# YU WAN

Mobile: +1 412 337 7296|Email: yuwan@andrew.cmu.edu|Linkedin:www.linkedin.com/in/rain-wan

## EDUCATION

**Carnegie Mellon University, Mechanical Engineering | Master of Science Research** **Pittsburgh, USA**

- Research Direction: GPU-based Global Optimisation *Aug.2024-Present*
- Featured Courses: Engineering computation, Optimisation, Machine Learning, Deep Learning
- Current GPA: 3.99/4.0

**University College London, School of Engineering | Bachelor of Engineering** **London, UK**

- B.Eng in Mechanical Engineering, First Class Honour Degree (Top 5%) *Sep.2019-May2022*

## WORK EXPERIENCE

**Red Bull Ford Powertrains, Placement Year** **Milton Keynes, UK**

*Mechanical ICE Design Engineer, F1 Powertrains Technology Development* *Jul.2022-Jul.2023*

***Design and Development of Simple Pneumatic Spring Controlled by Chocking Effect***

- Built a MATLAB/Simscape model with compressible gas and heat transfer to predict pressure dynamics during valve motion.
- Designed and Developed a new pneumatic spring without any complex sealing and gas vent ducts, relying solely on precise control of the flow choking effect.

***Improvement and Redesign of Centrifugal Roller Damper***

- Diagnosed the failure mode in a Sarazin-type camshaft roller damper; introduced a rolling–sliding factor to improve swing-angle prediction.
- Engineered a new carrier and rollers, achieving 1.8× torque capacity with a more compact package.

***Design and Development of MGU-K Driveline Viscous Vane Damper***

- Explored a vane damper for MGU-K drivelines (inspired by armoured-vehicle suspension); modelled chamber pressures and geometry sensitivity in MATLAB/Simscape.
- Resolved cavitation, air self-bleeding, and adaptive activation through targeted design changes.

***Formulating Piston Ring Conformability Criteria Regarding Liner Bore Distortion***

- Developed a Fourier-based MATLAB tool to model bore distortion and ring conformability under static and thermal loads; formulated a 'Red Bull' blow-by criterion.
- Investigated ring collapse and flutter using dyno-test damage evidence; prototyped a conformable ring accordingly.

## ACADEMIC PROJECTS

**Optimisation of Microneedle Array Layout, CMU** Sept.*2024-Nov.2024*

*Adviser: Prof Jeremy Michalek*

- Programming & analysis lead. Built the Python optimisation code for the microneedle array layout (SciPy trust-constr) with a Hagen–Poiseuille-based objective under geometric and pressure constraints; added randomised initialisation and a ten-restart policy with tight tolerances.
- Executed the full study on the microneedle array layout via three independent runs and a parametric sensitivity analysis, validating convergence and robustness and delivering a constraint-compliant layout that maximised predicted flow.

**Rubik's Cube Interactive Solver, CMU** Oct.*2024-Dec.2024*

*Role: Team Leader*

- Led a six-student team to deliver a working CLI application on Windows; organised sprints and version control with GitHub; ensured on-time delivery.
- Primary author of the integrated C++ codebase (majority of implementation): designed the class architecture and completed final assembly and testing.
- Implemented perspective control, reproducible scrambling with recorded moves, and a reverse-sequence solver with

hint generation; resolved key-binding conflicts between view and cube control and optimised scrambling loops for stability.

**Design and Build Model Version of Formula E Student Vehicle, UCL** *Oct.2021-Jun.2022*

*Adviser: Prof Tim Baker*

***Achievement: The Only Graduate Project Selected for Collection and Exhibition in Department, 2022***

- Pioneered the design and construction of UCL's first Electric Formula Student Car model at a 1:8 Scale.
- Conceptualised the chassis frame, drawing inspiration from leading globally designs, and conducted modal and static load under different operating conditions on AnsysWorkbench to validate structural integrity.
- Explored and compared the application of suspension featuring various wishbone arrangement, devised and simulated the kinematic response in MATLAB to optimise the driving stability of the vehicle.
- Studied and conducted a sensitivity sweep of the Ackermann steering system geometry design, suggesting a negative Ackermann angle design to compensate the tire slip effect.
- Engineered and constructed a hub motor with an integrated planetary gear system to maximise volume and transmission efficiency, while conducting topological optimisation of the motor casing structural design, leading to a notable 34% reduction in dead weight.

**Renewable Fuel Lab, UCL** *Mar.2021-May. 2021*

*Adviser: Prof Paul Hellier*

- Studied and explored the effect of fuel composition on IC engine thermal efficiency, peak heat release rate and pollutant emission.
- Conducted experiment with a Honda single-cylinder engine, modifying spark timing and changing ethanol proportions.
- Analysed cylinder effective pressure and peak heat release rate, concluding that a mixture of 5% 1-pentanol and 95% gasoline exhibited a 10% higher thermal efficiency, higher net heat release rate, and lower NOx emissions compared to the gasoline.

**PW100 Engine Impeller Redesign, UCL** *Nov.2020-Apr.2021*

*Adviser: Dr Bhagyalakshmi Dasari*

- Led a group of 6 students, studying and proposing a more efficient impeller prototype model to enhance PW100 engine efficiency.
- Conducted an impeller parameter sensitivity study using MATLAB, performed hydrodynamic performance simulation with ANSYS Fluent, and explored material selection and manufacturing process through CES EDUPACK.
- Delivered a 3D-printed impeller model to the test rig, achieving a ranking of 4 out of 28 groups with an overall efficiency of 42%.

## LEADERSHIP AND TEACHING

Teaching Assistant (Engineering Computation), CMU *Feb.2025-Jun.2025*

MechSpace (Workshop) Senior Mentor, UCL *2019 & 2021*

## TECHNICAL SKILLS

- Language: Professional English (ILETS 7.5, Industry-level Communication), Native Chinese Speaker
- Programming Languages: MATLAB，C++, Python ( Numba, PyTorch)
- Analysis Tool: Ansys Workbench, Abaqus, GT Suite, CATIA, NX