

# Dynamic Dyno Drives R&D



Lawrence Tech's new Automotive Engineering Institute announces the opening of its four-wheel drive chassis dynamometer. Become a partner in exploring innovative automotive engineering solutions at our unique research facilities.

## Four-Wheel Drive Chassis Dynamometer

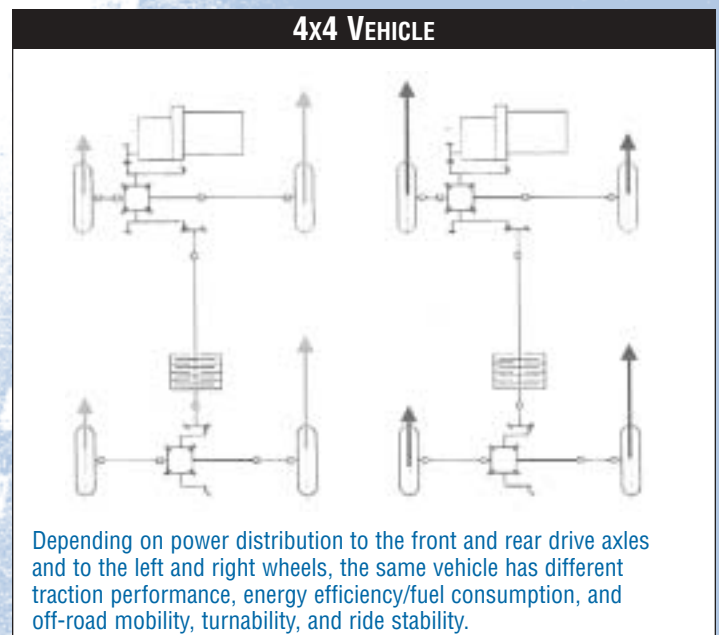
- Unique 4x4 vehicle chassis dynamometer with individual wheel torque electronic controls of one, two, three, or all four drive wheels and speed capability of up to 100 mph.
- Four individual wheel power absorbers with 175 HP per wheel capability for continuous operation and up to 350 HP intermittently.
- Adjustable 89-135 inch wheelbase with an extension up to 175 inches.

## Research Opportunities Abound

- **Vehicle Performance: Traction**  
Research optimum vehicle traction performance and vehicle energy efficiency by experimenting with power distribution to the tire/ground contact patches for each of the four wheels. Develop optimum driveline system hardware to accomplish top

vehicle performance: open and limited slip differentials, locking differentials, viscous drive, traction control, and other mechanical and mechatronic driveline systems. Also, research wheel power balance to improve tire design.

- **Next Generation Concept Vehicle Development**  
Explore novel driveline arrangements with alternative next-generation energy sources for fuel cell, electric, hybrid-electric, hydrogen, and hydraulically powered vehicles. The dynamometer can accommodate 4x4 full/part time and 4x2 vehicle arrangements. Develop optimum logic algorithms and electronic hardware to individually control power distributions to each of all the drive wheels. Boost vehicle performance in various operational conditions.



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## RESEARCH OPPORTUNITIES

### Continued

- **Vehicle Performance:**

- **Turnability/Ride Stability**

- Evaluate vehicle turnability and ride stability on the basis of the lateral forces of each of the four wheels, including acceleration and yaw resisting and assisting moments. Improve ride stability systems and drive-line systems to control vehicle oversteering and understeering.

- **Vehicle Performance:**

- **Acceleration/Braking**

- Experiment with vehicle timing to test various types of acceleration/braking and distance runs. Evaluate the performance of vehicles with different driveline system arrangements.

- **Durability**

- Test vehicle driveline durability to improve the design and life of the hardware. Testing can include all powertrain components and can apply manually controlled loads and simulate proving ground test cycle loads.

- **Diagnostic Testing**

- Study total vehicle systems to diagnose system-, subsystem-, and component-level hardware issues and verify corrective actions for effectiveness.

- **NVH Development**

- Conduct experimental studies for all noise and vibration concerns on vehicle driveline systems with structure borne noise.

- **Safety**

- Study active safety system elements to improve vehicle design.

- **Fuel Economy Improvement**

- Improve vehicle energy efficiency and fuel economy by developing driveline systems based on optimum power flow distributions to each of the four drive wheels.

- **Emissions**

- Perform emissions tests on gas and diesel powered vehicles with various powertrain layouts.



## BECOME AN AUTOMOTIVE ENGINEERING INSTITUTE PARTNER

For more information on partnering with Lawrence Tech and the Automotive Engineering Institute, contact Dr. Suresh Bansal at 248.204.2563 or Dr. Vladimir Vantsevich at 248.204.2577 or email [AEI@ltu.edu](mailto:AEI@ltu.edu).

## MASTER OF SCIENCE IN AUTOMOTIVE ENGINEERING

Lawrence Tech's Master of Science in Automotive Engineering program is designed for working professionals who are graduates of ABET-accredited undergraduate mechanical or electrical engineering programs. The program seeks to help students use and improve their leadership skills in the field of automotive engineering, from the beginning of strategic planning, design, and product engineering, to manufacturing and engineering management.

For more information on this exciting full- or part-time program, contact:

**Lawrence Tech Office of Admissions**

**800.CALL.LTU, ext. 1, or email [admissions@ltu.edu](mailto:admissions@ltu.edu).**

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