

# Hsueh-Ti (Derek) Liu

**E-mail:** htliu1992@gmail.com **Website:** <https://www.andrew.cmu.edu/user/hsuehtil>  
**Address:** 230 N. Craig Street, Apt. 605, Pittsburgh, PA 15213 **Mobile:** (412) 557-1236

## EDUCATION

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**Carnegie Mellon University (CMU) - Pittsburgh, PA** Expected May 2017

*Master of Science in Mechanical Engineering (GPA: 3.74/4.00)*

- Research in Data-driven Geometry Processing, Machine Learning; Member of CMU Graphics Group

**National Taiwan University (NTU) - Taipei, Taiwan** June 2014

*Bachelor of Science in Engineering in Engineering Science and Ocean Engineering (ESOE) (GPA: 3.77/4.00)*

## RESEARCH AND WORK EXPERIENCE

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**Engineering Optimization, CMU** Instructor: Dr. Aaron Johnson Fall 2016 - Present

*Teaching Assistant*

- Holding office hour and preparing solution manuals for assignments and exams

**Date-driven Shape Style Transfer, Mitsubishi Research** Advisor: Dr. Levent Burak Kara Fall 2016 - Present

*Primary Researcher and Software Developer*

- Creating a framework to transfer style of a shape to other shapes across different domains
- Developing algorithms to learn style metric within shape collections and deform shape according to desired style

**Dirac Operator in Geometry Processing, CMU** Advisor: Dr. Keenan Crane, Dr. Alec Jacobson Summer 2016 - Present

- Constructing a novel shape differential operator based on Dirac Operator in Quantum Mechanics
- Developing a shape signature to detect extrinsic properties, e.g. texture, instead of intrinsic ones

**Shell Structural Optimization for Additive Manufacturing, CMU** Advisor: Dr. Levent Burak Kara Fall 2015 - Present

- Creating a topology optimization method for creating support-structure-free objects for additive manufacturing
- Applying density-based topology optimization and spectral geometry processing to optimize shell shapes

**Compliant Attachment Structure Design for 3D Printing, CMU** Advisor: Dr. Levent Burak Kara Spring 2016

- Contributed to the design of a computational tool to control deformation behavior of compliant structures
- Implemented Moving Least Square and Variational Interpolation to compute distance field given boundary points

## COURSE PROJECTS

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**Adversarial 3D Shape Net, CMU** Instructor: Dr. Ruslan Salakhutdinov Fall 2016

- Designed a unsupervised 3D shape generative model using adversarial training approach
- Performed 3D shape recognition, generation, and reconstruction from 2.5D images

**Combining Active Learning and Accuracy Estimation using Unlabeled Data, CMU** Instructor: Dr. Tom Mitchell Spring 2016

- Combined results from error estimation model to improve active learning model
- Built an error estimation model based on graphical model approaches; Invented a new query strategy for active learning model, which improves the learning rate by 30 percent in the early training stage

**Shape Descriptor Design Using Spin Transformation, CMU** Instructor: Dr. Keenan Crane Spring 2016

- Designed a novel shape signature using Curvature Potential information
- Compared shape signatures using Persistent Barcodes and reconstructed original shapes using Spin Transformation

**Recognition of Partially Obstructed 3D Objects from Point Cloud Data, CMU** Instructor: Dr. Kenji Shimada Spring 2016

- Recognized 3D objects from partially observed surface, which can improve 3D metal printing process
- Extracted 3D features from shapes and implemented Hough Voting algorithm to identify objects and orientations

## SKILLS & RELEVANT COURSEWORK

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**Languages:** Mandarin Chinese (Native), English

**Programming Language:** Matlab, C++, Python

**Selected Courses:** Computer Aided Design, Computer Graphics, Discrete Differential Geometry, Engineering Optimization, Machine Learning for Engineering Design, Machine Learning, Topics in Deep Learning, Computer Vision

## LEADERSHIP & MILITARY EXPERIENCE

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**Taipei City Government - Taipei, Taiwan** July 2014 - July 2015

*Substitute Military serviceman, Secretariat*

- Contributed to diplomatic events of Taipei City Government, including acting as the Master of Ceremony
- Participated in organizing the 5<sup>th</sup> United Cities and Local Governments Asia-Pacific Congress with officials

**The Student Association, NTU - Taipei, Taiwan** August 2012 - July 2013

*Chairman*

- Partnered with alumni in Horizon Group, the largest yacht company in Taiwan, to deliver a lecture about yacht industry
- Co-organized an event for 400 people, with a focus on building relationships within ESOE department