CURRICULUM VITAE

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ACADEMIC EDUCATION

09/2021-Present **Shanghai Jiao Tong University**   *Shanghai, China*
MS Advisors: Prof. Yuan Qu and Prof. Jiamiao Yang
Major: Electronic and Information Engineering | GPA: 3.67/4.0
Master of Science in Engineering expected in June 2024

09/2017-07/2021 **Tianjin University**   *Tianjin, China*
Major: Measurement & Control Technology and Instruments
Major GPA: 3.58/4.0 | Overall GPA: 3.37/4.0
Bachelor of Engineering acquired in July 2021

CORE COURSEWORK:
- Matrix Theory, Advanced Mathematics, College Physics, Introduction of Life Science and Biotechnology, Engineering Optics (Fourier Optics), Vision Measurement (Deep Learning), Digital Signal Processing, Modern Intelligent Optical Instrument and Design

SKILLS:
- Python, MATLAB, PyTorch, SolidWorks, Toefl (best score: 103)
- Deep Learning, Foundation of Optics, Fourier Optics, Optical Experimental Skills

HONORS & AWARDS:
- Guo Xie Birong Scholarship rewarded by Shanghai Jiao Tong University, 10/2023 (Rank: 1/62)
- The 1st Scholarship rewarded by Shanghai Jiao Tong University, 11/2023 (top30%)
- The 1st Scholarship rewarded by Shanghai Jiao Tong University, 11/2022 (top30%)

PUBLICATION

- Yuan Qu*, **Hengyu Lian***, Chunxu Ding, et al., "High frame-rate reconfigurable diffractive neural network based on superpixels", *Optics Letters,* 2023, 48(19):5025-5028.
- Yuan Qu*, **Hengyu Lian***, Rongjun Shao, et al., "Time series analysis for financial indices using optical reservoir computing", *Optical Engineering,* 2024, 63(5): 054108-054108.

ACADEMIC RESEARCH

10/2022-Present ***Research on Optical Encryption System based on Diffractive Neural Network***
Supervisor: Prof. Yuan Qu

- Learned about the progress of optical encryption system and the theory of traditional AES encryption method
- Leveraged **PyTorch** framework to simulate optical encryption system on the basis of diffractive neural network
- Verified the feasibilities of the system's different aspects through simulation models, and calculated ideal phase patterns of the diffractive neural network
- Constructed an optical experimental system with **Digital Micro-Mirror Devices (DMD)** and

Spatial Light Modulators (SLM)

- Carried out **precise pixel matching** between DMD and SLM
- Anticipate to achieve each function of classic AES electrical encryption algorithm by optical means, which exploits the parallelism of spatial light to realize a faster and more secure encryption method

10/2022-5/2023   ***High Frame-Rate Reconfigurable Diffractive Neural Network based on Superpixels**, Supervisor: Prof. Yuan Qu and Prof. Jiamiao Yang*

- Had a literature review to understand the current progress of diffractive neural network, and concluded its strengths and weakness
- Learned about the basic knowledge about the **Fourier Optics**
- Constructed a diffractive neural network model with **PyTorch** based on the **angular spectrum method** and optimized the model to acquire the optical field expected
- Designed and constructed the experimental optical path, and compensated the curvature caused by Digital Micro-Mirror Devices (DMD) with the **phase-shifting interference method**
- Modulated the light field with DMD and applied adaptational methods to correct the error between the experiment and simulation
- Classified the image datasets (MNIST) and video datasets (Weizmann) with various structures of the diffractive neural network, verified the experimental results and launched data analysis
- Accepted and posted in *Optics Letters* on August 29, 2023

9/2021-9/2022   ***Scanning System based on Super Pixel Encoding Wavefront Engineering***
                 Supervisor: Prof. Jiamiao Yang

- Had a initial understanding of the optical field
- Learned about the theory and details of the superpixel encoding method and debugged the corresponding code implemented by **Python**
- Constructed the whole scanning system and verified the scanning experiment

ACADEMIC COMPETITION

08/2019-10/2019   ***Research on Real-Time Detection and Control System of Nickel Ion Concentration**, Supervisor: Prof. Min Lai and Prof. Xiaodong Zhang*
                 The First MNMT (Micro-Nano Manufacturing Technology) Challenge organized by Tianjin University

- Screened the feasibility of the related ion concentration detection methods based on the existing experimental conditions
- Constructed the experimental system based on the selected method
- Sampled and quantified ion concentration data with a microcontroller development board
- Used STM32 microcontroller to get feedback control of the ion concentration in the liquid to be tested, and keep the ion concentration in the solution in a constant range

EXTRACURRICULAR ACTIVITIES

09/2017-07/2021   ***CLASS MONITOR**, School of Precision Instrument and Optoelectronics Engineering, Tianjin University*

- ◆ Took overall responsibility for class work, including formulating class development plans, organizing class activities, helping create supportive atmosphere for our class