



 MICHIGAN STATE UNIVERSITY
INNOVATION CENTER

2020

ANNUAL

REPORT

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Dear friends of the MSU Innovation Center,

We hope our 2020 Annual Report finds you all healthy and well. Without a doubt, 2020 has been challenging: a worldwide pandemic, social injustice unrest, an economic downturn, and so much more. We're living and working in a different world today, affecting us all in so many different ways.

When we left our campus offices March 16, I never imagined we'd still be working from home these seven months later. We all miss the day-to-day human contact with colleagues that we simply took for granted. But despite the challenges, MSU is an organization with strength and resilience, and the staff of the MSU Innovation Center personify those virtues.

Collectively, we are Spartan strong. Our staff has been amazingly productive working in their new home offices; connecting with business and community partners, our faculty and student researchers, and each other — developing and advancing key Innovation Center projects and programs, hardly missing a beat.

We've found new ways to be productive through technology. The relationships with our stakeholders, old and new, easily defeat the barriers of social distancing. We've made significant strides as we managed our way through this uncertain year.

A recent note from President Samuel L. Stanley Jr., M.D., said this:

“Even in the most challenging of times, like we find ourselves in today as we face the coronavirus and its numerous impacts on our institution, we must continue to plan for the future. I believe these changes will position us well to become more efficient and reach our full potential as we tackle our current challenges and prepare to seize new opportunities. Together we will identify and implement innovative and creative ways to achieve our mission as a world-class land-grant research university.”



I couldn't agree more. This 2020 annual report highlights the importance of collaboration in our everyday work. By working together, staying focused and committed, we accomplish great things. I am proud to share a few stories of our success.

Stay well, and please do keep in touch — even if only virtually, for now.

A handwritten signature in black ink that reads "Charles A. Hasemann, Ph.D." The signature is fluid and cursive.

Charles A. Hasemann, Ph.D.
Assistant Vice President for Innovation
and Economic Development





Innovation Celebration

The tenth annual MSU Innovation Celebration looked a little different in 2020.

In order to present the well-deserved awards to our distinguished faculty, Innovation Center staff planned a short masked up and socially distanced presentation outside Beaumont Tower on Oct. 30.

The MSU Innovation Celebration is an annual event held in honor of MSU researchers who reported an invention, licensed a technology or were awarded patents during the academic year, recognizing outstanding achievements in technology transfer and sponsored research.

To read more about the 2020 Innovation Celebration awardees, please visit our [Innovation Center 2020 event page](#), which includes stories and videos.





Building a Spartan Presence, One Program at a Time

Grand Rapids is Michigan's second largest city with a population of more than 200,000 and about a million in the metro area. Located on the banks of the Grand River that winds its way through the vibrant downtown, there's an abundance of entrepreneurs, researchers and investors in the region.

About 75 miles to the east, the Red Cedar River runs through Michigan State University and serves as a tributary to the Grand, systematically connecting the two cities.

With its fast-growing presence in the bustling Grand Rapids area, the MSU Innovation Center has become a powerful current — a connecting point between the university's entrepreneurial and research resources and the startups that are helping stimulate Michigan's economy.

Progressive programs and a strong collaboration with the MSU Foundation and its subsidiaries is also sparking entrepreneurship in the region and throughout the state.

"West Michigan already has an appreciation for the great work that is completed from MSU's agriculture resources, medical school and medical research facilities," said Kevin McCurren, commercialization program director for the Innovation Center. "I want to make west Michigan aware of the many resources that rest of the university has to share."

As the Innovation Center's full-time Grand Rapids resident, McCurren has more than 25 years of corporate and entrepreneurial experience. He has an office inside the Grand Rapids Research Center where he regularly engages with MSU researchers focused on advancing the university's efforts in improving human health.

"We enjoy working with startup companies because they are what is changing Michigan and the world," he said. "They are also job creators. The majority of new jobs are created by companies less than 10 years old. We also enjoy connecting existing corporations and new startups to the many resources at MSU and the MSU Foundation, and ultimately helping MSU research find a way to serve the world."

Building a Spartan Presence, One Program at a Time *continued*

Many Roles, Collaborative Purpose

McCurren has two distinct roles for MSU in west Michigan. Half of his time is devoted to MSU Business Connect, where he works to pair the region's businesses to the research and talent assets of MSU.

For the other half, he serves as the director of Gateway Grand Rapids. In conjunction with the City of Grand Rapids and its Local District Financing Authority, Gateway is funded by the Michigan Strategic Fund and managed by the Michigan Economic Development Corporation (MEDC) Entrepreneurship and Innovation division.

The Gateway program consults with early stage entrepreneurs and helps develop capital plans. Through his work, McCurren connects corporations and organizations with MSU resources in East Lansing.

Gateway helps bridge early stage companies with MEDC programs. One major initiative McCurren oversees is managing \$150,000 in grants to help support nine early-stage, high-tech, high-growth companies. The Business Accelerator grants are supported through MEDC's Small Business Development Center.

In the past 10 months, McCurren and his team have also helped 56 Grand Rapids-based early-stage companies by developing strategies, creating or refining business plans and acquiring funds. Through this work, engagement between MSU and corporations and organizations in Grand Rapids has increased markedly.

Building With MSU Foundation and its Subsidiaries

The recent Grand Rapids and Red Cedar Ventures Virtual Pitch event featured a dozen companies trying to raise initial or seed funds. Red Cedar Ventures is a

subsidiary of the MSU Foundation and one of the few and most active pre-seed funds in Michigan.

"Our organizations held a virtual pitch event for startups to engage with angel groups and institutional investors in Michigan," McCurren explained. "Many were new to the early stage investors. The objective was to introduce companies to investors with the goal of identifying funding options and put them on the radar as companies to watch."

Participating companies ranged from one that created an app utilizing augmented reality for construction sites to a cybersecurity platform that uses artificial intelligence to address cybersecurity needs.

McCurren also collaborates with the Spartan Innovations' Conquer Accelerator program that helps growing companies overcome challenges, providing \$20,000 in funding, and 10 weeks of hands-on mentorship and training. Part of the MSU Innovation Center, Spartan Innovations is the venture creation arm of the MSU Foundation.

The East Lansing-based Conquer program has successfully run for five years and recently launched its first Grand Rapids 2020 cohort consisting of teams: Airway Innovations, Building Catalyst, FirstIgnite, Lawnbot, and The Patient Company. In addition, the more than 25 companies not selected to the Conquer Accelerator are receiving some support and follow up from the Small Business Development Center, Gateway Grand Rapids and Spartan Innovations.

"Conquer Accelerator helps entrepreneurs successfully build and launch a viable company," said Thomas Stewart, Conquer Accelerator program manager. "I think the Grand Rapids cohort is a great representation of the talent in the region, and I'm looking forward to helping push these businesses to the next level."

Building a Spartan Presence, One Program at a Time *continued*

Conquer Accelerator also launched its first internship program, Conquer Accelerator Diversity in Entrepreneurship (CADE), the first such program for Spartan Innovations. Frank Urban, director of Venture Creation for Spartan Innovations, noted the program aims to increase diversity within the entrepreneurial community by hiring young professionals from various ethnicities and backgrounds to collaborate with selected teams.

“The CADE program is a step toward increasing diversity and inclusion in the entrepreneurial ecosystem,” Urban said. “We’re very excited to launch this effort.”

Opportunities to collaborate with the MSU Foundation and its subsidiaries of Red Cedar Ventures, Spartan Innovations and the recent new Pre-Seed Fund Michigan Rise are valuable to the expansion of MSU support in Grand Rapids.

“With the Conquer Accelerator program now in place in Grand Rapids, the shared offices of all these entities in the MSU Research Center, and the programing, funding and teams of these entities, this will contribute to a lot of momentum in Grand Rapids to help grow entrepreneurship in the coming years,” said Jeff Wesley, executive director of Michigan Rise, Red Cedar Ventures and Spartan Innovations.

Opportunities on the Horizon

With the opening of the Doug Meijer Medical Innovation Center (DMMIC) in fall 2021, there will be even more opportunity for MSU’s impact in west Michigan.

The Innovation Center has been a strong supporter of the developing collaboration between Bold Advanced Medical Future (BAMF) Health and MSU. As the anchor tenant in the DMMIC, BAMF will be collaborating with MSU faculty and medical doctors to create and deliver life-changing diagnostics and therapies.

The DMMIC also will serve as an incubator for innovation-based companies, where McCurren further hopes to place some of the early-stage companies he works with or that spin out of MSU research.

Strong Partners Build Momentum

McCurren is even working with some companies outside the west Michigan region. Anne Lanc, who recently launched the startup Ionburst, a cybersecurity company based in Edinburgh, Scotland, said McCurren has propelled efforts on many fronts.

He helped initiate website security testing with developers and introduced Lanc and her staff to community members in greater Grand Rapids and beyond.

Lanc is the former international treasury director of BlackRock, one of the world’s largest financial planning institutions. She left that role to head up Ionburst’s push in the U.S.

“I believe we have a solution that can make a real difference in the world by making data privacy a human right,” Lanc said. “I’m passionate about protecting people... It horrifies me to read recent reports of the first time a patient’s death was directly linked to a data breach a hospital had suffered, or a new type of malware that can alter CT scans to fake tumors.”

Lanc said her company chose Michigan as its North American base because of the state’s advanced reputation for cybersecurity support and growth. “We are committed to Michigan, and our business development director has been a resident in Michigan for the last 20 years. As we grow, we will create skilled jobs to develop Ionburst to meet client needs.”

Strong partners like McCurren along with the MEDC help build speed, Lanc added.



Building a Spartan Presence, One Program at a Time *continued*

“We’re still at the beginning of our journey. It took a leap of faith to move from a well-respected role to an unknown startup,” she said. “But it’s exciting to change the world.”

Chase Bonhag, CEO of FirstIgnite, said McCurren has been with the Traverse City-based company from nearly the beginning — participating in meetings, giving introductions, offering advice and even attending presentations in Kalamazoo and Traverse City.

Over the last several years, FirstIgnite has built artificial intelligence-powered business development tools to transform scientific research into revenue.

“We help universities and corporations monetize the research and intellectual property they have invested in, but haven’t commercialized,” Bonhag explained. “Many solutions to the world’s biggest problems have been invented, but not commercialized, and we’re helping solve this problem.”

Bonhag said working with McCurren has led to success after success. “We’ve actually received a customer and an investor thanks to the introductions he made,” Bonhag said. “More importantly, he’s helped us learn to talk about our business in a way that is more collaborative with our customers rather than focused so much on the industry problem.”

Kelsey Boersma, project manager with the Center for Research & Innovation for the Mary Free Bed Rehabilitation Hospital, said McCurren helped her find funding options to support a patient trial for a rehabilitative crutch. He also explained intellectual property guidelines and set up a technology office at the Grand Rapids hospital.

“He’s connected us with innovators in the community who may have an idea that could positively impact the populations we serve,” Boersma said. “Kevin has been instrumental in sharing resources and connections with us to grow our tech transfer capabilities. His insights and experience make a positive impact in and around the west Michigan community.”



Industry-university Partnerships Foster Innovation, Boost Economic Growth

In a move that could help solidify Michigan's place as a global leader in autonomous vehicles and other areas of mobility, the MSU Innovation Center is leading an initiative to connect the university's mobility researchers to technology companies across the country.

The drive to create new partnerships advances Michigan State University's success in the mobility field. MSU's accomplishments include a long-term collaboration with Ford on more than 50 mobility research projects, a partnership with the Gotcha electric scooter company and an ongoing transformation of MSU's East Lansing campus into a living laboratory to test emerging technologies for new mobility systems.

The MSU Innovation Center had a key role in those projects and is well positioned to create more partnerships that yield impactful research and results.

"Over the years, the MSU Innovation Center has become a one-stop shop for industry to be able to tap the enormous talent we have on campus," said Satish Udpa, former MSU interim president and former dean of engineering.

Centered on MSU Strengths

Facilitating connections with industry is a priority for Brice Nelson, senior director of corporate partnerships at Business Connect, a unit housed under the Innovation Center's umbrella. Nelson serves as MSU's front door for corporations, directing businesses to the right MSU resources.

Nelson and newly hired analyst Keith Rouse II are spearheading the charge to create partnerships centered around MSU's strengths in the technical and social research areas of mobility, along with leveraging a large campus that can function as a living laboratory for mobility research.

"The research behind mobility covers a broad range of technology from autonomous cars to smarter infrastructure



Industry-university Partnerships Foster Innovation, Boost Economic Growth *continued*

to assistive robotics,” Nelson explained. “MSU faculty working in these areas have made profound contributions. My hope is that we can expand the number of partnerships we have with companies in this space and find value in utilizing these overlapping strengths.”

Rouse has been instrumental in identifying companies that match MSU’s research expertise, while developing a systematic approach to engaging with them.

“We hired Keith as a prospecting and strategy specialist in March 2020, and in a short time, he has made considerable progress,” Nelson said. “One of our focuses is connecting with companies in the autonomous vehicle arena. There are well over 500 companies working on different aspects of hardware, software, applications and analytics. Keith’s research has enabled us to better identify which companies are working in areas that match our strengths.”

Partnerships Key for Progress

Udpa, who has now returned to his love of research in the College of Engineering, also serves as director of mobility for MSU. Udpa praises Nelson’s ability to promote partnerships that help the university grow its mobility footprint and stresses the importance of continued efforts.

“For the first time in possibly a hundred years, Michigan has an opportunity to reassert its global leadership in all things automotive, Udpa said. “Autonomous vehicles will have an impact on just about every area of business, not just in transportation, but in insurance, hospitality, civil infrastructure, infant to elder care and education – the list is long, but the challenge is exciting.”

Udpa was recently appointed by Michigan Governor Gretchen Whitmer to the Michigan Council on Future Mobility and

Electrification. The 10-member council will work to ensure Michigan continues to be a world leader of innovation and growth in the mobility sector.

In terms of mobility research, MSU has an advantage given the strong commitment to technological research, as well as historical ties with the automotive industry in the state of Michigan.

For example, MSU’s partnership with Ford, a contract Nelson helped forge, has supported research involving sensors, lightweight materials, autonomous technology and mobility. Since 2014, Ford and MSU have partnered on more than 50 research projects regarding mobility.

More Than Just Autonomous Vehicles

MSU also is committed to mobility research outside of the automotive industry and is looking to revolutionize all forms of automated mobility. Last fall, the university partnered with Gotcha, an electric scooter company that unleashed 300 e-scooters for use on campus.

In return, MSU has used the scooters as a “testbed” for human-centric mobility in a newer but increasingly more popular form of automated transportation. The data returned to Gotcha helped improve overall safety of the e-scooters as well as provided new information on this emerging preferred mode of transportation.

MSU’s partnership with Gotcha demonstrates what collaboration opportunities can arise from building relationships between leading companies and campus partners.

In addition to serving as a practical alternative travel option to students and faculty, Gotcha is funding research focused on attitudes about e-scooters and is working with engineering students and MSU’s Resource Center for People with

Industry-university Partnerships Foster Innovation, Boost Economic Growth *continued*

Disabilities to enable visually impaired individuals an enhanced mechanism of navigating parked e-scooters.

“We have had discussions with several other companies that offer mobility platforms and smart infrastructures with various applications,” Nelson said. “MSU has a great opportunity to be on the cutting edge of providing safe and efficient micro-mobility options. We have the base to continue our process of implementing and inventing technology that leverages our campus infrastructure to enable the coexistence of pedestrians, bicyclists, e-scooters, cars and buses.”

Looking Ahead to “Mobility Solutions”

Currently, MSU is researching how to transform campus into an “advanced mobility ecosystem” that would allow mobility researchers to test emerging technologies for new mobility solutions. Those include 5G data transmission, solutions for “first mile/last mile” transportation and validation of technologies for automated and connected vehicle systems.

“At Michigan State University, we are aggressively moving forward to prepare ourselves to help Michigan retain its leadership in the mobility sector, be it in the area of technology, civil infrastructure, social science, business, communications or law,” Udpa said.

Nelson said he has always been interested in understanding how things work. His passion for mobility research and development is a natural fit with his position at MSU.

“We have amazing faculty who are working on some very exciting projects, and I get to ask them the ‘how’ and ‘why’ questions about their work,” Nelson said. “I also get

to interact with future thinkers at companies to learn about what they would like their next iteration of products or services to include. Matching a particular MSU expertise to a challenge a company is facing is the ideal outcome. My role at MSU is to help companies find this value and to help work through the details to enable the work to go forward.”

Rouse shares a similar enthusiasm for the work ahead.

“I’ve always been interested to hear about some of the amazing advances that come out of the university,” he said. “As part of the team at MSU Business Connect, I’m most excited to be working to help support and facilitate future advances.”

MSU Innovation Center Key for Connections

Udpa added that the Innovation Center is an essential resource for advancing research and ultimately the mission of the university.

“It is often very difficult for faculty members to connect with industry and find people who may have an interest in what the faculty member could offer,” Udpa said. “The MSU Innovation Center plays a key role in facilitating these connections.”

This work extends beyond MSU’s campus. The State of Michigan views industry-university collaborations, as well as innovation that such partnerships foster, as key to economic growth and vitality, Udpa said.

“Industry and university partnerships are vitally important for advancing the state and nation’s interests in a highly competitive world,” Udpa added. “Fortunately for MSU, the Innovation Center’s rolodex has grown significantly in recent years to the benefit of the university and industry alike.”



MSU Professor: Probiotics Help Treat Bone Loss

Dr. Laura McCabe has a better solution than drinking milk to get strong bones.

McCabe, a professor in the Department of Physiology at Michigan State University, studies the effects of probiotics in patients with osteoporosis, or bone loss. Probiotics are live microorganisms administered to a patient in a specific amount to benefit overall health.

Recently, with the help of the MSU Innovation Center, BioGaia — a Swedish healthcare company — McCabe and Robert Britton, former associate professor in MSU's Microbiology and Molecular Genetics department, patented the use of a probiotic as a preventative measure against the development of osteoporosis.

BioGaia sells the probiotic as part of its lineup of dietary supplements, and it's now purchased by people around the world.

Fifty-four million Americans have low bone density, or osteoporosis, according to the National Osteoporosis Foundation. About one in two women and up to one in four men over the age of 50 will break a bone due to osteoporosis. The disease causes an estimated two million broken bones every year.

This first-ever Surgeon General's Report on bone health and osteoporosis (2004) illustrates the large burden that bone disease places on our nation.

MSU Professor: Probiotics Help Treat Bone Loss *continued*

“Osteoporosis, fractures and other chronic diseases no longer should be thought of as an inevitable part of growing old. By focusing on prevention and lifestyle changes, including physical activity and nutrition, as well as early diagnosis and appropriate treatment, Americans can avoid much of the damaging impact of bone disease and other chronic diseases,” the report states.

“This is all still very relevant information, and understanding the nutritional element of probiotics supporting healthy bones is key,” McCabe said.

Probiotics Benefit Bone Health

McCabe began her research at MSU by looking at how bad bacteria in the intestine caused inflammation and ultimately osteoporosis. She hypothesized that the opposite could be true – good bacteria could help prevent osteoporosis. Her research focuses on a particular strain of bacteria: *Lactobacillus reuteri* (L.reuteri).

“Our lab team has shown over and over again that probiotics benefit bone health and can prevent bone loss under a variety of conditions, including menopause, Type 1 Diabetes and following antibiotic treatment,” McCabe explained.

McCabe’s research focuses on how individual organs communicate their function and health to one another as well as their responses to these signals.

“Understanding who is talking to who and what the language is could be the key to identifying very novel, simple and effective ways to treat disease,” McCabe said.

In animal models, she identified microbiota, or microbes within the body, and communications between the gut and the

bones that play an important role in the regulation of bone health. Recent studies have confirmed this effect in humans.

“Preventing bone loss is important because low bone density is a risk factor for bone breaks,” McCabe said. “Despite the many medications available, the number of patients with osteoporosis and its associated fractures is increasing. Our lab’s goal is to help the body build bone, prevent bone loss and decrease bone breaks in patients.”

Connecting with the MSU Innovation Center

The MSU Innovation Center helped McCabe in several steps along the path of this success. Early on, with the assistance of the Innovation Center’s Business Connect team, BioGaia sponsored research in the McCabe and Britton laboratories that demonstrated the potential utility of these probiotics.

As the results emerged, the MSU Technologies team memorialized the research in an invention disclosure, working with legal counsel to protect the intellectual property in a patent, and eventually



MSU Professor: Probiotics Help Treat Bone Loss *continued*

negotiated the terms of the license agreement that provided BioGaia with the exclusive rights to sell the product.

All of this came to fruition from McCabe and Britton's foundational work on these probiotics. McCabe worked closely with Anne Di Sante, associate director of MSU Technologies, and Charles Hasemann, assistant vice president for Innovation and Economic Development.

Hasemann recalled working on a series of contracts with BioGaia over a four-year period totaling \$550,000 that supported the research on campus.

"This is a great example of how the Innovation Center is meant to work; we help MSU faculty and students form the partnerships and have the resources it takes to translate their research discoveries into products and services that make our lives better," Hasemann said. "We offer advice and business expertise, alongside a world-class network of corporations, entrepreneurs, and investors, all in one place."

It's helpful and important to have someone who can manage some of the business aspects and offer advice and information, McCabe said. "The Innovation Center is critical for assisting faculty with the next step of moving their research to next level."

Di Sante said she would describe the efforts of the Innovation Center staff to be those of a "catalyst."

"We increase the rate of the reaction, that is, moving the research accomplishments of MSU faculty more rapidly towards commercialization, so the benefits of the technology impact the public," Di Sante said. "Working closely with Dr. McCabe, we were able to translate the development status of the technology into meaningful requirements of our licensee to ensure commercialization did not lag. This project is an example of the positive outcomes of an open and collaborative relationship between a faculty member and a tech transfer professional."

McCabe said she feels fortunate to have such a valuable resource on campus with dedicated staff who helped bring her research to the market.

"I am so lucky to work with so many great colleagues at MSU who make research fun," she said. "How can I not get excited about the idea of our lab's research having an impact on how we think about clinically treating and preventing low bone density?"

Di Sante agrees and said the work was fulfilling.

"We had fun, too."

325 East Grand River Ave.
East Lansing, MI 48823
517.355.2186

innovationcenter.msu.edu
@msuinnovation

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U N I V E R S I T Y