

McGill Chem-E Car

Summer Recruitment 2017-18



Come join us for **pizza**
in **Wong 1020 !**

and/or contact us at
mcgillchemecar@gmail.com



Who We Are

- A design team, tasked with building a **shoebox-sized car powered and stopped by chemical reactions**
- Founded in 2011 to give Chemical Engineering students a practical, hands-on learning opportunity
- Currently 40+ members of various origins, from various fields of study
- We strive for **innovation, networking, teamwork and real world experience** in a technical and interdisciplinary environment

Why We Need You

We are currently recruiting new members to participate in developing the car that will compete in the **AIChE regionals competition in March 2018.**

Chem-E Car is divided into different sub-teams, namely Power Source, Stopping Mechanism, Mechanical and Electrical.

The general tasks of the team members are the following:

1. Attend **weekly subteam meetings**
2. Be willing to work 3+ hours/week in the lab, workshop or on the computer
3. **Contribute to design, logistics, and construction** of the car
4. Participate in outreach events and 3-5 day out of town competitions

What's In It For You

This would imply that you would also **attend the yearly AIChE Chemical Engineering conference**, which is a great opportunity to meet students from other North American universities as well as learn about new and pertinent research and industry topics.

And of course, gain skills and expertise in the sub-team of your choice!:

Power Source

This sub-team is in charge of supplying the necessary energy for the car to move. Normally, the energy comes from a chemical source but non-chemical thermal sources can also be used. Tasks include:

- Design and build the unit cell delivering the power
- Design and construct the network of multiple unit cells providing the necessary power
- Design experiments to test power source operation
- Analyze results and develop models for the power output and car velocity under different loads, distances and operation parameters
- Predict and manipulate the power source performance based on developed models and the specific needs of the team

Stopping Mechanism

This sub-team is in charge of ensuring that the car stops at the finish line by manipulating the kinetics of a chemical reaction, that is, by changing parameters

such as reactants concentration, mixing, temperature, and pressure. Tasks include:

- Choose a chemical reaction that is safe, economically viable and easily measurable
- Design and perform experiments to test the kinetics of the reaction
- Analyse data and accurately model the reaction time with a manipulated parameter
- Optimize protocol to minimize variability in the results
- Collaborate with the electrical subteam to calibrate and manipulate sensors as well as the regulator response to the sensor signal

Management

This sub-team is perhaps the least technical, yet one of the most important. It is in charge of keeping track of the team's finances, competition logistics and social media presence. Tasks include:

- Collaborate and communicate with other McGill clubs, societies and services
- Run fundraising events such as BBQs or bake sales
- Contact sponsors and external funding sources such as industrial firms
- Organize outreach events, independently and with other organizations at McGill and beyond
- Initiate all-team events and social activities
- Manage crowdfunding campaigns and social media accounts

- Arrange the logistics for the competition trips

- Arrange the cabling on the chassis to ensure smooth operation and synchronization of the car components

Mechanical

This sub-team is in charge of building and assembling the mechanical components of the car, namely the chassis, wheels, bearings, motor, as well as the necessary components of the power source and stopping mechanism. Tasks include:

- Design car components in autocad, Autodesk Inventor, Solidworks or similar software
- Use various tools and techniques such as laser cutting, drilling, polishing to shape and assemble car pieces
- Allocate and distribute necessary space for car components on the chassis while keeping track of the center of mass and competition constraints
- Design and implement sitting and liquid dispensing systems on the car

We are excited to have you on our team!

Electrical

This sub-team is responsible for the relations between the aforementioned technical sub-teams. In other words, it coordinates the movement of the car depending on the power source and the stopping mechanism needs. Tasks include:

- Design, calibrate and troubleshoot various types of sensors such as the light sensor, speed sensor, continuous voltmeter, continuous ammeter
- Use an electronic platform such as Arduino or Raspberry pi to regular parameters of the car (such as motor operation) based on sensor outputs