

## Engineering Science & Technology Division

**T**he Engineering Science and Technology Division (ESTD) is one of the largest research divisions at Oak Ridge National Laboratory, with more than 300 staff, numerous national user facilities, and laboratories located in 13 buildings. The division has an annual research, development, and deployment effort of more than \$100 million to support the missions of the Department of Energy and other agencies and organizations.



### Research, Development, and Deployment Focus Areas

- Industrial energy efficiency
- Buildings
- Cooling, heating, and power technologies
- Solar energy
- Sensors, electronics, and signal analysis
- Robotics and energetic systems
- Power electronics
- Fuels, engines, and emissions
- Transportation

#### *Industrial energy efficiency*

Providing industry with tools and techniques to identify energy-efficiency improvement opportunities in plant production systems.

#### *Buildings*

Developing technologies that make residential and commercial buildings more energy-efficient, healthier to occupy, and more environmentally friendly.

#### *Cooling, heating, and power technologies*

Developing integrated systems that provide on-site or near-site power using internal combustion engines, combustion turbines, micro-turbines, and fuel cells combined with thermally activated technologies for space conditioning.



## ***Solar energy***

Developing and commercializing new hybrid solar lighting systems that more than double the efficiency and improve the affordability of solar energy in commercial buildings.

## ***Sensors, electronics, and signal analysis***

Creating novel transducers, micro-/nano-electronics, signal and image processing solutions, and advanced wireless networks.

## ***Robotics and energetic systems***

Developing unique technologies that include sensor-based navigation, human-like reasoning methodologies, advanced mobility mechanisms and systems designs, human amplification and human-machine synergistic systems, novel power and actuator technologies, and non-holonomic motion planning and control.

## ***Power electronics***

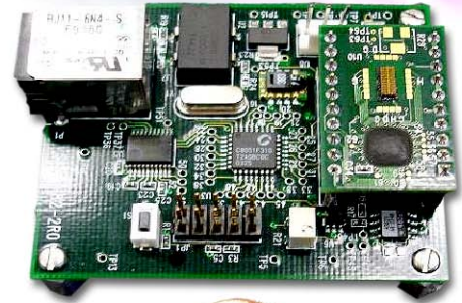
Advancing the technology of soft-switched inverters, multilevel inverters, power quality applications, motor control techniques, and efficient, compact electric machines.

## ***Fuels, engines, and emissions***

Focusing research on advanced energy conversion, fuels, and emission-control technologies. Comprehensive capabilities include engine and vehicle dynamometers, bench-top engine exhaust simulators, and unique diagnostic and measurement tools.

## ***Transportation***

Developing integrated multi- and inter-modal transportation solutions; providing policy-, planning- and technology-based research to support transportation efficiency, productivity, safety and security; with emphasis on advanced highway simulation modeling, freight mobility, remote sensing/GIS, sensor-based transportation applications, transportation logistics, heavy vehicle safety/security, and information-based transportation analysis tools.



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