Aobo Yang

Academic Building, 6111
Clear Water Bay, Hong Kong SAR, China

ayangae@connect.ust.hk
ResearchGate
LinkedIn

EDUCATION

- **Swiss Federal Technology Institute of Lausanne (EPFL)** *Visiting Ph.D.* 2024.09-2025.09
  Supervisor: Prof. Pascal Fua Computer Vision Lab
- **The Hong Kong University of Science and Technology** *Ph.D. candidate* 2022.02-present
  Supervisor: Prof. Rhea Liem (now at Imperial College London)
- **University of California, San Diego** *Master of Science* 2018.09-2020.09
  Supervisor: Prof. John Hwang LSDO Lab
- **Beihang University** *Bachelor of Energy and Power Engineering* 2013.07-2017.07

REFERENCE CANDIDATES

- **Prof. Rhea Liem** —Imperial College London, Reader (Associate Professor)
  Email: r.liem@imperial.ac.uk Website: Faculty Profile
- **Prof. Larry Li** —The Hong Kong University of Science and Technology, Associate Professor
  Email: larryli@ust.hk Website: Faculty Profile
- **Prof. Jichao Li** —Northwestern Polytechnical University, Professor
  Email: jichaoli@nwpu.edu.cn Website: Personal website

SERVING PROJECTS

- Shanghai Municipal 2023 "Science and Technology Innovation Action Plan" 2023.06 – present
  Project for Cooperation with Hong Kong, Macao, and Taiwan
- Hong Kong Research Grants Council General Research Fund (GRF) 2023.06 – present
  Multifidelity Data Fusion for Aerodynamic Shape Optimization
- Hong Kong Research Grants Council General Research Fund (GRF) 2022.02 – present
  Operation-aware Aircraft Design Optimization
- U.S. National Science Foundation (NSF) 2018.10 – 2020.09
  NASA Virtual Super-Resolution Optics Using Reconfigurable Swarms (VISORS)
  satellites

RESEARCH

I design and optimize flying vehicles. My research focuses on using machine learning methods to lightweight high computational cost computational mechanics. I emphasize combining physics-based modeling, data-driven learning, and generative modeling to enable scalable, operation-aware engineering design. I summarize three major works during my Ph.D. as follows.

- **Operation-aware commercial aircraft design optimization**
  - Gaussian mixture model for flight operational data clustering analysis

  - Cluster-based operation-aware rapid high-fidelity commercial aircraft wing design platform
  - Quantification investigation of airlines emission trade-off study

- **Multifidelity data fusion and design optimization**
  - Proposes a generalizable multifidelity framework for scalable multifidelity data fusion
  - Gradient-based diagram enables large-scale design optimization
  - Scalable, accurate results rival adjoint CFD with faster computation

- **Generative modeling for high-fidelity inverse design**
  I propose *Dflow-SUR* to enable a high-fidelity physics-based inverse design, the contributions are:
  - Decouples inference from physical guidance for stable optimization
  - Enhances controllability and mitigates surrogate uncertainty
  - Outperforms energy-based methods in aerodynamic design quality

AWARDS

- **AIAA MDO Best Paper Award 2024**
- **AIAA Aviation 2024 MDO Student Best Paper Award**
- **AIAA Aviation 2023 MDO Student Best Paper Candidate** *1/6*
- **HKUST 2024 Best Teaching Assistant Award**

TEACHING ASSISTANCE

- **Linear Control Theory** *Prof. Robert Bitmead, UCSD* 2019.09 – 2019.12
- **Advanced Vibration** *Prof. Vitali Nesterenko, UCSD* 2019.12 – 2020.03
- **Aircraft Design** *Prof. Rhea Liem, HKUST* 2023.02 – 2023.05

Supervision on master projects (EPFL)

- **Anthony Grégoire Kalaydjian** *Aerodynamic design optimization* Score: 5.5/6
- **Sébastien Alexis Andrew Chahoud** *Multifidelity surrogate modeling* Score: 5.75/6
- **Damien Genoud** *Satellite constellation anomaly detection* Score: 5.75/6

WORK and INTERNSHIP

- **Chinese Academy of Science** 2020.11 – 2021.11
  Strategic Planning Researcher
  - Large-scale remote-sensing satellite constellation optimization and investigation
  - The overall mission and design of a microsatellite .
  - Large scientific space vehicle and mega constellation simulation supports for strategy and decision

- **BMW R&D Center (Beijing)** 2018.03 – 2018.07
  Autonomous Driving Group *Internship* Supervisor: Dr. Thomas Page
  - Benchmark China city on-road autonomous driving test regulations

  - Regulatory analysis and regulatory constraints set up, conference monitoring
  - Data analysis on BMW on-road autonomous driving test

SKILLS

- **CFD**: I specialize in RANS-based design optimization. I am proficient with both commercial and open-source software such as `OpenFOAM` and `ANSYS Fluent`. My primary research tools are `ADflow` and `SU2`, which are RANS CFD solvers equipped with adjoint implementations.
- **AI**: I have experience on training latest neural networks and neural operators as surrogate models for physics AI research, as well as expertise in the latest generative modeling approaches, including diffusion models and flow matching.
- **Multidisciplinary design optimization (MDO)**: I have worked on several MDO projects using NASAOpenMDAO, the aircraft design framework MACH-Aero, and the satellite swarm optimization tool LSDO-CubeSat.
- **Coding**: `Python`, MATLAB, `Julia`