

SPRING 2024 UNDERGRADUATE RESEARCH SYMPOSIUM

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NYU SHANGHAI



The NYU Shanghai Undergraduate Research Symposium is a university-wide celebration of research which showcases work from undergraduates spanning Arts and Sciences, Business, and Computer Science, Data Science, and Engineering. The Symposium features recently completed projects by Major Honors students, as well as research papers and creative work by students for their Capstone Projects, Independent Study Courses and as part of the Dean's Undergraduate Research Fund (DURF).

Visitors will have the opportunity to cast a vote for the projects that most impress them, and a panel of NYU Shanghai faculty will select the winning projects.







FLOOR PLAN Poster Demonstrations V</t

Reception Desk

05:00 - 05:45 PM Presentations

Humanities & Social Science A (E302) Humanities & Social Science B (E303) STEM (E304)

05:50 - 06:45 PMQ&A Sessions (Magnolia House)07:00 - 07:15 PMAwards Ceremony (Magnolia House)

Humanities & Social Science Group A



- Social Science
- Interdisciplinary
- Humanities
- Economics

How Did the 2022 Beijing Winter Olympics Affect the US Public's Perception of China's Image?

Lingxin Guo

Area: Social Science Mentor: Ivan Rasmussen

The 2022 Winter Olympics has attracted global attention. China hoped to raise its prestige as a hospitable and responsible country. Given this context, my research studying the impact of such a sports mega-event on Sino-US relations. I sought to study how effective China's Olympics was as a diplomatic image-making strategy in affecting Sino-US relations. This study would benefit policymakers to be more aware of the political implications of global sports events regarding Sino-US relations. To answer the research question, I conducted a survey via Amazon Mechanical Turk to study whether US public amity toward China increased after the 2022 Olympics.

The Influence of Mainline Theme Movies on Nationalism among University Students in China: A Case Study in Shanghai

Jiawei Ye Shuli Wu

Area: Social Science Mentor: Yao Lin

The mainline theme movie (主旋律电影) refers to movies that promote dominant political ideology in China (i.e., nationalism, collectivism) (Guan and Hu 2021). Intrigued by the unprecedented success of mainline theme movies in the past few years, we propose our research question: Do mainline theme movies in China promote nationalism among their audience, especially undergraduate students? If yes, why? If not, why not? Adopting a mixed-method approach, we identify the positive correlation between the audience's exposure to mainline theme movies and their level of nationalistic sentiments and ravel out the underlying mechanisms.

The Relationship Between Social Media & Political Polarization in the United States

Helen Zhu

Area: Social Science Mentor: Tyler Haupert

Political polarization is a key topic that has been and is still being studied within United States politics. In recent years, there has been a rise in political polarization, and social media usage has steadily increased. This paper will examine data collected from a survey of 609 respondents in the United States, where respondents answered questions regarding their social media usage, media trust, and attitudes towards the other political party. The project utilizes the survey results, looking at statistical significance to determine to what extent social media affects polarization.

Renewable Energy Literacy in the US: Investigating Gendered Trends

Ruby Rich

Area: Social Science Mentor: Travis Klingberg

Renewable energy technologies have rapidly become cheaper and more efficient than fossil fuels. But, are Americans aware of this trend? To answer this question, this study utilizes a quantitative online survey to investigate demographic trends in Americans' knowledge on renewable energy. Ultimately, the goal of this research is to gain a comprehensive understanding of the level of awareness and knowledge that different demographic groups within the US population possess about renewable energy sources. Such insights are essential for guiding targeted educational campaigns and shaping policy decisions to narrow the awareness gap, fostering a more sustainable and energy-conscious society.

Predictive Power of RNS Regarding Next Period Return

Yifei Jiang Ziyue Wang

Area: Interdisciplinary Mentor: Xin Zhou

This research explores Risk-Neutral Skewness (RNS) in nine major Chinese ETF options. Employing methodologies by Jiang & Zhou (2024) and Bakish (2003), we calculate RNS values and assess their predictive power for future market returns. Through regressions, we identify factors influencing RNS, revealing a significant inverse relationship with 30-day returns. Seasonal patterns in ETF RNS are observed, aligned with ETF issuance schedules. Granger causality analysis confirms RNS as a robust predictor of returns. Our findings provide actionable insights for investors, enhancing understanding of market dynamics and facilitating informed decision-making in Chinese ETF options trading.

The Humanitarian Crisis in Sudan, 2024

Zichun Zhao

Area: Humanities Mentor: Shuang Wen

Focusing on the humanitarian crisis happening in The Republic of Sudan, this project analyzes why and how it happened, and what should we do to improve the situation. The project seeks to use Sudan as a case study to shed light on the humanitarian dilemmas that many developing countries are facing but may not be reported in the international media, and to call on the world to engage in a humanitarian crisis. Shifting Dynamics of Northbound Capital: Predictive Power and Trading Strategies in the Chinese Stock Market

> Jingru Luo Siteng Wu Yilu Pan

Area: Economics Mentor: Xin Zhou

This paper investigates the predictive power and trading logic of Northbound Capital in China's Stock Connect program. Employing data from November 2014 to October 2023, we analyze the influence of Northbound Capital on the Shanghai stock markets. Our study reveals a decline in predictive power post-2020, with Northbound Capital shifting preferences for companies with specific financial characteristics. We delve into short-term and long-term trading strategies of northbound capital, uncovering a dynamic approach that adapts to market conditions. The paper also highlights the impact of recent regulatory changes, showing how they reshape investment strategies and market dynamics.

Environmental Disclosure and Firm Value: A DID Analysis of ESG Performance in China's Listed Companies

Jiajun Wang Di Li

Area: Economics Mentor: Xin Zhou

This study extends previous research on the relationship between Tobin's Q and ESG scores by examining the significant shift in the impact of environmental (E) scores on Tobin's Q during 2021-2022. We hypothesize that the issuance of the Administrative Measures for the Legal Disclosure of Enterprise Environmental Information by the Ministry of Ecology and Environment in 2021 influenced this relationship. Employing a Difference-in-Differences (DID) methodology, we explore the policy's effect on the disclosure of corporate carbon emissions and its impact on corporate value.

Humanities & Social Science Group B



- Social Science
- Humanities
- Global China Studies
- Interdisciplinary

Study With Me: Impact of Online Self-Study Rooms on Study Habits in Chinese University Students

Celia Forster

Area: Social Science Mentor: Pekka Santtila

This study investigates the effects of online self-study rooms (线上自习室) on the study habits of Chinese university students, including procrastination, time management, and stress. 30 students from East China Normal University were randomly assigned to either participate in online self-study rooms or continue their normal study routine over a two-week period. Despite the hypothesized benefits of this study method, we find no significant differences in study habits between the groups. Further research is needed to explore the potential of such interventions in diverse educational contexts and with larger sample sizes to assess their true impact on study habits.

After the Act: Post-Sex Behaviors and Their Correlates in Straight Chinese Couples

Julie Yang

Area: Social Science Mentor: Pekka Santtila

The study investigates how post-sex behaviors affect Chinese couples' relationship satisfaction, sexual satisfaction, and intimacy. We also examined if these relationships were different between genders and if these relationships varied after sexual dysfunction intervention. Thirty-five heterosexual couples completed survey questions before and after a sexual dysfunction intervention, reporting on post-sex behavior, relationship satisfaction, sexual satisfaction, intimacy level, and sexual dysfunction. Results showed that the age and relationship length in both male and female participants were negatively correlated with positive post-sex behaviors. Additionally, the sexual dysfunction intervention was positively correlated with positive post-sex behaviors.

The Impact of AI-generated Photos in Advertisements on Consumer Decision Making

Ruoming (Hattey) Sun

Area: Social Science Mentor: Brian Hall

As AI (Artificial Intelligence) has been a popular tool among the marketing industry for generating attractive photos in advertisements to capture consumers' attention, this research wants to understand how AIgenerated photos in advertisements influence consumer psychology from the aspect of emotion-based decision making. With ChatGPT to create photos, the results from an online experiment showed that, compared to real photos, AI-generated photos didn't significantly impact people's perceived quality, emotion, attitude. The effects of perceived quality, attitude and emotion on purchase intention for two product types were confirmed with the existence of AI-generated photo serving as a moderating variable.

How do Mindsets and Parenting Matter? Depressive Symptoms of Migrant Children in Shanghai

Yucheng Bao

Area: Social Science Mentor: Lixian Cui

Migrant children in China are underrepresented in research and suffer from mental health plights (e.g., depression) and disparities compared to their local urban counterparts. The current study recruits 136 migrant children from the College and Career Lab at NYU Shanghai to investigate the effects of personal mindsets and parenting styles on children's depressive symptoms. The results demonstrate that fixed mindsets reveal significant detrimental effects on children's mental wellbeing, via negatively impacting self-esteem. Meanwhile, a higher level of harsh parenting exacerbates the detrimental effect of fixed mindsets on children's depressive symptoms, while a higher level of authoritative parenting can mitigate it. Ambivalence of Love & Faith † : A Literary Analysis of Chretien de Troyes' *Lancelot: The Knight of the Cart*

Yuchen Zhang

Area: Humanities Mentor: Melanie Hackney

The project is a literary analysis of the female protagonist – Guinevere – in The Knight of the Cart, a medieval French courtly romance by Chretien de Troyes. Different from existing scholars' focus on the representation of courtly love and Christianity or Guinevere's images in this novel, I intend to tease out how Guinevere poses challenges in her relationships with King Arthur and Lancelot respectively, to find out how a noblewoman is empowered by adultery to negotiate her position in medieval society. Digital Intimacy and Intermedia Storytelling in Chinese *Otome* Games -- A Case Study of *Light and Night*

Fenglin Selina Ju

Area: Global China Studies Mentor: Yucong Hao

Digital intimacy, facilitated by advancing digital technologies, has emerged as the expanded romance from physical contact-based human interaction in the 21st century. This paper investigates the transformative framework of digital intimacy from social media to Chinese Otome games, with the example of one of the top four, Light and Night. My research examines the game interface, in-game social media functions, and voice performance and suggests that the reading and listening experiences embody an imagined fantasy. Through digital interface analysis and critical game studies, I argue the Otome game reshapes media product convergence and develops digital intimacy with various nonsemantic materials.

Female Mosques

Sarah Perlman Catherine Leininger Hailey Pang Samanthan Chen

Area: Global China Studies Mentor: Shuang Wen

A female mosque is a place of worship dedicated to Muslim women. They can be found all over the world, but there is a higher concentration of them in China. Our research discusses the reason for this phenomenon, through three self-conducted interviews and analyses of five scholarly sources. Our working thesis is due to the core principles of the modern Chinese government, religious activity is affected, resulting in more female mosques.

Exploring The Influence of Second Language Exposure on Native Speakers of Chinese Living in the Mainland

Margaret Czarnik

Area: Interdisciplinary Mentor: Marcel Daniels

Despite the majority of the Chinese population being monolingual, more and more Chinese natives speak a second language. While English is the most popular second language taught in China, its acquisition and exposure to it change the learner's language habits in all the spoken languages. In my research, I concentrated on Chinese natives speaking English fluently, living in mainland China, and functioning in a multilingual community daily. I investigated communities' and the English language's influence on their language habits and their own image as language speakers. While researching, I discovered huge changes in almost every aspect of their lives.



Biology

STEM

- Chemistry
- Mathematics
- Neural Science
- CS / DS / Engineering

Phenotypic Differentiation of Spotted Lanternflies *Lycorma delicatula* in Native and Invasive Habitats

Aria Zhang

Area: Biology Mentor: Kristin Winchell

Lycorma delicatula (spotted lanternfly) is an infamous invasive species in the United States indigenous to China. This project investigates the color morphs, especially the wing coloration of adult spotted lanternflies from New York City and Shanghai, thus understanding the adaptation of this species to urbanization and new habitats during their invasion. We collected spectrum reflection data from three regions on the wings within the range of 400-700 nm and conducted analysis in R to determine phenotypic variations across populations. We found the blue color morph to appear exclusively in Shanghai and determined coloration differences between populations from NYC and Shanghai.

Frozen Gaussian Approximation for Wavepacket Dynamics on 1D Morse Potential

Haorui Hu

Area: Chemistry Mentor: Xiang Sun

Since the Wentzel-Kramer-Brilloui (WKB) approximation to the Schrödinger equation, semiclassical approximation has been under developing for more than a hundred years. Notably, a series of semiclassical initial value representations (SC-IVR) are developed under the Feynman path integral formalism of quantum mechanics, and it is a practical way to incorporate nuclear quantum effect in molecular dynamics simulation. Position-space (van Vleck) SC-IVR and phase-space (Herman-Kluk) SC-IVR are applied to simulate the wave packet dynamics, while linearized SC-IVR and forward-backward SC-IVR are useful to study time correlation functions. I will simulate the wave packet dynamics on the Morse potential by HK-SC-IVR, benchmarked by Split Operator Fourier Transform (SOFT) method in this research poster. Advancing Quantum Dynamics Simulations: A Comparative Study of Dynamical Methods for the Spin-Boson Model

Brian Liu

Area: Chemistry Mentor: Xiang Sun

This thesis investigates various computational methods for simulating population dynamics within the spin-boson model, focusing on numerically exact and approximate methods. Through an extensive literature review and simulations, the study aims to evaluate the accuracy, efficiency, and reliability of these methods. Findings suggest that numerically exact methods give more precise results, but they are more computationally demanding. Approximate methods reduce the computational load, but give less accurate results. This study is important as it allows for a better understanding of quantum dynamics in the spin-boson model and lays the foundation for future research to optimize such computational strategies.

Tuning UV Response of Green Fluorescent Protein (GFP) Chromophore through Chemical Modifications

Yu Shen

Area: Chemistry Mentor: William Glover

UV light induces fluorescence in the Green Fluorescence Protein (GFP) but also leads to irreversible photodamage, limiting its applications in biological imaging. This study aims to explore the photodamage mechanism of GFP and learn how to alter it through chemical modifications. To address this, we applied multiconfigurational electronic structure calculations and excited-state dynamics simulations to the GFP chromophore and its biomimetics. Our studies suggest that adding π -electron donating groups on the phenoxide ring can influence a key gateway state that leads to photo-oxidation of the GFP chromophore. Overall, this research offers insights into genetically modified GFP variants for enhanced applications.

Application of Markov Chain Monte Carlo in the Oscillatory Long-Range Ising Model

Jiajun Chen

Area: Mathematics Mentor: Eric Endo

This research project delves into the Oscillatory Long-Range Ising Model, employing Markov Chain Monte Carlo methods to explore phase transitions in systems with oscillatory interactions. Under Prof. Eric O. Endo's mentorship at NYU Shanghai, the study innovates by examining long-range interactions that decay and oscillate, a significant deviation from traditional Ising models. Through computational simulations, the project reveals how these unique interactions affect phase transitions, providing insights with potential implications for material science. This exploration not only advances the theoretical understanding of statistical mechanics but also opens new avenues for future research in the field. Exploring the Impact of Brief Naps on Emotional Reactivity to Emotionally Valenced Words

Annie Lu

Area: Neural Science Mentor: Xing Tian

This pilot study investigates the influence of short naps, particularly focusing on sleep spindles during non-rapideye-movement stage 2 (N2) sleep, on emotional reactivity during emotion association and imagination tasks. Current research primarily explores the role of sleep spindles in memory forming, intelligence, and learning, less talking about its impact on emotions. Hypothesizing that sleep spindles during N2 sleep play a crucial role in emotional regulation, we aim to analyze emotional reactivity using EEG measures and emotionally-valenced word stimuli. This study holds significance in understanding emotional regulation, potentially contributing to enhancing cognitive functioning and emotional well-being across various domains.

A Direct Lexical-to-Phonetic Transformation in Speech Production

James Chen

Area: Neural Science Mentor: Xing Tian

Speech production, a testament to human cognitive and motor capabilities. There were various models trying to explain such a process. The Hierarchical State Feedback Control (HSFC) model can potentially explain the human speech production, but some of the links are not fully explored. We hypothesized that the transformation between lemma and phonetics levels is achieved by both gamma band and high-gamma band communication. In this Stereoelectroencephalography (sEEG) experiment, with a Chinese monosyllabic word reading-speech production task, we found that the high-gamma and gamma oscillation showed differences in patterns but similar in timing activation of motor level and phonetic level, suggesting a direct transformation from lemma level to motor level.

LLMBiasWatch: A Framework for Prompt-Based Bias Detection in Language Model Outputs

Ameer Qureshi Ramish Jalil

Area: CS / DS / Engineering Mentor: Rachid Rebiha

The use of generative artificial intelligence has become increasingly popular as technology progresses and experts are showing that 92% of the data found on the internet will be from generative A.I in 10 years from now. Starting from a prompt Generative A.I. is able to generate automatically new contents. Unfortunately, it tends to reinforce the bias that was first available on its data sets. We propose an automated prompting framework allowing us to quantify the biases found in the end-users output. Our framework allows us to compare the bias between LLM popular tools and methods to quantify bias on polarized topics (e.g., profession, gender, race, religion, and political ideology).

Arithmetic Reasoning with LLM: Prolog Generation & Permutation

Xiaocheng Yang Bingsen Chen

Area: CS / DS / Engineering Mentor: Yik-Cheung (Wilson) Tam

Instructing LLMs to solve math problems using Chain of Thought (CoT) relies on generating a sequence of arithmetic expressions, which is prone to cascaded calculation errors. We hypothesize that LLMs should focus on extracting predicates and symbolic formulas from the math problem description, while the calculation can be done via a code interpreter. We investigate using LLM to generate Prolog programs to solve mathematical problems. Our Prolog generation approach outperforms CoT on the GSM8K benchmark across distinct LLMs. Additionally, given the insensitive ordering of predicates and symbolic formulas, we permute the ground truth Prolog predicates for more robust LLM training.

HUMANITIES & SOCIAL SCIENCE GROUP A

JUDGES



llaf Elard

Associate Professor of Practice in Economics



Melanie Hackney

Assistant Dean for Curriculum Clinical Associate Professor of French



Brian J. Hall

Director of the Center for Global Health Equity Professor of Global Public Health, NYU Shanghai Associated Professor, School of Global Public Health, NYU

HUMANITIES & SOCIAL SCIENCE GROUP B

JUDGES



Jia Miao

Assistant Professor of Sociology



Tyler Haupert

Assistant Professor of Urban Studies



Mengdie Zhao

Assistant Professor Faculty Fellow of Global China Studies

JUDGES



STEM

Olivier Marin

Associate Dean of Arts and Sciences Professor of Practice in Computer Science



Henry James (Xiaotao) Li

Professor of Practice in Biochemistry



Linmin Zhang

Undergraduate Coordinator of Neuroscience Assistant Professor of Practice in Neuroscience



Shengkui Ye

Undergraduate Coordinator of Mathematics Associate Professor of Practice in Mathematics



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