

HAOTIAN HANG

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PERSONAL INFO

Birth Year: 1997

Citizenship: People's Republic of China

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EDUCATION

- 2020 - **University of Southern California**, Los Angeles, CA
Ph.D. Student, Mechanical Engineering
Master of Science, Mechanical Engineering, December 2021
- 2015 - 2019 **Shanghai Jiao Tong University**, Shanghai, China
B.S. Aeronautics and Astronautics Engineering, June 2019 (Average Score: 89.22/100)

EMPLOYMENT

- 2020 - **Research Assistant**, Bio-Inspired Motion Lab at USC, PI: *Prof. Eva Kanso*
- 2019 **Intern Algorithmic Engineer**, Shanghai Hongpu Information Technology Co., Ltd.
Conduct flaw detection on images of photovoltaic cell using Faster R-CNN and yolov3
- 2016 - 2019 **Research Assistant**, J.C.Wu Center for Aerodynamics, PI: *Prof. Hong Liu*

PUBLICATIONS

- 2022 3. Hang, H., Heydari, S., Costello, J., & Kanso, E. (2022). *Active tail flexion in concert with passive hydrodynamic forces improves swimming speed and efficiency*. Journal of Fluid Mechanics, 932, A35.
- 2021 2. Xiang, Y., Hang, H., Qin, S., and Liu, H. (2021). *Scaling analysis of the circulation growth of leading-edge vortex in flapping flight*. Acta Mech. Sin.
- 2020 1. Hang, H., Yu, B., Xiang, Y., Zhang, B., and Liu, H. (2020). *An objective-adaptive refinement criterion based on modified ridge extraction method for finite-time Lyapunov exponent (FTLE) calculation*. Journal of Visualization, 23(1), 81-95.

RESEARCH INTERESTS/EXPERIENCE

- 2020 - **Learning to blindly follow hydrodynamic trails**, supervised by *Prof. Eva Kanso*
joint with *Sina Heydari, Yusheng Jiao, Feng Ling*
Employ reinforcement learning to follow vortical wakes based on local flow sensory
Find traveling wave characteristic of wakes is important for source seeking and our controller is stable in locating source
Compare performance between mechano- and chemo- sensing, and different sensory cues
- 2020 - **Flexion in fish swimming**, supervised by *Prof. Eva Kanso, Prof. John H. Costello*
joint with *Sina Heydari*
Analyze the role of active and passive flexion on swimming speed and efficiency of a self-propelling pitching plate using vortex sheet method
Parametric study on effects of flexion phase, flexion angle and flexion ratio on swimming performance
- 2016 - 2019 **Mechanisms of high generation in insects flight**, supervised by *Prof. Hong Liu and Dr. Yang Xiang and Dr. Suyang Qing*
Conduct experimental study using robotic flapping wing models in glycerin with Reynolds number similar to insects
Measure flow field using particle image velocimetry (PIV) and measure force and torque using 6-axis force sensor, analogue filter and NI data acquisition system
Study difference in formation of leading edge vortex(LEV) for different kinematic modes, and find advanced rotation can generate a larger LEV because of wake capture
Find a scaling law between passive rotation and active translation in flapping wing model
- 2016 - 2019 **AMR for FTLE calculation**, supervised by *Prof. Hong Liu, Prof. Bin Zhang, Bin Yu and Dr. Yang Xiang*
Develop a physics-based adaptive refinement method for finite-time Lyapunov exponent calculation

- 2015 - 2016 **VTOL pitch-changed quadrotor** , supported by National Students' Platform for Innovation and Entrepreneurship Training , supervised by *Prof. Junqi Wu*
 joint with *Dongming Ding, Jihong Huang, Chaoqun Li, Zhikang Qiu*
 Lead a team to make a quad rotor and fulfilled of pitch-changed technique and VTOL technique in terms of both mechanical and control

TALKS/PRESENTATIONS

- 2021 **APS Division of Fluid Dynamics Meeting**, Active tail flexion in concert with passive hydrodynamic forces improves swimming speed and efficiency
 2020 **APS Division of Fluid Dynamics Meeting**, Flowtaxis in the wakes of oscillating airfoils
 2018 **APS Division of Fluid Dynamics Meeting**, Passive rotation of a flapping wing with an inhomogeneous mass distribution

TEACHING EXPERIENCE

- at **University of Southern California**
 2021 Spring **Teaching Assistant**, AME-526, Introduction to mathematical methods in engineering II, *Prof. Niema Pahlevan*
 2020 Fall **Teaching Assistant**, AME-404, Computational Solutions to Engineering Problems, *Prof. Takahiro Sakai*

GRADUATE COURSEWORK

- at **University of Southern California**
 2021 PHYS-516, Methods of Computational Physics, A , *Prof. Aiichiro Nakano*
 EE-556, Stochastic Systems and Reinforcement Learning, A , *Prof. Rahul Jain*
 CSCI-570, Analysis of Algorithms, B+ , *Prof. Victor Adamchik*
 AME-508, Machine Learning and Computational Physics, A , *Prof. Assad Oberai*
 CSCI-596, Scientific Computing and Visualization, A , *Prof. Aiichiro Nakano*
class project: a C++ parallel reinforcement learning implementation *Github Link*
 2020 AME-525, Engineering Analysis, A- , *Prof. Eva Kanso*
 AME-526, Introduction to Mathematical Methods in Engineering II, A , *Prof. Niema Pahlevan*
 AME-511, Compressible Gas Dynamics, A , *Prof. Iván Bermejo-Moreno*
 PHYS-760, Selected Topics in Computational Physics, P , *Prof. Satish Kumar Thittamaranahalli*
 AME-451, Linear Control Systems I, A , *Prof. Henryk Flashner*
 AME-541, Linear Control Systems II, A- , *Prof. Néstor O. Pérez-Arancibia*
 AME-535A, Introduction to Computational Fluid Mechanics, A , *Prof. Alejandra Uranga*
 AME-530A, Dynamics of Incompressible Fluids, B+ , *Prof. Carlos Pantano*

HONOR/AWARDS

- 2017-2018 Hui-Chun Chin and Tsung-Dao Lee Chinese Undergraduate Research Endowment of SJTU
 2016 Honeywell Star Project
Second Place , Parts of the National College Students Physics Competition
Third Place , Chinese College Students' Mathematics Competition
 2014 **First Place**, Chinese Chemistry Olympiad
First Place, Shanghai Adolescents Science and Technology Innovation Contest

ONLINE COURSEWORK

- at **Udacity**
 2022 C++ Nanodegree
 at **Coursera**
 2021 Build a Modern Computer from First Principles: From Nand to Tetris (Project-Centered Course), Hebrew University of Jerusalem
 2019 **Specialization**, DeepLearning.AI TensorFlow Developer , DeepLearning.AI (containing 4 courses)
Specialization, Deep Learning, DeepLearning.AI (containing 5 courses)
 Machine Learning, Stanford University,
 2014 General Chemistry, Peking University

TECHNICAL SKILLS

Programming Language:	Python, Matlab, Fortran, C/C++ (from more familiar to less, same below)
Machine learning framework:	Pytorch, Tensorflow
Hardware:	Arduino, Raspberry Pi, Pixhawk