

Shao-Ju Wang

A 3.66 GPA is not among the bests of your applicants. And yet, I am proud of it when it comes to completing dual degrees in Computer Science and Electrical Engineering plus a minor in Computer Engineering within four years of college. My college education aim was to build the most holistic training in different engineering disciplines possible because I believe that better problem-solving skills and ideas come from a combination of knowledge and skills from various perspectives. Therefore, I tried to reach this goal with dual degrees with a minor and research projects with professors of different engineering backgrounds. And now, I am ready for my next aim of focusing and sharpening my knowledge and skills in Automatic Control and Embedded Systems.

Within automatic control, I am especially interested in AI and robotics that free-up manpower, particularly those requiring less cost to own and operate. At Penn State, I accomplished two projects involving computer vision, one in a fruit fly 3D model and the other in a metal deposition. These two projects show me the unlimited potential of how computing can help remove redundancy works and automation's potential. Furthermore, living in a developing country for six years, I had the opportunity to witness some deplorable living conditions where

Shao-Ju Wang

Shao-Ju Wang

people don't even have access to essential utilities. Those encounters have motivated my quest to improve technologies and devices that are beneficial and affordable to those with limited resources. And I believe that my graduate training in automatic control will be the way for me to achieve that goal.

The second area of specialty that I would like to acquire further is embedded system. To achieve the goal of building affordable devices that aid people, I am eager to learn more about the architecture of embedded systems, particularly microcontrollers. At Penn State, I took courses in algorithm frameworks, such as divide and conquer, dynamic programming, and microcontrollers and MIPS architecture. I aim to tackle the optimization problem with both software and hardware approach; achieving more than double effectiveness.

My interest in research projects began from my favorite course at Penn State, CMPEN 454, Introduction to Computer Vision. The course combines the physical world, bits, and math altogether. After taking the course, I began working with some of the professors at Penn State, developing computer vision programs that aid their research. First, I joined Professor Jean

Shao-Ju Wang

Shao-Ju Wang

Mongeau's Bio-motion Systems Lab of Mechanical Engineering to help them recreate a fruit fly 3D model with stereo images. Although I did not work on the core computer vision code, I helped optimize the user experience and learned a lot about the techniques and flow. After completing the project, I assisted Professor Sanjay Joshi from Industrial Engineering in creating a program that automatically determines the dimension of metal deposition from the cross-sectional image. Meanwhile, I am developing a single-lens camera distance detection algorithm that works on the phone with Professor Kyusun Choi in Computer Engineering. This device will detect obstacles in front of a micromobility to prevent traffic accidents. These project experiences in software and low-power hardware have shown me my limitations in these areas, the fun of finding solutions on my own or within a team, and, more importantly, the urge to study further.

Not only did projects with the professors in engineering research, but I also helped Professor Yunting Liu from Electrical Engineering in settling and improving her lab session in EE 413, Introduction to Power Electronics. I assisted her and her TA in finding and solving the missing or confusing parts of the lab operation. I also made some technical suggestions on the

Shao-Ju Wang

Shao-Ju Wang

typesetting of the lab manual. From this experience, I learned the development process of lab design and how to conduct the lab.

I enjoyed the teamwork research with the professors and their team members. And yet, I am also trying to solve some of my questions in engineering on my own. The project on converting USB PD to ATX motherboard connections is my own attempt to solve the complexity of desktop power. Conventional ATX power supply takes several cables to supply power to the motherboard, while I am trying to provide the power with a single USB type-c cable. There are still many engineering questions that I wish I could find the answers to and the solutions from my training in your Master's program.

In my last year of undergraduate education, I was the treasurer of the IEEE- Eta Kappa Nu (HKN) honor society. Aside from managing cash flow, I enjoyed tutoring members and non-members on electrical and computer-related coursework and assisting them with course selections. I was delighted when I could find ways to help these students understand the concepts they tried to learn in class. It was a mutually beneficial experience because I learned to express

Shao-Ju Wang

Shao-Ju Wang

myself better and thought more profound about this knowledge or skills. And I hope I will have more of these opportunities in the future.

Academic education in CS, EE with a minor in CE exposed me to the spectrum between hardware and software. From project and tutoring experiences, I know I want to be a researcher and a professor at the university in my career life. Therefore, I am working step by step toward that goal. The CS graduate program at Columbia University has been one of the best in the world. I will be able to learn research skills that will further lead me to the future goal, learning from and contributing to our world as a professor. My life goal is to develop and improve technology to improve human life, especially for those with limited resources.

Shao-Ju Wang