

# Lin, Ching-Te

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## Research Interest

computational methods to study laminar and turbulence flow, flow control schemes utilizing control theory or data-driven approach, reduced-order modeling, and compressed sensing

## Education

**Ph.D. in Mechanical Engineering, California Institute of Technology** Sept. 2023 – Present

**M.S. in Mechanical Engineering, National Taiwan University (NTU)** Sept. 2021 – Aug. 2023

Relevant Courses: Viscous Flow, Robust Control, Introduction to Chaotic Dynamics

Advisor: Dr. Hsieh-Chen Tsai

Thesis title: Closed-loop Flow Control on Harmonic Oscillation of a Circular Cylinder

**B.S. in Mechanical Engineering, NTU** Sept. 2017 – Aug. 2021

Relevant Courses: Advanced Thermodynamics, Advanced Thermal Transfer, Linear Control Systems

## Projects & Research Experience

**Research Assistant in the Department of Mechanical Engineering, NTU** Spring 2021 – Aug. 2023

- Applied Resolvent Analysis on a tilted flat plate to construct a reduced-order model with a relative error of 3% on the boundary
- Develop Floquet-based Resolvent Analysis and design an active flow control strategy on a plunging cylinder to attenuate lift fluctuation by up to 25.7%

**Robust Control Courses Final Project, NTU** Spring 2022

- Utilized loop shaping method to design a robust controller for a chaotic Lorenz system
- Rejected the input and output disturbance and improved by 32% compared to an LQR controller

**Introduction to Chaotic Dynamic Courses Final Project, NTU** Fall 2021

- Performed Finite-time Lyapunov exponent to figure out the Lagrangian coherent structure of flow past a cylinder

**Drone Innovation and Application Competition, Taipei Computer Association** Dec. 2020 – July 2021

- High Distinction Award (Awarded top five out of fifty-seven teams nationwide)
- Proposed an autonomous aircraft with the design of a tandem wing tail sitter, which can carry 10 kg loading and maneuver with a flight distance of 15 km
- Proposed a control law to resist the side wing up to 5 m/s when hovering and verified via SIMULINK

**Summer Research Project, Moldex3D (CoreTech System Co., Ltd.)** July 2020 – Aug. 2020

- Performed plastic injection molding simulation via Moldex3D
- Improved unbalanced flow in multi-cavities with modified runners

**Formula SAE Japan Racing Car, NTU** Sept. 2018 – June 2020

- Co-lead a team of 8 members to design brake, steering, and suspension systems for a racing car
- Performed finite element analysis to study the structure limit of the designed part
- Communicated with sponsor companies and manufacturing companies

## Publication

- Ching-Te Lin & Hsieh-Chen Tsai. (2024) Feedback flow control on a plunging circular cylinder. *Physics of Fluids* 1 April 2024; 36 (4): 047126. doi:10.1063/5.0203558
- Lin, C.-T., Tsai, M.-L., & Tsai, H.-C. (2023). Flow control of a plunging cylinder based on resolvent analysis. *Journal of Fluid Mechanics*, 967, A41. doi:10.1017/jfm.2023.526

## Honors & Awards

**Ministry of Education Taiwan-Caltech Scholarship, Ministry of Education, Taiwan** Sept. 2023

- Awarded three Ph.D. students annually to support their Ph.D. studies for four years

**Sing Lung Foundation Scholarship, Sing Lung Foundation** Nov. 2022

- Honored students with outstanding academic achievement in mechanical engineering

**Dean's List Award, NTU** Spring 2021

- Awarded top five percent of students for excellent academic performance in the department of mechanical engineering

## Teaching Experience

**Teaching Assistant, Advanced Thermodynamics (I), graduate-level** Fall 2022

- Hold weekly office hours to answer questions about the course from 50 graduate-level students

**Teaching Assistant, Engineering Mathematics (1), (2), conducted in English** Fall 2021 – Spring 2023

- Prepare and grade quizzes and assignments for the lecture, including ODE, linear algebra, complex analysis, and PDE
- Hold TA office hours and a review lecture of 1 hour for the midterm exam in English

**Teaching Assistant**, *Fluid Mechanics, conducted in English*

**Spring 2022**

- Held TA office hours and graded assignments and exams for 50 sophomore-level undergraduates

## **Skills**

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**Programming Language:** FORTRAN, MATLAB, Python, C++

**Computer-Aid Design Software:** SolidWorks, Autodesk Inventor, AutoCAD

**English (Advanced) :** TOEFL: 102/120; GRE: 325/340, AW: 3.5

**German (Beginner):** Completed B1 level language courses in NTU