FULL STEAM AHEAD

Recognizing and Fulfilling Need

AGBU Alex & Marie MANOOGIAN SCHOOL
Heritage · Achievement · Excellence

Dr. Hosep Torossian

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2. Federal Priority
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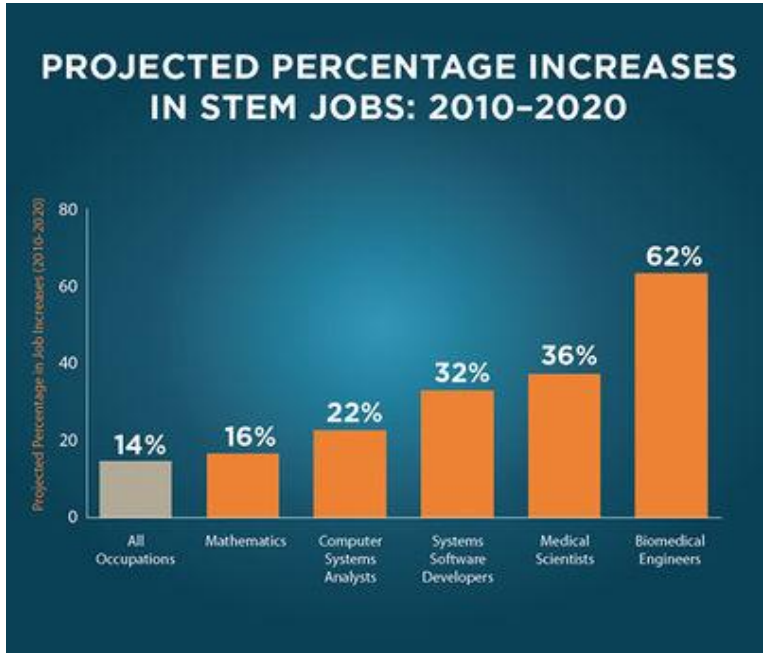
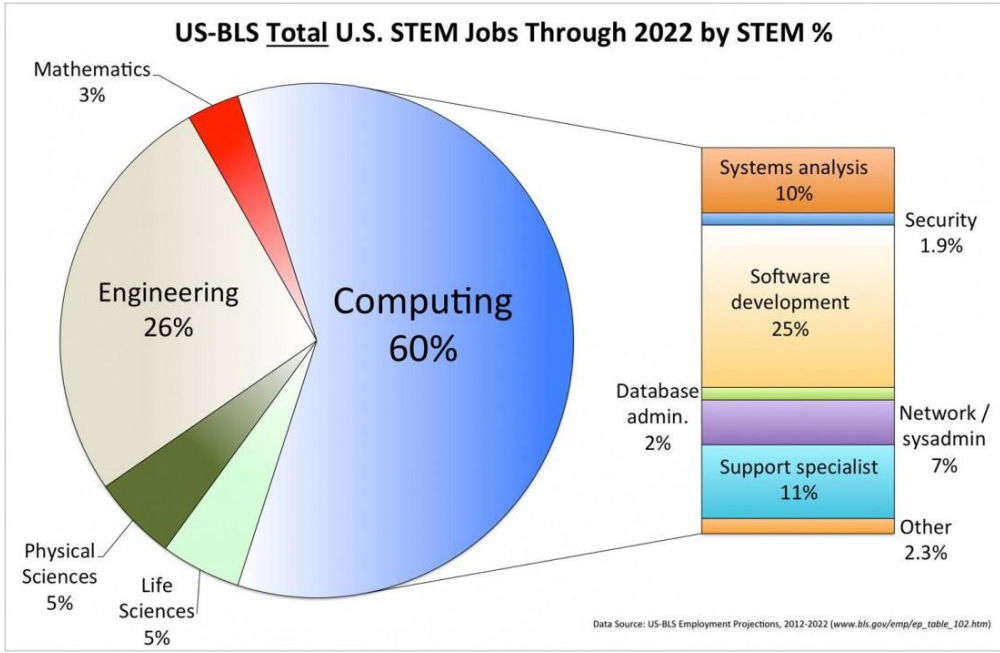
STEM ASPECTS

Science	Technology	Engineering	Mathematics
• Biology • Chemistry • Physics • Zoological Studies • Environment Studies	• Computer Science • Information Systems • Web Design • Game Design • Software Creation	• Mechanical • Electrical • Chemical • Robotics • Civil	• Accounting • Statistics • Finance • Pure Mathematics

STEM BASED EMPLOYMENT





Projected Jobs

- Projections by the U.S. Department of Labor indicate another 10.5% average growth in STEM related fields from 2020-2030, while other occupations will only grow 7.7%.

Areas of Employment

- With computing and engineering dominating future STEM employment, schools that wish to ensure the future success of students need to adjust accordingly, in addition to preparing students for all future career paths.

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IMPORTANCE OF STEM

STEM education changes society by offering learners a new mindset and skills valued in any profession. They allow young people to be flexible, look for patterns, find connections, and evaluate information.

STEM education raises social awareness.

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OUR FOUNDER, PHILANTHROPIST

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BENEFITS OF TEACHING STEM

1. Fosters creativity
2. Increases team collaboration
3. Develops communications skills
4. Empowers critical thinking skills
5. Boosts curiosity
6. Improves cognitive skills
7. Introduces STEM careers at early ages
8. Teaches how to take initiative
9. Enhances media literacy
10. Boosts social-emotional learning (SEL)

- It prepares professionals who can transform society with innovations and sustainable solutions to respond to real-world challenges.

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FEDERAL, SCIENCE, TECHNOLOGY, AND MATHEMATICS (STEM) EDUCATION STRATEGIC PLAN

"One of the things that I've been focused on as President is how we create and all-hands-on-deck approach to science, technology, engineering, and math. We need to make this a priority to train an army of new teachers in these subject areas, and to make sure that all of us as a country are lifting up these subjects for the respect that they deserve."

PRESIDENT BARACK OBAMA
2013 WHITE HOUSE SCIENCE FAIR

Maintaining America’s position ”means protecting America's world leadership in science, engineering, and technology. That requires maintaining federal funding for STEM R&D a top budget priority.”

“It is the only way to maintain our U.S. standard of living, national security, and global economic competitiveness.”

STEM NATIONAL GOALS

- Improve STEM instruction
- Increase and sustain youth public STEM engagement
- Enhance STEM experience of undergraduates
- Better serve under-represented student groups
- Design graduate education for tomorrow's workforce.

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EVERY STUDENT SUCCEEDS ACT (ESSA)

Congress provided 1.1 Billion in Title IV grants for FY18.

Can be used to support the wide range of activities that are specifically allowed in the statute to improve STEM teaching and learning.

- Expansion of high-quality STEM courses.
- Increased access for at-risk students.
- Provide hands on opportunities.
- Integration of arts into STEM subjects,
- Afterschool STEM programs.
- Expansion of environmental education.

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MICHIGAN ECONOMIC OVERVIEW 2019

Population: 9.97 Million

Jobs: 4.729 Million

Median Household Income: 52.7K (5K Below National)

Residents with Bachelor's: 16.6% (2% Below National)

Residents with Associates: 8.9% (0.9% Above National)

Top 3 Industries: Restaurants, General Medical, Education

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STEM IN MICHIGAN

Michigan has the potential to become a world leader in STEM education and careers, due to strong talent, educational institutions, and thriving industries.

According to the Federal Bureau of Labor Statistics, STEM careers are expected to grow at more than twice the rate of other occupations in the upcoming years.

Michigan has the 4th largest engineering, design, and development (EDD) workforce in the nation, with over 113,000 employees in related industries in 2020. Employment in EDD industries is almost twice as concentrated in Michigan as the national average.

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MICHIGAN DEPARTMENT OF EDUCATION

Imparting Understanding and Skills

- “We must help students and their parents understand that careers in STEM are opportunities for exciting, challenging, and financially rewarding high-satisfaction jobs.”
- “We can give them the STEM skills they need to adapt, as the industries they enter continue to evolve.”

Preparation for High-Skill and High Wage Jobs

- “Our core focus must be to ensure that we are preparing students to meet the needs of the future for high-wage high-skill jobs, that are rapidly becoming available in STEM fields in Michigan and across the country and do everything we can to show them that those rewarding careers can be achieved here in Michigan.”

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EDUCATIONAL CRISIS

- Michigan Trails other states in fourth grade reading. Report warns it could get worse.

Jennifer Chambers
The Detroit News
May 17, 2022

- By 2030, Michigan is projected to be the 39th in the nation for fourth grade ready performance. (Current Ranking #32)

State of MI Education Report
Education Trust – Midwest

- Michigan is in the bottom 10 states for Black students in fourth grade reading.

NAEP, 2019

- Between 2003 and 2019 – stagnation, while Massachusetts and Tennessee made significant progress.

- **Growing concerns about Michigan's economic competitiveness and its connection to the state's educational outcome.**

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EDUCATIONAL CRISIS

- Most and Least Educated Rankings in United States.

Michigan
#25

Research Indicators

- % of High School Diplomas
- % of Associate's Holders
- % of Bachelor's Degree Holders
- % of Graduate or Professional degree Holders
- University Quality

WalletHub
Adam McCann
Financial Writer
Feb 14, 2022

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MOST & LEAST INNOVATIVE STATES

- Innovation is the principle driver of U.S. economic growth. In 2022 the U.S. will spend nearly $600 Billion on R&D. More than any other county and more than 25% of the world's total. The U.S. is #3 on the global innovation index.

  WalletHub

- Nation's biggest contributors based on 22 key indicators, from share of STEM professionals to R&D spending per capita, to tech company density.
  - Michigan is Ranked #4
  - Louisiana is Ranked #50

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MOST & LEAST INNOVATIVE STATES

- Parameters for predicting future innovation ability and success of a state include:
  - Share of STEM professionals.
  - Projected STEM job demand by 2028
  - 8th Grade math and science performance.
  - Number of Masters of Science degrees.
  - Share of technology companies.
  - R&D spending per capita.
  - Fastest available internet speed.
  - Venture capital funding per capita.

BEST & WORST METRO AREAS FOR STEM PROFESSIONALS

- Metro Detroit #91 Among 100 areas.
- Study looked at 19 key metrics from per capita job spending for STEM graduates to median wage growth for STEM jobs.

WalletHub
Adam McCann
Financial Writer
Jan 19, 2022

- Median annual STEM wage is $89,780 compared to $40,020 for all non-STEM occupations.
- According to U.S. Department of Labor, projected growth is 2.8% higher for STEM jobs compared to all other fields.

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IS MICHIGAN POSITIONED TO ATTRACT STEAM EMPLOYERS?

Automation Alley
June 3, 2022

- In Feb 2022 Michigan had 330,000 job openings, up 55.7% from the same period last year, and equal to 7.2% of all jobs in the state. This compares to the national average of unfilled jobs which is 6.6%.
- Labor force participation rate is 59.5%, ranking Michigan 41st nationally. More people are leaving the workforce than coming in. A sign of talent shortage.
- Last year the average pay for a computer-math related job in Metro Detroit was $83,984, well below the U.S. Average of $97,540. Seattle was at the top of the list at $116,488!
- Talent shortage is a real and pressing issue. This is particularly true in the high-tech manufacturing sector, where Michigan relies heavily on STEM employees.

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CRISIS RECOGNIZED

Consumers Energy

"The data is so overwhelmingly clear that we can't just overlook it."

"the house is on fire, and we have to do something about it."

Consumers Energy Former CEO
Pattie Pope
Conference Chair

"Governor Gretchen Whitmer flashed a slide at the Detroit Regional Chamber's Mackinac Policy Conference that should shock everyone. On literacy, Michigan is ranked dead last in the nation. 50th."

NPR
Michigan Radio
Daniel Howes
Detroit News

THE SKILLMAN FOUNDATION

"It's an embarrassment that the state's kids do not deserve."

Skillman Foundation Former CEO
Tonya Allen

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FORD'S BLUE OVAL CITY

- $5.6 Billion in rural West Tennessee – Stanton.
- 5800 direct jobs with thousands more expected.
- 3600 acre mega complex call Blue Oval City, the largest, most advanced, most efficient auto production campus in Ford's history. World's best!
- F-Series generation of all electric trucks.
- Partnering with SKInnovation.
- Twin battery facilities in Kentucky.
- Total investment $11.4 Billion.

GM & LG LITHIUM BATTERY PLANTS ANNOUNCED

- $2.3 Billion battery cell plant for Cadillac Lyriq, adjacent to the new assembly plant in Tennessee.
- Capacity 70 Gigawatts, double of Tesla's Gigafactory in Nevada.
- GM has partnered with Honda to make Honda and Acura electric SUVs.
- GM and LG are constructing another plant in Ohio.
- Ohio plant will supply GM's Factory Zero in Michigan.
  - Hummer EV
  - Cruise Robotaxi
  - Chevy Silverado EV Truck
- Lithium battery range will range 450-600 miles.

GOING ELECTRIC

- Globally battery production is expected to grow from 95.3 (2020) GWh to 410.5 GWh (2024).
- America’s best-selling vehicles are going to be totally electric.
- 40% of Ford’s global fleet will be electric by 2030.

WHAT IS MICHIGAN DOING

"Citing Ford Snub, Michigan House fast tracks business incentives bills.

Dec 8, 2021

"Michigan Lawmakers OK $1 Billion for economic incentives to attract big business investments."

"The package was spurred by Ford's recent $11.4 Billion investment at new plants in Tennessee and Kentucky which will build F-Series pickups and electric vehicles batteries."

Dec 14, 2021

WHAT CAN BE DONE?

- Michigan needs to improve its education system. This incudes both primary and secondary education, as well as higher education. The state needs to produce a pipeline of educated workers prepared to enter the workforce and meet the needs of Michigan business.
- Michigan business needs to pay competitive wages.
- The state needs to better market itself as a place for STEM workers. This includes leveraging the State's many advantages, such as world class universities, vibrant cities, and beautiful natural scenery.
- Michigan has much to offer potential STEM employers. However, the state is not accurately positioned to attract the talent it needs in order to maintain its position as a leader in the manufacturing industry, despite being home to more than 11,000 manufacturing firms.

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STEM INVESTMENT AND RETURNS

Economic and Just Future

Investing in STEM is critical to the nation and its economic future for numerous reasons:

- The Jobs of the future are STEM jobs.
- Progress on STEM is critical to building a just and inclusive society.

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OUR STEAM JOURNEY

1995-2014	SaM	No Facilities
2014-2022	STEaM	Makeshift Facilities
2022-Future	STEAM	Dedicated Facilities

PROGRESS OVER TIME

Year	Progression
2013	Advanced placement course begin.
2014	First solar car and hands-on student STEAM project.
2015	Robotics and PLTW Human Body Systems introduced.
2016	Automotive and engineering annual competitions.
2017	Dual enrollment at LTU for STEAM courses and CAD introduced. Initial 3D printer acquired.
2018	PLTW Computer Science and Engineering Design Introduced.
2019	FIRST Robotics international competition. Recognized with 1st Place Rookie Award. Showcase at Detroit Auto Show.
2020	Request for STEAM building.
20-21	All programs continue despite COVID pandemic.
2021	Groundbreaking of Manoogian Steam Center building.
2022	Opening of Manoogian Steam Center. Partnership with OSTC and CCS established.

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OUR STEAM PROGRAM

Rigorous Courses

- Advance Placement Courses
- Calculus I
- Organic Chemistry
- Computer Aided Design (CAD)
- Environmental Sciences
- PLTW Human Body Systems
- PLTW Computer Science

Dual Enrollment

Oakland Community College

- Philosophy
- Sociology
- Psychology
- Criminal Justice
- Business
- General Ed. Courses

Dual Enrollment

Lawrence Tech University

- Physics
- Chemistry II
- Calculus II & III
- Intro. Engineering

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OUR STEAM PROGRAM

•Partnerships

- LTU – Summer STEM Camps
- WSU – Internships
- OSTC – Choice of 15 Programs
- DEC – Career Readiness Academy
- DEC – Speakers and Trips
- CCS - In the Pipeline
- GM, Nissan, MCS, & Other Visits

OUR STEAM PROGRAM

Engineering and Technology

- Solar Car
- Electric Car
- Robotics
- Computer Sciences

- 33 Total Awards and Trophies

Competitions and Awards

- LTU World Robotics Competition
- Square One
- FIRST Robotics
- Showcased at Detroit Auto Show
- Showcased at Lansing Charter Schools Day

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OUR STEAM PROGRAM

Students

- From a handful of kids to more than 30 in automotive and robotics.
- More than 50% female participation.
- Shift of future career ambitions from medical to engineering.

Faculty

- Our Biggest Asset
- Our Main Resource
- Our Motivators
- Our Nurturers
- Our Experts
- Our Innovators

School Board

- Fully supportive of our initiatives, vision, path, funding of programs, efforts, and facilities.

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FACILITIES OVER TIME

Beginnings	Realization	Pursuit	Completion
• Almost non-existent for Engineering and Technology. • Used a kitchen, electrical room, and multi-purpose room.	• Awards coming in. • Fear of stagnation. • Urgent request placed with board. • Appeal for facility.	• Vision, pitch, plans • Committees, sources of funding. • Architects, project management. • PR work, Covid setback, and delays for revisions.	• $2 Million • 4000 square foot building. • Manoogian STEAM Center opens September 2022. • Available to K-12.

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QUIK SHADE
adidas
1G
SQUARE ONE
EDUCATION NETWORK


UNIVERSITY
OF
MICHIGAN

CORRELATION BETWEEN UNIVERSITY ACCEPTANCES AND STEM PROGRAMS

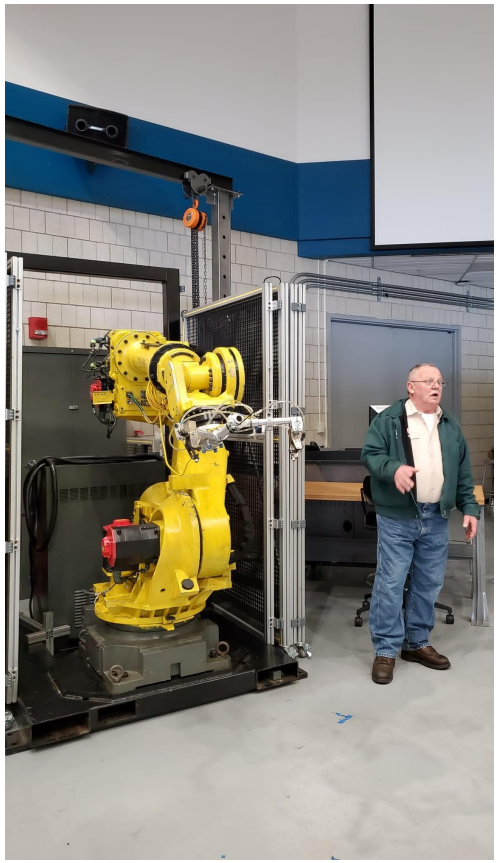
U of M is the Most Selective University in Michigan

2011-2016	22 Students	Average Class Size: 32
2017-2022	39 Students	Average Class Size: 32

Year	4-Year Scholarships Awarded
2020	3.0 Million
2021	4.6 Million
2022	12.2 Million

Scholarships Used To Average 1-2 Million

FUTURE PLANS



- Stay on path of our STEAM vision.
- Furnishment of the Steam Center building.
- Introduce Biotechnology in middle and high school.
- Make skilled trades education available to 11-12 grades.
- Focus on “A” of STEAM w/ Graphic Arts and Design.
- Expand elementary and middle school STEM programs.
- Bring coding to Middle School and then to Elementary.
- More opportunities for STEAM field trips.
- STEAM based professional development for faculty.
- Strengthen ties with ESD.
- Continue recruiting STEAM teachers.
- Use STEAM program as a marketing tool.
- Pursue renewable solar energy for school.
- STEAM for refugee and ESL students.

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TAKE HOME MESSAGE

1. Show students what they can do with degrees both before they enroll and throughout their academic careers.

2. Prepare high school students better in basic skills needed to succeed in STEM professions.

3. Ignite interest in STEM early!

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WOW . . . WHAT A YEAR!

31 students graduating

5 offers from Ivy League Universities (Princeton, Brown, Cornell, Dartmouth, U-Penn) to two students

Four-year graduation rate: **100%**

29 students heading to four-year universities

2 students continuing in community colleges

Total four-year university scholarships received: **OVER $12 million**

The Class of 2022 has **4** Valedictorians and **3** Salutatorians

145 university acceptances*

Notre Dame University gave **2** full-ride scholarships to two students

10 students (one third of the class) are accepted at U of M Ann Arbor, the most selective university in Michigan

**The 145 universities, in addition to the above include all Michigan universities, plus Boston College, Tufts University, Berkeley, Loyola and many others.*

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ACKNOWLEDGEMENTS

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THANK YOU

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