

# ENCI (ELIAS) LIU

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EDUCATION      **Columbia University**      Sep 2024 - Feb 2026 (Exp)  
M.A. Economics      Department of Economics

**Wuhan University**      Sep 2020 - Jun 2024  
Bachelor of Economics (Honors)      Hongyi Honor College

         • Weighted Average: 91.3/100

VISITING STUDY      **University of California, Berkeley**      Applied Mathematics  
Visiting Undergraduate

**Johns Hopkins University**      Mathematics  
Visiting Undergraduate

CORE CURRICULUM	Mathematics		Computer Science		
	Advanced Mathematics B		Introduction to Computer Science		
	Advanced Mathematics A		Python Programming		
	Linear Algebra A		C Programming		
	Probability and Mathematical Statistics		Advanced Programming Language		
	Discrete Mathematics		Digital Logic and Digital Circuits		
	Real Analysis		Machine Learning		
	Numerical Analysis		Computer Architecture		
	Stochastic Models		Data Structure		
	Economics I		Economics II		Finance
Microeconomics		Microeconomics Analysis I		Accounting	
Macroeconomics		Microeconomics Analysis II		International Economics	
Econometrics		Macroeconomics Analysis I		Financial Economics	
Intermediate Microeconomics		Macroeconomics Analysis II		Advanced Econometrics	
Intermediate Macroeconomics		Econometrics I		Advanced Financial Economics	
Intermediate Econometrics		Econometrics II		Advanced Macroeconomics	

PUBLICATIONS      **Enci Liu**, and Haoran Sun. “Enhancing Federated Learning with Clustering-Based Differential Privacy: A Novel Approach for Optimal Privacy-Utility Balance.” *Computer Communications*, 2024.

**Enci Liu**, et al. “Privacy-Preserving and Accurate Deep Neural Network Retrieval.” *International World Wide Web Conference (WWW 2025)*, (Under Review).

**Enci Liu**, et al. “SO(3)-Equivariant Watermarking for Panoramic Images.” *Conference on Computer Vision and Pattern Recognition (CVPR 2025)*, (Under Review).

GRANTS      **Mathematical Contest in Modeling (MCM)**      M Prize  
**World Quant Challenge**      Gold  
**Kaggle ARC Algorithm Contest**      Silver  
**IEEE Xtreme Programming Contest**      First place in the Columbia University tournament

RESEARCH EXPERIENCE      **Chinese Academy of Sciences | Institute of Information Engineering**  
Research Assistant      May 2023 - Dec 2023

         • Worked on missing value interpolation in multivariate time series datasets.

         • Evaluated the effectiveness of missing value interpolation models on the medical health surveillance dataset and the air quality dataset.

- Created randomized missing scenarios by using random discarding to bring the percentage of missing data from 25% to 50% and 75% respectively.
- Employed mean absolute error (MAE) as an evaluation metric to assess the interpolation effect of 5 models, T-CNN, BRITS, GLIMA, V-RIN, and RDIS, in both structured missing and randomized missing scenarios.
- Concluded that T-CNN performs optimally in both scenarios and has a much lower MAE in randomized missing scenarios.

WORK EXPERIENCE	<b>Bank of China   BOC International</b>	
	Intern, Asset Management Department	May 2024 - Jul 2024
	<ul style="list-style-type: none"> <li>• Assist the team in the dynamic rebalancing of portfolio management, maintaining a dynamic balance of portfolio risk and return based on market fluctuations and changes in portfolio asset weightings.</li> <li>• Participate in portfolio risk exposure analysis and stress testing.</li> <li>• Assist in performance evaluation and attribution analysis to help the team quantitatively assess the risk-adjusted return of the portfolio.</li> </ul>	
	<b>State Administration of Foreign Exchange   Silk Road Fund</b>	
	Intern, Investment Department I	Mar 2024 - May 2024
	<ul style="list-style-type: none"> <li>• Adopted the relative valuation method to evaluate the proposed PV project, and constructed the conversion stock decision tree to analyze the possible path of equity conversion, timing and relevant factors.</li> <li>• Analyzed the EU industrial regulation policy and wrote a research report on "EU Power Battery Policy Analysis and Outlook" to provide reference for the department's new energy investment strategy.</li> </ul>	
CERTIFICATIONS AND AFFILIATIONS	<b>IBM</b> , Full Stack Software Developer Professional Certificate	
	<b>Ministry of Industry and Information Technology (MIIT)</b> ,	Sep 2024
	Qualification of Computer and Software Professional - Programmer	May 2024
	<b>American Statistical Association (ASA)</b>	Student Member
	<b>Association for Computing Machinery (ACM)</b>	Student Member
	<b>Institute of Electrical and Electronics Engineers (IEEE)</b>	Graduate Student Member
HONORS AND AWARDS	Honor Graduate Award, Wuhan University	
	HongYi Academic Scholarship	
	Scholarship for Outstanding Students	
	HongYi Academic Scholarship	
	Scholarship for Outstanding Students	
	Merit Student of Wuhan University	
	Scholarship for Outstanding Students	
	Merit Student of Wuhan University	
	Merit Student of Hongyi Honor College	
	Second Prize, Wuhan University 2020-2021 Research Project	
TECHNICAL SKILLS	<b>Languages:</b> C/C++, Python, SQL, HTML/CSS, MATLAB, Mathematica, Stata, Verilog, $\text{\LaTeX}$	
	<b>Developer Tools:</b> Git, VS Code, Visual Studio, PyCharm, Xcode, QT Creator, Jupyter, World Quant Brain	
	<b>Libraries:</b> Pandas, NumPy, Matplotlib	