

Michigan's
University
Research
Corridor

CONFRONTING COVID-19

Research, Innovation and Leadership

SEPTEMBER 2020



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FROM THE PRESIDENTS

Fighting and Responding to COVID-19

The crisis created by COVID-19 has demonstrated that **the world needs universities with the scope and scale of Michigan's three largest research universities more than ever**. Michigan State University, the University of Michigan and Wayne State University — which together make up the University Research Corridor (URC) — have been at the forefront of responding to and fighting COVID-19.

We have taken important actions to address the pandemic crisis in Michigan. This includes developing new models for diagnostic tests and vaccines and personal protection equipment, as well as leading research on the differing effects of COVID-19 on specific populations and its impact on stress and mental health. Our three universities also have created more than 65 new technologies available for license and pledged to accelerate the broad distribution of these innovations to prevent, diagnose, treat and contain COVID-19, and to protect health care workers during the pandemic.

Our capacity to fight this novel coronavirus did not start with this pandemic, but rather stems from decades of investment in research and practice at our universities, positioning us to respond to global crises with discoveries and innovation. Our universities provide the infrastructure and expertise to support researchers with the knowledge and ability to study viruses, develop treatments and vaccines, care for patients, assist educators and counsel government and business.

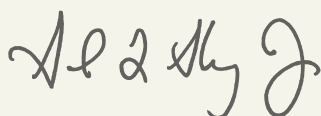
This report is a brief review of the incredible work our URC faculty researchers, medical and university staff and students have done and continue to do to fight COVID-19 and deal with its effects on every aspect of our lives.

Sincerely,

Samuel L. Stanley, Jr., M.D.
President
Michigan State University

Mark S. Schlissel, M.D., Ph.D.
President
University of Michigan

M. Roy Wilson, M.D.
President
Wayne State University



EXECUTIVE SUMMARY

From the early days of the pandemic, URC researchers joined the race to fight COVID-19 by studying ways to contain its spread, developing more effective and efficient screening, testing and tracing, working to find drugs that could treat COVID-19 and contributing to the global race to discover a vaccine.

They've worked on the National COVID-19 Convalescent Plasma Project and conducted research into COVID-19's long-term effects on patients, including cataloguing inflammatory reactions and psychological ones. They've tapped nanotechnology to diagnose infection and studied why the novel coronavirus is rarely passed from mothers to babies. And they've given guidance to doctors treating COVID-19 patients on what antibiotics may do more harm than good.

In the area of education, the URC universities worked quickly to mobilize technology to support students and instructors dealing with online learning when students had to be sent home this spring under Gov. Gretchen Whitmer's shutdown orders. They also put more resources, where needed, into supporting both online and in-person classes this fall. In addition, URC education experts have provided resources and expertise to help K-12 educators, students and parents deal with distance learning and prepare for new ways to offer instruction this fall. URC experts from WSU, MSU and U-M Dearborn participated in the Michigan Taskforce on ABA Treatment During the Pandemic to develop a toolkit for serving children with autism, and all three universities have pushed to make broadband access more available statewide.

During the initial wave of the crisis in Michigan, personal protective equipment (PPE) was in short supply, posing a dangerous threat to front-line hospital workers. With supply chains disrupted and a growing international demand, URC researchers organized to donate PPE, and to engineer ways to quickly produce new and effectively clean and reuse existing PPE. Doctors and nurses trained at URC universities served on the front lines during the height of the crisis and remain at the ready for any additional waves of the virus. They shifted smoothly to helping patients through telemedicine and resumed in-person medical care and surgeries as soon as they could safely do so.



Just as importantly, they found solutions to lessen the racial disparity in health care treatment and outcomes that made Blacks and Hispanics more likely to get COVID-19 and to experience worse responses. Experts from all three URC universities serve on Gov. Whitmer's Michigan Coronavirus Task Force on Racial Disparities, and URC medical professionals worked to help lessen health disparities in rural areas of the state as well.

As state and local leaders work to determine the best policies to protect the lives of their constituents while balancing the effects on the economy and people's livelihoods, URC leaders and experts have been providing counsel to them based on the best available science and knowledge.

That includes providing businesses with advice on how to institute safe health screenings and flexible work arrangements for their employees. URC experts helped businesses understand and navigate disruptions to our health care and food supply chains, and guided manufacturers interested in switching to producing essential pandemic items, such as protective garments and equipment, medical parts for respirators and pumps to spray disinfectants. And URC institutions supported entrepreneurship by moving COVID-19 related technologies to the lab and launching financial support for small businesses. They've taken an active role in helping businesses and communities secure essential goods and services and updated licensing rules to accelerate the broad distribution of public health solutions to the pandemic.

As we move forward, the three URC universities continue to make decisions that are in the best interests of their students, staff and faculty, and of residents across Michigan. This report investigates the many positive contributions the URC has made in the state of Michigan and nationwide in dealing with the COVID-19 pandemic and in helping people cope with this extraordinary challenge.

RAPID RESPONSE

When health care services were overloaded in traditional areas, the URC universities responded by providing pop-up drive-thru testing, converting dorms into rooms for hospital patients and being a source of help and information for residents, especially for those in at-risk communities.

Supporting the Front-line Effort

As the pandemic hit, doctors trained by or affiliated with the URC universities launched research efforts to find ways to save lives. **One promising COVID-19 treatment is the use of convalescent plasma, donated by people who have recovered from the virus.** MSU epidemiologist and professor Nigel Paneth, along with an MSU research team and colleagues from Johns Hopkins University and the Mayo Clinic, **led the development of the National COVID-19 Convalescent Plasma Project.** The project includes 170 physician-scientists from 50 universities and hospitals across the nation studying the use of convalescent plasma in COVID-19 treatment and prevention. Paneth also spearheaded the launch of a MSU-hosted website that helps physicians participate in trials and where prospective donors can register.



Roger Pique-Regi, Ph.D.

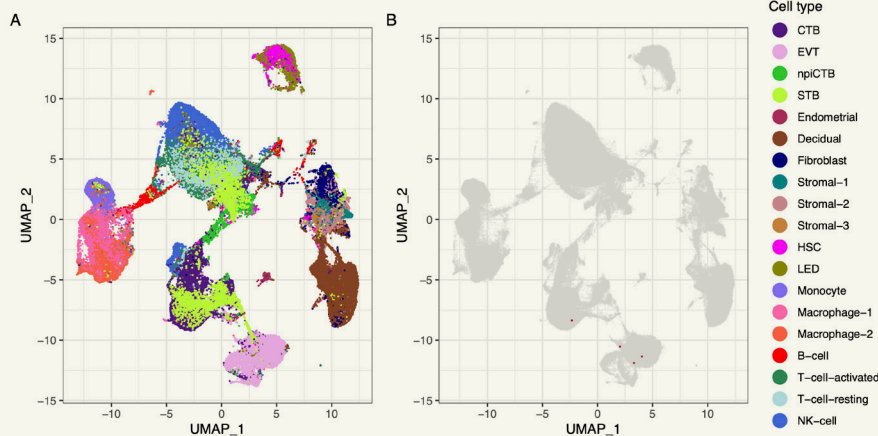


Roberto Romero, M.D.



Nardhy Gomez-Lopez, Ph.D.

Researchers also turned their attention to the virus's effect on babies. **COVID-19, unlike other viruses such as Zika and rubella, is rarely passed from mothers to newborns.** Researchers at the WSU School of Medicine and the National Institutes of Health (NIH) Perinatology Research Branch of the National Institute of Child Health and Human Development in Detroit **used cutting-edge molecular techniques to study why.**



Transcriptional map of the human placenta. The uniform manifold approximation plot arranges the cell into clusters by gene expression. In (A) the cells/nuclei are colored illustrating the different cell types composing the human placenta. In (B) only the cells/nuclei that simultaneously co-express ACE2 and TMPRSS2 are colored in red, illustrating that the canonical transcripts that are necessary for SARS-CoV-2 viral infection are not present in most cells (colored in gray).



Other researchers concentrated on studying COVID-19 patients as they recovered from the disease. Michael Brennan, D.O., an MSU College of Osteopathic Medicine alumni and endocrinologist at Beaumont Health hospitals, found evidence while treating COVID-19 patients with recurring symptoms after they had been discharged that **COVID-19 is a highly inflammatory disease, especially for those with diabetes**. Meilan Han, M.D., a critical care physician at Michigan Medicine and U-M professor of pulmonary disease, found that some discharged patients were leaving the hospital with multiple other problems, including the formation of blood clots in their lungs or legs, which could lead to strokes.

To build on what we have learned thus far and move our understanding of the long-term effects of COVID-19 forward, Heather Abraham, M.D., an internist with Wayne Health in Detroit and assistant professor at WSU School of Medicine, is seeking grant funding to create a **comprehensive analysis of the range of post-COVID-19 symptoms related to the inflammatory nature of the disease**, such as heart failure, asthma and neurological issues, as well as psychiatric issues. And U-M School of Public Health Associate Professor Nancy Fleischer is leading a U-M survey that investigates how COVID-19 affects the health and well-being of survivors.

Studying data from COVID-19 patients treated at Detroit Medical Center hospitals, a **WSU team found many patients prescribed antibiotics ended up infected with a bacterium that causes life-threatening diarrhea**. Their research led to guidance urging doctors to be more judicious in how they prescribed antibiotics when treating COVID-19 patients.

In the search for diagnostic tools that could identify COVID-19 patients at greater risk of death before complications arise, researchers looked into using nanotechnology to diagnose infection and assess future risk. Morteza Mahmoudi, assistant professor in the Department of Radiology, Precision Health Program in the MSU College of Human Medicine, found that the identifying and cataloging **fingerprint-like patterns created by varying levels of infection and stages of disease on the composition of tears, saliva, urine and plasma could help pinpoint those patients**.

During the crisis, **Michigan hospitals and health care providers continue to treat patients for non-COVID-19 related health issues**. WSU clinical professors at the Eugene Applebaum College of Pharmacy and Health Sciences are working to increase pharmacists' awareness about the importance of ensuring that patients with opioid use disorder (OUD) have access to medications that treat opioid addiction or reverse the effects of overdoses.

The OncCOVID app, a free, web-based application that uses national cancer data, the patient's characteristics and the spread of COVID-19 in the patient's community developed by a team of data scientists and cancer doctors from the U-M Rogel Cancer Center and the School of Public Health, is available to **help doctors gauge the long-term risk of postponed cancer care for patients against potential COVID-19 infection**.

Volunteer Sydnee Wargo collects information on a patient as part of a COVID-19 test.



Supporting the Community

Understanding the pandemic's toll on frontline workers, the WSU Department of Psychiatry and Behavioral Neurosciences set up **Warriors Strong Together Support Services**, a free mental health hotline for police, firefighters and their families in Metro Detroit. The hotline provides ongoing mental health support.

Expanding drive-thru and walk-up testing, particularly for Detroiters who lack access to private vehicles, is supported in part with funds from WSU's Office of the President. **A mobile testing partnership for symptomatic first responders and medical providers in Detroit and Dearborn** was established between Ford Motor Company, WSU, WSU Physicians Group and the Arab Community Center for Economic and Social Services (ACCESS), the largest Arab American community nonprofit in the United States. WSU also has launched the Warrior Relief and Response campaign to provide increased support for these critical programs and services, as well as to support students on campus.

URC faculty, staff and students stepped up to address the shortage of personal protection equipment (PPE) such as medical masks, gloves and face shields.



At U-M, students with **Blueprints for Pangaea**, a student-run nonprofit dedicated to reallocating unused medical supplies to places most in need, **coordinated a donation of around 700 plastic face shields and redirected \$9,000 of PPE to clinics and health systems in Southeast Michigan**. They're also working with students from the WSU chapter to donate hundreds additional face shields and thousands of masks to the Ann Arbor and Detroit frontline.



Nathan Tykocki, assistant professor of pharmacology and toxicology in the MSU College of Osteopathic Medicine, organized researchers campus wide to create 3D-printed medical face shields. As of mid-August 2020, Tykocki and colleagues had **distributed 12,336 face shield and mask combinations and nearly 1,000 visor attachments to health care and agricultural groups throughout Michigan** through the Food Processing and Innovation Center, Michigan's leading independent commercial food development, processing, packaging and research facility.

3d printer and medical face shields



HEALTH DISPARITIES

Good health care is out of reach for those who lack health insurance or transportation to health care facilities, or who fail to get adequate treatment because of biases against their race, gender or ethnicity. The spread of COVID-19 has exposed these health disparities as it has taken a disproportionately heavy toll on the black population in Michigan and across the nation. The URC is home to some of the nation's leading experts on health disparities, who work to expand and share what we know to mitigate COVID-19's effect on communities of color.

Racial Disparities

WSU President M. Roy Wilson, a national expert on health disparities, **urged the use of more effective communications targeting African-American communities**, removing barriers to testing and treatment, and tracking racial data among COVID-19 patients, as well as addressing the underlying conditions that lead to health disparities.

Riana Anderson, assistant professor at U-M's School of Public Health and an expert on the impact of racial discrimination on the psychological well-being of Black families, found **the pandemic has taken a heavy toll on the mental health of African Americans.**

She offers guidance to therapy and other online resources through various organizations to support African Americans.



Governor Whitmer's Task Force

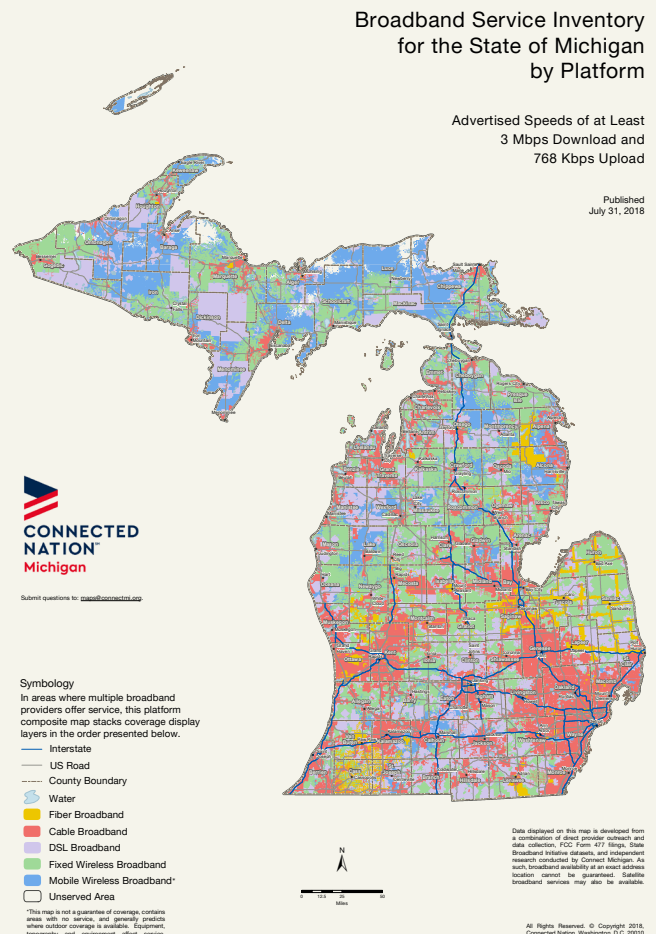
Experts from all three URC universities serve on Gov. Whitmer's Michigan Coronavirus Task Force on **Racial Disparities**, including WSU President M. Roy Wilson; Debra Furr-Holden, Associate Dean for Public Health Integration at the MSU College of Human Medicine and Director of the Flint Center for Health Equity Solutions; Matthew L. Boulton, U-M Senior Associate Dean for Global Public Health and Director of the Minority Health and Health Disparities International Research Training Program; and Randolph Rasch, MSU Professor and Dean of the College of Nursing. Chaired by Lt. Governor Gilchrist and consisting of leaders across state government and health care professionals from communities most affected by the spread of coronavirus, the task force provided Gov. Whitmer with recommendations on how to address health disparities in Michigan. **Their insight catalyzed Whitmer's declaration that racism is a public health crisis in Michigan and her required implicit bias training for healthcare providers.**

"We must confront systemic racism head on so we can create a more equitable and just Michigan."

- Gov. Gretchen Whitmer

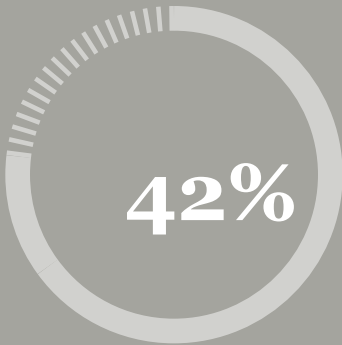
Rural Health Disparities

Hospital systems have responded to the COVID-19 crisis by implementing telehealth options. MSU researchers from the College of Human Medicine studied one large Michigan rural health care system in response to the pandemic and found that, while telehealth offers promise for addressing rural health disparities, overcoming broadband access challenges in rural settings must be a priority. Experts from URC universities are working with organizations such as **Connect Michigan**, a nonprofit organization dedicated to expanding the access, adoption, and use of broadband, to improve rural telehealth and find ways to expand broadband access.





BY THE NUMBERS



the share of doctors practicing in Michigan (nearly 19,000 doctors) who graduated from a URC medical school

2,468



medical professionals graduated from URC universities in 2018 - more than any peer university research clusters in the nation

500+



COVID-19-related research projects are occurring at the URC universities

100+



clinical trials, medical device and COVID-19 testing protocols being developed by URC universities



65+



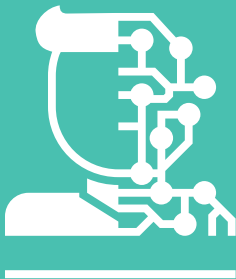
New technologies available for license from MSU, U-M and WSU, spanning from new models for PPE to testing assays to antiviral therapeutics

RESEARCH

The URC universities have had to pause a lot of their laboratory research, but are now restarting it under tightly managed conditions. Many labs did not pause, quickly shifting their focus to the coronavirus to expand our understanding of the virus and how it spreads, seeking innovative ways to test new therapies to treat COVID-19 patients, discovering a potential vaccine and studying the impacts of the virus on survivors.

Containing the Spread

Based on studying the way people communicate in a crisis, MSU College of Communication Arts and Sciences professors are providing citizens with critical thinking tools to avoid the explosion of COVID-19 misinformation found online. To support public health officials in decision making, U-M researchers developed a mathematical model that combines epidemic dynamics and macroeconomic cost modeling to simulate the costs of the various lockdown measures on both the economy and mortality rates. **Their model suggests that the use of masks and social distancing are the factors that end lockdowns the quickest, with the smallest loss of life.**

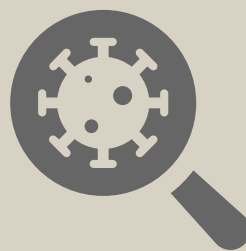


Using a novel machine learning model, a team of MSU researchers led by Guowei Wei, professor in the departments of Mathematics and Biochemistry and Molecular Biology, studied mutations in the SARS-CoV-2 genome. **Their findings suggest these mutations are making the novel coronavirus more infectious.**





WSU psychology researchers studied a representative U.S. sample to determine how well people adhered to guidelines intended to slow the spread of COVID-19 based on demographic, personality, and social cognition predictors. **Their findings suggest that people were more likely to adhere to the guidelines if they felt it was their duty and had positive attitudes toward the guidelines and stronger intentions to follow them.** Age, sex, education, income, children in the household, shelter-in-place orders, and self-rated health levels showed little to no association with adhering to the guidelines.

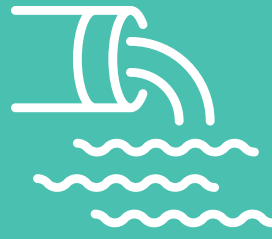


Working with the Henry Ford Health System with a grant from the NSF, WSU engineering researchers are developing a **COVID-19 risk-prediction system** that uses the latest outbreak reports to dynamically update risk levels for events and locations. This tool, which will be built with privacy algorithms and could incorporate GPS and calendar data as well as input from users, could be used by individuals and organizations to assess risk when hosting or attending events and while traveling.

Screening, Testing, Tracing

URC researchers have been working to validate a test to detect COVID-19 that is more accurate and timelier than those currently available. **Working with more than 300 participating clinical laboratories across 46 states and four countries**, MSU researchers demonstrated that most tests were highly accurate and some commonly used testing methods reported 100 percent accuracy. But lead researcher Frances Pouch Downes, professor in the MSU Biomedical Laboratory Diagnostics Program, cautions that the reliability of new COVID-19 antigen and antibody tests needs to be determined.

When it comes to antibody tests, a microfluidic device, or “lab on a chip”, invented at U-M and developed by U-M startup **Optofluidic Bioassay**, could give an accurate result on COVID-19 antibodies in just 15 minutes with a finger-prick’s worth of blood.



Testing individuals is only one way to measure the spread of COVID-19 in communities. Researchers at URC universities are **tracking COVID-19 in communities’ wastewater** as another way to detect the disease.

With a rapid response grant from the National Science Foundation (NSF), Krista Wigginton, U-M associate professor of civil and environmental engineering who is a visiting professor at Stanford, is leading a research team from U-M and Stanford University to **explore whether community’s wastewater could give an early warning of the spread of COVID-19**. They are also studying how the novel coronavirus behaves and moves through the environment. This work is part of a larger study investigating how the virus responds to ultraviolet and solar light.

At MSU, Associate Professor of Environmental Engineering Irene Xagorarakis is using a method from one of her recently completed NSF-funded studies to test wastewater and predict COVID-19 in Detroit. This study, funded by the Great Lakes Water Authority, will determine if viral outbreaks can be identified and forecasted through wastewater sampling, **warning of potential outbreaks before they appear in health facilities**. Joan Rose, Nowlin Chair in water research, is monitoring six communities’ wastewater around the state, including on campus. Working with the State of Michigan, the goal is to **conduct a statewide wastewater monitoring program** to assist with understanding how one can **monitor and ultimately prevent disease transmission**.

WSU faculty from the School of Medicine and Law School have teamed up to **explore the legal and ethical issues associated with community detection of COVID-19 through wastewater monitoring**. With support from the Healthy Urban Waters – a collaboration of WSU researchers networked with the community to focus on water in an urban setting and future impacts of human culture on community, the ecosystem and economic health – Jeffrey Ram, professor of physiology and director of the WSU Belle Isle Aquarium Field Research Laboratory, and Associate Professor of Law Lance Gable describe recent scientific evidence regarding COVID-19 detection in wastewater, identify public health benefits and discuss the limitations of existing data.

Drug Discovery and Treatment

Building on past collaboration to save lives, such as the 2016 work of cardiologists to develop a treatment protocol used across the country to reduce deaths from cardiogenic shock, doctors from WSU, Henry Ford Health System, Ascension Michigan, Beaumont, and Detroit Medical Center are teaming up to conduct large-scale COVID-19 drug trials in a search for a COVID-19 vaccine. According to Jason Pogue, clinical professor of pharmacy at U-M, we will likely be dealing with COVID-19 into the future. **While it is possible an effective vaccine will be developed in 2021, even a suboptimal vaccine, such as the seasonal flu vaccine, can benefit the population.**



Michael Feig

MSU Professor of Biochemistry and Molecular Biology Michael Feig had never used his ability to model high resolution molecular structures to study coronaviruses. But once the pandemic struck, he and his research group switched to this new area of study. With MSU postdoctoral student Dr. Lim Heo, Feig generated high accuracy models for the virus that causes COVID-19. **These models support the research community by providing a starting point for screening existing drugs for potential treatments.**



Jonny Sexton, PhD

A joint venture of the Michigan Institute for Clinical & Health Research (MICHHR) and the U-M Life Sciences Institute, the Center for Drug Repurposing (U-M CDR) was launched last year to discover new uses for existing drugs. Rapidly mobilizing resources once the pandemic began, the U-M CDR began using artificial intelligence to screen all 2,400 FDA approved drugs and is extending screening to experimental compounds from a library of nearly 7,000 compounds in search of an antiviral drug or drug cocktail that is effective against COVID-19.

EDUCATION

All three URC universities have schools and colleges of education that are recognized for excellence in primary, secondary and higher education and urban education. During the pandemic, URC education experts met the challenges facing education by listening to the needs of educators, students and parents, sharing relevant expertise, and developing new approaches and resources to support teaching and learning at home.

Perhaps the greatest challenge in education was shifting classroom instruction to online almost overnight when schools and universities were suddenly closed. Uncertainty coupled with new modes for teaching and learning created hurdles and stress for educators, students and parents.

Higher Education

In the days following the closures, the URC universities tapped campus experts to develop resources for teaching online. U-M Dr. Rebecca Quintana, learning experience design lead at the Center for Academic Innovation (CAI), and James DeVaney, associate vice provost for academic innovation and founding executive director of the CAI, are **experts in “resilient teaching”** - the development of agile learning environments that adapt in the face of uncertainty. They’re offering guidelines and insights through a **four-week online course, Resilient Teaching Through Times of Crisis and Change**, available to university faculty across the country.

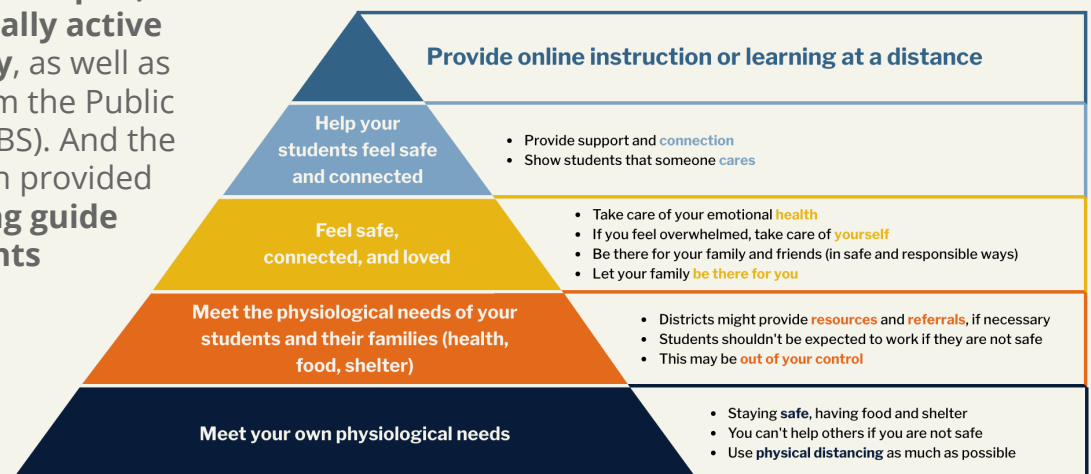




K-12 Support

To support K-12 educators, students and parents, URC education experts provided online resources. For example, WSU launched **#HealthyKidsQuarantined**, a website that provided activities, resources and fun challenges through weekly calendars, enabling K-12 parents to keep their children engaged and busy after schools closed. MSU's College of Education worked with WKAR TV to create **short videos on topics, such as keeping kids physically active and promoting literacy**, as well as linking to resources from the Public Broadcasting System (PBS). And the U-M School of Education provided **a teaching and learning guide for teachers and parents** on its website with links to family and teaching resources for public health advice, anxiety and self-care advice, and instructional guidance.

MSU has also created support programs and materials to help Michigan's K-12 school districts prepare for online instruction, such as the **Foundations of Successful Online Teaching & Learning series**, which was collaboratively developed by MSU's Enhanced Digital Learning Initiative and Okemos Public Schools.



THE TEACHER HIERARCHY OF NEEDS from U-M School of Education

Providing for Special Needs

URC experts from WSU, MSU and U-M Dearborn participated in the Michigan Taskforce on ABA Treatment During the Pandemic to **develop a toolkit for serving children with autism**. Many of the approximately 21,000 students with autism attending Michigan’s schools receive applied behavior analysis (ABA) therapy to improve learning and social skills in clinics, schools and homes. But COVID-19 has hindered providers’ ability to deliver services. The toolkit offers information to enable providers to develop safe plans for delivery services.

Broadband Challenges

To help policymakers in Michigan and nationally understand how schools adjusted to the COVID-19 crisis, MSU’s Education Policy Innovation Collaborative (EPIC) examined nearly 9,000 responses from K-8 teachers and principals representing 90% of Michigan school districts. **One of the primary concerns of educators, it found, was the lack of consistent internet access and technology training for students**, with about a quarter of students and families unable to shift learning online.

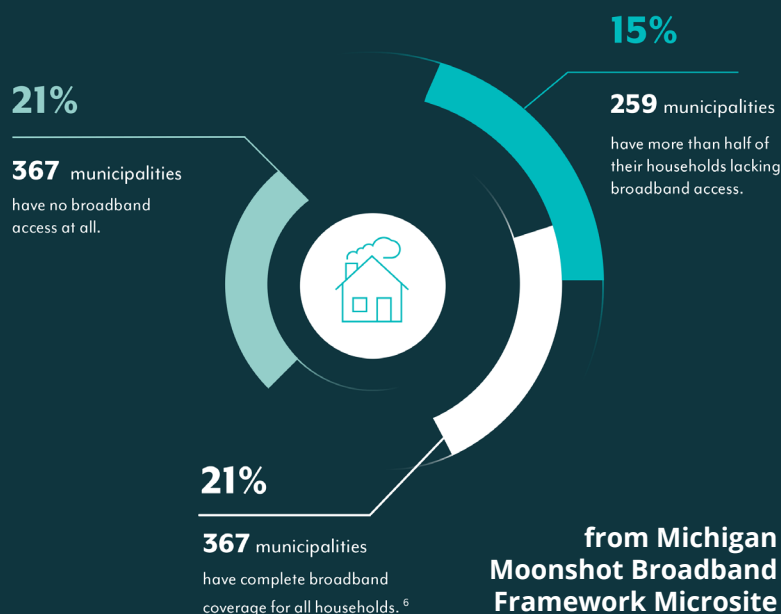


To bridge the digital divide in Michigan, **the Merit Network** — founded in 1966 by the URC universities to pioneer internet rules and practices — launched the **Michigan Moonshot** with MSU’s Quello Center, and M-Lab, the world’s largest open internet measurement platform. This initiative is a collective call to action to **expand broadband access to all citizens**.

In August 2020, WSU became the first university to participate in promoting the Michigan Moonshot survey on internet access and connectivity. Collecting this information from WSU students, faculty and staff will allow the university a better look at the campus community’s readiness and needs for virtual learning and working.

— More than **360,000** households in Michigan don’t have access to broadband.¹

Of the **1,773** municipalities in Michigan:



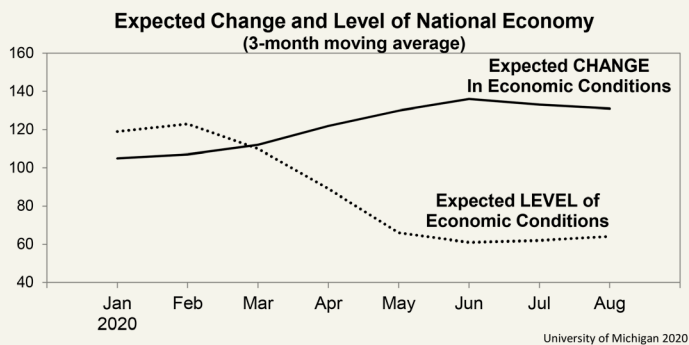


BUSINESS

URC experts are helping business owners figure out ways to deal with the economic chaos COVID-19 is causing. And **all three URC Presidents served on Governor Whitmer's Michigan Economic Recovery Council** with fellow leaders from industry and health care, lending their expertise as both presidents of major research universities and medical doctors to develop the **MI Safe Start** plan on how to safely open the economy again.

Market Analysis

Richard Curtin, U-M research associate professor and chief economist and director of the Survey Research Center, conducts monthly surveys of consumer attitudes, expectations and behavior. Since the pandemic began, responses suggest a **full restoration of consumer confidence will be more difficult and take more time than following any other recession since the Great Depression.**



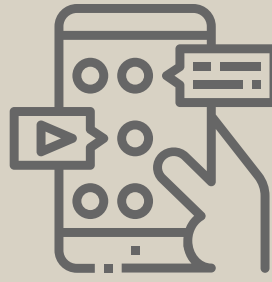
Government

To help local governments think through emerging fiscal issues, MSU Extension Center for Local Government Finance & Policy and the Center for Local, State, and Urban Policy at U-M's Gerald R. Ford School partnered with public finance experts from universities, consulting firms and research institutions from around the state to **provide local government leaders with COVID-19 Fiscal Strategy and Resource Guides.** The guides and memos offer information, ideas and tools to help successfully navigate the new fiscal landscape on issues, such as emergency spending, revenue losses and budget cuts.

Getting Back to Work

Companies struggled to meet their hiring needs and commitments to university students during the pandemic. The Palmer Career Management Center, which provides career services for students in the MSU Broad College of Business, took a leading role to help companies **overcome hiring challenges by convening more than 50 company representatives from a range of industries to connect and problem-solve together.** Virtual discussions centered on sharing how work is being affected, plans for fulfilling full-time and internship offers and exploring ongoing opportunities for remote working.

Many people now working at home have needed to find ways to share workspace and family responsibilities with other household members while managing pandemic-related stress. WSU sociology researchers were **studying employees' use of flexible work arrangements (FWA)** before the pandemic, but quickly pivoted and expanded the study to examine the effects of COVID-19 on working couples by plans to conduct a series of surveys through summer 2021. In preliminary results, **couples reported an uptick in work-family conflict and a decrease in relationship satisfaction and mental health.** The WSU team hopes that the coronavirus could change how employers conduct business, potentially changing stigmas around FWA and informing employers how to develop better policies to support employees and their families in crisis and times of stability.



Combining the expertise of U-M epidemiologists, data scientists and computer scientists and engineers, U-M faculty, staff, alumni and students developed two online tools to help Michigan get back to work. Created for the Michigan Department of Health and Human Services (MDHHS), **the MI Safe Start Map** is a dashboard that provides real time, visualized data for officials to easily identify areas where COVID-19 presents a higher risk, and for the public to understand the pandemic status in their community and across the state. **The MI Symptoms app** is a COVID-19 symptom checklist app for individuals to use to know if they should go to work on any given day.

MI Safe Start Map
Track the risk levels of COVID-19 indicators
[Dashboard](#) [About](#)

Risk Levels: ■ 1: Very High Risk ■ 2: High Risk ■ 3: Med-High Risk ■ 4: Medium Risk ■ 5: Low Risk ■ 6: Post- Pandemic

Michigan

[For details, see MI Safe Start Plan PDF](#)
[or visit michigan.gov/coronavirus.](https://michigan.gov/coronavirus)

MI Safe Start Map dashboard

Indicators, Trends, and Risk Determinations as of:

Sep 18

Michigan: Statewide

Correctional Facilities Data:

Exclude

Probable Cases:

Include

* Over previous 7 days

Epidemic Spread
^

Test Results	3.1% positive tests * 	28.8k daily tests administered* 	v
New Cases	54.2 daily/ million * 	539.7 daily * 	v
Deaths	8		v

Public Health Capacity
v

Entrepreneurship and Innovation

To support Detroit's most vulnerable businesses during the first months of the pandemic when Michigan and Detroit were being particularly hard hit by the pandemic, WSU's TechTown Detroit launched **the Detroit Small Business Stabilization Fund** in partnership with the City of Detroit, the Detroit Economic Growth Corporation (DEGC), and Invest Detroit. This emergency fund **provided working capital grants in amounts up to \$5,000 to qualifying small businesses.**

The Economic Growth Institute at U-M is providing counseling to help Michigan manufacturing companies shift to producing essential pandemic items, such as protective garments and equipment, or medical parts for respirators and pumps to spray disinfectants. It also has developed the **Leader's Toolkit for COVID Risk Management** with U-M complex systems expert Dr. Scott E. Page to develop frameworks for modifying employee interactions to reduce the likelihood of transmitting the virus to others.



More than 65 COVID-19-related technologies are eligible for more open licensing terms to **narrow the time university innovations and technologies take between discovery and being used in the world to address the pandemic.** These new licensing policies are part of each URC university's commitment to adopting COVID-19 strategies that will accelerate the broad distribution of public health solutions.



Supply Chain

As the pandemic halted production in manufacturing hubs and limited the transportation of existing inventories, complex and time-sensitive global value chains were disrupted. The URC universities each have experts in nationally recognized supply chain programs and fields critical to key Michigan industries who provided insights to Michigan industry and government leaders and took an active role in helping businesses and communities secure essential goods and services. URC universities also have made efforts to ensure value chain systems are more resilient in the future.

Health Care

In anticipation of **supply chain challenges that could significantly limit the availability of COVID-19 medical treatments and a vaccine**, a team of U-M medicinal chemists are using artificial intelligence (AI) to identify alternative pharmaceutical building blocks for 12 drugs under investigation to treat COVID-19. This approach allows the researchers to navigate around the starting materials already in the supply chain to identify alternatives that could provide a continuous flow through the supply chain.



MSU health sciences chief Norman Beauchamp, is working with employers and community economic development leaders in Grand Rapids and Lansing, including **The Right Place** and **Lansing Economic Area Partnership (LEAP)**, to align business supply and manufacturing capabilities with local needs for safety and medical equipment.

WSU's Mike Ilitch School of Business added a new concentration in **health care supply chain management and digital and business analytics** in its MBA program starting September 2020. In addition to educating students of the key disciplines within the health care industry, the program will include disaster preparedness to better prepare health care management professionals for the next crisis.





Food Supply

In the early days of the pandemic, grocery stores experienced food shortages and high prices for staples while food service institutions experienced food surpluses and the potential for waste. As U-M Ross School of Business professor and founding faculty director of the Center for Value Chain Innovation Ravi Anupindi explains, the food supply chain was disrupted by labor shortages, distribution challenges and shifts in demand from food service to homes. These challenges, according to Anupindi, have spurred a great

deal of creativity and adaptation in the food supply chain, leading to greater resiliency in the system. MSU Extension and the MSU Center for Regional Food Systems, which advances regionally rooted food systems through applied research, education, and outreach, have helped MSU during the pandemic to **coordinate these food system networks to help feed Michigan's families and communities while also supporting Michigan's food businesses.**

“We have many vulnerable, food insecure populations, including roughly 11 million children, about a third of undergraduate students, the elderly and low-income families. Their access to food is significantly impacted by the pandemic.”

- Ravi Anupindi

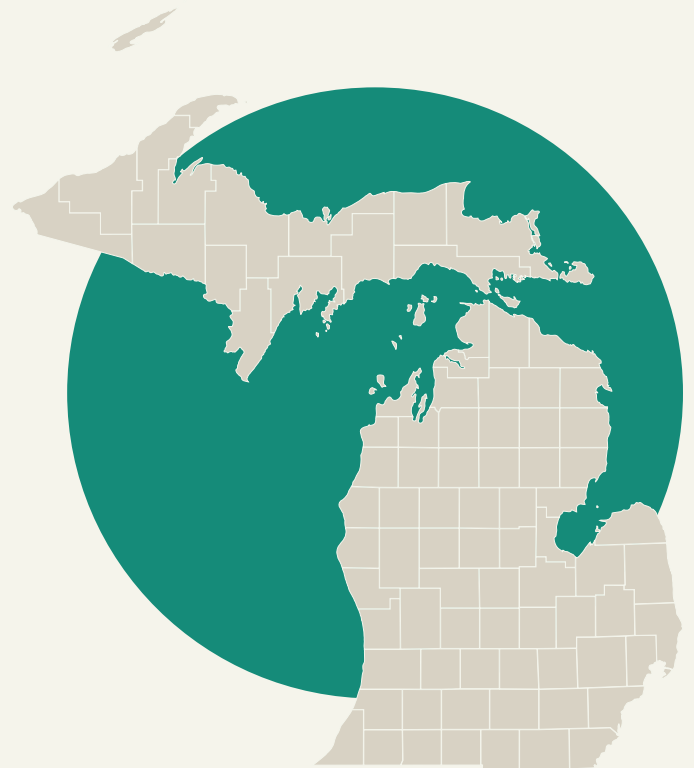
U-M Ross School of Business professor and founding faculty director of the Center for Value Chain Innovation



MSU Extension (MSUE) has also worked with the State of Michigan through the Michigan Economic Development Corporation to **connect agricultural entrepreneurs and producers** through the Pure Michigan Business Connect, an intrastate B2B matchmaking resource. And MSUE has worked to **connect farmers and producers to financing opportunities**, such as Michigan Agriculture and Small Farms Safety Grants, an emergency fund using federal CARES Act dollars to help cover some of the COVID-19 costs to Michigan's agricultural industry.

"The health and safety of Michigan's food and agriculture workers will be even more important over the next few months as crops are harvested and products make their way to grocery store shelves."

- Gary McDowell
Michigan Department
of Agriculture and Rural
Development director



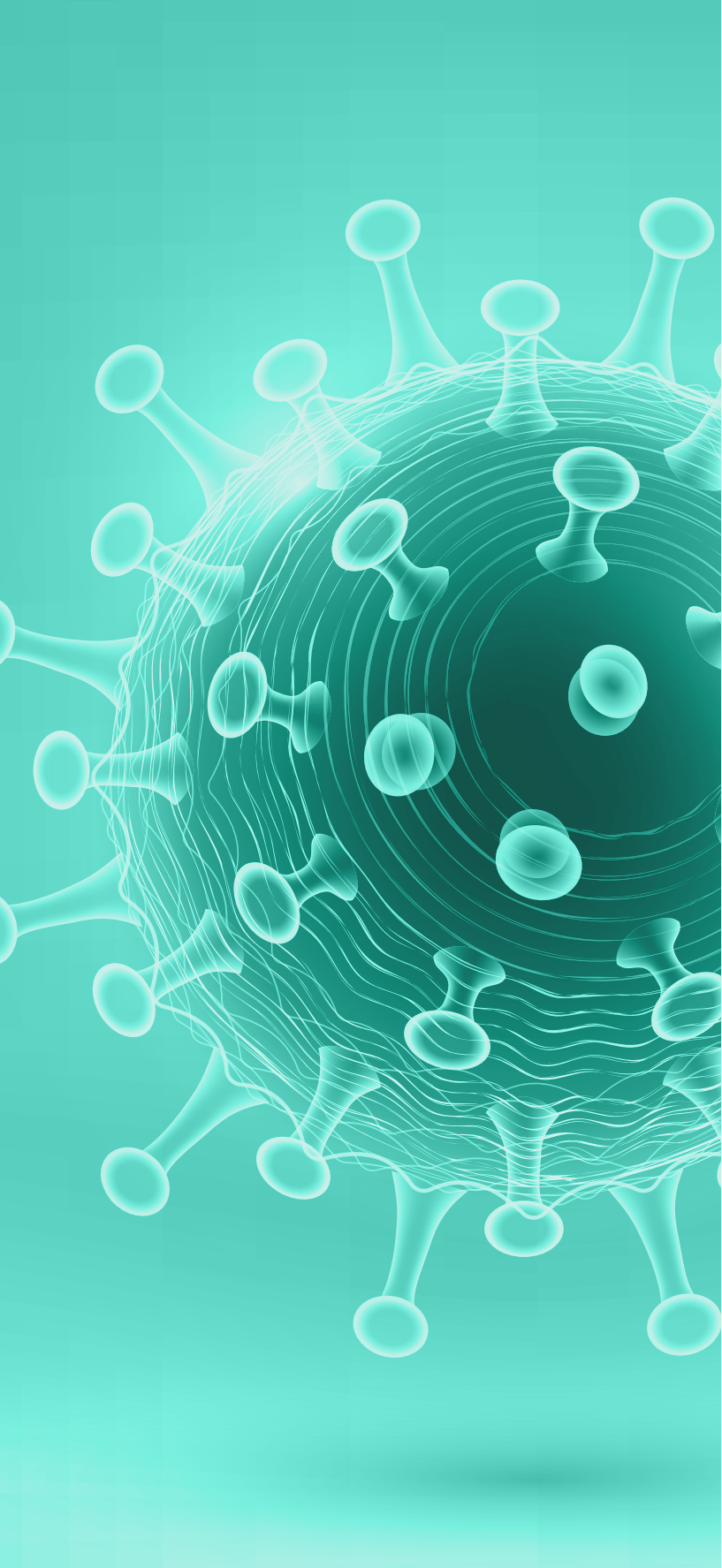
CONCLUSION

Wherever the COVID-19 pandemic takes us, the URC universities are uniquely positioned to lead efforts to lessen its effects on our communities, economy, education and health.

ABOUT MICHIGAN'S UNIVERSITY RESEARCH CORRIDOR

Michigan's University Research Corridor (URC) is an alliance of Michigan State University, the University of Michigan and Wayne State University and the leading engine for innovation in Michigan and the Great Lakes region. The URC is focused on increasing economic prosperity and connecting Michigan to the world. Find out more at urcmich.org.





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