# HAN, Yimin

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## Education

**Northwestern University,** Graduate School, Evanston, IL, USA *Sep. 2021 – Jun. 2023(expected)*

*Master of Science in Electrical Engineering* | GPA: 3.81/4.0

- Courses: Machine Learning, Digital Control, Deep Reinforcement Learning, Intro to Computer Vision, Embedded System, Statistic Pattern Recognition, Active Learning in Robotics, Digital Signal Processing, Robotic Manipulation

**Sun Yat-sen University**, School of Physics, Guangzhou, China *Aug. 2016 – Jun. 2020*

*Bachelor of Science in Opto-Electronics Information Science and Engineering* | GPA: 3.4/4.0

- 3rd Class Scholarship for SYSU Outstanding Student

**Miami University–Oxford**, Oxford, OH, USA *Jul. 2017 – Aug. 2017*

*Exchange Student*

- Courses: Rhetoric and Writing in American Academic Culture, Rhetoric of American Culture

## Publication

Co-author, *Predicting Quantum Many-body Dynamics with Transferable Neural Networks*
Published by Chinese Physics Letters, 2020, 37 (1): 018401.
DOI: 10.1088/0256-307X/37/1/018401 (URL: http://cpl.iphy.ac.cn/10.1088/0256-307X/37/1/018401#1)

## Research Internship

**Research Institute of Tsinghua University in Shenzhen** *Jul. 2019-Aug. 2019*

*Intern, Research Center for Optomechatronics and Advanced Manufacturing*

- Researched into the nature of the materials of photoelectric sensor, and used AgTe as quantum dot material after considering the high toxicity of HgTe
- Assisted to design the photosensitive chip structure of the sensor, proposed the idea of "silicon + quantum dot + control circuit" three-layer structure, and suggested adding an organic layer to reduce the dark current

## Research Project

**RL-based Shepherding Problems: from Single-agent to Multi-agent** *Sep. 2022-present*

Advisor: Prof. Randy Freeman, Professor, Electrical and Computer Engineering, Northwestern University;
Prof. Ermin Wei, Assistant Professor, Electrical and Computer Engineering, Northwestern University

- Used Deep Q-learning Network as single shepherd's controller and constructed environment based on the "Strombom model"

**RL-based Highway Merging Strategy Design Using FLOW** *Mar. 2022-Oct. 2022*

Advisor: Prof. Qi Zhu, Associate Professor, Electrical and Computer Engineering, Northwestern University

- Built the highway merging environment based on FLOW
- Used ramp meter to control the ramp merging process
- Implemented Proximal Policy Optimization method to control intelligent vehicles and ramp meter

**Research on Many-body Problem based on Deep Learning Method** *Sep. 2017-Jul. 2020*

Advisor: Prof. Xiao Zhang, Professor, School of Physics, Sun Yat-sen University

- Considered one-dimension Ising model and compute the Schrodinger equation through Matrix Product State algorithm, and evolved its wave function explicitly with the Hamiltonian
- Built LSTM(Long Short Term Memory) network to approximate the dynamic quantum many-body system
- Finished the paper "Predicting quantum many-body dynamics with Long Short-Term Memory based neural networks" in arxiv.org (URL: https://arxiv.org/pdf/1905.09168.pdf)
- Optimized LSTM network with a simple recurrent unit (SRU) based efficient and transferable sequence learning framework and trained the model in a transfer learning way.
- Published the paper "*Predicting Quantum Many-body Dynamics with Transferable Neural Networks*"

## Course Projects

**Northwestern University ME455 Active Learning in Robotics,** *Apr. 2022-Jun. 2022*

- Used Iterative Linear Quadratic Control to find the optimal control signal and optimized trajectory
- Implemented a particle filter for a differential drive vehicle system
- Implemented a Kalman Filter on system state prediction
- Used Infotaxis(Entropy Reducing Control for Object Localization method) to solve the localization problem of a door.

**LSTM based multi-modal prediction model for Auto-Vehicle Trajectory Prediction,** *Feb. 2022-Mar. 2022*

- Generated data from NGSIM US-101 and I80 datasets and encapsulated it into the form of PyTorch Dataset
- Built a LSTM encoder-decoder using PyTorch to forecast the future position distribution of a certain vehicle.

**Finger Cursor,** *Nov. 2021-Dec. 2021*

- Detect and track a fingertip through a video, and use it for drawing trajectory remotely and mouse-movement control.
- Detection: Built skin color mask to segment human's hand and then use dilation and erosion to optimize it
- Tracking: Found the biggest contour in ROI and choose the topmost point as the fingertip.

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- **Programming Skills**: Python, Matlab, C++, Mathematica, ROS, PyTorch, FLOW, Ray RLlib
- **OS**: Windows, Linux, MacOS
- **Standard Tests Scores:** TOEFL 103, GRE 320