

# MICHIGAN STATE UNIVERSITY FOUNDATION

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## Composite Vehicle Research Center Fact Sheet

CONTACT: Eann Patterson, Director (available for interview), CVRC: (517)884-1600, [www.egr.msu.edu/cvrc](http://www.egr.msu.edu/cvrc)

### About the Composite Vehicle Research Center (CVRC)

The CVRC is an MSU Center of Excellence for the design and testing of composite structures for lightweight, environment-friendly, durable and safe vehicles. The CVRC develops impact resistant, lightweight materials for automotive, aerospace and marine use.

### Guiding Principle – Design Validated by Experiment

### The Goals of The Composite Vehicle Research Center

- Advanced design of composite shells and structures for vehicles
- Development and use of novel experimental mechanics, methods and smart sensing systems for analysis, NDE, and structural health monitoring
- Integration of simulation and experimental mechanics in design protocols for vehicles

### Advanced Composite Materials Research for Air and Ground Vehicles

A research program to pursue new knowledge and novel technologies in the following areas:

- Damage Survivability – Resistance of the vehicle and its occupants to crash and impacts
- Composite Joining – Design and reliability of joints between composite structures
- Multi-functional Composites – Design, fabrication, and integration of mechanical, thermal, electrical and self-healing properties into composite structures
- Self-Diagnostics Composites – Embedded devices for NDE and structural health monitoring
- Structural Integrity of Composites – Evaluation and prediction of fatigue life and durability for 3-D components through simulation and tests
- Biomimetics – Exploration of and design based on biologically occurring composites

### What is your primary area of focus at the CVRC?

Eann Patterson: “We provide fundamental research and testing on a variety of polymer composite materials designed to provide crash and impact resistance properties combined with light weight. CVRC operations are primarily funded by the U.S. Army and U.S. Navy. We develop and test a variety of crash resistant and impact resistant structures.”

### Does your research have applications for non-military use?

Eann Patterson: “We find that many of our lightweight, impact resistant structural materials have direct application in civilian vehicles. Structural composites are being used routinely to enhance strength and improve crash-predictability in automobiles.”

“When we envision pairing our strong, lightweight polymer composites with the highly fuel-efficient engine and power train developments designed by our sister group on the MSU campus, the Energy and Automotive Research Lab, we can create safe, highly fuel-efficient vehicles.”

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What role has the University Corporate Research Park played in the development of the CVRC?

Eann Patterson: "Locating within the park has provided us with a home for our research and development facilities. In our labs we perform impact testing, which provides us quick feedback on our innovative designs for experimental polymer/composite structures. If we were to build this facility on campus it would have required an extended timeline and involved approval process. By locating within the research park, the development of the facility happened very quickly. The Foundation had space available that we could move into straight away. This allowed us to build momentum quickly and so that we can provide useful research results for our sponsors and ultimately the automotive market."