

## Welcoming IDEATE to Cragmor Village

By Mariah Wagner

IDEATE isn't just a savvy, new word one might hope they can find in the Webster Dictionary. It's the name of the program that is calling the Forster House 'home'. IDEATE is an acronym for "Innovative Drivetrains in Electric Automotive Technology Education," which focuses on bringing an exciting variety of programs and courses in electric drive train technology and automotive battery control. Behind these exciting studies on campus are Dr. Greg Plett and Dr. Scott Trimboli. To better understand the field of battery research and welcome our new neighbors to Cragmor Village Road, we were fortunate enough to have a few of our questions answered by them.

**Mariah Wagner:** Why should students be interested in battery research? How is it applicable?

**Dr. Gregory Plett:** Batteries power modern technology that we have come to rely upon. All kinds of consumer-electronics devices are battery powered. Increasingly, consumers are also becoming interested in battery-powered electric vehicles, or at least battery-enhanced hybrid-electric vehicles. The battery pack is the single-most expensive component of the electric drivetrain in these vehicles, so it makes sense to invest some thought into how to "make batteries last longer and work better", which is our mantra. The primary concern of our research team is to understand at a very fundamental level what makes batteries degrade, and to learn how to use batteries in ways that slows down aging but still delivers maximum performance. This will ultimately allow either using smaller battery packs (reducing up-front costs) or extending the life of the battery (reducing or eliminating replacement costs).

**MW:** What are your hopes for engaging students with the newly renovated space?

**GP:** The new space will be used in two primary capacities. The office space in the building will be used by graduate students performing fundamental research to push the boundaries of knowledge. But, a critical feature of the new building is that it has garage space that will be used by our team of students who are building two off-road electric vehicles. These vehicles will allow us to implement the theoretic developments in order to validate them in a very useful way to see what works in practice and what does not — allowing us to have very practical research results that lead to further topics of investigation. These vehicles will also be spotlight dynamic displays at outreach events to draw more students to UCCS, to the mindset of sustainability, and to our research program.

**MW:** If EVs could flood the market in the next ten years, what would this mean for battery research? What would be the next steps?

**GP:** Electric-vehicle controls already exist and work reasonably well; however, the field is still quite new. Lithium-ion battery cells were commercialized for the first time in 1991; the Tesla Roadster EV was the first production vehicle to use lithium-ion batteries (in 2008); the Chevy Volt was the first plug-in hybrid-electric vehicle to use lithium-ion battery cells (in 2010). We know quite a bit about "new" lithium-ion battery cells, but there is a lot to learn about "old" lithium-ion battery cells. How do we make mathematical models of degradation? How do we track aging in a battery cell? How do we change the controls of how the cell is used as it ages? How do we slow aging? There is a lot

of research to be done and these are all next steps that we are working on, believing that these steps will help us to fulfill our mantra. We believe that the student researchers who pass through our program will find productive and fulfilling careers in this industry.

We live in a rapidly changing and advancing technological world where research and studies of this nature are crucial in order to keep up. If you have any questions on these courses or programs, you can contact Dr. Gregory Plett at: [gplett@uccs.edu](mailto:gplett@uccs.edu) or Dr. Scott Trimboli at: [mtrimbol@uccs.edu](mailto:mtrimbol@uccs.edu). Soon enough, you'll be able to schedule visits at the Forster House, and see them in action!