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About the EcoCAR Innovation Challenge

Managed by Argonne National Laboratory for the U.S. Department of Energy, the EcoCAR Innovation Challenge: Driving the Future (EcoCAR) is the 15th Advanced Vehicle Technology Competition (AVTC) series. EcoCAR brings together automakers General Motors and Stellantis, technology partner MathWorks, and a coalition of government and industry organizations to build a next-generation workforce that is future-ready to drive innovation across the mobility and tech sectors.

This unique four-year series challenges 20 North American university teams to develop next-generation energy-efficient, intelligent mobility solutions and innovative products from concept through potential commercialization. Teams leverage emerging technologies, including artificial intelligence, machine learning, and exascale computing, to address real-world transportation challenges.

Throughout the series, teams follow an industry-standard Vehicle Development Process (VDP) that mirrors automotive product development from initial concept through validation. Students apply cutting-edge engineering to real vehicles while gaining hands-on experience in systems engineering, product development, project management, leadership, and cross-functional collaboration.

Operating as mock automotive startups, each team brings together students and faculty from engineering, computer science, business, entrepreneurship, project management, marketing and communications to develop customer-focused solutions using industry best practices. This multidisciplinary approach prepares students to work across technical and business functions while delivering products that meet real-world customer needs.

By combining experiential learning with industry mentorship and emerging technologies, EcoCAR develops a future-ready workforce equipped with the technical expertise, professional skills, and innovative mindset needed to drive the future of automotive engineering, advanced manufacturing, and intelligent mobility.

Mission:

To develop the next generation of industry-ready leaders through hands-on, interdisciplinary experiences that transform innovative ideas into real-world mobility solutions.

Vision:

To strengthen North American leadership in transportation innovation through world-class talent, technology, and collaboration.

EcoCAR Innovation Challenge Program Goals:

Goal 1: Develop a Future-Ready Workforce

Prepare the next generation of industry-ready leaders through immersive, hands-on experiences that bridge the gap between universities and industry. By combining technical training, leadership development, interdisciplinary collaboration, and professional mentorship, EcoCAR equips students with the knowledge, adaptability, and real-world experience to make an immediate impact on day one of their careers.

Goal 2: Advance Next-Generation Mobility Technologies

Challenge students to solve complex mobility challenges by designing, integrating, and validating intelligent vehicle technologies that redefine the future of transportation. Through connected and automated systems, electrification, artificial intelligence, software-defined engineering, and product innovation, students transform bold ideas into real-world mobility solutions while advancing the vehicle development process.

Goal 3: Accelerate Innovation Through Partnership

Bring together industry, government, and universities in a collaborative ecosystem that connects education with real-world engineering. By leveraging shared expertise, cutting-edge technologies, industry mentorship, and applied research, EcoCAR accelerates innovation, strengthens the talent pipeline, and builds lasting partnerships that shape the future of mobility.



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Track Overview:

This series will involve a vehicle track sponsored by General Motors and a vehicle track sponsored by Stellantis. The tracks provide distinct engineering challenges and vehicle platforms that reflect choices in mobility offered to customers in North America.

Cross-Track Tools and Technologies:

MathWorks:

As co-headline sponsors, MathWorks equips all EcoCAR teams with industry-leading software, including MATLAB® and Simulink®, to design, simulate, and validate next-generation vehicle systems. Through Model-Based Design tools, AI-enabled engineering workflows, hands-on training, and expert technical support, students gain practical experience developing software-defined vehicle technologies while collaborating across disciplines and preparing for careers in the automotive industry.

Artificial Intelligence:

Artificial Intelligence (AI) will be a key focus area in every track of the challenge, especially given the rapid advancements in Large Language Models (LLMs) and AI Agents that are transforming industries worldwide, including automotive. This challenge aims to serve as a dynamic platform to encourage students to explore new AI methodologies, foster collaboration among stakeholders, and develop professionals who can meet the rising demand for AI expertise.

Technical Tracks

General Motors Track:

General Motors will provide the 2026 Chevrolet Blazer EV as the platform for its 10 university teams. Students will work directly with connected and automated vehicle technologies, developing team-designed automated driving features and vehicle-to-everything connectivity solutions. Teams will take on the challenge of transforming mobility by integrating advanced propulsion systems, pioneering automated vehicle technologies, and deploying wireless vehicle-to-everything (V2X) connectivity for seamless interaction with surrounding vehicles and infrastructure.

GM Track Technical Goals:

Goal 1: Develop and Integrate Advanced Propulsion Systems

Design, integrate, and validate advanced vehicle hardware, propulsion systems, and control software using industry-standard engineering processes that transform engineering concepts into fully integrated vehicle systems.

Goal 2: Advance Connected and Automated Vehicle Technologies

Develop and integrate Connected and Automated Vehicle (CAV) technologies that improve vehicle safety, efficiency, and connectivity through automated driving features, vehicle-to-everything (V2X) communication, and intelligent software systems.

Goal 3: Balance Vehicle Performance and Consumer Appeal Through Model-Based Engineering

Leverage systems engineering, modeling, simulation, and data-driven decision making to balance vehicle performance and consumer appeal by optimizing range, regenerative braking, and drive quality while demonstrating improved dynamic performance and delivering a desirable consumer experience



Featured Swimlanes:

Vehicle Systems Engineering (VSE)

Vehicle Systems Engineering provides the technical foundation for the entire vehicle development effort. Students learn to translate customer needs into engineering requirements, evaluate competing design concepts, and make objective, data-driven engineering decisions. The swimlane emphasizes systems thinking, traceability, and informed decision making throughout the vehicle lifecycle.

Vehicle Hardware Integration (VHI)

Vehicle Hardware Integration focuses on transforming engineering concepts into physical vehicle systems. Students learn how to package, design, document, and safely integrate hardware while preparing for future vehicle modifications. The swimlane emphasizes practical engineering and real-world implementation.

Propulsion Controls and Modeling (PCM)

The Propulsion Controls and Modeling (PCM) swimlane is responsible for the design, development, integration, and testing of the vehicle's longitudinal propulsion controls. Students use software development and modeling techniques to build a control system optimized for performance, energy efficiency, and drivability.

Connected and Automated Vehicles (CAV)

The Connected and Automated Vehicle (CAV) swimlane focuses on designing, building, and deploying automated driving features. These features incorporate Vehicle-to-Everything (V2X) connectivity to enable more energy-efficient vehicle performance. By participating in this swimlane, students learn about autonomous system design and development as well as software development best practices.

Stellantis Track:

Stellantis will provide the 2026 Jeep Cherokee as the platform for its 10 university teams. Students will explore advanced vehicle technologies, optimize propulsion systems, and develop intelligent features that enhance vehicle performance and the driver experience. Teams will architect, design, and integrate a high voltage energy storage system and an electric drive unit into a Hybrid Electric Vehicle (HEV) platform enabling teams to explore various propulsion and battery system architectures. Teams will target optimizing their vehicle's overall efficiency and off-road capabilities by iteratively simulating various modifications, integrating new propulsion components, and designing / calibrating advanced controls algorithms.

Stellantis Track Technical Goals:

Goal 1: Off-Road Performance and Efficiency Tradeoffs

Optimize the vehicle's overall efficiency while actively increasing its off-road capabilities, demonstrating a deep engineering understanding of the critical tradeoffs between energy consumption and off-road performance.

Goal 2: High-Voltage System and Rear EDU Integration

Architect, design, and assemble a high-voltage battery pack, utilizing the program-supported module-level build approach, and successfully integrate a rear electric drive (EDU) unit into the HEV platform.

Goal 3: Advanced Propulsion Controls

Develop, design, and calibrate advanced control algorithms to effectively manage the complexities of the newly integrated propulsion components and optimize the vehicle's overall performance.

Featured Swimlanes:

Vehicle Systems Engineering (VSE)

The Vehicle Systems Engineering swimlane guides the development of the Stellantis vehicle from concept through integration by applying a structured, requirements-driven engineering process. Students evaluate



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complete vehicle architectures while balancing performance, capability, safety, and project execution constraints. The swimlane highlights how complex engineering decisions are made in industry.

Vehicle Hardware Integration (VHI)

The Vehicle Hardware Integration swimlane prepares students to design, package, and eventually integrate advanced electrified vehicle hardware. The swimlane combines practical engineering, laboratory work, and design documentation to support future vehicle modifications. Students learn how engineering concepts become reliable vehicle hardware.

Propulsion Controls and Modeling (PCM)

The Propulsion Controls and Modeling (PCM) swimlane is responsible for the design, development, integration, and testing of the vehicle's longitudinal propulsion controls. PCM students use software development and modeling techniques to build a control system optimized for both performance and energy efficiency.

High Voltage Battery (HVB)

The High Voltage Battery (HVB) swimlane challenges students to design, analyze, and ultimately build a custom battery pack specifically to power the team-added rear electric drive unit (EDU) in the Stellantis vehicle. Students evaluate module configurations and pack architectures to meet strict electrical, safety, and packaging requirements. The swimlane bridges high-voltage systems integration and real-world automotive engineering, requiring students to think simultaneously about performance, safety, weight, and cost. This swimlane is hands-on and technically demanding, culminating in a team-built, vehicle-integrated battery system utilizing program-provided modules.

Cross-Track Activities and Functions:

Product Innovation Track:

The Product Innovation Track (PIT) exposes all 20 university teams to innovation methods and entrepreneurial frameworks as they develop innovative products, processes, or methodologies that directly support their vehicle development. Students will explore deep-tech and R&D approaches by starting with vehicle-relevant technologies and conducting rigorous customer discovery to define exact applications and requirements before building. Teams will utilize processes, such as capturing the "Voice of Customer," application discovery, and requirements validation, guiding their innovations from concept toward potential commercialization. Ultimately, the primary focus of this track is the development of the students themselves; it aims to shape "stakeholder-aware engineers" who understand how to balance complex technical trade-offs with business value and real-world integration roadblocks.

Product Innovation Goals:

Goal 1: Student Entrepreneurial Development

Cultivate T-shaped innovators by building students' awareness and capabilities within the business and entrepreneurial space, providing them with hands-on venture-building experience.

Goal 2: Evidence-Based Customer Discovery

Identify genuine mobility problems and formulate validated solutions through structured, evidence-based customer discovery methodologies, aiming to develop defensible pre-seed exit strategies rather than fully operational commercial businesses.

Goal 3: Validated Prototyping

Develop a working prototype or Minimum Viable Product that successfully demonstrates the technical feasibility, market desirability, and business viability of the venture concept.



Project Management (PM)

Project Management keeps technical and product work aligned, identifies risks early, and provides the planning and evidence needed to move confidently through the Vehicle Development Process. Project Managers (PMs) establish team roles and operating practices, build an integrated workplan, engage university stakeholders, and complete status and assurance reviews. Throughout the EcoCAR Innovation Challenge, PMs coordinate schedules, risks, changes, resources, and cross-swimlane dependencies. The Project Management swimlane connects people, plans, risks, resources, and decisions to turn EcoCAR's multi-year goals into coordinated team execution.

Marketing Communications (MarCom)

The Marketing & Communications function is a strategic component of the EcoCAR Innovation Challenge that enables teams to build a professional brand, communicate complex engineering innovations, engage key stakeholders, highlight sponsor contributions, and amplify the impact of their technical achievements. Through integrated communications and product marketing activities, students gain industry-relevant experience while ensuring their team's work reaches audiences beyond the competition. MarCom Managers (MCM) will lead brand building, storytelling, strategic outreach, and market positioning to support the team's mission and success. These activities develop both creative and strategic capabilities, preparing students to plan, execute, and manage impactful communications initiatives and campaigns in a real-world setting.



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EcoCAR Innovation Challenge Students

The EcoCAR Innovation Challenge empowers students to go beyond the classroom by solving real-world engineering challenges alongside industry leaders. Participants gain hands-on experience with advanced vehicle technologies, develop leadership, communication, project management, and teamwork skills, and receive mentorship from experts across the automotive industry. The result is a one-of-a-kind learning experience that prepares students to launch successful careers in advanced mobility.

Why Join?

Engineer the Future of Mobility

Work on real vehicle platforms while solving next-generation mobility challenges in connected and automated vehicles, electrification, artificial intelligence, and advanced propulsion. EcoCAR gives students the opportunity to apply engineering principles to technologies that are shaping the future of the automotive industry.

Learn Alongside Industry

Collaborate with engineers, researchers, and technical experts from General Motors, Stellantis, MathWorks, Argonne National Laboratory, the U.S. Department of Energy, and other industry partners. Through mentorship, technical reviews, and professional training, students gain insight into industry expectations while building meaningful professional relationships.

Gain Experience with Professional Tools & Technologies

Develop hands-on experience using the same software, hardware, engineering workflows, and testing methodologies used throughout the automotive industry. Students work with advanced vehicle platforms, AI-enabled engineering tools, simulation environments, and emerging technologies while receiving technical support from industry experts.

Develop as a Future Industry Leader

EcoCAR challenges students to think beyond engineering by developing leadership, communication, project management, and systems-thinking skills. Working within multidisciplinary teams prepares participants to lead complex technical projects and thrive in collaborative professional environments.

Turn Innovation into Impact

Transform ideas into real-world solutions by designing, validating, and presenting innovative technologies throughout the four-year competition. Students produce professional engineering deliverables, technical presentations, publications, and product concepts while contributing to technologies with real industry applications.

Benefits to Students:

- Immersive, hands-on learning that transcends the classroom
- Direct experience working with industry-leading software tools, hardware, and vehicles
- Portfolio-ready deliverables and publications
- Mentorship and networking with industry experts + exposure to professional standards and safety practices
- Leadership roles that build confidence and career readiness
- Valuable project management, communications, teamwork and problem-solving skills

Benefits to Faculty and Institutions

Participating in the EcoCAR Innovation Challenge delivers lasting value beyond the student experience. The program strengthens academic programs, fosters interdisciplinary collaboration, and expands research and industry partnerships while providing resources that enhance teaching, innovation, and workforce



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development. From supporting faculty research to attracting and retaining top students, EcoCAR serves as a catalyst for institutional growth and long-term impact.

- Build and strengthen your engineering program
- Foster interdisciplinary collaboration across your institution
- Receive funding for students, travel, equipment, and facilities
- Advance research, proposals, and publications through applied learning
- Strengthen industry partnerships and technology transfer opportunities
- Integrate industry training and education into your curriculum
- Recruit and retain top students across multiple disciplines

EcoCAR Innovation Challenge Sponsors

Companies are invited to join this national collaboration as an EcoCAR sponsor, integrating their technology, engaging with top engineering talent, and helping shape the future of mobility while realizing long-term recruiting, visibility, and business impact.

Why Sponsor:

Recruiting

EcoCAR sponsorship provides companies with a direct pipeline to industry-ready talent. Sponsors gain access to high-achieving, competitively selected students who are trained over four years using real industry tools, processes, and performance expectations, graduating as workforce-ready contributors.

In-Person Engagement & Collaboration

EcoCAR provides a multi-OEM, collaborative ecosystem where sponsors operate within a highly integrated, hands-on environment, fostering B2B relationship building, accelerating cross-industry collaboration, and enabling real-time technical exchange that drives innovation beyond the competition.

Product Exposure

EcoCAR integrates sponsor products directly into vehicle builds, national events, and judged technical presentations, building brand credibility, accelerating workforce adoption, and generating real-world product insight.

Company Promotion / Brand Visibility

Sponsors receive sustained brand exposure across a national four-year program, which include media coverage, digital campaigns, and live events, positioning your organization as a visible leader in innovation, workforce development, and STEM education.



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AVTC Fast Facts

- **34,000+** students have graduated from AVTCs
- **112** North American colleges have participated in **15** unique series over the past **38** years
- **20** universities are currently involved
- **2,400** student participants in the EcoCAR EV Challenge and Battery Workforce Challenge
- **1,800+** hours of hands-on industry sponsor training since 2022
- **180+** peer-reviewed conference or journal publications since 2016
- **70+** graduate theses and dissertations since 2016
- **180** internships and job offers (2025)
- **160** companies hired an AVTC student (2025)
- **\$11.5k** higher initial salary compared to peers (4-yr study 2023-2026)



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