## FALL 2019 NYU SHANGHAI UNDERGRADUATE RESEARCH EXPO AND POSTER COMPETITION

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Friday, October 25, 2019
10:00AM-12:00PM
[https://researchsymposium.shanghai.nyu.edu](https://researchsymposium.shanghai.nyu.edu)
As part of the ambitious “Made in China 2025” blueprint, Chinese officials have set the semiconductor industry a goal of reaching US$305 billion in output by 2030 and meeting 80% of domestic demand. Aimed high, the Chinese semiconductor industry seems frustrating as for its development despite the government’s support. As most commonly known, talents and capital resources are the fundamental drivers for the development of the tech-intensive industry. Guided by this concern, our research focuses on the two most important factors determining the prospect of this industry—intellectual training and financial investment. Our project aims to provide deep insights into the current bottlenecks and advise on future development to help achieve the long-term sustainable thriving of the Chinese semiconductor industry.

Deep Reinforcement Learning (DRL) is one of the most active research fields nowadays, achieving great success in many areas such as autonomous driving, robotics and GO playing. In our project, we devise an algorithm named Best Action Imitation Learning (BAIL) which works well on off-policy datasets. An off-policy dataset means the agent does not further interact with the environment and we can only train the policy on a fixed buffer of data. In experiments, we demonstrated that BAIL outperforms Behavioral Cloning (BC) and Batch-Constrained deep Q-learning (BCQ) in the “Final Buffer” setting as in the paper “Off-policy Deep Reinforcement Learning without Exploration” (Fujimoto et al, 2019). We also demonstrated BAIL is capable to learn robustly from a wide range of off-policy data distributions.

The paper presents results on the top wealth shares estimation of South Korea by combining survey data and rich lists. By complementing survey data with rich lists, we are able to obtain less biased estimates and gain a more comprehensive picture of the wealth distribution.

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.

A New Public Cryptography Design Based on CA Chaotic System
STUDENT Gengyu Chen (Computer Science)
PROJECT TYPE DURF
MENTOR Siyao Guo

The rapid expansion of smart phone usage and development of mobile technology has introduced mobile payments as a new way for consumer spending. In China, the emergence of mobile payments is the most prominent in the world with billions of users adopted mobile payment services in less than a decade. In this research, we investigate the influence of mobile payments on consumers’ consumption behaviors based on a dataset from a major international bank in China. This dataset has users’ credit card transactions information in PC websites, traditional cards and mobile payment services. Using a difference-in-difference research design, we are able to find that higher mobile payment usage induces both the frequency and amount of transactions to increase. Moreover, mobile payment also plays as a substitution for physical card payment and PC payment methods. We also find that the introduction of a new form of mobile payment such as WeChat Pay would also substitute the existing mobile payment methods.
Founding fathers often constitute the central icon of national space programs in the public eye. Yet, few have questioned how their reputation got established publicly, and what imperatives motivated such establishment. In this poster, we undo the recognized status of two father figures – Qian Xuesen (1911-2009) and Vikram Sarabhai (1919-1971) – in the Chinese and Indian spaceflight histories. While Sarabhai was claimed to have set the vision for India’s space program, Qian won national veneration for setting up China’s independent space industry. By tracing the historical development of their public images, this poster examines the particular nationalist propaganda and changing global geopolitics that indexed the popular narratives of the two. In turn, such examination maps out a global space history beyond the major space powers such as the US and the USSR, and further provides a cultural lens into the rising roles of India and China at the subsidence of the Cold War Space Race.

The Meiji Restoration of 1868 represented a starting point of Japan’s rapid modernization. Political and social changes before and after the Meiji Restoration affected both Japan’s future development and foreign policy. By examining domestic and international factors that contributed to the Meiji Restoration, this research will discuss the ideological changes implemented by the new Meiji state. The Meiji leadership implemented not only Western ideas but also appropriated Chinese Confucianism in order to strengthen Japanese nationalism. However, instead of consolidating social hierarchies in the late Tokugawa period, Confucianism was appropriated as a tool to support and increase the legitimacy of the anti-Tokugawa bakufu movement. Whether Western or Chinese ideas, these appropriations by Meiji revolutionaries aimed at turning Japan into a rich nation with a strong army to better protect Japan from being divided by western powers.
Researchers across many disciplines have taken an interest in children’s drawings. Psychologists have often studied children’s drawings to explore their expressive or artistic content. Little work, however, has focused on the geometry that children depict; recent work has found that children’s drawings include more objects than landscape elements in their portrayals. In this study, we will explore the reason behind the greater depiction of objects by studying the communicative intent of children’s drawings. The goal of the study is to see if children will verbally detail or draw landscape elements and objects with the same frequency. We predict that children will label walls (landscape element) more often in the verbal condition compared to the drawing condition, showing that the lack of landscape elements in the drawings is a result due to the challenge of their depiction.

Math

STUDENT
Ziyu Lu (Honors Mathematics)
PROJECT TYPE
DURF
MENTOR
Laurent Mertz

The goal of this project is to formulate and simulate a model of dry friction when the object is subject to a stochastic force. The framework of stochastic differential equation with multi-valued drift is employed to model the dynamics of such a system. We derived the associated backward Kolmogorov equation of this process and argued that we cannot derive the Fokker Plank equation in the standard approach. Statistical quantities are computed numerically by Monte Carlo estimation and also by solving the backward Kolmogorov equation.

Judges

Melanie Hackney
Director of Language Programs, Clinical Assistant Professor of French

Jungseog Kang
Assistant Professor of Biology, NYU Shanghai; Global Network Assistant Professor, NYU

Emily Tsiang
Visiting Associate Arts Professor of IMB

Siyao Guo
Assistant Professor of Computer Science, NYU Shanghai; Global Network Assistant Professor, NYU

Lihua Xu
Associate Professor of Practice in Computer Science

Stavros Didakis
Associate Arts Professor of IMA

Jin Huang
Visiting Assistant Professor of Marketing

Weiwei Weng
Associate Professor of Practice of Economics

Christina Wang
Assistant Professor of Finance, NYU Shanghai; Global Network Assistant Professor, NYU