EV Workforce Development & Education at

Agenda

- What is the EGI & EVC
- EVC Pillars
- Education & Workforce Activity
- How to Engage

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ECONOMIC GROWTH INSTITUTE

EQUITABLE ECONOMIC GROWTH

Our Mission

We Educate,
Innovate
& Engage
to Accelerate
the Future of
Electric Mobility

Our Vision

To Make Michigan
the E-Motor Capital*

*and to Make Detroit the E-Motor City

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Stakeholder Engagement

- **Goal is to work with industry to establish the high-level priorities on Technology, Workforce Development, and Education**
- Execute resulting project portfolio as a partnership of academia, industry, and government

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Strategic Pillars

- Facilities Expansion
- Education
- Workforce Development
- Technology
- Foundation:
  - Excellence
  - Collaboration

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M | BATTERY LAB

Battery Lab Overview

- Open access, user facility
- Your IP is protected every step of the way
- Designed to accommodate users from the academic to the OEM level
- State-of-the-art Li-ion battery mixing, coating, assembly, and testing equipment
- Facilitate collaborations between industry and academic experts
- Competitive pricing

M | BATTERY LAB

Battery Lab 2.0 – Bigger, Faster, Better

Battery Lab 3.0 –

expand training/education capabilities

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Industry Needs

Proposed Priorities of Project Workshops – *Technical*

1. Batteries
2. Drive Module System Optimization and Integration
3. Vehicle/Component End of Life
4. Data Collection, Modelling & Analysis
5. Electric Infrastructure and Charging Equipment
6. Thermal Management
7. Raw Materials and Supply Chain
8. Light-weighting

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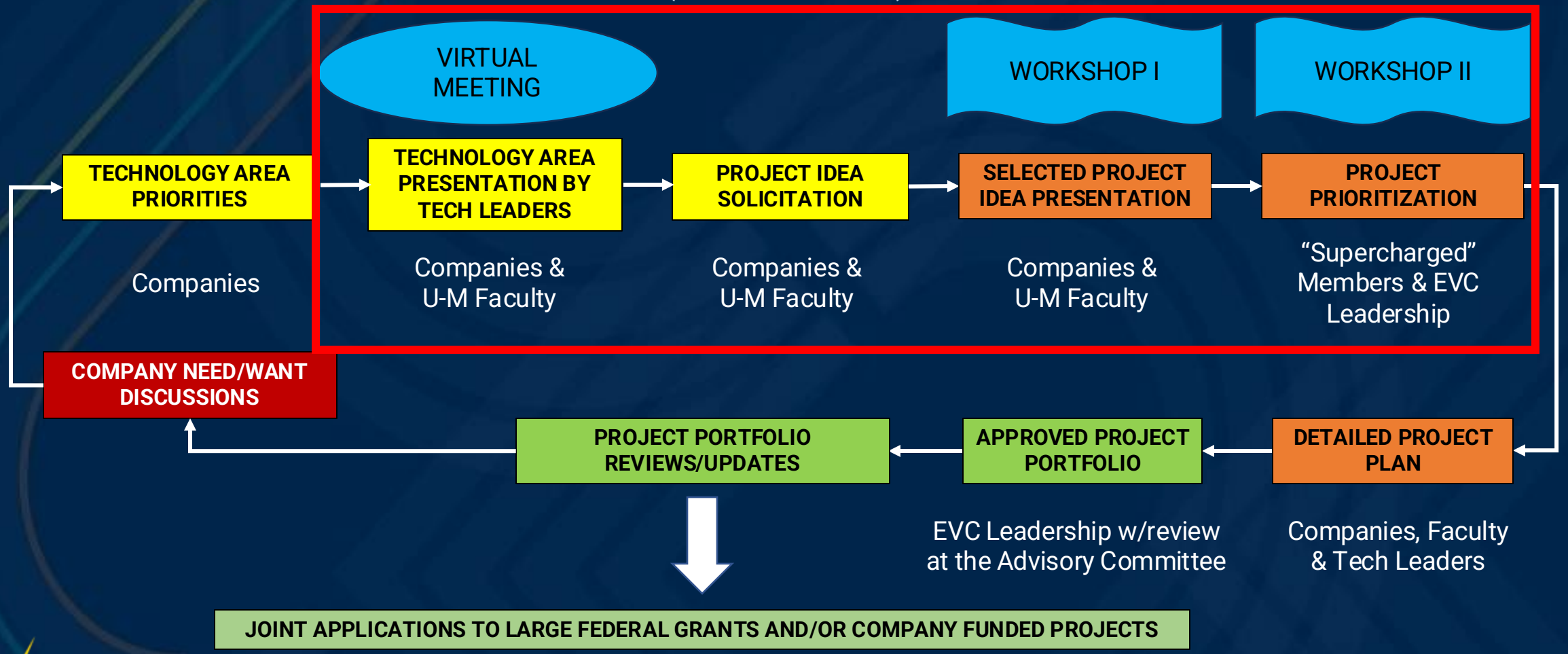
Company-Driven Project Portfolio Process

(Technical)



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Workshop Output

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- Project ideas submitted: 124
- Project ideas with at least two companies at end of workshop:
  - Batteries 19
  - Drives 14

- Companies requested second workshop on End-Of-Life and Thermal Management prior to final prioritization since overlap in internal resources
  - **Scheduled for September 18**

- Goal is to have first round of projects in these technology areas launched by 4Q24
  - Proposing to pilot launch two projects in September

- Electric Infrastructure and Charging Equipment will be third workshop

Strategic Pillars

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Industry-Driven Priorities

- Sparking PK-12 Minds
- Undergraduate, Graduate, and Professional Education
- Workforce Transformation
- Foster Collaboration
- Energize Organization Transformation

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EVC Workforce Development & Education

EV Industry Needs + Collaboration = Equitable & Accessible Employer Driven Solutions

Skills	Opportunity	Growth

Strategies

- Increase degrees and certificates
- Reskill for industry transitions
- Expand pathways to lifelong learning and career success

- Expand career exposure, exploration, experience, and navigation

Promote equity and accessibility throughout

- Make Michigan the “go-to state” for business growth
- Provide dynamic and responsive business solutions
- Support Michigan’s small business and entrepreneurial ecosystem

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Support for Diverse Audiences

Michigan undergraduate and graduate students

Roadshows, webinars, and symposiums for industry, students, and researchers

Open educational content for engaged publics and diverse learners

Hands-on and experiential learning for all audiences

Community college and certificate learners

K-12 learners and educators

Industry partners for relevant training solutions and targeted content development

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Sparking PK-12 Minds

EV Roadmaps

- Support to U-M Center for Digital Curricula (CDC) for EV standards-aligned, engagement and teachable science curriculum for grades K-8
- Summer 2024
  - Faculty and students shared content expertise
  - Educators applied Michigan science standards to ideate engaging, experiential activities
  - Developing career video content
  - Developing experiential learning opportunities

"Students follow their own paths to learn about electric vehicles & job opportunities in Michigan's industries."

Occupation Target: EV Sector

Grizzly Scholars Program

- Next Gen Youth Camp, Office of Culture, Community and Equity (OCCE)
- Partnered with Ypsilanti Community Schools and Germany-Ballintyn Education Foundation to host 15 rising 7th grade students
- Experiential learning:
  - Assemble an electric vehicle
  - 3D print a car model
  - Manipulate, examine, and virtually tear down a CAD model of a Model 3 Tesla in VR

Occupation Target: EV Sector

Thinkabit Lab

- Hosted high school students from Michigan Engineering Zone Thinkabit Lab Program at Mcity
- Included talks and tours with faculty and staff

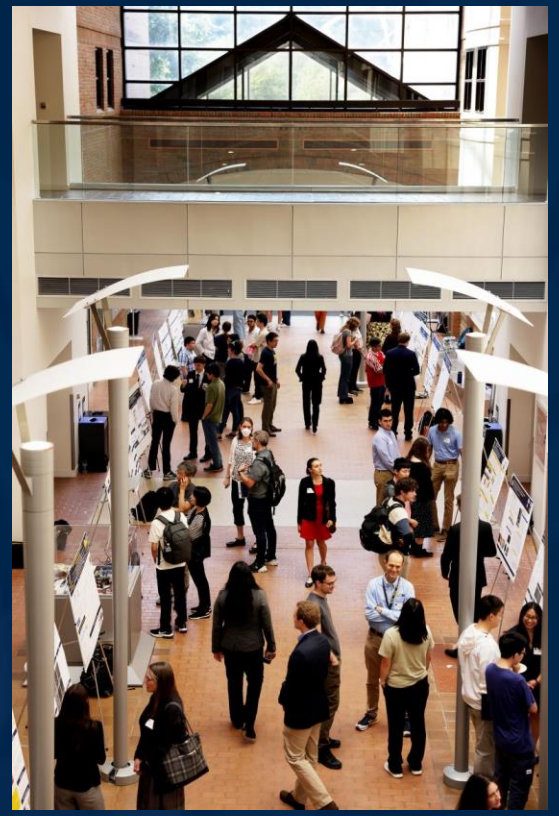
“These potential future engineers (ages 14-18) get to see how our centers collaborate to tackle the challenges of deploying new technologies.”

Occupation Target: Engineer

Undergraduate, Graduate, and Professional Education

Undergraduate Research Experiences in EV Tech

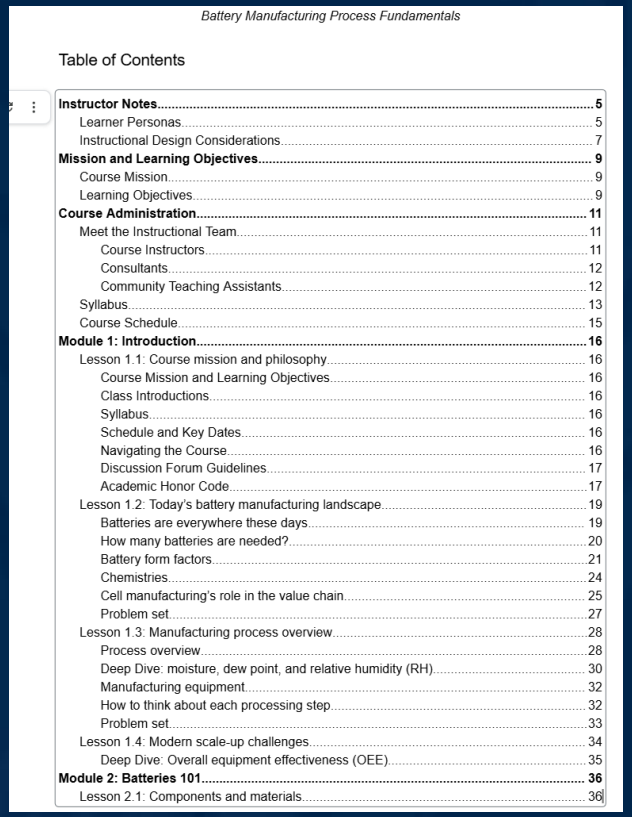
- EVC sponsored an inaugural cohort of 5 students for the Research Experiences Undergraduate (REU) in EV Tech
- EVC students joined with M-SHORE, MRSEC and NSF EFRI programs (a total cohort of 42 students) hosted at the Lurie Nanofabrication facility at UofM.
- Each student received a stipend, housing, on-campus programming, and worked in faculty research lab alongside other graduate students on real-world problems.
- The REU students presented lightning talks and posters on their research to culminate many weeks of hard work.



Occupation Target: Graduate Student Researcher

MEng Courses (in development)

- Battery Management Systems Programming
  - Hands-on laboratory leveraging a HIL test stand
  - Students learn to implement BMS algorithms
  - Test and debug using automotive V&V principles
  - Work with 120 channel Opal-RT/comemso battery emulator
- Battery Manufacturing Process Fundamentals
  - Course reader in process
  - **Pilot offering as 20-hour certificate course in November 2024**
  - Target first offering of credit course in Winter 2025



Battery Manufacturing Process Fundamentals

Table of Contents

Occupation Target: Engineer

Masters in Battery Engineering (in development)

- A proposed 27 credit hour curriculum could be completed in 1 year (with a spring semester laboratory)
- A new undergrad/graduate course in battery manufacturing in development
- Partnership with SEAS (Environment and Sustainability) and CFE (Entrepreneurship) for electives that provide a broad experience
- Hand on learning opportunities for battery system engineering and testing,
  - HIL BMS programming lab
  - Leverage Faculty expertise and testing labs in EV thermal management and optimization
- Option for an online degree program offering after first residential cohort

Occupation Target: Engineer

The Michigander Scholars

Powered by the Michigan Economic Development Corporation

- Program for **Engineering and Computer Science undergrad and grad students** interested in a career in **EVs, AVs, Semi-conductors, or Advanced Manufacturing**
- The program aims to **increase participants' knowledge** about those careers, connect them with **participating Michigan employers**, and **provide scholarships** to students who take positions with the employers

More info here:

https://mcity.umich.edu/what-mcity-offers/for-students/michigander-scholars-program/

https://maveric.eecs.umich.edu/news/announcing-the-michigander-scholars-in-semiconductors-scholarship/

https://www.michiganbusiness.org/why-michigan/workforce/the-michigander-scholarship/

Mcity UNIVERSITY OF MICHIGAN

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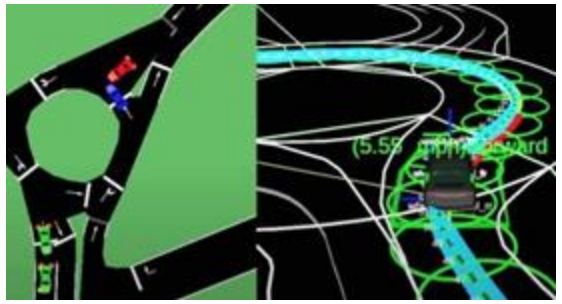
Mcity investigates equitable and accessible mobility solutions for smart communities with a focus on connected and automated vehicle safety and infrastructure. Explore our current projects

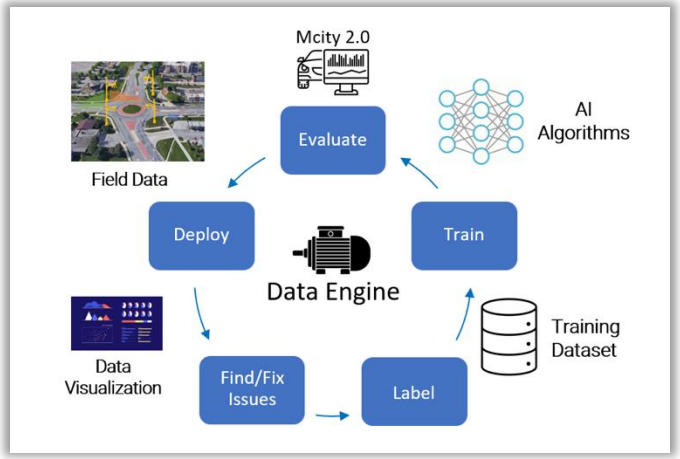
NEXT-GENERATION CITY

A full-scale outdoor laboratory with connected infrastructure and operating system



SIMULATED ENVIRONMENTS

Nationwide virtual access to our test facility, shared data, and digital twins



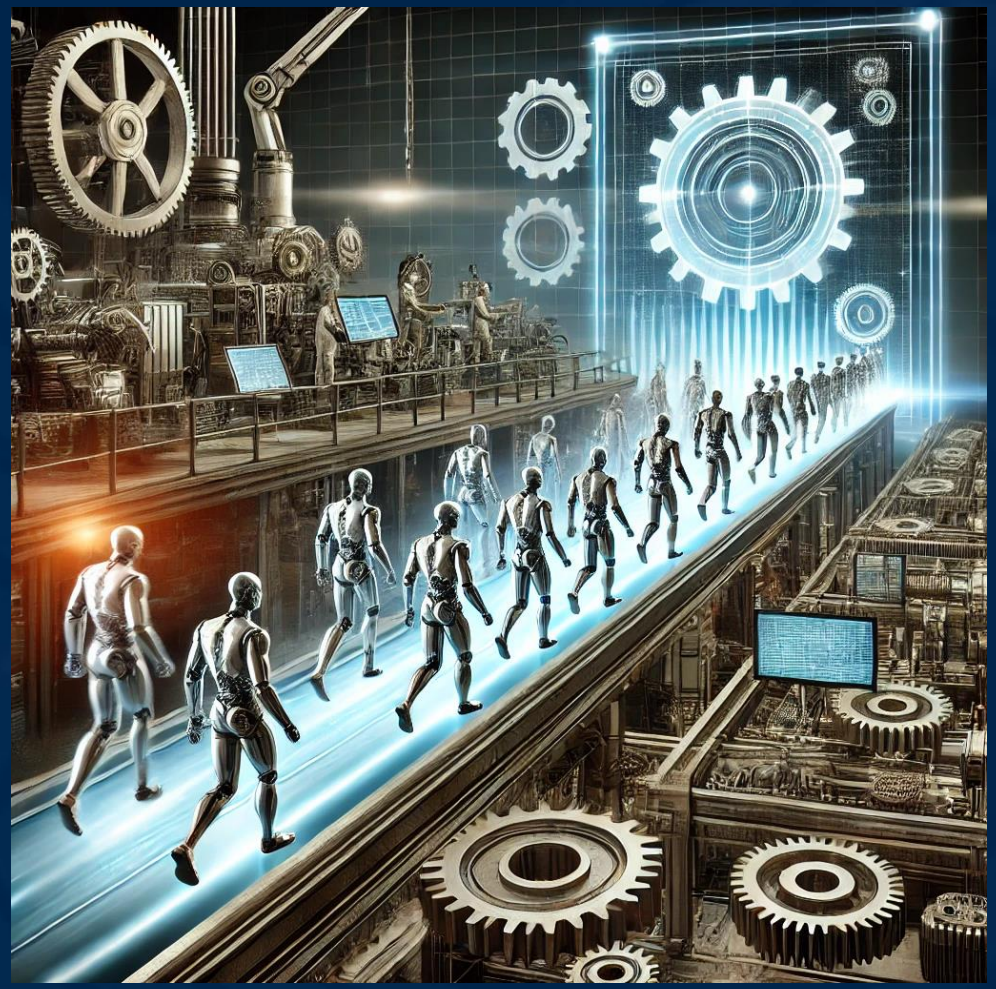
MCITY DATA ENGINE

Powered by artificial intelligence

ON-SITE WORKSPACES

Office and garage space available while working at Mcity

Workforce Transformation



Advanced Mobility Supply Chain Transformation Center

At the ECONOMIC GROWTH INSTITUTE, UNIVERSITY OF MICHIGAN

Leverage Resources and Funding

The STC program can help automotive manufacturers identify, develop, and co-fund critical projects in their business. Here are some examples:

- Sales and marketing strategy
- Website development
- Operational improvements
- EV teardown
- Market diversification
- Leadership development
- Growth strategies
- Skill development
- Technology acceleration
- Cybersecurity

Eligible Counties of Southeast Michigan

GLOBAL EPICENTER OF MOBILITY
REVOLUTIONIZING THE DETROIT REGION

Michigan Vehicle Technology Transition Impact Project

Michigan Department of Treasury

Michigan Clean Cities

Economic Growth Institute, University of Michigan

Michigan Office of Future Mobility & Electrification

- Detroit city
- Ecorse city
- Flint city
- Hamtramck city
- Lansing city
- Lincoln Park city
- Melvindale city
- Pontiac city
- River Rouge city
- Warren city
- Wyandotte city

- Host local listening sessions to understand impact/need
- Prepare communities with community-based action plans
- Provide communities with workforce training & technical assistance

Foster Collaboration

Employer Portal (in development)

- Focus on efficient access to EV sector opportunities for employers
- Engagement with industry & partners to inform design

Target: All EV employers

EVC Workforce Development & Education

EVC Key Initiatives Timeline

2Q24

- ❑ K12 modules with experiential learning
- ❑ Host research experiences for undergraduate (REU) in electric vehicle technology

3Q24

- ❑ Host industry/ student roadshows
- ❑ Build EV teaching hands-on learning laboratories

4Q24

- ❑ Open online educational content
- ❑ Pilot battery management hardware hands-on laboratory exercises

2025

- ❑ Master's in Battery Engineering
- ❑ Hybrid industry driven training solutions
- ❑ Tools for employers to access resources and connect to students

Ongoing

- ❑ Support partner academic institutions in launch of EV programming
- ❑ Support to EV scholars
- ❑ Invite industry guest speakers
- ❑ White glove service to support employers access to solutions
- ❑ CBP support for businesses pursing federal funding
- ❑ Proposals for EVC sustainability

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Engage EVC Members

- Expansion of workforce development and education portfolio
  - Identify and engage unique audiences
  - Emphasize interactivity and innovation
  - Validate needs and feasibility and project impact

Short-form content

Hands-on experiences

Webinars & info sessions

Massively Open Online Courses (MOOCs)

Career portal & resource hub

XR and gamified learning

Community engagements

Occupation Target: Targeted EV Careers TBD

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Electric Vehicle Center - University of Michigan

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Today at the Center for Automotive Research (CAR) conference in Traverse City, Mcity Director Henry Liu participated in a fascinating panel, "Beyond ...more

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Automakers are revolutionizing vehicle design with advanced steels and lightweight materials, enhancing safety and efficiency. Alan Taub, ...more

New forms of steel for stronger, lighter cars
knowablemagazine.org

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Thank you!

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