



School of Mechanical Engineering Assistant Professor Shannon Yee, shown in the dark jacket, leads several energy research projects mentioned in the article beginning on page 24. Here, his research team poses in the lab.

# POWERING, COOLING AND MOVING

## GEORGIA TECH DEVELOPS NEW ENERGY, THERMAL, AND AUTONOMOUS VEHICLE TECHNOLOGIES

Georgia Tech is developing the next generation of energy technologies that could help power everything from the tiniest of wireless sensors to ultra-efficient homes and businesses. Harvesting energy from mechanical motion and converting heat from the environment are among the strategies, but researchers are also collecting energy from nuclear waste and gathering electricity from radio and television broadcasts. Other research projects are developing smaller heat pumps and better supercapacitors — and examining supercritical carbon dioxide to replace steam in power plants.

Putting electricity into computer devices generates heat that must be removed. Georgia Tech researchers are working on new approaches for that, from developing more thermally efficient integrated circuits and water cooled chips to optimizing the design of data centers. Their work could result in more powerful and efficient mobile devices and lower energy costs for the data centers that make cloud computing possible.

Also in this issue, you will learn about the many challenges that are slowing the introduction of autonomous vehicles. Operating a driverless car on a smooth highway is one thing; dealing with unpredictable terrain, vehicles that still have drivers, and potential system uncertainty is quite another thing. Georgia Tech researchers are addressing the autonomy issues that will have

to be resolved before we'll be able to sit back and watch a movie while our autonomous car drives us to work.

Finally, this issue of *Research Horizons* describes the work of the Georgia Manufacturing Extension Partnership, a federally supported program operated at Georgia Tech to assist the state's manufacturers. The program, which serves Georgia through a statewide network of regional offices, helps companies boost efficiency, improve quality, and serve their customers better.

Georgia Tech powers an impressive innovation ecosystem that facilitates transformative opportunities, strengthens collaborative partnerships, and maximizes the economic and societal impact of the Institute's research. Our goal is to conduct leading-edge research and then transition the results of that research into use.

As you read this issue of *Research Horizons*, you'll see how we're leveraging these collaborative partnerships to create game-changing solutions to society's most challenging problems. We truly are creating the next generation of autonomous vehicles, energy technologies, and thermal control for electronic devices.

As always, I welcome your feedback. Enjoy the magazine!

STEVE CROSS  
Executive Vice President for Research  
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