

# Mars Rover Design Team

## September 2018 Newsletter

### From the Desk of the CEO

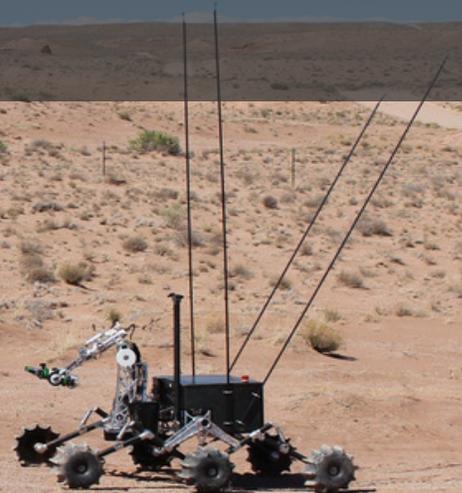
Hello Martians!

What an incredible start we've gotten this year. In just two weeks, we recruited over 100 new members from 18 majors! If that isn't amazing on its own, consider the recruitment for our Electrical PCB sub-team – a group that has historically struggled to recruit and retain members. At the end of last year, one of our members, Jacob Lipina, had a brilliant idea. He realized that Electrical and Computer Engineers joined the team – and, more importantly, stayed on the team – once they learned that we designed and built our own custom printed circuit boards (PCBs). Jacob suggested that we hand out custom PCBs at recruitment events to demonstrate what MRDT members do.

After our primary recruitment drive ended, we realized that we had recruited more than twice as many Electrical and Computer Engineering students than we normally do. Not only that, but we started PCB trainings the next week, immediately engaging the new members with a real project: design your own Driveboard. An incentive was there too; if the boards passed a functional review with experienced members, the team would order whatever they had designed.

By the end of this training, ten new members will have completed the full process and have designed, reviewed, ordered, and built their very own unique PCBs, all within the first two months of the year. Another fifteen will have completed the design and assembly processes using Driveboards from our 2018 rover, Atlas. Nowhere else on the planet can a person go from knowing nothing about PCBs to building their own in under two months. But on MRDT, we can't get enough of doing the impossible. Over the next few months follow our social media to find out how we do "impossible" things every day. Until next month, #Rovesohard!

All the best,  
Andrew Rausch



## Upcoming Events

October 6, 2018

Mechanical Preliminary Design Review  
Missouri Maker Conference 2018 Presentation

October 27, 2018

Electrical Preliminary Design Review

October 31, 2018

“Boo-Palooza” Trunk or Treat Service Event

## Technical Update

The Mars Rover Design Team thrives on experimentation and innovation. These aspects of the team are reflected in our decision to restructure this year’s technical branch into six new sub-teams: Electrical PCB, Sample Retrieval and Analysis (SRA), Software, Drivetrain, Ground Support Systems (GSS) and Manipulators.

This innovation is also present in this year’s designs. Most notably, the suspension will combine two familiar faces – Gryphon and Phoenix – in a brand new way. To make the suspension more stable and easier to manufacture, we have also engineered a way to replace Gryphon’s middle wheel with an A-arm. The robotic arm is going to utilize three separate differential joints as well as a carbon fiber structure and two unique grippers. As the science cache task saw significant rule changes, the team has started from scratch to design a sensor array that can be lowered into the ground to analyze six sites for signs of life. The team will also be testing a different battery configuration to save weight, as well as a collection of smaller boards to control the robotic arm. All these goals and more seem possible with one of the most capable and motivated group of students we have ever seen. As we complete extensive software, electrical, and mechanical trainings, our team will certainly build a rover today, teach new members tomorrow, and be an inspiration forever.



Andrew Van Horn and Judah Schad examine the wrist joint of the robotic arm.

## Alumni Involvement

Earlier this month, we announced a new initiative to recapture and preserve the story of our team. To accomplish this, we need the input of our alumni. We would like to learn about your experiences on the team, and your involvement in the projects that made MRDT what it is today. To share your story, contact Rebecca Marcolina at [rcmz95@mst.edu](mailto:rcmz95@mst.edu).



## Team Update

Many people may not realize that the design and construction of our yearly Mars Rover does not completely reflect the work of our whole team. Our PR sub-team has already been creating fabulous promotional material, which will be appearing on our social media over the next month: pay especially close attention to YouTube and Facebook for some really beautiful work. Our Business sub-team has also been working hard; members recently completed and submitted a proposal for the annual AMAE conference and the annual SAFB funding allocation request.

The team has also participated in a variety of service and outreach events. We most recently attended the Missouri 100 Conference hosted by the UM System, where we addressed a group of the 100 most passionate advocates for the university. The Missouri S&T design center also invited us to display our 2018 rover, Atlas, at the annual Society of Automotive Engineers conference, where we astonished small kids and automotive industry executives alike.

We are also incredibly excited to welcome our new members to the team! After analyzing retention data from the last two years, we discovered that there are three simple indicators as to whether or not a person will stay on the team: being integrated into the team (family), trained on required skills (education), and assigned an exciting and engaging project (passion). The application of this discovery is already yielding tangible results – passionate, excited new members.



Emily Bruns and Andrew Rausch join Avery Welker, the student representative to the UM System Board of Curators, and Dr. Melanie Mormile, a MRDT team advisor, at the Missouri 100 Conference.

