

# Sustainable Transportation Update

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## APEEM Technology Receives Patent

In September, the U.S. Patent Office issued the Direct Cooled Power Electronics Substrate technology Patent No. 7,796,388. The technology was developed by **Randy Wiles, Andrew Wereszczak, Curtis Ayers, and Kirk Lowe**, all researchers at ORNL's Advanced Power Electronics and Electric Machinery Research Center. The purpose of the new technology is to produce a power electronics packaging concept that greatly reduces the thermal resistance between the heat source (power switches) and the ambient. The development allows low cost silicon electronics to be cooled with 105 °C coolant (automotive radiator temperature) as opposed to the conventional separate 65 °C cooling loop presently used in hybrid automobiles, thus providing a less expensive traction drive system.



*Researcher **Randy Wiles** conducts Finite Element Analysis on the direct cooled power electronics substrate to determine design performance.*

## MAKE PLANS TO ATTEND 2010 ODYSSEY DAY

Presented by East Tennessee Clean Fuels Coalition, Odyssey Day 2010 is dedicated to promoting the awareness, availability, and use of alternative fuels.

### FREE Admission!

Friday, October 15, 10 a.m. – 3 p.m., Pellissippi State  
20+ alternative fuel vehicles on display  
Electric vehicles to see and test drive

Lectures on cellulosic ethanol and switchgrass work in East TN  
Hotdog, chips, and a drink for \$1 at the Propane Party!

Be sure to stop by the ORNL exhibit at the event, staffed by **Scott Curran**, Fuels, Engines, and Emissions Research Center.

## ORNL Demonstrates 45% Brake Thermal Efficiency on a Light-Duty Diesel Engine

ORNL researchers demonstrated 45% brake thermal efficiency on a light-duty diesel engine through improvements in engine operation, lubrication, and the recovery of thermal exhaust energy which is normally discarded to the environment. This achievement is one of three Joule milestones met by the Fuels, Engines, and Emissions Research Center in FY 2010. Note that Joule milestones are considered extremely important and are measurable goals tracked at high levels within DOE and industry. ORNL has successfully demonstrated increasingly aggressive DOE Vehicle Technologies efficiency milestones for each of the past six years.

## Sustainable Transportation Program Strengthens DOE Funded Clean Vehicles Team

ORNL is a core member of a recently announced clean vehicles consortium that will focus on a suite of technologies to put more electric and hybrid vehicles on the road. Working with the University of Michigan, which leads the consortium announced by the Department of Energy, ORNL will contribute in the areas of advanced systems integration, vehicle electrification, batteries and energy storage, characterization, optimization and combustion of biofuels, and lightweighting structures.

In announcing the consortia, Energy Secretary **Steven Chu** said, "The U.S.-China Clean Energy Research Center will help accelerate the development and deployment of clean vehicle and clean coal technologies here at home. This new partnership will also create new export opportunities for American companies, ensure the United States remains at the forefront of technology innovation and help to reduce global carbon pollution."

[http://www.ornl.gov/info/press\\_releases/get\\_press\\_release.cfm?ReleaseNumber=mr20100917-00](http://www.ornl.gov/info/press_releases/get_press_release.cfm?ReleaseNumber=mr20100917-00).

## KUB Trucks Wired for Data Acquisition...



**Gary Capps, Mary Beth Lascrain, and Adam Siekmann** integrated an ORNL data acquisition system into the first of three Knoxville Utilities Board vehicles as a part of the Medium Truck Duty Cycle Project. Various performance signals will be collected from these vehicles for a one-year period. The instrumented KUB Class-8 bucket truck is pictured here.

# September Visits, Honors, etc.....



**Ross Toedte**, Computing and Computational Sciences Directorate, talks with DOE VT Materials Technology leaders **Carol Schutte** and **Will Joost**. The two visited with ORNL researchers to discuss lightweighting materials research.

**Claus Daniel** participated in the National Academy of Engineering U.S. Frontiers of Engineering Symposium held in New York. Claus is one of eighty-six young engineers selected to take part, having been nominated by fellow engineers or organizations and chosen from approximately 265 applicants.

**Joerg Huslage** and **Oliver Groeger** from Volkswagen Research in Wolfsburg, Germany visited ORNL to learn more about the lab's battery research and discuss future collaborations on energy storage.



**Travis Tempel**, DOE Biomass Program, toured the Fuels, Engines, and Emissions Research Center while visiting ORNL.

Center for Transportation Analysis representatives met with several state and federal agencies to discuss research capabilities and opportunities. These include Transportation Security Administration's Highway and Motor Carrier Division, Federal Transit Administration's Office of Mobility Innovation, National Highway Traffic Safety Administration's Crash Avoidance Research Program, and North American Council for Freight Efficiency.

ORNL participated in the 4<sup>th</sup> Annual Intelligent Transportation Society of Tennessee Meeting held in Chattanooga. Special thanks to **Bill Knee**, Transportation Systems Research Group, who served on the organizing/planning committee and technical speakers committee. ORNL is a founding member of ITS-TN.

Several ORNL researchers participated in the 16th Directions in Engine-Efficiency and Emissions Research (DEER) Conference. Poster presenters included Fuels, Engines, and Emissions Research Center's (FEERC) **Jim Parks**, **Thomas Briggs**, **Bruce Bunting**, **Scott Curran**, and **Jim Szybist**. Materials Science and Technology Division poster presenters included **C. Narula**, **X Yang**, and **Michael Lance**. Presentations were made by FEERC's **Bill Partridge**, **Kalyana Chakravarthy**, **Todd Toops**, **Jim Szybist**, and **Bruce Bunting**. FEERC's **Robert Wagner**, **Jim Parks**, and **Todd Toops** co-chaired technical sessions.



**Karren More**, Materials Science and Technology Division, shares information with Fuel Cell Technology Team members from DOE, industry, and other national laboratories who met at ORNL.

## Looking Ahead

**Oct. 7-8**, *Beyond Lithium Ion: Materials Perspectives*, a symposium on research opportunities in electrochemical energy storage, ORNL Conference Center.  
<http://home.ornl.gov/general/announcements/FullStory.cfm?ID=4538&Portal=TechCalendar>

**October 14**, Federal Motor Carrier Safety Administration, in close partnership with Tennessee Department of Safety, Tennessee Department of Transportation, ORNL, and the University of Tennessee, will host a Commercial Motor Vehicle (CMV) Safety Technology Showcase at the Greene County CMV Inspection station, highlighting the truck and bus roadside technology testing corridor. The event will be take place southbound I-81 near Mile Marker 21.

**October 18**, National Highway Traffic Safety Administration will meet with ORNL staff to discuss analysis and modeling, lithium-ion battery, bio-fuels, cognitive radio, medium and heavy duty truck, and data linking/geo-spatial modeling research.

To submit news or information, call 865-946-1861 or email [grahamkj@ornl.gov](mailto:grahamkj@ornl.gov). Deadline is 3<sup>rd</sup> Wednesday of the month.