

# Iou-Sheng (Danny) Chang

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## Education

### Johns Hopkins University, Laboratory for Computational Sensing and Robotics

Baltimore, MD, USA  
Aug. 2022 - May. 2024

M.S.E. in Robotics

- **Research Internship MSE Degree Option** · Co-advised by [Mathias Unberath](#) and [Noah Medical](#)
- Relevant Coursework: Computer Integrated Surgery I & II; Computer Vision; Machine Perception; Algorithms for Sensor-based Robotics; Robot Devices, Kinematics, Dynamics, and Control; Applied Optimal Control; Artificial Intelligence

### University of California - Los Angeles, Henry Samueli School of Engineering

Los Angeles, CA, USA  
Sep. 2016 - Jun. 2019

B.S. in Electrical Engineering

- **Dean's Honors List** · Senior Capstone Project: Design of Robotic Systems · Technical Breadth Area: Engineering Science

## Skills

### Programming Languages/Software

Python, C++, C, C#, MATLAB, SIMULINK, Unity, MRTK, Arduino, Solidworks, Creo, AutoCAD, ETC

### Technologies/Frameworks

Linux, ROS, Git/Repo, PyTorch, TensorFlow, OpenCV, Scikit-learn, Docker, AWS, Azure, Gazebo, RViz

## Professional Experience

### Noah Medical Inc.

San Carlos, CA, USA  
May. 2023 - Present

Computer Vision and Medical Imaging Research Intern

- Enhanced C-Arm camera calibration accuracy by developing and implementing a closed-form solution for the camera intrinsic matrix using a 2-layered 3D calibration phantom, complemented with nonlinear refinement through the Levenberg-Marquardt algorithm.
- Increased augmented fluoroscopy success rate by 25% in the Galaxy System by enhancing Tomosynthesis board marker bead detection using a deep-learning approach, effectively overcoming CT-to-body divergence challenges with the TiLT<sup>+</sup> technology.

### Jochu Technology Co., Ltd.

Hsinchu, Taiwan

Mechatronics and Control Engineer

Jan. 2021 - Jul. 2022

- Led the controls and electronics team for a qualified MDR Class I and FDA Class II medical power mobility scooter project, including integration of sensor fusion utilizing Extended Kalman Filter, implementation of the Vehicle Control System, and design of electrical diagrams.
- Designed and implemented the Obstacle Avoidance and Autopilot Control Algorithm for the WHILL Model M medical power wheelchair.

### Enhanced Handling Automation Technology Inc.

Taichung, Taiwan

Automation and Control Engineer | Internship

May.- Dec. 2020 | Jul.- Sep. 2017

- Enhanced assembly line efficiency and reduced manufacturing lead time by 20% through designing optimal obstacle avoidance and collision-free paths for industrial articulated robotic manipulators using state estimation and RRT\* motion planning algorithm.

## Research and Project Experience

### VRPelviSim: Transforming Clinical Practices in Fluoroscopic Surgery with Virtual Reality

JHU Spring 2024

| PYTHON, UNITY, C#, VR, DOCKER, ZEROMQ, CAP'N PROTO, NETWORKS | [\[Poster\]](#) [\[Demo\]](#) [\[Report\]](#) [\[ARCADE Lab\]](#)

- Developed a user-friendly VR fluoroscopic surgery training platform, nominated for the Best Project Award by [CISST ERC](#).
- Designed a tutorial and data acquisition system to streamline user onboarding and enhance X-ray anatomical views collection efficiency.
- Implemented a Docker containerized, scalable cloud hosting to support multi-user access and enable centralized simulation management.

### Transfer Learning in Semantic Segmentation | PYTHON, PYTORCH | [\[Report\]](#)

JHU Spring 2023

- Enhanced semantic segmentation performance – boosted pixel-wise accuracy from 66% to 81% and mean IoU from 61% to 78% – on a self-developed Baltimore City dataset by applying transfer learning to fine-tune the DeepLabv3+ MobileNet architecture.

### Sampling-Based UR5 Robot Manipulator Navigation | C++, ROS, RVIZ, MOVEIT!

JHU Spring 2023

- Implemented RRT path planner with KD-tree nearest neighbor search for collision-free motion planning in complex environments.
- Implemented Park and Martin hand-eye calibration method, achieving sub-0.1mm accuracy for Robotiq end-effector in pick and place task.

### Structure from Motion | PYTHON, OPENCV | [\[Report\]](#)

JHU Fall 2022

- Applied the Tomasi-Kanade Factorization method to reconstruct 3-D rigid structures from multi-viewpoint 2-D images utilizing OpenCV.
- Implemented Lowe's distance ratio test to control false feature matches effectively, achieving a 70% improvement in accuracy.

### Deep Convolutional Neural Network, Adversarial Attacks and Defense | PYTHON / PYTORCH | [\[Report\]](#)

JHU Fall 2022

- Built the GoogLeNet architecture using PyTorch, trained and tested on CIFAR-10 Dataset, and attained a 92.68% test accuracy.
- Implemented multiple adversarial attack methods (FGSM, Noise, Semantic), and used Defensive Dilution to secure an 89% test accuracy.

### Sampling-Based 2-Wheeled Paper Robot Motion Planning | MATLAB / C++ | [\[Demo\]](#) [\[Report\]](#)

UCLA Winter 2019

- Achieved optimal obstacle-free pathfinding and precise parallel parking for a 2-wheeled paper robot using RRT-based planner (RRT\*), Markov Decision Process (MDP) model, and Kalman filter in MATLAB.

## Extracurricular Experience

### Baja SAE | UCLA Bruin Racing

Los Angeles, CA, USA  
Sep. 2017 - Jun. 2019

Electronic Continuously Variable Transmission (ECVT) Control Lead | [\[2018 ECVT\]](#) [\[2019 ECVT\]](#)

- Designed, implemented, and validated digital feedback control system for the electromechanically actuated CVT (ECVT) in a Baja SAE competition (3<sup>rd</sup> ever electromechanical transmission in the 44-year history of the Baja competition).
- Executed system identification and control of full vehicle powertrain by step and chirp response using custom MATLAB scripts, and synthesized a finite-state machine and closed-loop control algorithm utilizing the nonlinear plant model of the system created in SIMULINK.