

# CHENCHEN HUANG

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## EDUCATION

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2024  
(EXPECTED) **University of Southern California**, Los Angeles, CA  
Doctor of Philosophy (Ph.D.), Mechanical Engineering  
Master of Science (M.Sc.), Computer Science  
MAY 2019 **University of Southern California**, Los Angeles, CA  
Master of Science (M.Sc.), Mechanical Engineering  
JUN. 2017 **Jilin University**, Changchun, China  
Bachelor of Science (B.Sc.), Energy and Power Engineering, Automotive Engine

## WORK EXPERIENCE

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05-08/2023 **Machine Learning Research Intern**, *ByteDance Inc., Seattle*  
Worked on protein force field generation and development under high-performance environment.  
2019 - **Research Assistance**, *Bio-Inspired Motion Lab, University of Southern California*  
Working towards modeling collective dynamics of animals.  
2021 **Teaching Assistance**, *Viterbi School of Engineering, University of Southern California*  
Teaching Assistance of Engineering Analysis.  
2018 **Summer Research Intern**, *Bio-Inspired Motion Lab, University of Southern California*  
Worked on experiment of garden hose instability and motion reconstructing algorithm.  
2018 **Research Intern**, *Advance Manufacturing Lab, University of Southern California*  
Participated in the process of developing a new SLA printer.  
2015 - 2017 **Engineering Assistance**, *PACE Center, Jilin University*  
Led team in the designing of solar energy vehicle aiming at World Solar Challenge.

## RESEARCH EXPERIENCE

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JAN. 2019  
PRESENT **Dynamical System of Collective Behaviors**

- Formulated mathematical models for inter-individual motion and interactions of animal group.
- Optimized algorithm for real-time large-scale multi-agent stochastic system simulation.
- Conducted time-series analysis and dimension reduction on macroscopic scale results.
- Constructed time-evolution model of probability of dynamical states to discover patterns.

MAY 2021  
PRESENT **Locomotion Control Mechanism with Behavioral Data**

- Developed a reduced-order fluid dynamics model to study fish locomotion under channel flow.
- Constructed both in-continuous and continuous dynamical model for behavioral algorithm.
- Designed and evaluated multiple sensors arrangements and control policies based on experimental data.
- Deployed numerical parallel computation simulation to discover optimal feedback control strategies.

APR. 2017  
AUG 2016 **Hybrid Vehicle Cooling Optimization**

- Collected battery spec data for optimal selection based on designated operation conditions.
- Designed layout of cooling system in a NiMH battery hybrid vehicle.
- Proposed a corresponding testing system for cooling efficiency evaluation.
- Conducted aerodynamic simulation on battery pack cooling system to maximize thermal efficiency.

## ACADEMIC PROJECTS

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DEC. 2021 **Deep Operator Network for Physical System**

- Utilized Deep Learning approach to learn operators in nonlinear system.
- Proposed a framework using DeepONet for inference of parameters in partially-observable system.
- Implemented and benchmarked against a phase separation evolution system.

MAY 2020 **Epidemic Simulation with Collective Dynamics**

- Constructed a transmission model based on spatial and probabilistic transmission.
- Developed a collective dynamics model to simulate the transmission process of COVID-19 outbreak.
- Analyzed both SIR/SEIR and Spatial transmission model for the insight of virus spreading.

MAY 2018

**Bio-Inspired Robot** (*Featured in USC news*)

- Extracted gait and joints movement data from motion of Felidae family animals.
- Designed structure and mechanism of a four-legged robot based on analysis of animal's gait data.
- Built robot with 3D-printing (FDM) parts and implemented motor control on microcontroller.

## SKILLS

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Programming Languages: Python, MATLAB, C/C++, SQL  
Machine Learning Frameworks: TensorFlow, PyTorch, scikit-learn  
Libraries and Other Tools: NumPy, SciPy, pandas, matplotlib, MPI, OpenMP, git, Linux, L<sup>A</sup>T<sub>E</sub>X

## COURSEWORK\*

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### Viterbi Engineering School

Analysis of Algorithms	Compressible Gas Dynamics
Dynamics of Incompressible Fluids	Engineering Analysis
Engineering Vibrations	Foundations of Artificial Intelligence
High Performance Computing and Simulations	Introduction to Computational Fluid Mechanics
Machine Learning and Computational Physics	Mechanical Behavior of Engineering Materials
Nonlinear Dynamical Systems, Vibrations, and Chaos	Performance Analysis Using Markov Models
Scientific Computing and Visualization	Transition to Chaos in Dynamical Systems

### Dana and David Dornsife College of Letters, Arts and Sciences

Numerical Analysis and Computation	Methods of Computational Physics
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*\*Alphabetical order*

## TALKS/PRESENTATIONS

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Nov. 2021	74th Annual Meeting of the American Physical Society Division of Fluid Dynamics (DFD) "Sensorimotor control of fish rheotaxis"
AUG. 2021	Remote Colloquium on Vortex Dominated Flows (ReCoVor) "Bistability in the collective behavior of confined fish schools"
Nov. 2020	73rd Annual Meeting of the American Physical Society Division of Fluid Dynamics (DFD) "Bistability in the collective behavior of confined fish schools"

## PUBLICATIONS

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2022	C. Huang, E. Kanso (in prep)., <i>Phase transition in the collective behavior of confined fish schools</i>
2022	C. Huang, E. Kanso (in prep)., <i>Sensorimotor control of fish rheotaxis</i>

## HONORS AND AWARDS

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The Frist Prize of Scholarship, Jilin University 2014  
Excellent Student, Jilin University 2014  
The Second Prize of Scholarship, Jilin University 2015  
Excellent Student, Jilin University 2015  
The Second Prize of Scholarship, Jilin University 2016

## MISC. ASSOCIATION

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Judge of Undergraduate Symposium for Scholarly and Creative Work, University of Southern California  
Lead of PACE (Partners for the Advancement of Collaborative Engineering Education) Center, Jilin University  
*Projects: Rural Vehicle Market Research, Solar Energy Vehicle*  
Member of Innovation Center, Jilin University.