Chi-Yao Huang

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Education

- **Arizona State University (ASU)** — Tempe, AZ
  Ph.D in Computer Science — *Current*
- **Arizona State University (ASU)** — Tempe, AZ
  M.S. in Robotics and Autonomous Systems (AI Track); GPA: 4.00/4.00 — *Aug 2021 – May 2023*
- **National Taiwan University (NTU)** — Taipei, Taiwan
  M.S. in Mechanical Engineering; GPA: 3.83/4.3 — *Sep 2015 – Jun 2017*
- **National Sun Yat-Sen University (NSYSU)** — Kaohsiung, Taiwan
  B.S. in Mechanical and Electro-Mechanical Engineering — *Sep 2010 – Jun 2014*

Experience

- **Arizona State University (ASU)** — Tempe, AZ
  Ph.D. Student – Prof. Yezhou Yang — *Aug 2021 – Present*
  - **Domain Expansion: A Latent Space Construction Framework for Multi-Task Learning (ICLR 2026):** Developed 'Domain Expansion,' a novel Multi-Task Learning framework designed to solve latent representation collapse caused by conflicting gradients. Designed a unique orthogonal pooling mechanism that isolates objectives into mutually orthogonal subspaces to prevent interference. Validated the approach on complex Computer Vision benchmarks (ShapeNet, MPIIGaze), demonstrating that the framework yields an interpretable and compositional latent space. (https://arxiv.org/abs/2601.20069)
  - **VOCAL: Visual Odometry via ContrAstive Learning (WACV 2026):** Introduced 'VOCAL,' a novel Visual Odometry framework that overcomes the limitations of rigid geometric assumptions by reformulating state estimation as a label ranking challenge. Integrated Bayesian inference with contrastive learning to align visual features directly with camera states. Validated the approach on the KITTI dataset, proving that this structure supports multimodal compatibility and promotes general and explainable spatial intelligence. (https://arxiv.org/abs/2507.00243)
  - **Aerial Pose Estimation (Sponsored by Toyota Research Institute of NA (TRINA))):** Developed high-altitude pose estimation for aerial robots using IR and IMU sensors under varying weather conditions; secured full funding support from TRINA for project execution.
  - **3D Landmark Reconstruction for Robot Localization and Mapping:** Employed learning-based 3D reconstruction and semantic labeling to enable robots to jointly optimize their trajectory and object poses. (Demo)
- **Advanced and Creative Team, HTC VIVE (Acquired by Google)** — New Taipei, Taiwan
  Core Member & Strategic Innovator, Team Lambda (VR/AR Innovations) — *Sep 2017 – Feb 2021*
  - **Core Contributions:** Played a pivotal role as a core team member—spearheading design reviews, mentoring junior engineers, and driving key technical decisions that shaped breakthrough VR/AR technologies.
  - **VIVE COSMOS:** Developed a multi-camera VR tracking system with 0.4 mm accuracy by utilizing multi-camera Bundle Adjustment and designing a mothership SLAM system for all VR products. (Product Overview, Demo)
  - **VIVE FOCUS 3:** Led a team to prototype an MR system integrating gesture and tightly-coupled visual-inertial SLAM tracking, achieving trajectory jitter below 0.1 mm and a 4× speed-up on embedded systems. (Product Overview)
  - **VIVE FLOW:** Collaborated with hardware and firmware teams to resolve CPU loading and thermal issues in an AR device. (Product Overview)
  - **Scene:** Engineered a voxel-based obstacle mapping system for VR safety, integrating semantic maps for real-world interactions.
- **NTU Robotics Lab, National Taiwan University** — Taipei, Taiwan
  Graduate Student and Vice System Manager - Prof. Han-Pang Huang — *Sep 2015 – Jun 2017*
  - **Master Thesis: 3D Reconstruction and Path Planning with Signed Distance Function:** Fused optical flow with feature points for efficient SLAM; modified bundle adjustment using Lie groups and quaternions; implemented voxel hashing for dense mapping; integrated SLAM with biped robot path planning.
  - **Humanoid Robot:** Designed ZMP trajectories to enable robust biped locomotion on uneven terrains.
  - **Vice System Manager:** Developed orientation materials and managed robotic equipment including robotic arms and mobile robots.

- **Company of Air Defense Artillery Battalion, R.O.C. Army** Taiwan
  Battalion Dispatcher *Sep 2014 – Sep 2015*
  - **:** Managed hundreds of vehicles and anti-air systems during military exercises.
- **National Sun Yat-Sen University** Kaohsiung, Taiwan
  Undergraduate Student - Prof. Yaw-Terng Su *Sep 2010 – Jun 2014*
  - **Commercial Vehicle Speed Control System:** Designed a PID controller for vehicle speed regulation.
  - **Stairlift for Elderly People:** Developed a PLC-based stair climbing system to enhance mobility for the elderly.

Research Areas

- Representation Learning, Spatial Intelligence, Visual Odometry, SLAM, 3D Computer Vision, Robotics

Honors, Awards & Grants

- **Research Grant, Toyota Research Institute of North America (TRINA) (2024 – Present)**
- **Ira A. Fulton Schools of Engineering Fulton Fellows Award, ASU**
- **Student with Distinction, Arizona State University**

Skills

- **Programming Languages:** Python, C/C++, JavaScript
- **Libraries & Tools:** PyTorch, OpenCV, Eigen, Ceres, Keras, OpenGL, SIMD, CEVA, Hexagon

Languages

- English (Fluent), Mandarin (Native)