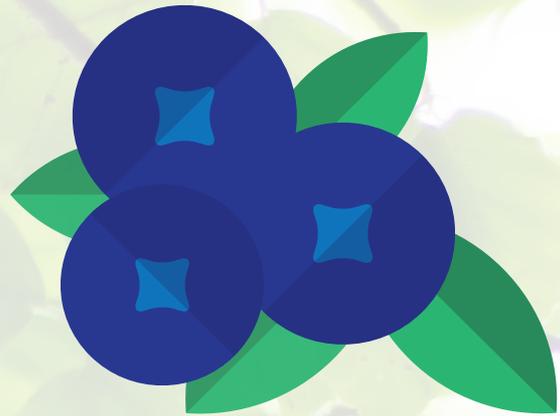
1,004

MTA/CDA
AGREEMENTS
EXECUTED

A teal circle containing a stylized microscope icon. The microscope is dark green with a white eyepiece and a white base. The circle is partially overlapped by a white box containing text.

\$23.8M

CORPORATE GIFT
GRANT & PROJECT
SUPPORT



\$10M

REVENUE FROM
MSU BLUEBERRY
PATENTS

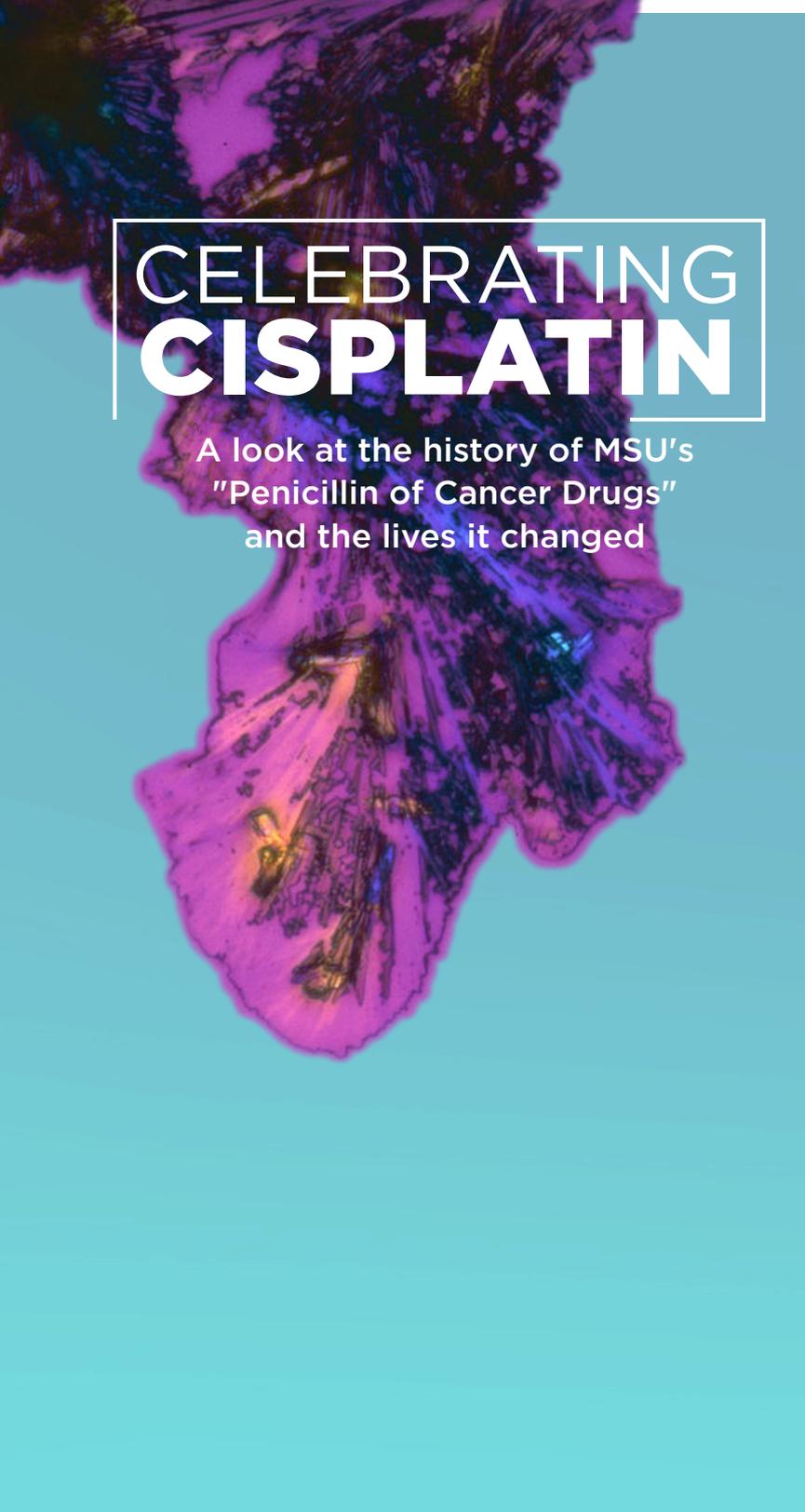
316

STUDENT STARTUP
COMPANIES SERVED
IN THE HATCH

A grey circle containing the number 15 in white. The circle is partially overlapped by a white box containing text.

15

**NEW COMPANIES
LAUNCHED**
FROM CONQUER
ACCELERATOR
SINCE 2016



CELEBRATING CISPLATIN

A look at the history of MSU's
"Penicillin of Cancer Drugs"
and the lives it changed

Discovering the Gold Standard of Cancer Treatments

Cancer doesn't care if you have a gold medal.

Legendary figure skater Scott Hamilton has had it three times. Hamilton, who won gold at the 1984 Winter Olympics, was diagnosed with stage 3 testicular cancer in 1997. It had spread to his stomach.

"When they told me, I was like, 'I want it to be something else,'" shared Hamilton. "But they said, 'No, this is a good one to get, if you had to choose one,' which is kind of crazy. But I'm grateful there was a proven treatment. I know many cancers don't really have one."

That proven treatment was cisplatin.

Discovered at Michigan State University in 1965, the chemical compound prevents the DNA in cancer cells from replicating, confusing them and causing them to die. "The fact that I'm still here 21 years later is kind of awesome."

The Aha Moment

This year marks the 40th anniversary of the FDA's approval of cisplatin as an anti-cancer drug – an event of significance in medicine, to MSU, and to the future of all research done on its campus.

When Dr. Barnett Rosenberg emerged from his lab at MSU in 1965 and proclaimed to a group of grad students, "I've just cured cancer!" it got their attention.

What Rosenberg and his research partner, microbiologist Loretta Van Camp, discovered were the first glimpses of cisplatin – what would later be referred to as the "penicillin of cancer drugs."

The chemical compound cisplatin interferes with the growth of cancer cells, slowing their advance in the body. The drug cisplatin is used to treat many types of cancer, but it's most widely prescribed for testicular, ovarian, bladder, lung and stomach cancers. It has become the gold standard to which many new cancer medicines are compared.

The discovery, patenting and FDA approval of cisplatin was a 13-year process--a rarity in the research world.

"These are home runs that happen very rarely," said Dr. Richard Chylla, executive director of MSU Technologies. "This is one of those handful of success stories where the impact of its discovery is far more important than the money the discovery made," Chylla said. "Cisplatin has had a huge impact on society. It's a cancer workhorse."

Four decades later, cisplatin is making new discoveries possible every day at MSU.

Resources earned from sales of cisplatin and its derivative, carboplatin, fuel lab work and investments by the MSU Foundation, through offices such as MSU Technologies.

There, they support investments in research and economic development initiatives through the commercialization of cutting-edge technologies invented by MSU faculty, staff, and students.

"The fact that I work in an office that is the legacy of something like this is huge," Chylla said. "The royalties allowed us to build capacity, fund research, to do a lot of things. But when we look at the success of our office, we're looking at what kind of impact we have: This discovery has literally saved millions of lives."

In August, MSU convened researchers from around the world for the Cisplatin Celebration, a cancer treatment symposium.

**Learn more at:
chemistry.msu.edu/cisplatin**



Scott Hamilton

Paying it Forward

The 12 weeks of treatment cured Hamilton's testicular cancer.

"I'd tell anyone who would listen that the greatest gifts given are to those who may never know the origin of that gift," he said. "I didn't know MSU developed cisplatin. It's amazing. I can now say thank you for giving my life back."

Incredibly, Hamilton has battled cancer twice more since 1997. Both times he's had brain cancer. Both times he's fought it successfully.

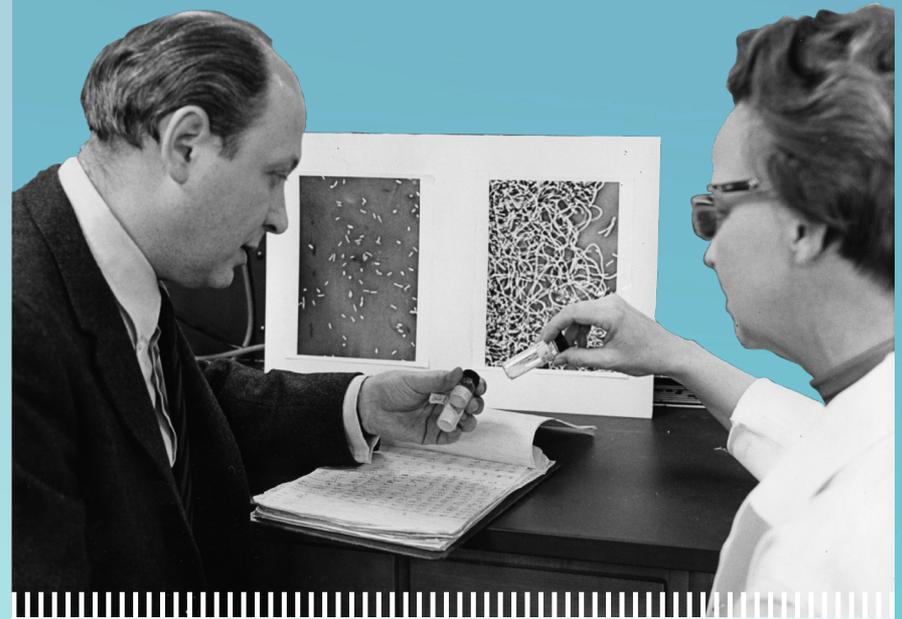
As a result, he's driven to help others diagnosed with cancer in many ways. The Scott Hamilton CARES Foundation supports innovative cancer treatment research, and he's helped create resources for cancer patients and caregivers to learn about chemotherapy drugs and side effects in clear terms.

Hamilton attributes all his work helping cancer patients and survivors to his athletic background, and said if cisplatin hadn't saved his life, he wouldn't have been able to do the work he's doing now.

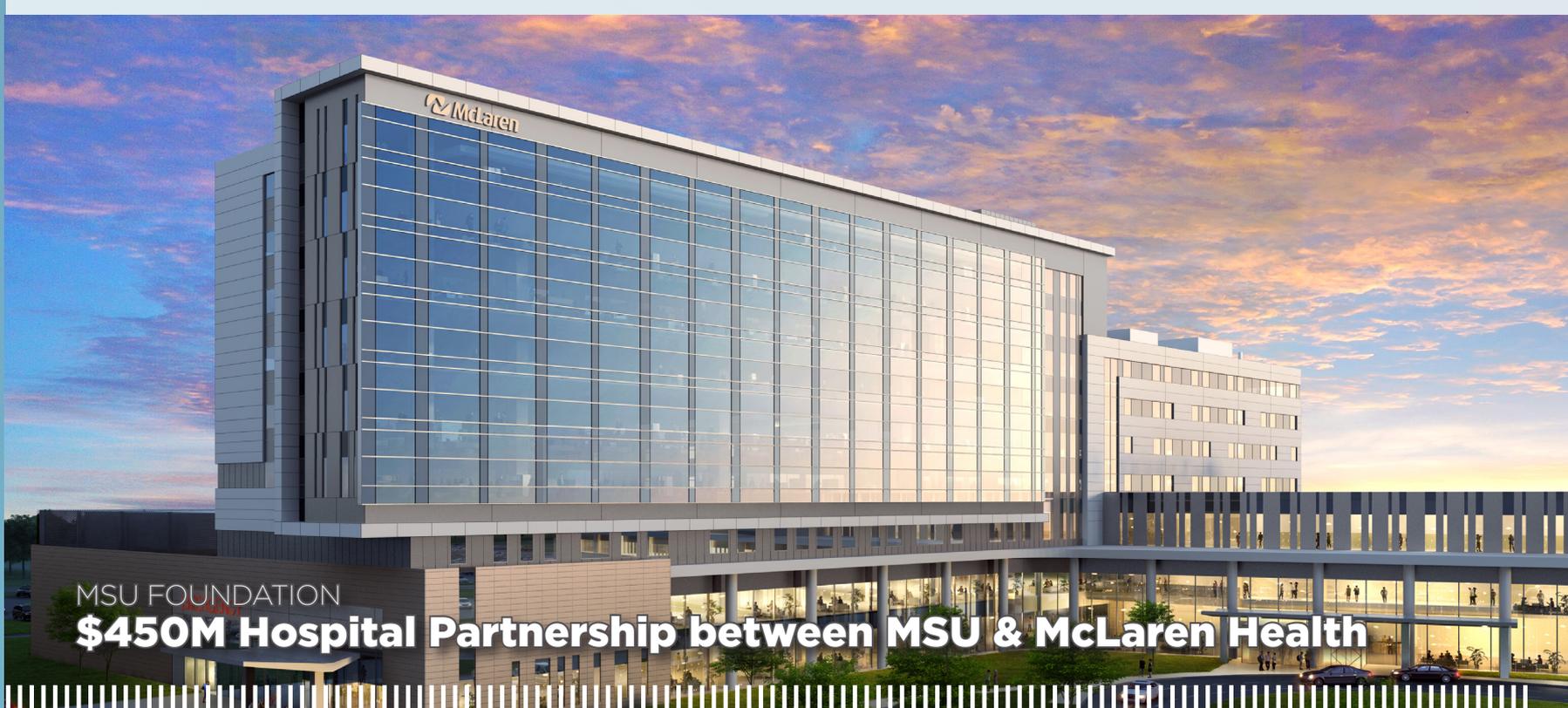
"I'm grateful," he said. "It's great to celebrate this discovery. It's right up there with penicillin, polio vaccines, all these great drugs that have saved lives – and what's happened because of all those lives being saved. It's the butterfly effect."

Adapted from original stories by Robin Miner-Swartz

**Learn more about the discovery of
Cisplatin and success stories at:
innovationcenter.msu.edu/cisplatin**



Dr. Rosenberg and Loretta Van Camp examining data that led to the development of cisplatin.



MSU FOUNDATION

\$450M Hospital Partnership between MSU & McLaren Health

McLaren Health Care launched a new \$450 million campus adjacent to MSU to expand research, education, and clinical services.

“We intend to redesign the traditional hospital and ambulatory care settings to build the safest, most efficient health care campus in the world,” said Brian Brown, Vice President of Marketing, Planning and Public Relations at McLaren Greater Lansing. “This project isn’t just about bricks and mortar; this is about reinventing health care delivery.”

The new health care campus will be developed on land purchased from the MSU Foundation in its University Corporate Research Park and will house a 240-bed, state-of-the-art hospital, cancer center, ambulatory care center, and other facilities. When completed in late 2021, the campus will be home to more than 1,000 physicians, researchers, educators, and other members of the academic and medical team.

MSU and McLaren agreed to collaborate on a number of initiatives to advance the university’s academic, research, and clinical care missions. These include access to data to

accelerate clinical research, recruitment of health care professionals and researchers, support for team-based learning philosophies, cooperation on clinical trials, and collaboration on multiple clinical service lines.

Construction of the campus will create an estimated 2,500 jobs, and McLaren expects to add approximately 80 employees to its workforce after the campus opens in addition to its current 75 full- and part-time openings.

“It is right here where tomorrow’s solutions take root and grow,” said David Washburn, executive director for the Michigan State University Foundation.

“This collaboration between Michigan State University and McLaren is illustrative of how research parks serve the common good in uncommon ways. We are proud to be part of creating dynamic spaces and building relationships that generate value for our community.”

Learn more: tinyurl.com/MSUF-McLaren

TECH TRANSFER

Facial Recognition Technology

Unlocking a phone or computer with facial recognition is fast and easy. It's also ripe for spoofing.

Using a photo, a video or a 3-D mask, people have been able to access devices that weren't theirs.

But thanks to new technology developed by Xiaoming Liu at MSU, that can change.

Liu, assistant professor of computer science and engineering, is looking for ways to prevent recreating people's faces to assume their identity or access private information. It's called face anti-spoofing.

"Face anti-spoofing aims to classify between real human faces and spoof attacks," Liu said.

Liu's technology goes beyond being able to detect if a face is being shown on a 2-D surface, such as paper or a screen, or presented on a 3-D mask.



"His facial recognition technology looks for features that prove you're actually a living person," said Ray DeVito, technology manager for MSU Technologies. "A mask makes you a 3-D object, your nose sticks out from your face when you move, things change relative position, but you're not showing the characteristics of true flesh-and-blood presenting to the camera. This can detect those kinds of things."

A big part of the biometrics work being done at MSU focuses on ways to intercept spoofing methods by those intending to use information nefariously.

To prevent a spoof, researchers must test various methods against their technology. Liu's lab is doing just that with a new framework, or algorithm, they've created.

Because of the speed at which this technology evolves, today's top-of-the-line anti-spoofing technology will be outdated in a few years,

so MSU Technologies is working quickly to move Liu's work to market.

With the help of MSU Technologies, several companies are already testing Liu's technology for a variety of uses.

"As an academic institution, we're good at taking conventional data sets and running all the analysis," DeVito said. "He's done all the work, published it and gotten attention. Now the real test comes out in the real world where the lighting isn't good, all sorts of situations and conditions we didn't anticipate can come up. These companies give us feedback, which is tremendously helpful."

With many discoveries, MSU Technologies does a fair amount of legwork to promote opportunities and generate interest to help companies understand where a technology will have the greatest impact. But with Liu's spoof detection for facial recognition, the value was clear.

"People immediately saw the value in this and started coming to us," DeVito said. "You love when that happens."

Cell Line for Human & Animal Vaccine Production

In a flu pandemic, spending six to nine months developing a vaccine can mean lost lives.

Imagine a time when a vaccine could be developed in a matter of days. Paul Coussens, Patty S.D. Weber and Kristen Pabst-Smith have made that a reality.

The researchers developed and successfully tested an immortalized chick fibroblast cell line to efficiently and cost-effectively grow human and animal viruses for vaccines in a serum-free environment. Eliminating eggs from vaccine development saves resources, money and, perhaps most importantly, time.

“Many vaccines are made by taking embryo tissue out of chicken eggs, injecting them with the virus and incubating them so the viruses replicate,” said Tom Herlache, assistant director for commercialization for MSU Technologies. “The vaccine virus propagates in the chicken embryos. It’s a very labor-intensive process, and it takes about two eggs to make every dose of vaccine.”

Big picture: Making a million vaccine doses requires two million eggs. Or, as Herlache said with a grin, “You have to break a few eggs to make a vaccine.”

Dad jokes aside, that’s the reality. “There’s a whole front-end industry supplying eggs to vaccine manufacturers,” Herlache said. “It’s labor-intensive and it creates a lot of waste.”

Rather than work with eggs, Coussens and his team focused on an immortal chick cell line – a line of cells that continue to grow outside of the egg in a serum-free environment.

The immortal cells can be frozen, thawed and grown in a culture forever, eliminating the time and money needed for egg-based production.

“This makes it much more cost-effective for companies to use a cell line like ours for vaccine production,” Coussens said.

The technology is first being tested and used to develop avian vaccines. Bird flu and other viruses can have a significant, devastating impact on chicken and turkey coops, which then

affects food prices. It’s also being investigated for human flu vaccines.

The CDC looks to China to predict which strains of human influenza will reach the U.S. during flu season. But making predictions months ahead of time is an imperfect process.

“Sometimes, what’s emerging in China dies out and something else takes off, and that’s what comes over and creates a pandemic here,” Herlache said. “And we’re stuck because we made all this vaccine which is ultimately not effective, and we need to switch it. But that process takes months.”

This PBS-12SF serum-free process will help adjust the vaccine cocktail to combat the evolution of influenza strains in a short period of time. It also benefits people with egg allergies – there’s no egg albumin for them to react to in vaccines made with PBS-12SF cells.

Coussens came to Michigan State in the 1980s and began working on poultry viruses. It’s taken decades of research – and funding – to reach this point. That’s the value of working in a university setting, he said.

“Working with MSU Technologies to move this to market has been very valuable,” Coussens said. “Their investment in the work being done here makes a real difference in agriculture and health sciences.”

The patent for Immortalized Chick Fibroblast Cell Line for Production of Human and Veterinary Vaccines was issued in 2014. The tech was licensed by two major animal vaccine manufacturers and is in testing at a third, and vaccines made using PBS-12SF cells likely could reach the market by the end of 2019.

MSU PARTNERSHIPS

Ford and MSU Expand R&D Partnership

Automotive Innovation

Ford Motor Co. and MSU expanded their partnership to allow even more researchers to collaborate on projects that showcase university expertise and create new features and improvements to meet market demand.

Investing in their existing research and development partnership, this expanded collaborative alliance is designed to develop a wide array of technologies for automobiles, focusing on sensors, lightweight materials, and autonomous technology.

Ford chose to grow their partnership with MSU based on the number of previous successful projects they have worked on together. Academic and industrial R&D partnerships have a proven internal process to evolve, refine and implement successful collaborative results.

“This is a great example of how MSU partnerships can both advance research and help develop innovative global solutions,” said Charles Hasemann, assistant vice president for innovation and economic development at the MSU Innovation Center.

“Research collaborations like this one with Ford Motor Co. allow companies and MSU to share resources and expertise to solve “real-world” problems. The novel outcomes from these collaborations advance knowledge and understanding, while also achieving a positive economic outcome for the company and for Michigan. We’re quite pleased that MSU and Ford are partnering on a suite of innovative new projects,” he said.

Ford employs more than 200,000 people at 62 plants that produce 6.65 million vehicles each year, leading to \$152 billion in annual sales. One of the largest automobile producers globally, Ford officials hope MSU researchers can help further develop the automaker’s technical capabilities as it continues to strengthen its core automotive business while developing emerging opportunities and new mobility solutions.



MSU PARTNERSHIPS

Rim Guard Partners with MSU on Creative Ag and Industry Solutions

Based in Wyoming, Michigan, Rim Guard provides cost-effective and non-corrosive ballast solutions, using Michigan beet juice. Farmers and industry utilize ballasts to weigh down tires on tractors, optimizing balance and stability, improving lifting performance, and maximizing pulling power.

Rim Guard ballast also protects wheels from corrosion caused by most commercially-available liquid ballasts. It is non-toxic and biodegradable, freeze-resistant to -35 degrees Fahrenheit, up to 75% less expensive, and effective with or without tubes. This ballast technology is advanced by an ongoing partnership with Rim Guard, MSU and the Michigan Corporate Relations Network (MCRN), combining expertise from across Michigan.

To help with further research at Rim Guard, the MCRN Small Company Innovation Program (SCIP) awarded the company a 50/50 research grant totaling \$80,000 for a project in partnership with MSU, which will be supervised by Professor Yan Liu.

Small companies such as Rim Guard often face challenges meeting research and development needs. SCIP grants help companies commercialize faster and connect them with universities, increasing the number of collaborative efforts across Michigan, and accelerating companies' positive economic impact.

The first statewide network in the country to provide a critical and unique tool for business growth and attraction, MCRN began in 2011 as collaboration between six of Michigan's leading research universities. MCRN is supported by the Michigan Economic Development Corporation and the Michigan Strategic Fund.



MSU STARTUP SPOTLIGHT

iHydrate

IoT: Smart bottle technology

HydrateMe focuses on creating a hydration solution designed to accommodate many different lifestyles.

This technology allows for hydration tracking on various bottle products across a broad spectrum of users. Integrated into a compact and convenient band, this hydration tracking pairs directly with smartphones.

Developed at MSU, and licensed to HydrateME, LLC, this technology tracks liquid consumption levels by capturing a unique sip signature. By combining specific algorithms with an accelerometer, the band identifies how much liquid is ingested with each sip. This is all done with zero contact with the liquid inside, creating a more hygienic solution than many of the products on the market.



Most users don't use one bottle all the time, and this product allows users to track their progress on all their bottles. The band features magnetic fastening that allows users to quickly swap bottles.

Information is displayed to users via both a smartphone app and LED progress array on the band. They can track progress at both a micro and macro level. For a greater understanding of how hydration impacts health from day to day, the app also allows user to input track their daily hunger, mental acuity, and energy levels.

Hydration plays a large role in general well-being, so it's useful to for everyone to track, not just athletes. In collaboration with RKS Design, an evaluation of the current market identified missing support for general health users. These users may not be highly active but focus on hydration to increase health benefits.

MSU STARTUP SPOTLIGHT

Acela Biotek

Microbial Technology Solutions

More than 25 percent of the world's agricultural land is depleted and degraded, greatly impacting the world's economy and ability to produce enough food for a growing population.

Current agricultural practices are unable to keep pace with this problem, resulting in a need for sustainable solutions that can increase crop yields, utilize less water, and protect soil.

Acela Biotek is a microbial technology company seeking to solve this and many other global challenges by utilizing naturally occurring microorganisms. They licensed LALITHA 21, a technology developed at MSU, that creates a superior soil environment through a proprietary mixture of microorganisms. This reduces the need for harmful chemicals, increases yields, revitalizing soil to improve plant growth and ecosystem health.

Dr. Chilekampalli Adinarayana Reddy, MSU professor of microbiology and molecular genetics, and Dr. Lalithakumari Janarthanam, a distinguished microbiologist and plant pathologist for whom the technology is named, invented the technology

with the goal to restore agricultural soils that have been depleted of their microbe population because of farming practices.

LALITHA 21's stable consortium of microbe strains, which works in several soil conditions and on numerous crop plants, is unique for the selection process used to build it. Drs. Reddy and Janarthanam isolated beneficial bacteria, fungi and other soil microbes, then combined selected groups of organisms and identified a formulation that significantly increased plant growth and productivity.

Historically, similar technologies have been sold as single, or mixtures of up to five, nitrogen-fixing strains. LALITHA 21 contains up to 20 microbial strains that increase nitrogen availability, solubilize minerals important for plant growth, improve retention of moisture and nutrients, and enhance plants' ability to cope with environmental stress.

Dr. Janarthanam is chief technology officer of Acela Biotek in Davis, California. There, Dr. Janarthanam and her team continue to develop and improve the technology in hopes of creating a formula suitable for all crops and soil conditions.

acelabiotek.com



2018 Innovation Celebration

Held high above Spartan Stadium, the MSU Innovation Celebration is an annual event uniting university and community to honor MSU innovators and showcase some of the many inventions and innovations developed at MSU.

Technologies and student startups on display represent discoveries from a diverse range of academic fields and potential commercial applications. Some are available for evaluation by interested commercial partners or have already been licensed by companies, while others are in early stages of development, but all represent faculty and student excellence and innovation taking place across campus, illustrating the ways MSU is driving economic development in Michigan and beyond.

TECHNOLOGIES & STARTUPS ON DISPLAY

Safoi Babana-Hampton

Hmong Memory at the Crossroads & Growing up Hmong at the Crossroads

Thomas Bieler

Advanced Brazing for Joining and Circuit Applications

Federica Brandizzi

Single Modifying Gene to Boost Crop Productivity

Loïc Déjardin

Minimally Invasive Surgical Stabilizing System

Ranjan Mukherjee, Srinivas Kavuturu

Pancreatic Softness Index for Improved Surgical Outcomes

Muhammad Rabnawaz

Self-Cleaning Coatings

Chris Waters

Method for Eradicating Bacterial Biofilms

Mi Zhang

Smart Devices for Health Care & Wellbeing

MSU Startups

HydrateMe

PhotosynQ

CiBO Technologies

XG Sciences

Student Startups

Land Grant Goods

Ninety6

Sidekick

Smart Staffing

Vade

Vloggle



Christoph Benning & John Ohlrogge

INNOVATORS OF THE YEAR

MSU Foundation Professor and Director of the Plant Research Lab; Professor Emeritus of Plant Biology and University Distinguished Professor

The 2018 Innovators of the Year are Christoph Benning and John Ohlrogge, for their work in understanding how plants accumulate oil, via WRINKLED1 genetic research. WRINKLED1 is the name for a ubiquitous regulator in oil-accumulating plant tissues. Many plant species accumulate vegetable oil in their seeds as a major storage component, which provides carbon and energy for seedling development. These oils are a staple in the human diet and are increasingly important as renewable feed stocks for industry.



Lawrence T. Drzal

TECH TRANSFER ACHIEVEMENT AWARD

University Distinguished Professor of Chemical Engineering and Materials Science

An educator, mentor and leader at MSU for more than 20 years, Lawrence Drzal's composite materials research is primarily in adhesion and the fiber-matrix interphase in polymer matrix composite materials reinforced with carbon, glass, polymeric and bio-based fibers and in multifunctional composites in which graphene nanoplatelets, cellulose nanofibers, and other nanoparticles added to the fiber-matrix interphase. Applications for his expertise range from automotive and construction industries to fuel cells, batteries, and electronics.



David Closs

CORPORATE CONNECTOR

John H. McConnell Chair Professor of Business Administration in the Department of Supply Chain Management

David Closs has been extensively involved in the development and application of computer models and information systems for logistics operations and planning. The computer models have included applications for location analysis, inventory management, forecasting, and routing. His experience focuses on the logistics related issues in the consumer products, medical and pharmaceutical products and parts industries. Dr. Closs actively participates in logistics executive development seminars and has presented sessions on five continents.



Donald Morelli

INNOVATION OF THE YEAR

Chair of Department of Chemical Engineering and Materials Science

Donald Morelli's work in thermoelectric materials converts waste heat sources into electricity. While they have been studied for decades, only a few have reached commercial applications because of their low efficiency, high cost, and use of rare elements. This process is the first step in creating a low-cost, widespread technology for converting heat to electricity.

STUDENT STARTUP +
2018 CONQUER ACCELERATOR

AgileCare Solutions

Bailey Paxton, David Ackley

Founded in 2017, AgileCare automates the process of matching caregivers with clients for private-duty home health care companies.

Due to its local and personal nature, the home care industry is fragmented. Care is personal, and clients want to work with caregivers who are in their community and they will get along with.

The AgileCare tool makes caregiver staffing simple. Staffing recommendations are based on client needs, caregiver background, location, continuity, and personality.

With an easy-to-use interface, the AgileCare software makes scheduling more efficient, improving the quality of matches for the best in-home care available for clients and caregivers.

This software can reduce office overhead by 25-50 percent, which can save owners \$45,000-\$90,000 a year while maximizing revenue, minimizing scheduling errors, and improving caregiver retention and customer satisfaction.

useagilecare.com





STUDENT STARTUP + 2018 CONQUER ACCELERATOR

Vloggle

David Girjis, Christian Marougi, Michael Jajou

Vloggle is a mobile app that allows users to create beautiful videos. With Vloggle, users get to choose the clips they want to combine, apply precision edits, and seamlessly add animations.

According to The Global Web Index, 44 percent of internet users watch vlogs (video blogs) each month.

Although vlogging is incredibly popular, editing video content can be difficult and time-consuming. It takes an average of 4-5 hours to create a vlog, which discourages many people.

The Vloggle social media app empowers vloggers, giving them the control to quickly record, edit, share, and connect with their friends. It's as easy as capture, edit, share.

vloggleapp.com

STUDENT STARTUP + 2018 CONQUER ACCELERATOR

Sidekick

Kayla Schindler, Erin Rose

Sidekick is a next-generation mobile platform providing immersive prevention education and on-demand tools to help young people combat sexual violence.

According to the Bureau of Justice Statistics, nearly one in five women and one in 16 men will experience sexual assault while attending college. Sexual violence is the leading reason freshman women drop out of school.

Survivors of sexual assault have a higher chance of suffering Post-Traumatic Stress Disorder (PTSD), developing substance abuse problems, attempting suicide, and being assaulted again.

In May 2018, Sidekick began pilot programs with students at both Michigan State University and Duke University.

mysidekickapp.io



ENTREPRENEURSHIP

Give Green Day + Student Commercial Kitchen

MSU Entrepreneurship and the MSU Innovation Center joined the University-wide Give Green Day campaign on November 28, 2017, promoting and celebrating entrepreneurship by raising funds for the MSU Student Commercial Kitchen Incubator.

Located within the Student Organic Farm on MSU's campus, the kitchen incubator is a nonprofit, student-led facility designed to help student entrepreneurs and startups by providing a place to process, create, package and sell local organic food products.



With a goal of \$4,000, 2017's Give Green Day raised over \$5,100 and engaged more than 80 unique donors.

Funds were used to help upgrade and replace equipment in the commercial kitchen facility, offering new and dynamic resources to food-based student startups wishing to accelerate their business. These improvements increased capacity for production and packaging.

Among the student startups to benefit from the upgrades is Land Grant Goods, which uses the kitchen to process and package honey, tea, and jam products.

This success capped a record-breaking year for entrepreneurship at MSU, which saw more than 500 students enroll in the Entrepreneurship Minor and more than 200 student teams in the MSU Hatch startup incubator.

MSU's six entrepreneurship-related organizations experienced rapid growth and participation as well.

The James Ian Gray Scholarship in Entrepreneurial Studies

The James Ian Gray Scholarship in Entrepreneurial Studies is given to one innovative student each year, based on their contributions to entrepreneurship at MSU. The fund supports current MSU students studying entrepreneurship and experiencing the risks that accompany starting a company.

The MSU Innovation Center is proud to award this \$10,000 scholarship to Malik Jackson, a third-year chemical engineering student with a minor in entrepreneurship.

Jackson's start-up company, Trinhydral, is dedicated to creating products that help provide access to clean water, especially to underdeveloped and underprivileged areas.



Jackson also serves as the vice president of OptimizeMSU, a social entrepreneurship and innovation club that helps incubate student-led projects and ideas.

Dr. Ian Gray is MSU's past vice president for research and graduate studies, and is one of the founding leaders behind the creation of the MSU Innovation Center.

Built with the generous donation of Dr. Donald C. Anderson, a physician, pediatric cancer researcher, drug discoverer, and entrepreneur, this gift encourages and supports promising students who choose to pursue entrepreneurship as part of their undergraduate experience.

"We are glad to support Malik's education at MSU through Don's generosity. He is a leader amongst his peers and shows passion for entrepreneurship as well as his education as an undergraduate student," said Charles Hasemann, assistant vice president for innovation & economic development, and leader of the MSU Innovation Center.

Students chosen for the scholarship participate in coursework as part of the undergraduate minor in entrepreneurship, are engaged with the Innovation Center, utilize opportunities to interact with commercial entities, and experience risk-taking to expand entrepreneurial efforts, all while completing a degree.

HORTICULTURE

Trialing Programs at MSU: The Path from Lab to Table

With thousands of varieties in assessment and in trials at MSU, we see and share the newest cultivars of everything from apples to zinnias.

When it comes to food plants, new cultivars must meet an extensive list of criteria that varies by species, such as propagation, ease of processing, storage times, and more. To help get the right varieties with the right blend of attributes to market quickly, MSU Technologies partners with growers and researchers on an extensive series of trials around the world, based on the crop variety and industry. Dozens of food plants are trialed, with the most complex and prolific programs being blueberries, potatoes, dry beans, and wheat.

MSU works with nurseries interested in early looks at promising blueberry plants for propagation. Their experiences

generate data to help with decisions about which new plants make it to market. This input helps speed up new blueberry plant releases to market by up to two years. Trialing partners in the program get first exclusive access to plants and a head start on licensing new varieties. It's a process that helps both sides and, ultimately, the consumer.

MSU also plays a support role in industry-supported potato trialing programs. Led by the U.S. Potato Board and the National Chip Processors Trials (NCPT), MSU researchers work with commercial growers to determine which potatoes go to NCPT trials, which results in buy-in from chip producers.

Of the nearly 1,000 annual early potato tests, about





a dozen varieties have the right final potato characteristics to make it to grower trials. They are then planted and assessed for several years. These assessments are conducted by growers and seed producers, identified through grower organizations associated with MSU and the Michigan Potato Industry Committee. Once the trials are complete, MSU Technologies facilitates licensing varieties to growers, usually one or two varieties of that dozen being assessed. Throughout the trials, MSU Technologies coordinates transfer agreements to protect inventors by limiting use and prohibiting distribution.

This process connects the end producers, in this case, potato chip manufacturers, to growers and the researchers breeding potatoes that store well, won't bruise easily and both look and taste delicious when fried.

Revenue from licenses supports breeding programs and facilitates future research.

Similar to potatoes, the process for trialing wheat and dry beans narrows down one or two superior varieties from a pool of nearly 1,000. Licenses go from MSU to the state seed agencies, which then sub-license the seeds for trial to farmers.

Each new crop has different stakeholders and pathways to market. MSU Technologies works within each of these steps via nurseries, growers, and distributors, to help move research to market and get improved varieties onto dinner tables around the world.



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