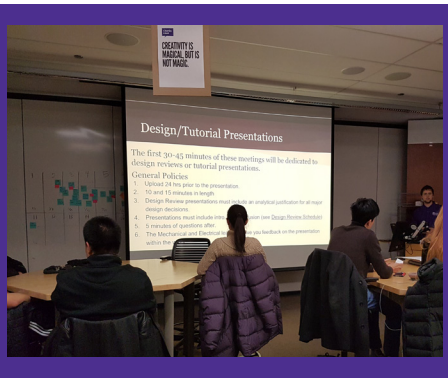
NU solar

Driven by Innovation, Fueled by the Sun

Winter Quarter Newsletter, January - March 2017

We made it through a rather mild Northwestern Winter and are ready to hit the ground running after wrapping up several projects. In addition, we've instituted a new design review process at the beginning of general meetings to keep all members updated on the various mechanical and electrical projects everyone has been working on. We'll be back after spring break!

— Kerui Tan
Associate Project Manager



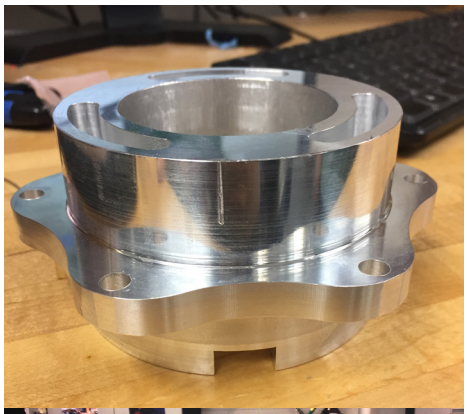
Mechanical Team Progress

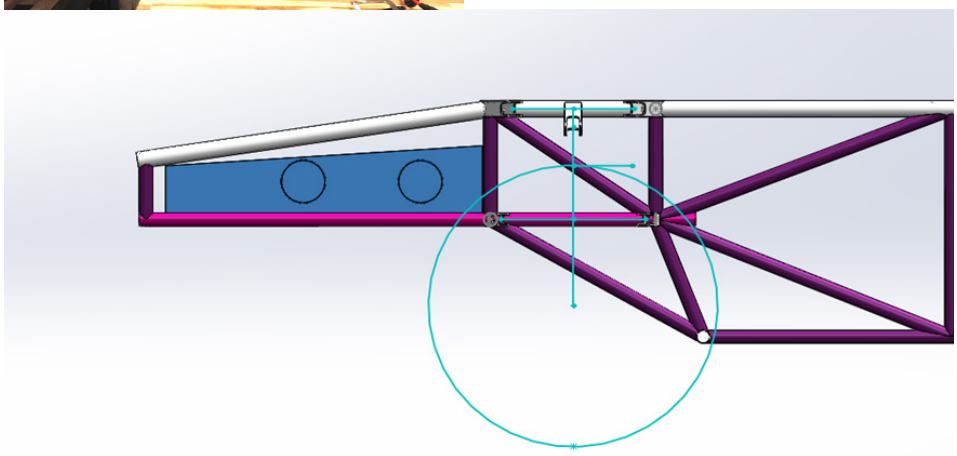
by Kerui Tan, Mechanical Team member

This past quarter the Mechanical Team worked on several different projects, including finishing the front and rear suspension for SC7, designing the battery box to fit in the frame of SC7, and making more carbon fiber panels.

All four a-arms have been finished and attached to the frame. The rear trailing arms were welded together and also mounted to the frame. The rear spindles are almost finished and the rear hubs have been CNC'd and just need to be bored out to fit the bearings, as seen in the top right.

The battery box design had to fit inside the frame and provide adequate ventilation for the batteries and space for the electronics. The Electrical Team needed more space than originally estimated, so the frame was modified with a latching mechanism to accommodate sliding the battery box in and out without interference from the wheels, as pictured on the right.





Carbon Fiber For SC7

by Emily Zhao, Business Team member

A key feature of our team's cars is the use of carbon fiber. Carbon fiber is a lightweight yet durable material, which makes it perfect for the solar cars. However, manufacturing with carbon fiber is not the easiest thing in the world. Freshman members Lindon Liu and Dylan Montgomery went through a lengthy learning process in order to make the best carbon fiber panels.

In order to form strong composites from the fabric-like industrial carbon fiber sheets, five layers of the sheets

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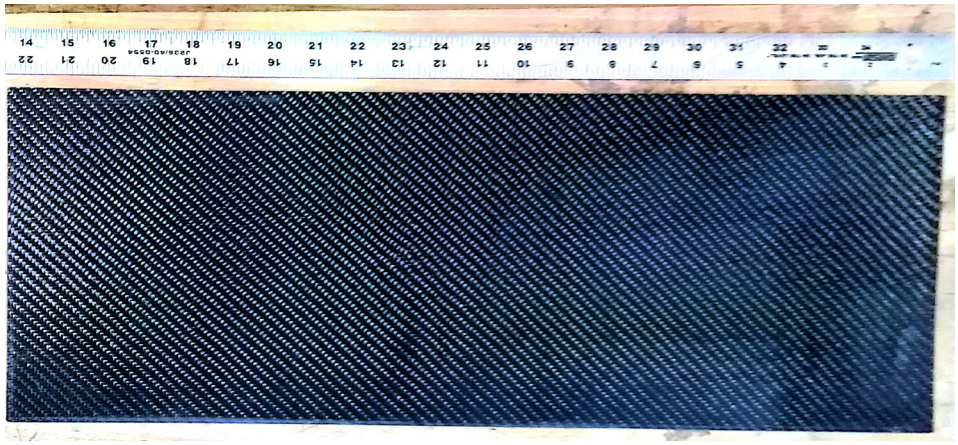
are adhered together and eventually hardened through the use of resin.

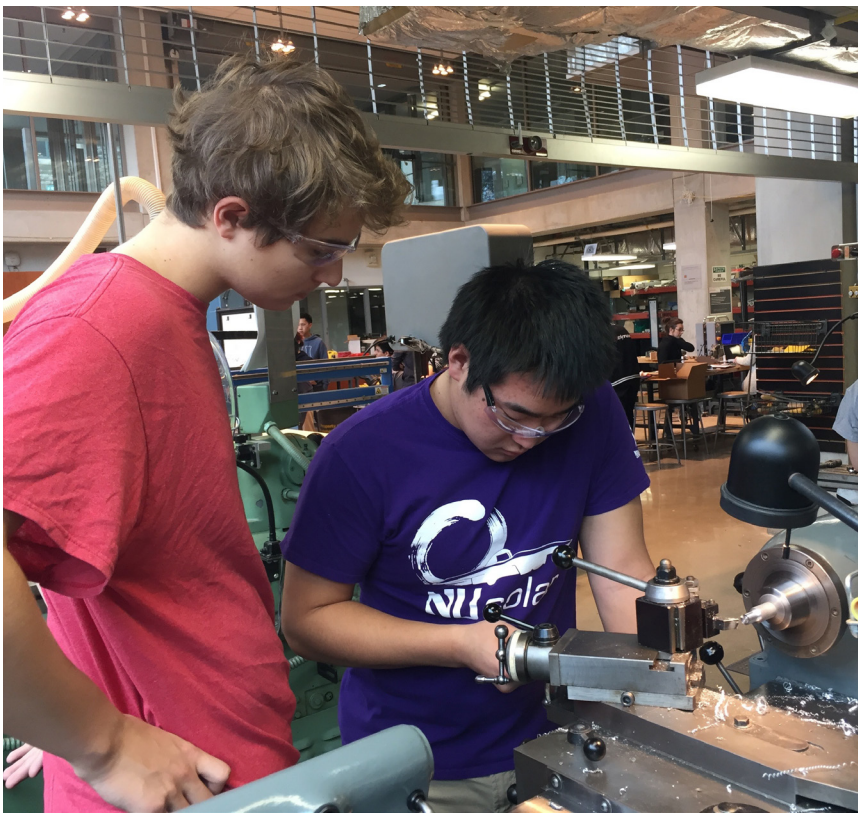
Initially, the duo faced a couple problems: the resin would not spread evenly, the panels were difficult to cut, and they lacked proper white out. However, through necessary trial and error, the duo are now confident in their process and technique.

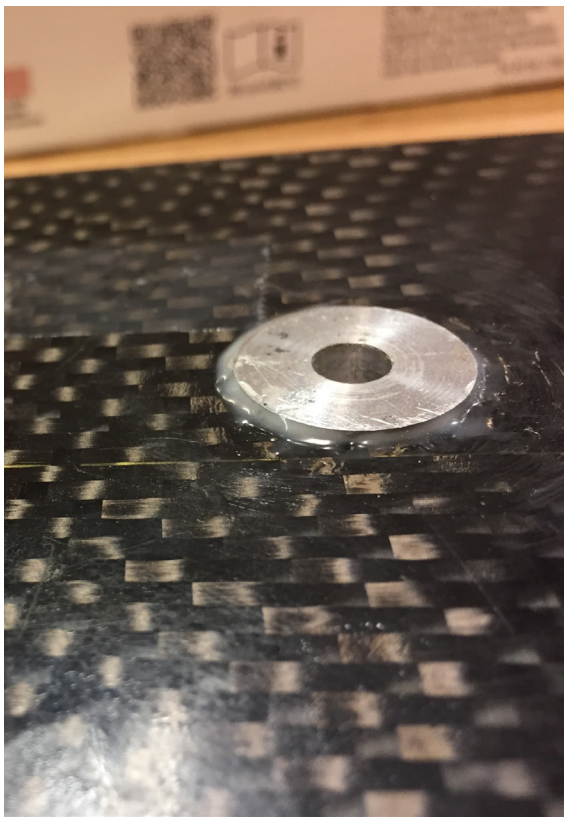
Liu and Montgomery were able to make enough panels for the new car by the end of the winter quarter and consequently moved onto the next step: attaching grommets, below on the right. They are pictured in the bottom left machining more grommets on the lathe.

The carbon fiber panels should not be directly compressed because they would crack, so the flat ring on the grommets absorb the compression pressure instead, as seen in the bottom right. The grommets are also used to secure the panels, as screws can be threaded through the holes.

➡ Team member Ieva Stakvileviciute welds the rear trailing arm together. NUsolar members learn skills that would not otherwise be included in their current curriculum.







The New Faces of 2016-2017 Part 2

Lindon Liu (ME '20)

Hometown: Omaha, NE

Idea Career: Work for an engineering firm like Lockheed Martin or Boeing

Interests: Video games, watching TV, spending time with friends, playing pool, taking things apart and seeing how they work. One time one of our breakers broke, and after we replaced it I took it apart and reassembled it to figure out why it was broken.

Why did you join NUsolar?

It's really interesting, and in high school I did robotics, so wanted a step up from it, like a challenge, and I thought solar car was the perfect thing.

What are you working on now?

Composites, carbon fiber layups.

What have you learned so far?

How to handle carbon fiber, how it is made into panels, and how much precision it requires.

What would you like to do in the future in NUsolar?

I would like to work on welding the frame together, manufacturing parts, or assembling everything.

What do you do in your free time?

Sleep, play video games and pool with friends.

Dylan Montgomery (Undecided '20)

Hometown: Franklin Lakes, NJ

Idea Career: Factory Manager

Interests: Computer games, economics, and physics.

Why did you join NUsolar?

I'm interested in solar power and the conversion of electrical energy to mechanical, and thought it would be interesting to get more experience building stuff.

What are you working on now?

Composites, carbon fiber layups.

What have you learned so far?

How to cut and construct composites and the safety precautions needed.

What would you like to do in the future in NUsolar?

I'll see where it takes me, I'm willing to go wherever I'm needed, learning as I go.

What do you do in your free time?

I enjoy playing computer games and hanging out with friends.

Crystal Gong (CS/MMSS '20)

Hometown: Naperville, IL

Ideal Career: Software engineer

Interests: Computer science, physics, and making things.

Why did you join NUsolar?

I thought it seemed interesting.

What are you working on now?

Welding, composites, and machining some parts for the steering system.

What have you learned so far?

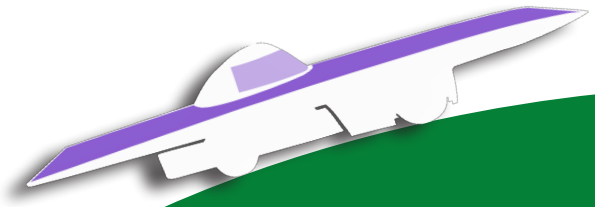
How to weld steel.

What would you like to do in the future in NUsolar?

I would like to do more welding and machining.

What do you do in your free time?

I enjoy watching psychological movies and reading.



Electrical Team Progress

The Electrical Team had several projects in the works as well, with a main goal of debugging the driver controls circuitry.. The new temperature sensors are up and running and have been getting reasonable measurements so far. There was a slight hitch when connecting the new sensors to Arduinos due to an incompatible library, but we were able to fix it after a lot of Googling.

The new DCDC, Driver Controls, and Current Sensor board designs were also finalized, so parts were ordered and the boards can be manufactured. The battery modules were also finalized along with the battery box setup.

New members continued to debug and figure out the telemetry system while others worked on debugging the car. Unfortunately, the car was not consistently turning on before break, but the bug was identified and will be taken care of next quarter.

Team Calendar

For a full team calendar, visit our website at nusolar.org.

Mar 18 - 27 Spring Break

Mid April (TBD) Alumni Hangout

July 3 - 8 FSGP 2017!

Sponsorship and Outreach

by Emily Zhao, Business Team member

The business team's greatest accomplishment this quarter was receiving one of the largest grants in team history from the Northwestern Sustainability Fund for solar cells and wheels. The NSF is also one of NUsolar's newest sponsors. The team also received a grant from Boeing, one of the team's older sponsors.

In a similar vein, the team is looking to improve the aesthetics of SC6, the previous solar car, by updating and replacing logos and decals so that they better reflect the current sponsor list.

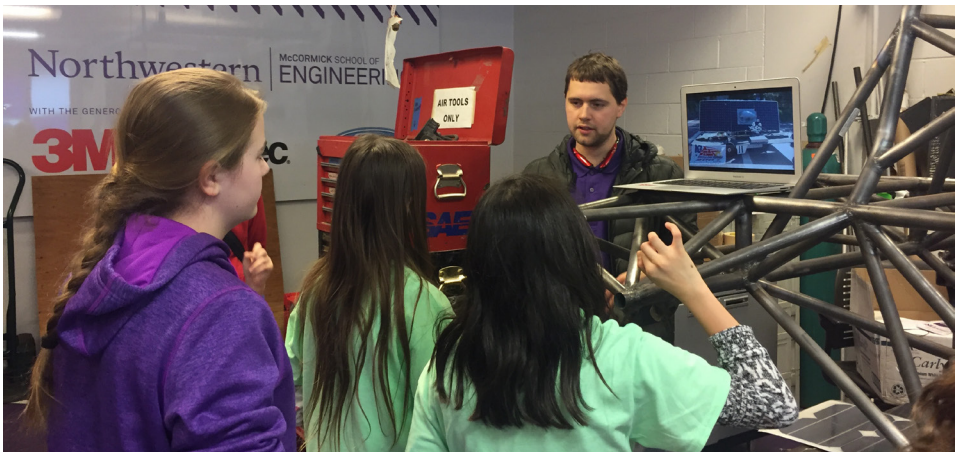
The team's continued success can be contributed to the minds that run it. NUsolar boasts a team with members from various countries and diverse backgrounds, which means there is never a shortage of good and original ideas.

To continue building upon this strength, the publicity and outreach team have been working on doing more outreach events. This quarter, the team was able to do five outreach events at elementary and high schools in the Chicagoland area. Northwestern's Society of Women Engineers also hosted their annual Career Day for Girls, and the team was more than thrilled to share our car with brilliant young minds.

While these audiences might not join our team specifically, it brings the idea of solar energy to the future minds of the world. If you know a school or organization that would be interested in hosting NUsolar, contact us at outreach@nusolar.org.

In terms of actual recruiting on campus, the business team posted team recruitment flyers around campus. Through these flyers and word of mouth, the business team welcomed two new members.

Below: Middle school and high school girls participating in SWE's Career Day for Girls listen to Alexander Martin while he presents on SC6 and solar energy.



Have questions or comments? Want to get involved? Visit us online:

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