

CURRENT EVENTS

After 2017 Pikes Peak Victory, Team Sets Sights on Isle of Man for 2019

Hello Buckeye Current friends, family, alumni, and sponsors! If you haven't heard much from the team about what we've been up to in recent months, this newsletter will hopefully give you some of the highlights.

First and foremost, this past June we raced at the Pikes Peak International Hill Climb and placed 1st in the Electric Class, 2nd in the Pikes Peak Challenge Class, and were the 11th fastest motorcycle in a field of 29 gas and electric competitors. After weeks of testing, tuning, and tweaking in Colorado, the RW-3x2 and Rob Barber finished with a time of 10:55.500. While the time is still short of the team's goals, the results speak for themselves, and Rob's grin coming down the mountain was a testament to the bike's performance on race day. The main issues experienced in the 2016 PPIHC, power limitations and overdesigned components, were the focus of this past year and were all but eliminated in this iteration of the bike.

Speaking with our rider after the competition and analyzing the data from our extensive sensor network showed some clear signs for improvement on a key component of the powertrain: the battery pack. As suggested by simulation results prior to the competition, the substantial power increase on the vehicle this year stretched the available energy on board the battery pack a little too thin. The low state of charge at the end of the race resulted in a significant decrease in DC bus voltage, which caused power limitations for the vehicle. As the main focus for refinement this year, the battery pack redesign effort is

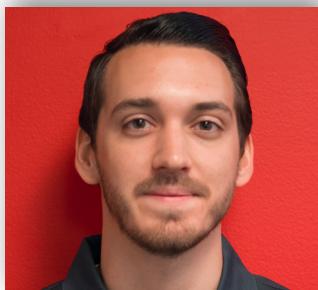
detailed in depth in the Technical Highlight section of the newsletter on the next page.

In addition to working on refining RW-3x for a return to Pikes Peak in 2018, the team has decided to adjust how we operate in a fairly large way. For the first time, the team is now designing two years into the future, with plans taking place now for a showing of RW-4 at the 2019 Isle of ManTT Zero. There were two main motivations for this adjustment, both of equal importance. First, in order to advance the team into working on more rigorous technical projects that require a higher level of research, like designing and manufacturing a custom frame, we need more than the few short months we have in a 1-year design/build cycle revolving around the academic year. Second, it is much easier to facilitate the transfer of knowledge between new generations of team members with an additional overarching project that has different technical foci. For example, in addition to all of the redesign projects taking place on RW-3x, we now have an additional set of projects that revolve around requirements-based design from the ground up for RW-4, one of the most important approaches to design the team employs that many younger members have little exposure to.

The team has also been up to the usual refinements from an organizational standpoint by adjusting how we handle project management, improving the team's approach to recruitment and onboarding of new members, and more. Keep an eye out for continued newsletter updates throughout the next few months!



2018 Team Leadership



Team Lead
Alex Miller



Project Manager
Brody Ringler



Operations Manager
Mason Hayes

Technical Highlight

After a successful but unsatisfactory run at Pikes Peak this past June, the team returned to Columbus to determine how best to improve the bike's performance for next year. As noted in the last section, the team analyzed data from the race and noticed one outstanding characteristic, "there was a significant drop off in power and voltage 85% of the way into the race" said Rachel Hawthorn, the team member leading the battery pack redesign. "We want to increase the current 7.7kWh pack by 15%, which would bring us to ~9kWh. The minimum energy requirement was then adjusted to 10kWh to allow for performance gains as we refine our motor/inverter pairing, and as Rob continues gaining experience on the mountain, giving him the ability to push the bike's performance even further."

"We're trying to stay as similar as possible to last year's design. The goal is to be able to use the sub-frame again for RW-3x3. We won't be using the same A123 26650 LiFePO4 cells, so we are currently assembling a list of viable cells and calculating the different pack sizes possible from each cell," said Hawthorn. "After the cell choice is made CAD work will start on the pack and simultaneously we will test 10 or so cells that have met our updated requirements." Following cell selection and CAD design, assembly will begin in January with the intent of wheel spin in March, 3 months before we return to Pikes Peak.

The intention of this upgraded battery pack is to allow our rider, Rob, to perform at his highest ability without being hindered by the performance of the vehicle. Hawthorn elaborated, "The hope is Rob will have a race with no limiting factors, getting RW-3x3 to the top of the mountain faster than any other bike competing."



Yupeng Cheng



Hometown: Guilin, China

Year/Major: Senior

Major: Mechanical Engineer

Hobbies: PC Gaming and Mountain Biking

Projects: "For RW-3X I worked on the front enclosure mounting and oil pan mounting, so just tiny projects. For RW-3X2 I worked on the rear subframe which dealt with integrating the cooling, suspension, and holding the rider's weight. I also worked on the enclosure for the battery balancer. This year I'm working with the capstone team, and we're doing the double wishbone front suspension steering system for RW-4."

Favorite Part of Team: "When you actually start physically building your projects when you see something that has come from nothing to be real it's pretty attracting, and going with the team to Pikes Peak because I haven't been to any professional races before so Pikes Peak taught me a lot, like how to deal with issues when you have limited time to solve it. It was a pretty valuable experience."

