



# MiSTEM Advisory Council: 2020 Annual Report

*Required by Section 99s of Public Act 58 of 2019*



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# About Us

## **MiSTEM Advisory Council**

The MiSTEM Advisory Council is charged with setting a strategic vision for STEM in Michigan and moving that vision to action through the MiSTEM Network. The Council consists of education, business and community leaders with the knowledge, experience and commitment to make quality, equitable STEM experiences the responsibility of our communities – and not solely our schools.

Specifically, the Council is tasked with the following:

1. Advance a statewide strategy for STEM education
2. Accelerate local and regional efforts through grant programs to support that strategy
3. Activate and support the MiSTEM Network to accelerate STEM education locally and regionally
4. Partner with the MiSTEM Network executive director to implement the statewide STEM strategy

## **Members**

The MiSTEM Advisory Council was created in 2015 under MCL 388.1699s and organized under the Department of Labor and Economic Opportunity per Executive Order No. 2019-13. The Council is made up of 11 voting members serving at the pleasure of the governor and four ex-officio legislators appointed from the House of Representatives and Senate.

**Adam F. Zemke**, Ypsilanti  
President, Launch Michigan

**Christian A. Velasquez**, Midland  
Global Market Director, Dow Chemical

**Daniel Williams**, Ph.D., Grand Rapids, Vice Chair  
President and Chief Executive Officer, West Michigan Center for Arts and Technology

**Gail S. Alpert**, West Bloomfield  
President, First in Michigan

**Jacqueline Huntoon**, Ph.D., Houghton  
Provost, Senior Vice President, Professor of Geology, Michigan Technological University

**Lee Graham**, Holly  
Executive Director, Operating Engineers 324 LMEC

**Mary K. Bacon**, Paris  
Adjunct Professor, Ferris State University

**Michelle Richard**, Chair  
Senior Deputy Adviser, Department of Labor and Economic Opportunity

**Sheila Alles**  
Chief Deputy Superintendent, Department of Education

**Tonya M. Matthews**, Ph.D., Detroit  
Director of the STEM Innovation Learning Center and Associate Provost for  
Inclusive Workforce Development, Wayne State University

**Wendy A. Winston**, Grand Rapids  
Educator, Grand Rapids Public Schools

**Sen. Dayna Polehanki**  
**Sen. Dale Zorn**  
**Rep. Padma Kuppa**  
**Rep. Brad Paquette**

### **The MiSTEM Network**

The MiSTEM Network was created to broaden ownership of the state's STEM strategy and position more Michigan students for success in our rapidly changing economy. The Network has established staffing across 16 regions in the state – putting people in place to build statewide capacity and sustainability for knowledge and activation. We bring together partners in each region (curriculum partners, educators, employers, influencers, families) to provide authentic STEM experiences in each community.

# Celebrating Progress

Over the past year, Michigan has continued to expand access to quality STEM experiences across the state. The MiSTEM Network and Advisory Council have continued building and increasing the infrastructure to empower educators and integrate business and education, creating high-quality STEM experiences in communities across Michigan, including:

- Dramatically expanded and diversified the Network from 160 participants, primarily from schools and ISDs, to 400 participants, including representatives from STEM employers and higher education
- Boosted leadership and participation at STEM-related events, including conferences, task forces and national, state and regional committees, to contribute to continued progress in closing the skills and opportunity gap
- Strengthened relationships with partners within each region to jointly focus on goals and solutions
- Provided \$3.05 million in state grants to support K-12 STEM programs with a proven track record of effectiveness, as well as new programs to expand access to work-related experiences and professional training
- Invested in the development of foundational communications tools with the creation of its website, 16 regional websites and Listservs
- Developed “From Students to Stewards” – a collaboration among the MiSTEM Network, Michigan Department of Environment, Great Lakes, and Energy (EGLE) and Michigan Department of Education (MDE), providing Network grants to help educators use place-based, real-world experiences to engage students and prepare them to be the next generation of water stewards and for water-focused STEM careers
- Increased communication among regions to share successes
- Responded to educator and community needs for virtual opportunities in professional learning and student programming during COVID-19

# Mission and Vision

In 2019, MiSTEM (per Executive Order 2019-13) was transferred to the Department of Labor and Economic Opportunity (LEO). This move positioned MiSTEM to continue improving STEM opportunities at K-12 and preparing our students to select STEM degrees and careers.

MiSTEM is part of the Prosperity team at LEO and is charged with supporting the state's Sixty by 30 goal – increasing the number of Michigan residents between the ages of 16 and 64 with a postsecondary credential to 60% by 2030. Through this transition, MiSTEM has worked to align to this new goal, adding clarity and consistency to our identity and establishing new priorities that will drive measurable success toward Sixty by 30 objectives in Michigan.

Together, the MiSTEM Advisory Council and Network have set forth a guiding mission and vision, clearly defining our unique place in the Michigan STEM ecosystem and our collaborative purpose.

## **Mission**

Be the catalyst for equitable access and engagement in authentic STEM experiences in every community in Michigan.

## **Vision**

Michigan is home to a generation of innovators who create more inclusive and prosperous businesses and communities.

## **Who We Are**

The MiSTEM Network builds and mobilizes committed networks of collaborators across Michigan to broaden the STEM ecosystem and embrace learning experiences beyond the physical classroom.

## **What We Do**

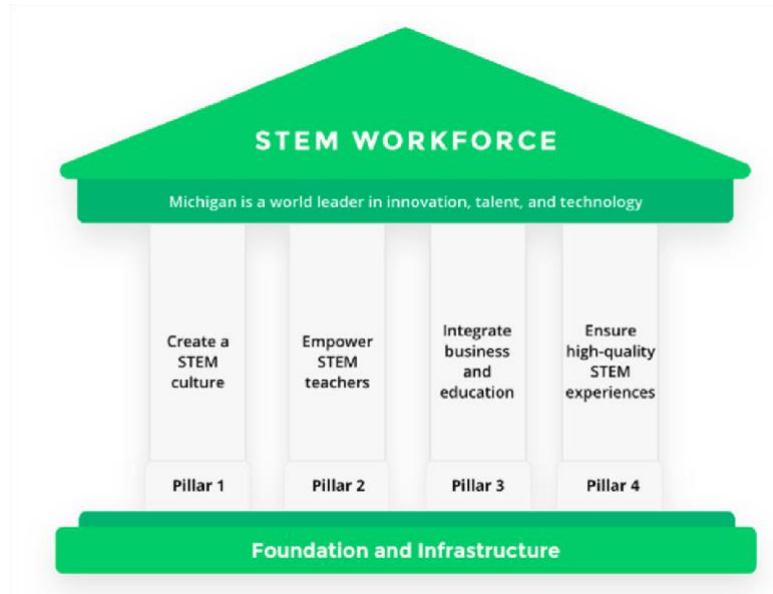
We provide real-world connections between school, the workplace and our communities.

- Responding to data
- Partnering with business and education
- Empowering STEM teachers
- Ensuring high-quality STEM experiences in and out of school

By increasing STEM engagement in all Michigan communities, we will transform the culture of STEM, creating sustainable pathways and careers to cultivate an innovative workforce of the future.

# MiSTEM Strategy

In 2016, the MiSTEM Advisory Council established a strategic plan for STEM in Michigan. This work was guided by the belief that if Michigan wanted to be home to the strongest STEM workforces in the nation, the state needed to change how it thought about STEM; support K-12 STEM educators; build collaboration across business, education and communities; and ensure quality experiences for all students. These pillars continue to drive MiSTEM's work today.



As implementation work has grown around these pillars, the integrated nature of the strategy becomes clearer. Further, the outer two pillars drive toward and articulate the outcomes that we wish to create from the actions taken in pillars two and three. As we continue to grow in our collaborations around this work and in service to the governor's Sixty by 30 goal, the Advisory Council has elevated the importance and focus on two areas of the statewide strategy in 2020 – to empower STEM teachers and to integrate business and education. Establishing connections between educators and business is vital to creating the pathways to a postsecondary credential.

- **Empower STEM Teachers:** By creating opportunities for professional learning, capacity building and support, and by connecting teachers with community partners that enable a diverse array of STEM-related engagement, we create the framework for collaboration.
- **Integrate Business and Education:** By bringing leaders together to codesign cross-disciplinary real-world projects, we provide authentic learning opportunities to help train a diverse STEM-literate workforce.

This strategy serves as a framework for grant funding and development of regional strategic plans and programs to put our vision into action.

# 2020-21 Priorities

The MiSTEM Advisory Council has established three priorities for 2020-21 that will continue to move STEM forward in Michigan. These priorities are to be carried out through actions that empower STEM teachers and integrate education with business.

- Priority 1: Strengthen the Network
- Priority 2: Contribute to the COVID-19 Response
- Priority 3: Elevate Computer Science

## Priority 1: Strengthen the Network

The MiSTEM Network has built a strong foundation and infrastructure to engage partners across the state that are invested in students, STEM education and workforce development. In 2019-20, the Network continued to strengthen and grow the ecosystem and culture in Michigan – adding clarity to the unique role STEM plays in building a vital workforce. Part of our work has involved continuing to improve funding streams available to support STEM work. In 2019, the Council also shifted to a grant process that ensured all communities and students had access to funding for STEM education.

This work is not done. The Network continues to grow and improve its relationships and support systems. In the year ahead, we are dedicated to continuous improvement to strengthen the Network through our ongoing commitment to equity and equitable access to enhanced learning opportunities for all. In 2020-21, we will:

- **Address disparities across the system.** All students can and should have access to high-quality STEM learning. However, access to STEM too frequently varies based on a student's race, ethnicity, income or hometown. The Network will continue to take steps to support and fund STEM education in all communities across the state. Specifically, we will:
  - Target investments to high-need demographics and places
  - Use regional data to support efforts to track and improve educational equity
  - Increase diversity and build organizational capacity in the STEM education field through educator training and professional learning
  - Reach out to students who are underrepresented in STEM careers (including women and students of color) to build a stronger STEM identity and allow them to imagine themselves in STEM careers
- **Continue the development of problem-, place- and project-based learning.** Especially in a time of such uncertainty, MiSTEM has an opportunity and responsibility to help curriculum become more flexible to meet the changing needs of students and communities. Problem-, place- and



project-based (3P) learning models allow for a natural coexistence of student and community voice and choice (equity and co-design) and intentionally imbedded career development work. While these efforts tend to exist in out-of-school programming and extracurricular or elective opportunities for youth, we advocate that the system needs to support a shift toward this pedagogical approach. This work is specifically defined as the No. 1 essential practice for [disciplinary literacy instruction](#) by the General Education Leadership Network (GELN). MiSTEM will support implementation of this instructional practice in classrooms, schools and systems with its GELN counterparts and other partners to co-design professional learning supports for communities to make these shifts. Through MiSTEM, Council grants will be a piece of the support structure to move this work forward.

- **Inspire learning through community partnerships.** These opportunities also naturally connect the out-of-school learning spaces to the formal education spaces and provide for cross-disciplinary exploration. Families, community partners, businesses and others contribute the rich context to use in problem-, place- and project-based learning while allowing for various community assets and profiles of experts to be showcased for students. We must further design opportunities for professional learning support to shift to 3P learning models that empower educators to connect classrooms to careers and expand learning programs through community partnerships. Working together, we will create a more vibrant STEM ecosystem that ultimately leads to more engaged students and a stronger Michigan workforce.

## **Priority 2: Contribute to the COVID-19 Response**

Like so many partners, MiSTEM has contributed to the state's COVID-19 response. Our STEM partners have:

- Facilitated a partnership among schools, universities and Great Lakes Composites for Project Face Shield, using 3D printers to produce and distribute over 2,200 face shields to 68 hospitals and fire and police departments across the Eastern Upper Peninsula.
- Distributed 4,200 STEM at Home kits with summer meet-up/eat-up programs in Genesee, Lapeer and St. Clair counties.

As a Network, we have continued our work by providing resources on social media, offering virtual professional development and student opportunities, and continuing to engage with and support community partners.

We are committed to further redeploying our resources to support students and schools that are thinking differently about instruction than ever before.

In the year ahead, MiSTEM will:

- **Allow grantees to be responsive.** MiSTEM will connect with past grant recipients to reimagine and transition the awarded STEMworks programming to virtual and hybrid learning spaces in addition to the already planned

professional learning and student activities. As there is considerable use of these programs in our state, the focus would be on relieving the burden on educators alone to transition their curriculum for fall and provide a supportive professional learning community to do this work. Educators are most needed to build relationships and engage students in learning – let us keep this as the primary objective and provide them the space to do this.

- **Collaborate to support diverse environments where students are learning.** Utilize all spaces where learning occurs to connect assets with schools: classroom instruction, out-of-school programs, designed informal settings and everyday settings and family activities. Each of these spaces has struggled during the pandemic, and each is struggling with what reopening means. MiSTEM provides a home for these spaces to come together and recognize their collective assets and abilities to empower youth. Examples were already seen in our state, prior to the pandemic, such as museum schools and place-based stewardship programs supported by the [From Students to Stewards](#) program and the [Great Lakes Stewardship Initiative](#).
- **Provide tools for STEM educators and districts.** MiSTEM is creating a series of playbooks to assist educators and school districts as they reimagine their STEM offerings and how their programming contributes to talent development and more inclusive and prosperous communities. The framework and associated tools will be created to scale quality practices across our state and help community partners to develop and share resources that facilitate connections with local systems.

### **Priority 3: Elevate Computer Science**

In May 2019, computer science standards were adopted for the state. The MiSTEM Network has been a regional [Code.org](#) partner that has provided a foundation for our schools to begin implementing these standards in K-12. In collaboration with Grand Valley State University, Code.org provided learning opportunities for 340 teachers through MiSTEM Advisory Council grants last year alone. Also important, Code.org is reaching substantial numbers of female students and students of color. In the year ahead, MiSTEM will:

- **Award grant funds to support computer science.** The computer science standards provide a rich opportunity to showcase careers and grow science and mathematical literacies where they naturally coincide. We recommend exploring how the grant opportunities for Math Recovery, Code.org, NGSX, Cereal City, Mi-STAR and Modeling in Science could work together to support this implementation. Similarly, MiSTEM should provide for STEM expertise to show how STEM programming intentionally supports the GELN early literacy, mathematics and disciplinary literacy [essentials documents](#).
- **Partner with DTMB to increase access to real-world computer science experiences.** The Department of Technology, Management and Budget (DTMB) has also called for increased coordination in computer science through its SecureMI Cybersecurity work. Since cybersecurity is important for every individual, home, community and business in our state, it provides a relevant way to engage students in learning computer science standards. This opens the door to 3P learning opportunities for student

engagement and career development throughout the K-12 system. MiSTEM already is leading these efforts in collaboration with MDE by identifying existing assets to help schools do this work. It is critical to capture these efforts in a playbook for the Michigan Integrated Continuous Improvement Process strategy bank so that other communities can grow their computer science programming.

- **Collaborate with partners, especially MDE and school districts statewide, to systematically increase access to computer science.** MDE is a critical partner in moving forward STEM education. As MDE works to implement Michigan’s Top 10 Strategic Education Plan, computer science particularly allows us to support the State Board of Education’s proposed goals of:
  - Expanding early childhood learning opportunities
  - Improving the health, safety and wellness of all learners
  - Expanding secondary learning opportunities for all students
  - Increasing the percentage of adults with a postsecondary credential

# Our Commitment

Michigan youth are entering an increasingly uncertain future. But MiSTEM can help. If Michigan is to meet its goal of Sixty by 30 and fill the projected shortage of qualified and skilled job seekers, MiSTEM must do its part in creating viable pathways for all students to consider and pursue high-wage, high-demand careers. The Network has a unique convening power to achieve its mission of catalyzing equitable access and engagement in authentic STEM experiences in every community in Michigan. This is done with a focus on driving positive outcomes for all students in Michigan, for the state's future workforce, businesses and economy.

Within the culture of MiSTEM is a commitment to data that drives decisions and motivates action. MiSTEM utilizes a robust group of evaluators that will continue to drive improvements in bringing together diverse groups of people, revising programming and fine-tuning areas of need. This work is critical to continue as the Network moves from establishing baselines and begins to measure the impacts of its collaborations. MiSTEM is dedicated to continuing efforts to move this important work forward through:

- Gathering data at the ISD/school level to guide regional direction and following this data to monitor progress of programs throughout student pathways.
- Aggregating school data at a regional level, identifying needs and gaps to inform grant direction and to measure grant progress.
- Compiling and analyzing regional data to understand MiSTEM impact on STEM career pathways statewide and using it to inform MiSTEM planning and program implementation around STEM graduation and labor market information.
- Monitoring annual progress toward the state's postsecondary attainment goals and adjusting focus areas as needed.

This data-driven approach will allow measurement of short-term STEM progress and monitoring of long-term STEM value to Michigan, while also providing a mechanism to guide future strategic direction for the Network.

The MiSTEM Network is committed to bringing people and practice together to continue its momentum. Together with all partners MiSTEM will:

- Inspire young people to explore STEM study and career pathways
- Empower administrators and educators to engage in STEM development and implementation
- Create dynamic school, employer and community connections

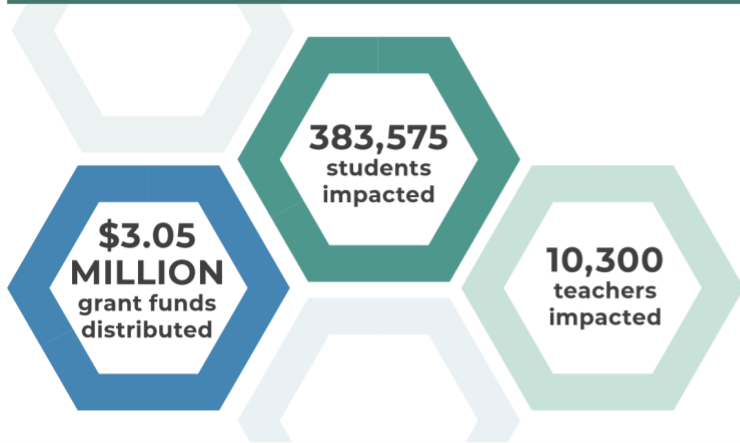
- Engage all stakeholders in Michigan to be part of the growing STEM ecosystem
- Build up the importance of STEM skills and education

With these actions, MiSTEM will realize its vision for Michigan as a home to innovators who create more inclusive and prosperous businesses and communities.

## A Critical Talent Shortage in STEM

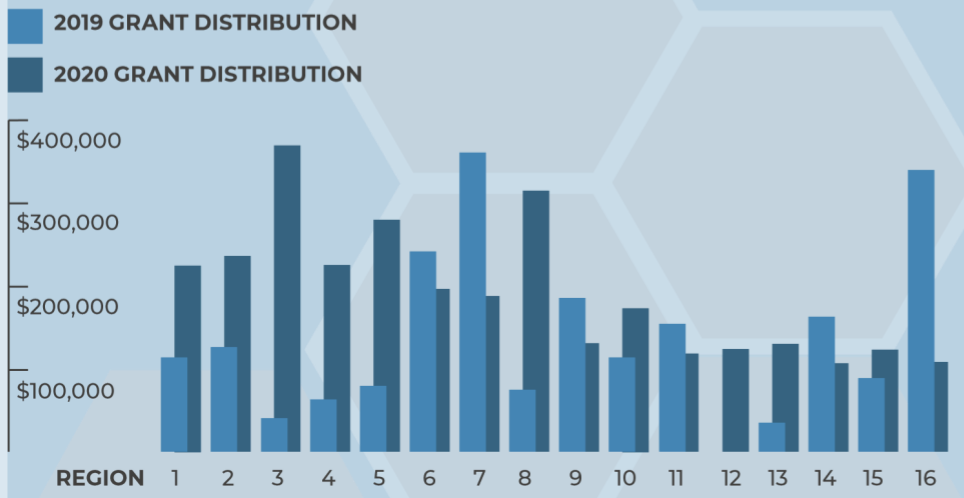
**337,820** openings in STEM careers THROUGH 2028

**26,600** new STEM job opportunities expected each year



2020 saw improvements for grant applications to ensure a more equitable process that distributed funds more widely across the 16 MiSTEM regions to:

- Offset rural challenges
- Adjust for population size



## Funding by Program

Code.org		X		
ASU Modeling Instruction			X	X
Math Recovery				X
NGSX			X	X
Great Lakes Stewardship Initiative				X
Mi-STAR			X	X
Cereal City Science			X	
Camp Invention			X	
Engineering is Elementary			X	
Phenomenal Science			X	X
PLTW	X	X	X	X
Imagine Math				X
Robotics Education & Competition Foundation	X	X	X	
STEM Equity Pipeline	X	X	X	X
Ten80			X	

### TOTAL FUNDS AWARDED\*

#### PER LEGISLATED FOCUS CATEGORIES



**Robotics**  
\$171,369



**Engineering or Bioscience**  
\$1,516,056



**Computer Science and Coding**  
\$563,869



**Other**  
\$2,235,083

\* Total reflects more than funds available, some programs meet more than one focus area

### REGION CODES


1. SOUTHWEST MICHIGAN
2. SOUTHCENTRAL MICHIGAN
3. WAYNE COUNTY
4. MACOMB COUNTY
5. OAKLAND COUNTY
6. GENESEE, LAPEER, ST. CLAIR COUNTIES
7. MID-MICHIGAN
8. WEST MICHIGAN
9. WEST CENTRAL MICHIGAN
10. CENTRAL MICHIGAN
11. THUMB
12. NORTHEAST MICHIGAN
13. NORTHWEST MICHIGAN
14. EASTERN U.P.
15. CENTRAL U.P.
16. COPPER COUNTRY

# MiSTEM Network 2019-2020 Impact Report

## The MiSTEM Network

The MiSTEM Network is working to transform the culture of STEM in Michigan – driving STEM infrastructure to prepare students for the evolving workforce.

Through 16 regional hubs across Michigan, the Network mobilizes collaborators to broaden the STEM ecosystem and embrace learning experiences beyond the physical classroom. We work to connect education, business and community partners so that every student can learn and use STEM skills to address authentic challenges in their communities.

 Our vision is to be a home to a generation of innovators who create more inclusive and prosperous business and communities.



MiSTEM Pillars

## 2019-2020 Impact Highlights



Administered 14 grants totalling \$3,050,000 to Michigan schools and educators to improve the next-generation STEM workforce



Connected with STEM-oriented businesses, organizations, higher education and community members to provide real-world experiences



Delivered 112 educator professional development events providing 2,366 contact hours to educators to enhance their ability to provide quality STEM learning experiences



Deployed 52 student events – including camps, robotics, vocational trade shows, innovation expos and internships – across all 16 regions, providing 800 contact hours



Developed critical partnerships that now span the Upper and Lower peninsulas, in both urban and rural communities

## The Power of Partnerships: Featured Programs

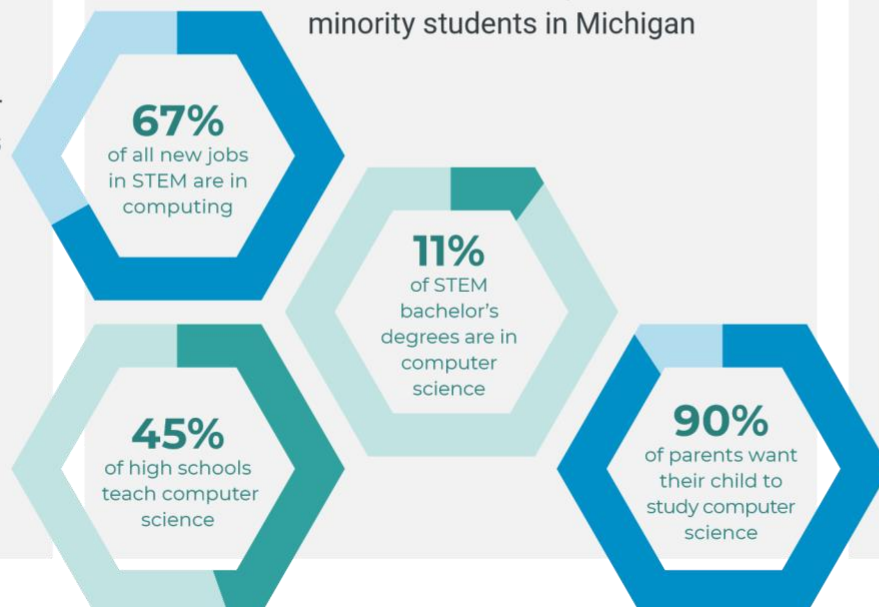
### TURNING STUDENTS INTO STEWARDS OF THE GREAT LAKES

- Using place-based, real-world experiences to engage students and prepare them for water-focused STEM careers. A collaboration among the MiSTEM Network, Michigan Department of Environment, Great Lakes, and Energy and the Michigan Department of Education
- MiSTEM Network grants help educators integrate water-literacy principles into school curricula for students from K-12 – cultivating the next generations of water stewards, leaders and decision-makers



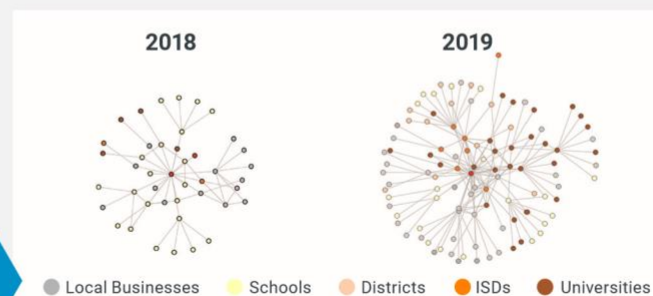
### GROWING COMPUTER SCIENCE LITERACY WITH CODE.ORG

- In collaboration with Grand Valley State University, CODE.org provided learning opportunities for 340 teachers through MiSTEM Advisory Council grants
- Importantly, CODE.org is reaching substantial numbers of female and underrepresented minority students in Michigan



### ACTIVATING REGIONAL NETWORKS FOR EMERGENCY RESPONSE

- Used social network analysis to build a diverse leadership network to improve collaboration and learning across sectors
- Facilitated a partnership among schools, universities and Great Lakes Composites – Project Faceshield – using 3D printers to produce and distribute over 2,200 face shields to 68 hospitals and fire and police departments across the Eastern Upper Peninsula



## Moving STEM Forward in Michigan

- Place equity at the forefront of all decisions, with a focus on data and regional needs to expand access
- Build STEM awareness and connect STEM learning to career pathways
- Identify measures of success in alignment with state Sixty by 30 goals and federal STEM goals

