

NEWSLETTER – SPRING 2021

NORTHEASTERN ELECTRIC RACING



Updates for the Spring 2021 Semester at Northeastern Electric Racing



President, Greg Corsello (ME '21), teaches Mechanical Project Lead, James Blatcher (ME '24), how to operate the HAAS CNC mini mill.

Overview

With COVID-19 precautions in place, Northeastern Electric Racing (NER) was able to safely resume in-person operations in the newly renovated Richards Hall maker space and machine shop. The team also held in-person general meetings in accordance with the university's COVID guidelines. This semester, work was primarily focused on manufacturing completed designs and preparing to compete in the 2021 Formula Hybrid+Electric (FH+E) virtual competition. The team aims to finish assembly of the car by the end of 2021 and compete in the in-person 2022 competition.

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Competition Updates

NER just finished competing in the team's second-ever competition, finishing in **1st place**, the team's **highest-ever finish**. After completing and submitting all competition reports, the team presented the all-electric vehicle's design, the design of a hypothetical optimal hybrid vehicle, and the team's project management to the FH+E judges.

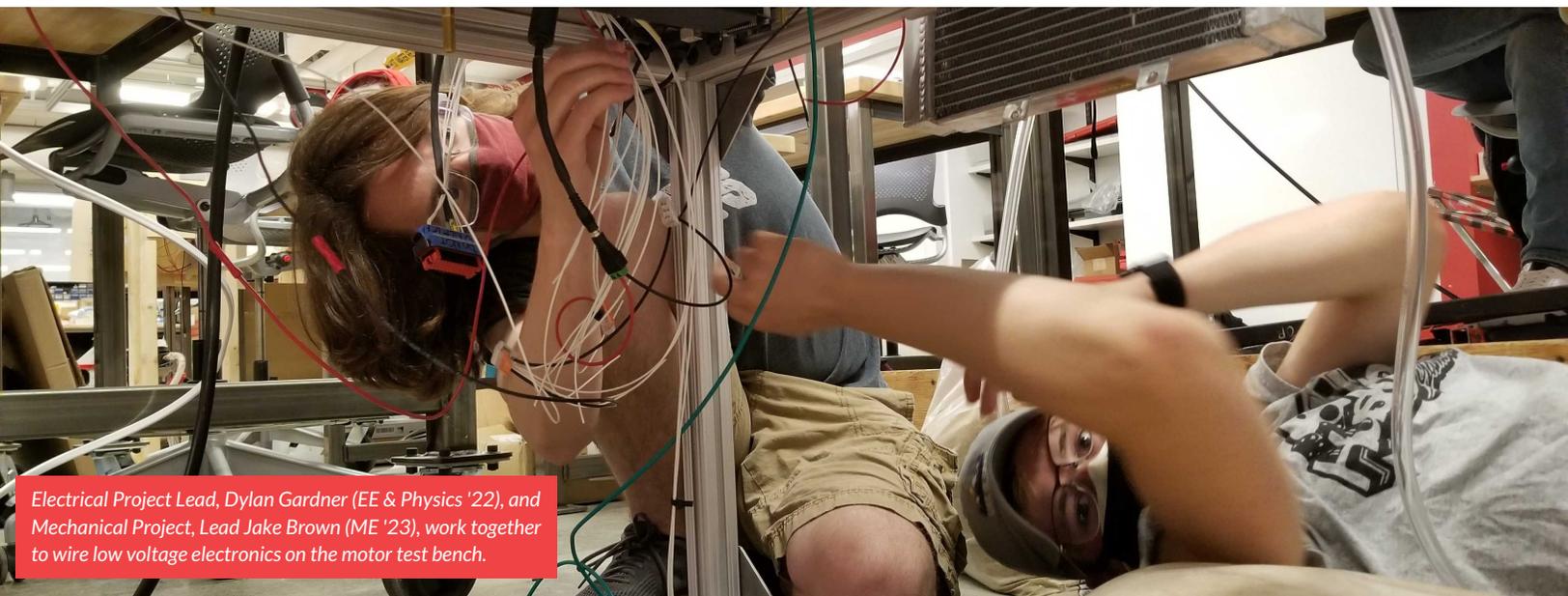
Electrical Team Updates

The electrical team has focused on the assembly of the charging system, redesign of the accumulator (battery), destructive testing of fusible links, and development of vehicle performance simulations. Judge feedback led the team to a complete redesign of the accumulator, which members of the mechanical and electrical teams are rapidly making progress on. MATLAB Simulink has been utilized to develop performance models that will continue to be used for the current and future vehicles.

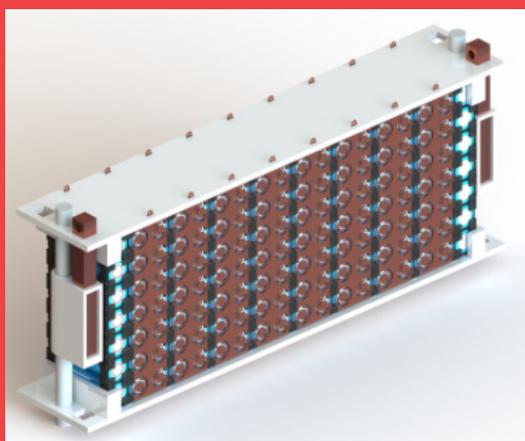
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Chief Electrical Engineer, Matthew McCauley (ECE '23), shows off his brand-new battery lug crimpers.



Electrical Project Lead, Dylan Gardner (EE & Physics '22), and Mechanical Project Lead Jake Brown (ME '23), work together to wire low voltage electronics on the motor test bench.



CAD model of the fusible link sheets attached to battery cells on one of the four segments that make up the accumulator.

Fusible Links

Laser cut fusible link sheets were designed as an elegant and robust solution to satisfy cell fusing requirements. After extensive research and simulations using EMWorks, the team created an array of prototypes along with a thorough test procedure. The team is currently destructively testing the prototypes to validate the design.

Mechanical Team Updates

Extensive efforts have been made by the mechanical team this semester to manufacture, assemble, and weld numerous vehicle subsystems. The team has successfully installed chassis mounts for the steering, pedal box, and differential along with complete installation of the front and rear suspensions, firewall, floor, and headrest.

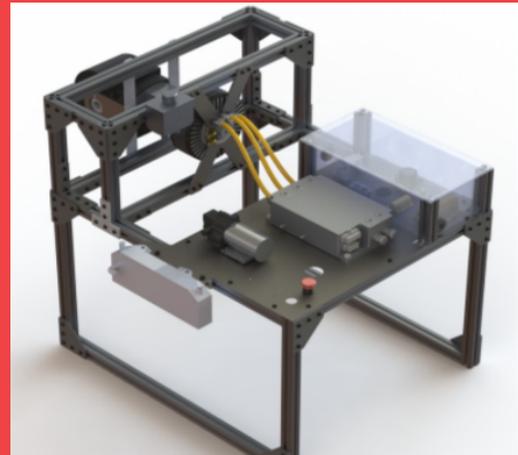
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Head of Drive Systems, Casey Sauer (ME '23), prepares the GM 10-bolt differential for a test spin.

Motor Test Bench

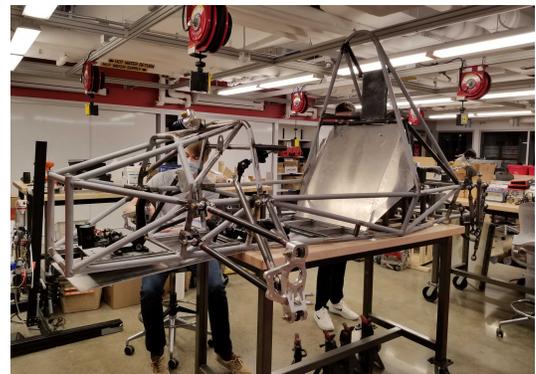
A standalone test bench was created in order to safely conduct integration testing of major tractive system components while outside the vehicle. Close collaboration between the electrical and mechanical teams have enabled the test bench to support testing of the motor cooling system, low voltage systems, tractive system, and differential.



CAD model of the motor test bench including the motor cooling system, motor controller, and low voltage control circuitry.



CAD model of all subsystems in the car including our beloved dummy driver, Percy.

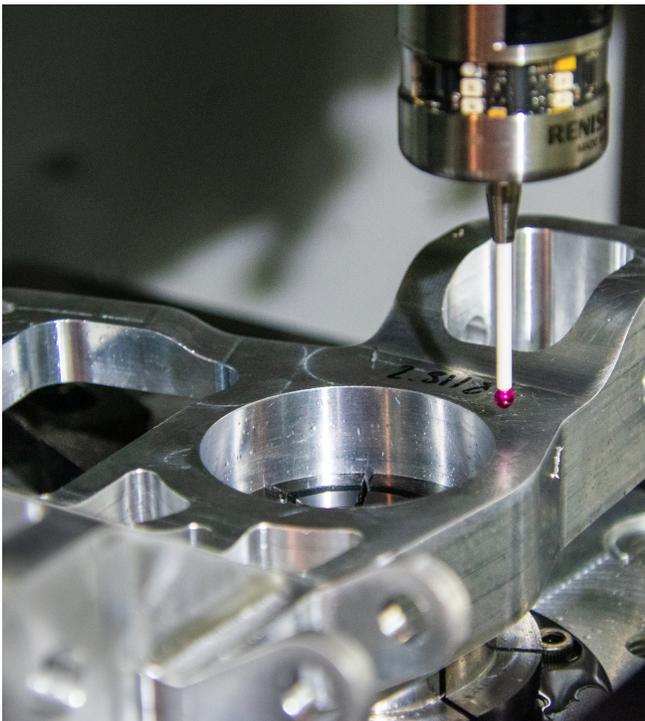


Mechanical Project Lead, Jakob Rauen (ME & Physics '23), works on assembling the front suspension in the newly renovated Richards maker space.

Business Team Updates

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The business team supported many aspects of the engineering teams in coordinating the manufacturing and welding logistics of 150+ parts, tracking 100+ purchases, and processing 475+ total project management change requests this year. Team spirit has never been higher after launching a completely redesigned website, holding team bonding events, and distributing newly redesigned team shirts!



Mechanical Project Lead, James Blatcher (ME '24), sets the origin on the HAAS CNC before running a program to modify the front knuckles.



Head of Outreach, Sofia Varner (ME & Design '24), uses an air hammer to remove the pinion gear from the differential.



The team held socially-distanced, in-person general meetings during the Spring semester, giving members the chance to meet and talk face-to-face.

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From Northeastern Electric Racing

