

Shih-Chieh(Jerry) Hsiung

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Robotics Institute
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EDUCATION

Robotics Institute, Carnegie Mellon University (CMU), Pittsburgh, PA **Aug 2016 - Aug 2018**
M.S., Robotics, Advisor: Dr. Michael Kaess, GPA: 3.95

Harvey Mudd College (HMC), Claremont, CA **Aug 2012 - May 2016**
B.S., Computer Science, Advisor: Dr. Christopher Clark, Major GPA: 3.72, Cumulative GPA: 3.68 (Dean's List)

EXPERIENCE

Researcher - Robot Perception Lab (CMU) **Sept 2016 - Present**

- Develop and implement from scratch a novel visual-inertial state estimation algorithm using information sparsification, which leads to the IROS 2018 conference paper.
- Derive a novel IMU preintegration model using Matrix Lie Group and the group affine properties to achieve better convergence in solving the visual-inertial optimization problem.
- Implement from scratch a visual-inertial pipeline for underwater nuclear inspection robot. Publish and present a conference paper at the Waste Management Symposia (WM 18) in Arizona.

Researcher - Lab for Intelligent and Autonomous Robots (HMC) **2013 - Jun 2016**

Lead System and Control Designer:

- Simulate and implement a stable PID dive controller for the OceanServer Iver2 AUV, including modeling vehicle dynamics and analyzing controller stability. Perform hundreds of hours field test to validate the controller in the physical system.
- Design a mathematical model for a simultaneous tracking and exploration algorithm using Mathematica and C#, for the purpose of collecting environmental data while tracking.
- Develop mathematical models for a multi-AUV tracking controller which minimizes time and distance traveled while optimizes data collection.

Lead Hardware Engineer:

- Design and build an autonomous underwater vehicle (AUV), including CAD drawing and system requirement calculations.
- Upgrade and install Iver2 hydrophones and battery management system.
- Prototype and manufacture "smart" tags to incorporate an inertial measurement unit, underwater camera, gps transmitter, and acoustic tag into one package.

PUBLICATIONS

S. Hsiung, M. Hsiao, E. Westman, R. Valencia, M. Kaess, "Information Sparsification in Visual-Inertial Odometry", in *2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)*

S. Hsiung, A. Tallaksen, L. Papincak, S. Suresh, H. Jones, W. Whittaker, M. Kaess, "Localized Imaging and Mapping for Underwater Fuel Storage Basins", in *Waste Management Symposia (WM 2018)*

Y. Lin, S. Hsiung, R. Piersall, C. White, C. Clark, C. Lowe, "A Multi-AUV System for Autonomous Tracking of Marine Life", in *Journal of Field Robotics (JFR 2016)*.

K. Smith, S. Hsiung, C. Clark, C. Lowe, "Stochastic Modeling and Control for Tracking the Periodic Movement of Marine Animals via AUVs", in *2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)*.

ACTIVITIES

Industry Liaison - HMC Engineering Clinic **Aug 2016 - Present**
Provide guidance and lead a team of 4-6 undergraduate juniors and seniors along with an engineering faculty to complete a year-long industrial funded robotics project.

HONORS

Engineering Departmental Honors, Computer Science Departmental Honors **2016**
Johnson Excellence in Engineering Award **2016**
USC Wrigley Institute Summer Fellow **2015**
The Wing and Ellen Tam Software Development Award **2015**

SOFTWARE

C++, Python, Robot Operation System (ROS), Mathematica, Matlab, Git.
Experienced with digital design using SystemVerilog and Quartus. Experienced with CAD design using SolidWorks. PCB layout using KiCad. Familiar with x86, ARM, and MIPS instruction sets and registers.