As a kid, every time I went on the highway, I was amazed by the skyscrapers, but I could see the huge amount of trash piling up and burned when I looked down. I knew that waste should be recycled, which led to me making toy telephones from food cans. Burning trash contributes to environmental problems, so I always try to turn waste into something useful. I always wanted to be an engineer, and the urge to make the best use of the things around me and make things more efficient has convinced me to be an electrical engineer.

I was curious about what else I could recycle and arrived at the idea of turning my old bicycle into a mini electricity generator. I used a chair and PVC pipes to support the wheel. I firstly used a small pipe as it was easier to cut and drill a hole, but it wasn’t strong enough to support the wheel. After I taped the pieces and attached the wheel to it, it collapsed, so I used a thicker pipe. I then had to think of a way to connect the wheel to the axle. I initially used yarn, but it kept slipping off, so I created a border on the wheel to keep the yarn in place, but it wasn’t efficient, so I used a rubber band instead. I then attached the dynamo to a series of small lamps using wires. When the axle rotates, the magnet inside the coil of wire turns, leading to electromagnetic induction, producing direct current, thus lighting the bulbs. I never thought that I could generate electricity from scraps. From this project, I learned how recycling trash could save energy and reduce the use of non-renewable resources.

Wanting to explore more concepts in engineering, I attended Oxford’s engineering summer course. I learned valuable skills for engineering like research, programming and problem-solving. A project I did was to demonstrate an aircraft’s motion using python to get the magnitude and direction of the resultant force of the plane, the difference in air velocity above and below the wings of the plane, and the Mach number sonic range of the aircraft. This skill can be used to help deal with environmental problems in Indonesia. Dams are an essential feature in Jakarta due to their frequent flooding but, the dams could break during heavy rain. In 2020, the leaks in 44 dams caused severe flooding killing 66 people. Programming can be implemented to help take extra precautions when building the dams. For example, a program could be designed to simulate the strength of the dams during heavy rains. With this, engineers could decide on the structure of the dams faster as there is a time constraint in building dams, having to make it before the monsoon season.

To be an engineer, I need to think creatively to solve the problems we face today, similar to Math Olympiads. The questions are not straight to the point and require me to think outside the box. I joined several Math Olympiads, earning one gold and three bronze. My goal from this is not to win but to explore deeper into math. My first Olympiad went badly, but I didn’t give up. Instead, it sparked my curiosity to explore new topics that I wouldn’t learn in school. I studied new functions or rules on the Internet, like the divisibility rules. In my math club, my friends and I would solve challenging questions where each of us would share our idea on solving them until reaching the solution. Here, I learned how to share my thoughts on a topic and think creatively to answer.

Indonesia is ranked 9th as the most polluted country. The burning of trash or throwing plastic into seas or lakes contributes to making pollution worse. The rising sea levels due to climate change and plastic waste in the ocean have caused Jakarta to sink by 10cm per year, sinking up to 4.6m by 2050 if no measures are taken. In Indonesia, recycling trash on a large scale is still uncommon; around 10% of trash is recycled. This is why as an engineer, I want to tackle these problems, turning waste into something useful and developing the clean energy industry to minimise pollution.