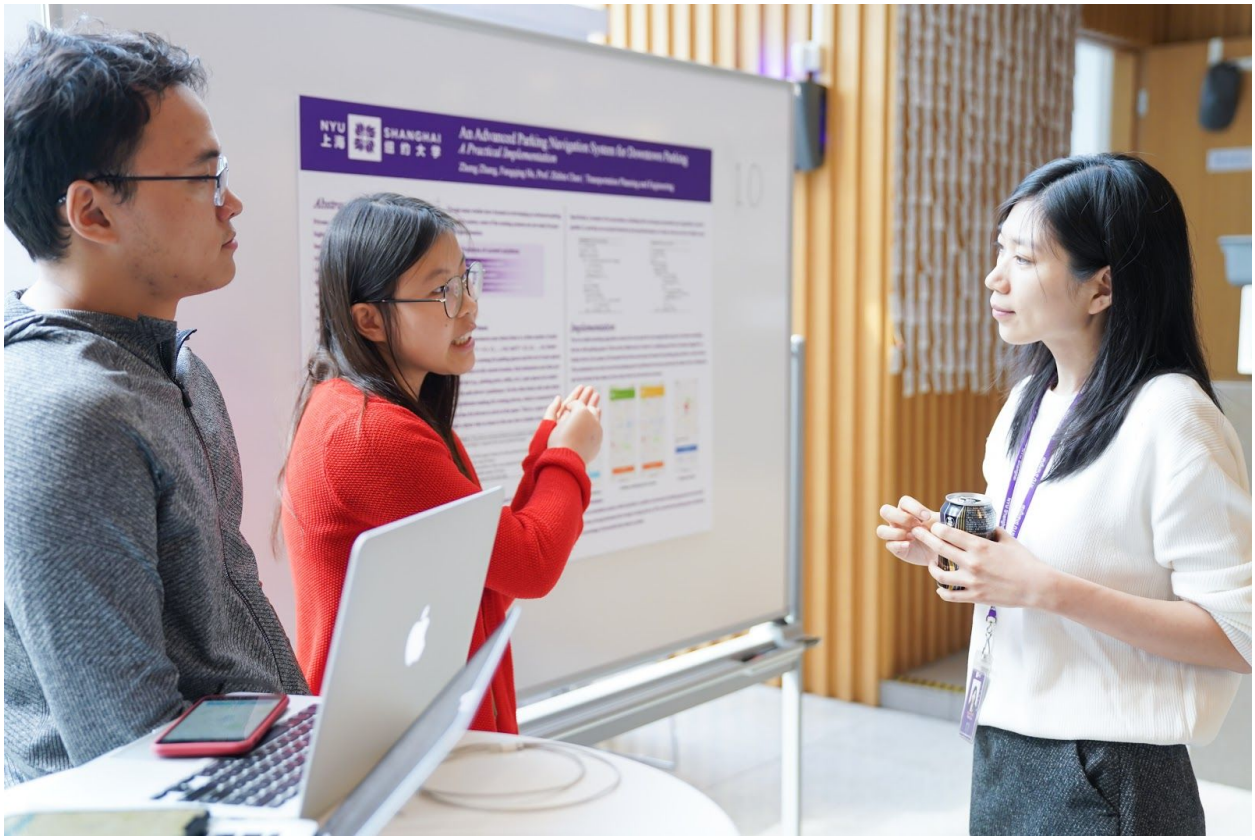
Fall 2019 Undergraduate Research Expo and Poster Competition Winners List

First Place Project

Project Title: Pika Park - Intelligent Parking Navigation System
Name: Zheng Zhang and Fangqing He

Abstract: Private vehicle penetration rate in urban area is rising at a higher rate than ever. Consequently, finding parking space has become drivers' daily headache. This research aims to mitigate the problem through establishing an intelligent, strategy-proof navigation system between drivers and parking spaces. Adopting a distributed two-sided matching algorithm, the system matches the drivers to their most appropriate parking spaces based on their real-time locations and parking preference, and thus preventing multiple drivers from being guided to the same parking space. This research will first build a fully functional, performance optimized backend to implement the two-sided matching algorithm and then develop a native APP on multiple mobile platforms (ideally both iOS and Android). The APP will guide drivers to parking spaces

according to their preference by considering their real-time position and traffic condition information.



“We just want to say it was such an amazing experience and opportunity to present our work to a cordial audience made up of faculty, staff, and students. The two hours we spent that morning meant a lot to us - it was the first time we present our work to the public; it was the first time we do a formal poster presentation; it was the first time we ever win an award for our research. We are more than flattered and truly grateful.

Both of us think that the overall arrangement and logistics are smooth & professional. We didn't face any trouble in the material/poster submissions. ” ---Zheng Zhang and Fangqing He

Second Place Project

Project Title: A New Public Cryptography Design Based on CA Chaotic System
Name: Gengyu Chen

Abstract: The great invention of public key cryptography has been widely used for the security of information exchange on the Internet. However, there are only two types of

cryptoschemes: group based (RSA, ECDSA) and lattice based scheme. The previous ones are to be broken with quantum computation and the latter still stays at theoretical level. Thus, scientists have been finding new public key assumptions and schemes. This research proposes a new public key cryptography scheme based on new assumption on pseudo random nonlinear function. We studied the theoretical security of our assumption and efficiency in time and space. After implementation we tested the concrete security through various attacks and studied the efficiency in statistics.

“Thanks for offering me the chance to present my research! I think it is a great activity with thoughtful planning and arrangement. We all really enjoyed it.” --- Gengyu Chen

Most Popular - Audience Choice Award

Project Title: 2019
Name: Zeping Fei and Muru Chen

Abstract: 2019 is a sculpture made of 2019 pieces of trash, designed to visualize what we consider "depression condition" is, address its influence on its sufferers, and bring mental health awareness to the public. Only when we walk into one's heart will we realize how much pain is hidden up there. 2019 is thus visualized as a 1/2 human heart which exposes depressed people's inner world. It turns a physical sculpture into an interactive installation-pulling the "vessels" creates heartbeats, a still sculpture then becomes alive. Small trash pieces filling the cross-section of the heart represent those little painful moments the depressed have experienced, hidden from the public. The audience are encouraged to dispose of some trash pieces from the sculpture into trashcans, meaning a clean-up of people's emotional trash. Depression does not stay with one for good, while those negative emotions can be recycled to something useful, positive and bright.