

Yang Yihan

Marie Skłodowska-Curie PhD Candidate
Engineering Department
University of Perugia, Perugia, Italy

EDUCATION

PhD: Engineering Department, University of Perugia, Perugia, Italy (2026-present)

DT-HATS-MSCA DC10: Development of a low temperature plasma ignition model for NH₃ and H₂

Master of Science (GPA: 4.0/4.0): Science (2023-2025), Aircraft, Rocket Engines and Power Plants, Moscow Aviation Institute, Moscow, Russia

Research Supervisor: Gueraiche Djahid

Article Title: Multi-modular UAV for Mars exploration: a concept feasibility study

Research Project Title: Multi-modular UAV for Mars exploration

Research Team: Yang Yihan (Leader), Albitar Daniel, Fedorov Konstantin, Tian Min (Member)

Thesis Supervisor: Ezhov A.D

Thesis Title: Optimization of NO_x Emission Reduction through Turbulence Control in Lean Methane-Hydrogen Combustion

Exchange Student: Kharkiv Aviation University (2022-2023), Kharkiv, Ukraine

Bachelor of Science (2018-2022): Material Engineering, Shenyang Aerospace University, Shenyang, China

- Outstanding Undergraduate Thesis Award
- Outstanding Graduate Award

Summer and Winter Schools Participant:

- Participant in the 2019 National English Competition for College Students (NECCS), hosted by The National College English Competition Organizing Committee, China
- Participant in the Overseas Scholars Meeting (10.2023), hosted by Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences
- Participant in the 12th "Soaring Youth" Scholars Forum hosted by Northwestern Polytechnical University (06.2024), Online
- Participant in The Fifth Space Festival "108 Minutes" Dedicated to the 90th Anniversary of the First Cosmonaut of the Earth Yuri Alexeevich Gagarin (06.2024), hosted by K. E. Tsiolkovsky State Museum of the History of Cosmonautics, Kaluga, Russia

PUBLICATIONS

[1] Gueraiche Djahid, Albitar Daniel, Fedorov Konstantin, Yang Yihan. (2025). Multi-modular UAV for Mars exploration: a concept feasibility study. Chinese Journal of Aeronautics, <https://doi.org/10.1016/j.cja.2025.103562>

RESEARCH EXPERIENCE

Journal Article Co-Author, Chinese Journal of Aeronautics, Beijing, China

- Conducted a brief concept study of a modular research aircraft with potential applications for Mars exploration, including CFD and structural simulations. The modular system includes a fixed-wing design along with a number of smaller autonomous quadcopter UAVs, encapsulated inside a geodesic spherical support through a gimbal mechanism for ground mobility. Analyzed the feasibility of allocating to these mini drones both scout and mapping tasks of complex terrain such as crater walls, canyons and cave systems that might hold key insights into the planet's geologic history. Once docked with the mothership fixed wing, the mini drones serve as a distributed propulsion system, including vertical take-off and landing and control, completely replacing control surfaces on the flying wing itself, its engine and landing gear. CFD and structural simulations have demonstrated the flight-ability in Mars conditions of a flying wing design prototype along with scout drone prototypes with a pentagon-hexagon geodesic shell.

Master's Research Team Leader, 'Multi-modular UAV for Mars exploration', Moscow Aviation University, Moscow, Russia

- Conducted a study on a modular research aircraft with potential Mars exploration applications. The system integrates an aircraft with smaller autonomous quadcopter UAVs, all housed within a geodesic spherical structure supported by a gimbal mechanism for ground mobility. The study assessed the feasibility of using these mini drones for scouting and mapping challenging terrain, such as crater walls, canyons, and caves, which could reveal crucial information about Mars' geological history. CFD and structural simulations confirmed the viability of the flying wing prototype and scout drones, which feature a pentagonal-hexagonal geodesic shell, under Martian conditions. This research is a part of the long term project 'Long endurance Mars flying exploration vehicle (LEMFEV)'.

Research Assistant, 'Long endurance Mars flying exploration vehicle (LEMFEV)', Moscow Aviation University, Moscow, Russia

- This project is aimed at a comprehensive exploratory study of a fixed wing long endurance Mars flying and exploration vehicle (LEMFEV), identification of design parameters, wing geometry and the minimum engine / battery performance required for a sustainable flight over Hellas Planitia crater, as well as maximum take-off and payload weights achievable. Including design of the wing geometry, structure and optimization for Martian atmospheric conditions.
- Conducted CFD simulations to analyze the behavior of the flying aircraft in the Martian atmosphere. Developed visual representations and engineering models using SolidWorks, ANSYS, and Fluent to support project analysis and presentation.
- This research won the 2021 Indo-Russian international contest and secured funding for 3 subsequent years, supported by the Russian Science Foundation.

Undergraduate Thesis Leader, 'Chromium electrodeposition from trivalent chromium bath containing formic acid, ammonium oxalate and carbamide: An investigation into complexing agents, current efficiency, electrodeposition rate, hardness and wear characteristics', Shenyang Aerospace University, Shenyang, Liaoning, China

- Developed the optimal formula for the plating solution and established the ideal parameters for

the trivalent chromium plating process. Studied the impact of various processes on coating wear resistance and hardness, and examined how the thickness of the nickel layer affects the hardness and wear resistance of the composite coating.

Research Leader, 'Advanced Performance Prediction of the RD-33 Turbofan Engine Using Mathematical Modelling and Thermodynamic Analysis'

- The turbofan engine has seen significant advancements in recent years, becoming a widely used power plant for both military and civilian aircraft. Combining the advantages of both turboprop and turbojet engines, it has been adapted to meet the increasing demands for greater payload capacity and extended range. This project aimed to explore and refine the use of mathematical algorithms to predict the design performance of a turbofan engine.
- Selected key parameters, performed thermogasdynamic calculations for the RD-33 engine, and compared the results with provided data.

Research Leader, 'Contact Heat Transfer in Vacuum Conditions'.

- Researched contact heat transfer issues in vacuum conditions and explored potential future developments. Examined thermal contact conductance and its influencing factors, along with modern techniques for predicting heat transfer.

Project Leader, 'Engine Test Bench Faults and Improvements'

- Conducted research on various engine test benches, identifying existing problems, faults, and development prospects.

Project Leader, 'Material Applications and Global Technological Development'

- Analyzed the application of advanced materials in industry and their role in driving technological advancements worldwide.

Project Leader, 'Research on Brighteners for High-Speed Electroless Nickel Plating'

- Investigated the impact of brightener content on the brightness, surface roughness, and deposition rate in electroless nickel plating processes.

Competition Project 1, Modelling and Stress Analysis of Aerospace structures Using ANSYS

- Explored the crucial role of ANSYS in aerospace design, performing static structural analysis and fluid dynamics using finite element analysis and Fluent.

Competition Project 2, Cross-Cultural Communication

- Awarded third prize in a NECCS-style contest focused on cross-cultural communication.

Teaching Assistant, Management, Management of Organization and Administration, Economics and Management Faculty (02.2023-08.2023), National University "Zaporizhzhia Polytechnic", Zaporizhia, Zaporizhia Oblast, Ukraine

WORK AND ENTREPRENEURIAL EXPERIENCE

Translator (01.2021 – 02.2021), Shanghai YIGUO YIMIN Translation Service Co. Ltd., Shanghai,

China

- Participated in the internship training and completed the translation of various English articles. Earned an internship certificate.

Teaching Assistant (05.2020 – 07.2021), National University "Zaporizhzhia Polytechnic", Zaporizhia, Zaporizhia Oblast, Ukraine

- Assisted teachers with lesson planning, supervised students in class, tracked attendance, calculated grades, provided additional support to students requiring special accommodations, helped students with unique learning needs, and worked with the teacher to identify student challenges and suggest appropriate solutions.

HONORS AND AWARDS

- National English Competition for College Students (NECCS), Grand Prize
- Foreign Language Teaching and Research Press (FLTRP) · English Talent for International Communication (ETIC) Cup English Public Reading Contest, First Prize
- Foreign Language Teaching and Research Press (FLTRP) · English Talent for International Communication (ETIC) Cup English Public Speaking Contest, Grand Prize
- "May 4th" Artistic Pioneer, 2021
- Mathematical Modelling Competition, Third Prize
- Outstanding Individual Contribution Award for the Teacher-Student Chorus of "Continuing the Bloodline, Our Heart Goes to the Party" in Celebration of the 100th Anniversary of the Founding of the Communist Party of China
- Outstanding Graduate, Shenyang Aerospace University 2022

TECHNICAL ABILITY

- IELTS 8.0
- CET-4: 624
- CET-6: 643
- Certificate of Shanghai Interpretation Accreditation Test (Intermediate Level)
- Proficient in ANSYS for simulation, modelling, and data analysis across engineering fields, including aerospace and fluid dynamics, for testing and predicting the behavior of complex systems under varying conditions.
- Skilled in OpenFOAM, SolidWorks, Siemens NX, ANSYS, CAD, and Origin, with the ability to perform in-depth analysis and optimize products efficiently.
- Proficient in Python and C++

Research:

https://drive.google.com/file/d/1KxPnZjBnwK0FRIHL-yTLiLW1kOiRoyuD/view?usp=drive_link

https://drive.google.com/file/d/1rKDNlOJO9ic_hDh8-chWaoATeOI2CLWa/view?usp=drive_link

Thesis:

https://drive.google.com/file/d/1iNDbfEIsOnLSfCFujMa30NW6iO----vS/view?usp=drive_link

https://drive.google.com/file/d/1ZoflpE0OFU04XjjSqFyGy-LEhhSull3E/view?usp=drive_link