Alex Baowend Soom M. A. Zongo

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Website — LinkedIn — GitHub

SUMMARY

Ph.D. student in Mechanical and Aerospace Engineering at The George Washington University, precisely within the Intelligent Aerospace Systems Lab (IASL). Dedicated researcher in Multi-Agent Reinforcement Learning, AI and Autonomous Safety-Critical Systems. Part of my work funded by NASA on Advanced Air Mobility. Publication records spanning ICGNC, and in the near future ACC, ICNS, ATRD, and CDC. Proficient in Python, PyTorch, MATLAB, and soon ADA.

EDUCATION

PhD in Mechanical and Aerospace Engineering — August 2024 - Present
School of Engineering and Applied Sciences George Washington University — Washington, DC, USA
Research Areas: *Multi-Agent Reinforcement Learning, Fight Control, Optimization, AI* — GPA: 3.9/4.0

Master in Control Sciences and Engineering — September 2021 - May 2024
Department of Automation, Tsinghua University — Beijing, China
Research Areas: *Reinforcement Learning, and Flight Dynamics and Control* — GPA: 3.81/4.0

Machine Learning Summer School — June 2022 - August 2022
Oxford University — London, United Kingdom

Bachelor of Engineering in Aircraft Design — September 2018 - June 2021
Department of Aeronautics, Beijing University of Aeronautics and Astronautics, — Beijing, China
Research Areas: *Aircraft Design, Flight Dynamics and Control, Aerodynamics* — GPA: 3.78/4.0

Freshman year in Aeronautics and Astronautics — September 2017 - June 2018
Department of Aeronautics and Astronautics, National Cheng Kung University — Tainan, Taiwan
Relevant Courses: *Engineering Mathematics, Material Sciences and Physics* — GPA: 4.05/4.3

SKILLS AND INTERESTS

Programming	Python, MATLAB, SIMULINK, C/C++, ROS/ROS2, Julia (Ongoing), ADA (Ongoing)
Libraries	PyTorch, Numpy, Scikit-Learn, OpenCV, Jax
CAD	OpenVSP, SOLIDWORKS, CATIA, ANSYS FLUENT
Soft Skills	Self-learning, Initiative, Team Work, technical writing (LATEX) and presentation
Languages	French(native), English(C2), Chinese(B1)

POSITION OF RESPONSIBILITY AND EXPERIENCE

Graduate Research Assistant — September 2024 - Present
George Washington University, Intelligent Aerospace Systems Lab (IASL), Washington, DC, US

- I am developing a **pre-flight eVTOL aircraft energy consumption estimation algorithm with conflict-resolution in high-density airspaces**. This project is funded by **NASA** and the abstract is under review for **ICNS** 2026.
- With a focus on **Robust Markov Decision Processes / (Multi-Agent) Reinforcement Learning**, I design and implemented a **Robust Multi-Agent Reinforcement framework for aircraft separation assurance under GPS spoofing and degradation**. This study is under review at **ACC** 2026.
- Organized and hosted the *Safe and Responsible AI workshop* on September 27, 2024, Washington, DC, USA. This workshop provided participants with the opportunity to identify challenges and opportunities, share work progress from multiple agencies (FAA, HASS COE, Johns Hopkins APL, and MIT Lincoln Labs) and institutes (TRAILS, NIST AI, RAIUK), and promote research collaborations.

Graduate Teaching Assistant January 2025 - May 2025

George Washington University, School of Mechanical and Aerospace Engineering, Washington, DC, US

· Course: **Linear Systems Dynamics** (MAE 3134), Spring 2025

· Responsibilities: Grading assignments and exams;
conducting recitations (office hours) to reinforce the lecture material.

Research Assistant September 2021 - May 2024

Tsinghua University, Navigation and Control Lab, Beijing, China

· Participated in various lab projects, including the design and evaluation of a **4D Trajectory-Based Optimization for ATM** .

· Designed and developed an **intelligent Fault-tolerant attitude flight control** for a fixed-wing using **Reinforcement Learning**. This work has been published at **ICGNC 2024**.

Secretary General May 2022 - May 2024

Tsinghua University African Student Association (THUASA), Beijing, China

· A student association established by students with the aim of cultural exchanges,
learning, and leadership skill development among students and peers.

· Served as a **team leader** and active member working to promote leadership Lead in cultural activities planning and organization

R&D Engineer September 2022 - May 2023

Tsinghua University Artificial Intelligence International Student Association club (TAISA), Beijing, China

· A graduate-level AI club established by students with the aim of learning
and professional skill development among students and peers

· Active member working to **develop AI solutions for societal problems**

RESEARCH PUBLICATION

I. Sharifi, **A. Zongo**, B. Wang, P. Wei. (2025). Ongoing, December 2025 - January 2026
Knowledge-Enhanced Safe Separation of Multi-Agent Unmanned Aerial Systems via Large Language Models, under preparation for the Air Transportation Research and Development Symposium (ATRD) 2026.

A. Zongo, P. Wei. (2025). Submitted, December 2025
eVTOL Aircraft Energy Consumption Estimation with Conflict Resolution in High-Density Airspaces, under submission to the Integrated Communications Navigation, and Surveillance (ICNS) Conference 2026.

A. Zongo, P. Wei. (2025). Submitted, September 2025
Robust Multi-Agent Reinforcement Learning for Small UAS Separation Assurance under GPS Degradation and Spoofing, In American Control Conference (ACC) 2026.

Zongo, A.B., Qing,L. (2025). Published, March 2025
Towards Intelligent Fault Tolerant Attitude Flight Control Of A Fixed-Wing Aircraft,
In: Yan, L., Duan, H., Deng, Y. (eds) Advances in Guidance, Navigation and Control. ICGNC 2024. Lecture Notes in Electrical Engineering, vol 1353. Springer, Singapore. [PDF] [Code]

PEER REVIEWS

Journal Reviews: Journal of Aerospace Information Systems (JAIS) (3 papers, 2025)

Conference Reviews: International Conference in Guidance, Navigation, and Control (ICGNC) (3 papers in 2024)

RELEVANT COURSES (GRADE)

Machine Learning (A)	Deep Reinforcement Learning (A)	Computational Optimization (A)
Aerodynamics (A)	Electro-Mechanical Control Systems (A)	Advanced Engineering Mathematics (A)
Aircraft Design (A)	Robotics and Computer Vision (A)	Flight Dynamics, Simulation and Control (A)
Algorithm Design (A)	Automatic Control (A)	Large Language Vision Models (In progress)

RELEVANT PROJECTS

George Washington University September 2024 - May 2025

- Graph Algorithm analysis and implementation (Jack Edmon's algorithm on graphs)
- Machine Learning algorithm application on diverse tasks (forecasting, classification, Reinforcement Learning).
- Application of System Identification, classical control, and non-linear control methods on plants (motors, SpaceX Grasshopper);
- Visual Odometry classical algorithm implementation on self-recorded datasets around my home.

Tsinghua University September 2021 - September 2023

- Fault-Tolerant Flight Control via Reinforcement Learning
- Audio analysis and separation via Deep Learning techniques

Beijing University of Aeronautics and Astronautics September 2020 - May 2021

- Conceptual design of a lightweight sport aircraft.
- Preliminary design of an helicopter.
- Flight simulator modeling with MATLAB/SIMULINK using the RCAM model. [Code]

General Aviation Aircraft Design Sept 2020 - May 2021

Beijing University of Aeronautics and Astronautics

- Conceptual design of a lightweight sport aircraft.
- Preliminary design of an helicopter.

POSITION OF RESPONSIBILITY AND EXPERIENCE

Graduate Teaching Assistant January 2025 - May 2025

George Washington University, School of Mechanical and Aerospace Engineering

- Course: Linear Systems Dynamics (MAE 3134), Spring 2025
- Responsibilities: Grading assignments and exams;
  conducting recitations (office hours) to reinforce the lecture material.

Graduate Research Assistant September 2024 - Present

George Washington University Intelligent Aerospace Systems Lab

- Focus: **Robust Markov Decision Processes / (Multi-Agent) Reinforcement Learning**
- Organizing and hosting the *Safe and Responsible AI workshop* on September 27, 2024, Washington, DC, USA. This workshop provided participants with the opportunity to identify challenges and opportunities, share work progress from multiple agencies (FAA, HASS COE, Johns Hopkins APL, and MIT Lincoln Labs) and institutes (TRAILS, NIST AI, RAIUK), and promote research collaborations.

Research Assistant September 2021 - May 2024

Tsinghua University Navigation and Control Lab

- Participated in various lab projects, including Trajectory-Based Optimization Performance Graphical Simulation
- Research on applying AI to Flight Control: Fault-tolerant flight control
- Resulting in a publication to the International Conference on Guidance, Navigation, and Control (ICGNC 2024).
- Reviewer of ICGNC 2024.

Secretary General May 2022 - May 2024

Tsinghua University African Student Association

- A student association established by students with the aim of cultural exchanges,
  learning, and leadership skill development among students and peers.

· Lead in cultural activities planning and organization
· Team leader and active member working to promote leadership and engagement in community service and problem-solving.

R&D Engineer September 2022 - May 2023
Tsinghua University Artificial Intelligence International Student Association club
· A graduate-level AI club established by students with the aim of learning and professional skill development among students and peers
· Active member working to develop AI solutions for societal problems

INTERNSHIP/TRAININGS

Robotics Software Engineer Intern,
Popular Robotics, Beijing, China June-November 2022

Worked on a **biped simulation in Gazebo with ROS & ROS2**

Designed a **course on gait motion basics, simulation and control**.

ACHIEVEMENTS

George Washington University Fellowship Fall 2024 - Present
Graduate Research and Teaching Assistantship Recipient
Funded by NASA, as part of NASA's University Leadership Initiaitves (ULI)

Tsinghua University
Chinese Government Scholarship Recipient 2021 - 2024

Beijing University of Aeronautics and Astronautics 2018 - 2021
Chinese Government Scholarship Recipient
Outstanding Academic Achievement Awardee 2019 and 2020

Fujen Catholic University & National Cheng Kung University 2016 - 2018
Taiwan Ministry of Foreign Affairs Scholarship Recipient

EXTRA-CURRICULAR

- Seminar on *Future of AI, The 6th Academic Forum on Artificial Intelligence of Beijing Universities*, Beijing, China April 2024
- Church Musician at *North Cathedral of Beijing* September 2023 - July 2024
- Campus Service Volunteer at *Tsinghua University* September 2021 - May 2024
- Piano player and performer at the *Global Village* and *Starry Night* events at Tsinghua University, Beijing, China May 2023

REFERENCES

Dr. Peng Wei
Associate Professor, Department of Mechanical and Aerospace Engineering
The George Washington University, Washington, DC, USA.
pwei@gwu.edu

Prof Li Qing
Professor, Department of Automation
Tsinghua University, Beijing, China
liqing@tsinghua.edu.cn

Dr. Ying Zhao
Associate Professor, Department of Computer Science and Technology

Tsinghua University, Beijing, China
yingz@tsinghua.edu.cn

DECLARATION

I hereby declare that the information provided above is true and accurate to the best of my knowledge and belief.