

# Guanlin (Frank) WU

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## EDUCATION

### Johns Hopkins University

2024.09 - Current

Baltimore, MD

- Master's in Systems Engineering
- GPA: 3.792/4.0
- Core Courses: Computer Vision, Trustworthy Machine Learning, Deep Learning, System Dynamics

### The Chinese University of Hong Kong, Shenzhen

2020.09 – 2024.7

Shenzhen, China

- B.Eng. in Computer Science and Engineering
- CGPA: 3.342/4.0; MGPA: 3.496/4.0
- Core Courses: Computer Architecture, Operating System, Software Engineering, Parallel Computing, Design and Analysis of Algorithm, Optimization, Stochastic Process, Machine Learning, Reinforcement Learning, Artificial Intelligence

## AWARD/HONORS

- Undergraduate Research Award
- School of Data Science **Dean's List** in 2022-2023, 2023-2024

## PUBLICATIONS

\*: Equal Contribution, †: Corresponding Author

### In Submission:

Yuhong Zhang\*, Jing Lin\*, Ailing Zeng\*, **Guanlin Wu\***, Shunlin Lu\*, Yurong Fu, Yuanhao Cai, Ruimao Zhang, Haoqian Wang, and Lei Zhang†. "MotionX++: A Large-Scale Multimodal 3D Whole-body Human Motion Dataset." In Submission. *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*. Available at [\[link\]](#).

### Published:

Yuhong Zhang\*, **Guanlin Wu\***, Ling-Hao Chen, Zhuokai Zhao, Jing Lin, Xiaoke Jiang, Jiamin Wu, Zhuoheng Li, Hao (Frank) Yang, Haoqian Wang, and Lei Zhang†. "HumanMM: Global Human Motion Recovery from Multi-shot Videos." *IEEE Computer Vision and Pattern Recognition (CVPR) 2025*. Available at [\[link\]](#).

Boxun Hu\*, Mingze Xia\*, Ding Zhao, and **Guanlin Wu**†. "MONA: Moving Object Detection from Videos Shot by Dynamic Camera" *AAAI Conference on Artificial Intelligence (AAAI) AI for Urban Planning Workshop 2025*. Available at [\[link\]](#).

**Guanlin Wu**, Zhuokai Zhao, Yutao He†. "RELAX: Reinforcement Learning Enabled 2D-LiDAR Autonomous System for Parsimonious UAVs." *AAAI Conference on Artificial Intelligence (AAAI) PRL Workshop 2025*. Available at [\[link\]](#).

Lifeng Guo†, Changhong Lu, and **Guanlin Wu**. "Approximation algorithms for a virtual machine allocation problem with finite types." *Information Processing Letters* 180 (2023): 106339. Available at [\[link\]](#).

Zeyi Jiang, Xuqing Liu, Mike Ma, **Guanlin Wu**, and Jay A. Farrell†. "LiDAR-Based Hatch Localization." *Remote Sensing* 14, no. 20 (2022): 5069. Available at [\[link\]](#).

## RESEARCH/WORKING EXPERIENCE

### Johns Hopkins University / Multimodal Autonomous Driving System

2024.10 – Current

Baltimore, MD

Research Assistant advised by Prof. Hao (Frank) Yang

- Build up the environment of several autonomous driving baseline methods such as 2DPASS, FRNet, Sphereformer, WaffleIron and run the inference.
- Preprocess the gaze prediction dataset, currently leading the creation of Vision Language Model (VLM) benchmark about gaze prediction and spatial understanding for autonomous driving.
- Design a learning algorithm that can transform the attention point in 3D world space to 2D image index.
- Working on develop a benchmark for the evaluation of spatial understanding of VLM.

### International Digital Economy Academy (IDEA) / Large Scale 3D Human Motion Dataset

2024.01 – 2024.12

Shenzhen, China

Research Intern advised by Prof. Lei Zhang

- Work on MotionX++, an motion annotation pipeline, the enhanced and extended work of MotionX [\[link\]](#).
- Propose masked Droid-SLAM for camera trajectory estimation, which is the enhanced version of Droid-SLAM, getting state-of-the-art (SOTA) absolute trajectory error (ATE) on EMDB dataset among all existing 3D human estimation method.
- Design algorithms for shot detection, moving camera detection and focal length change based on optical flow.
- Currently working on one stage motion annotation pipeline with much faster speed and more precise motion annotations compared to MotionX++.

- Propose a human motion recovery framework from multi-shot videos in world coordinates.
- Create multi-shot human motion dataset based on public datasets such as AIST and Human3.6M.
- Design a more advanced camera pose estimation Masked LEAP-VO based on LEAP-VO with the integration of SAM.

**University of California, Los Angeles/UAV Path Planning and Dynamic Obstacle Avoidance** **2023.06 – 2023.09**  
*Research Assistant advised by Prof. Yutao He* *Online*

- Designed a new UAV system based on 2D-LiDAR that included the Map Construction (based on Hector SLAM), the Path Planner (using RRT), and the Dynamic Obstacle Handler (using D3QN).
- Developed algorithms for LiDAR detection (with noise decreasing and motion trajectory) and Reset in RL training.
- Implemented a new training strategy for the RL model, where Dynamic Obstacle Handler was directly trained in the ROS-Gazebo-PX4 simulator with the UAV model "iris\_rplidar."

**East China Normal University/Virtual Machine Allocation** **2022.05 – 2022.11**  
*Research Assistant advised by Prof. Changhong Lu* *Shanghai, China*

- Improved Best Fit Algorithm slightly for specific type of DVBP problem by using an innovative way of constructing the Balanced Binary Tree.
- Managed to use Approximation algorithm to prove the ratio between modified Best Fit Algorithm and Optimal solution.
- Found the Virtual Machine data about their type from VMagent and HUAWEI.

**Tianjin Port/LiDAR-Based Hatch Localization** **2021.07 – 2022.04**  
*Data Analyst* *Tianjin, China*

- Used laser to collect information about shipment and stockpile and simultaneously created a 3D model using Point Cloud.
- Applied Point Cloud and MATLAB to complete the rasterization process, one of three stages for hatch localization.
- After scanning a reference hatch with size 23.55\*15.35m using LiDAR, the hatch localization algorithm was able to measure the hatch accurately with the same dimensions, satisfying the anti-collision requirement of error margins less than 0.5 meters.

## COURSE PROJECTS

**Operating System Course Projects** **2022.09 – 2022.12**  
*Independent Projects* *CUHK-Shenzhen*

- Learned about Kernel and loading a module into the Kernel. Created a kernel thread to execute the test program.
- Used multithread programming to accomplish a game called "Frog crosses river" and implemented a thread pool.
- Developed a virtual memory simulation on GPU using CUDA programming, where physical and secondary memory were implemented by shared and global memories, respectively.
- Developed a file system management simulation on GPU memory using CUDA Programming. Implemented a logical file system to manage metadata, free-space manager, and a File Control Block (FCB) to store file information.

**Computer Architecture Course Projects** **2022.01 – 2022.05**  
*Independent Projects* *CUHK-Shenzhen*

- Developed a C++ MIPS Instruction Set translator that converts instructions to machine code. It performs two scans of the input file to generate a label table and a vector of instruction lines, then outputs the translated machine code.
- Implemented a C++ simulator for the memory and register of the computer when running a MIPS asm file. This simulator displayed the changes in the Stack segment, Data segment (Dynamic data & Static data), and Text segment.
- Implemented an Arithmetic and Logic Unit (ALU) using Verilog.
- Developed a 5-stage pipelined CPU using Verilog, optimizing a program that previously required five clock cycles per instruction.

## Others

- **Language:** English (Fluent; TOEFL 108; GRE 326+4), Chinese (Native)
- **Computer skills:**
  - **Programming Languages:** C, C++, Java, Python, MySQL, MATLAB, Verilog
  - **Frameworks:** PyTorch, CUDA, SpringBoot, Vue
  - **Simulation Platforms and Packages:** ROS, Gazebo, PX4, Rviz, Gmapping, QGroundControl, PointCloud
  - **Toolchains:** Visual Studio Code, IntelliJ IDEA, PyCharm, CLion, Webstorm, MATLAB, Conda, Git, LaTeX, Markdown
- **Interests:** Philosophy, RAP, Work out, Basketball