

## APPLICATION OUTSIDE OF HUNGARY (US)

The sci-fi novel "*The Martian*" has been one of my favorite books since I was 12 because it is exciting and funny while being based on real science. The main character Mark Watney's inspiring ability to use his engineering knowledge and skills to overcome seemingly impossible challenges inspired me and led me to decide early on that I wanted to pursue engineering.

My interest in engineering has always been underpinned by a curiosity for science, but after I moved to the US and started high school I realized that if I was going to take the optional IB diploma program, I wouldn't have enough open periods left to take the most advanced AP science classes also offered at my school. Therefore, I decided to take an honors Chemistry and an AP Physics 1 class online at the highly selective Johns Hopkins Center for Talented Youth so that I could go straight to taking the more challenging AP Chemistry and AP Physics C courses in school. One of the many things that I found fascinating in AP Physics C were Inductor-Capacitor (LC) circuits. After doing additional research at home, I was able to build a simple (and only slightly dangerous) coilgun making use of a capacitor to quickly discharge a large amount of current through an inductor. The sudden change in current induces a strong magnetic field inside the inductor which accelerates a small screw and shoots it across the table. My enthusiasm for science was recognized by my school, as I received the Bausch and Lomb Honorary Science Award, the only science-related award handed out to one of the close to 600 students in my year.

I am also a member of my school's robotics team where we compete in VEX Robotics Competitions. I loved building the robot last year and especially enjoyed coming up with creative solutions to the many structural challenges we faced, regularly tinkering with the robot in my basement for hours on end. Lifting the heavy game objects required using some compound gear trains to gain enough mechanical advantage and I also had to build a conveyor belt onto the robot to pick up rings and place them onto the game objects. After the success of our robot in the state championship, I was elected to be the structural lead of our club of over 50 members. I aim to use this role to teach our members more about how they can apply their creativity to robotics and to prepare them for this year's competition. My rewarding experience with robotics led me to consider pursuing a career in mechanical engineering.

For my IB extended essay project, I chose to do a physics experiment investigating the relationship between the radius of a propeller and the thrust it produces. In one of the engineering classes I took in school, we learned the basics of CAD and this kindled my interest in 3D printing. I connected this hobby to my extended essay by 3D printing all of my propellers and also using CAD to design and print a simple thrust meter consisting of an L-shaped arm pivoted on its corner by ball bearings, with the motor and propeller attached to the top arm. The thrust from the propeller generates a torque around the pivot and the second arm is pressed down onto a kitchen scale to give fairly accurate readings of force.

During this project I learned a lot about the physics behind propellers and also about how to come up with, conduct, and document an experiment.

I've been rowing for five years and through hard work and perseverance, I earned a seat in my school's first boat. Rowing has taught me a lot about time management, since we practice every day and the boathouse is a 40 minute bike ride away, so I rarely get home before 6:30 pm.

I think that the combination of strenuous AP science classes and large IB projects, complemented by hands-on experience through the robotics club, has prepared me well for studying engineering at a top university and although I might not make it to Mars like Mark Watney, I certainly look forward to solving problems and improving the world through engineering.