

# 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

<b>PhD in Mechanical and Aerospace Engineering</b> School of Engineering and Applied Sciences George Washington University Research Areas: <i>Multi-Agent Reinforcement Learning, Flight Control, Optimization, AI</i>	August 2024 - Present Washington, DC, USA GPA: 3.9/4.0
<b>Master in Control Sciences and Engineering</b> Department of Automation, Tsinghua University Research Areas: <i>Reinforcement Learning, and Flight Dynamics and Control</i>	September 2021 - May 2024 Beijing, China GPA: 3.81/4.0
<b>Machine Learning Summer School</b> Oxford University	June 2022 - August 2022 London, United Kingdom
<b>Bachelor of Engineering in Aircraft Design</b> Department of Aeronautics, Beijing University of Aeronautics and Astronautics, Research Areas: <i>Aircraft Design, Flight Dynamics and Control, Aerodynamics</i>	September 2018 - June 2021 Beijing, China GPA: 3.78/4.0
<b>Freshman year in Aeronautics and Astronautics</b> Department of Aeronautics and Astronautics, National Cheng Kung University Relevant Courses: <i>Engineering Mathematics, Material Sciences and Physics</i>	September 2017 - June 2018 Tainan, Taiwan GPA: 4.05/4.3

## SKILLS AND INTERESTS

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

## POSITION OF RESPONSIBILITY AND EXPERIENCE

<b>Graduate Research Assistant</b> <i>George Washington University, Intelligent Aerospace Systems Lab (IASL), Washington, DC, US</i>	September 2024 - Present
· I am developing a <b>pre-flight eVTOL aircraft energy consumption estimation algorithm with conflict-resolution in high-density airspaces</b> . This project is funded by <b>NASA</b> and the abstract is under review for <b>ICNS 2026</b> .	
· With a focus on <b>Robust Markov Decision Processes / (Multi-Agent) Reinforcement Learning</b> , I design and implemented a <b>Robust Multi-Agent Reinforcement framework for aircraft separation assurance under GPS spoofing and degradation</b> . This study is under review at <b>ACC 2026</b> .	
· Organized and hosted the <i>Safe and Responsible AI workshop</i> 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

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Sharifi, I., **Zongo, A.**, Wang B., Wei, P. (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.

**Zongo, A.**, Wei, P. (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.

**Zongo, A.**, Wei, P. (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. [\[PDF\]](#) [\[Code\]](#)

## TECHNICAL ESSAYS AND SCHOLARLY BLOG POSTS

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**Zongo, A.** (2025).

Published, December 2025

*Aircraft Traffic Control: Managing Order in a Crowded Sky*. Scholarly blog post, archived on [Zenodo](#), and accessible [Online](#).

## PEER REVIEWS

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

## RELEVANT COURSES (GRADE)

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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

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<b>George Washington University</b>	September 2024 - May 2025
<ul style="list-style-type: none"><li>Graph Algorithm analysis and implementation (Jack Edmon's algorithm on graphs)</li><li>Machine Learning algorithm application on diverse tasks (forecasting, classification, Reinforcement Learning).</li><li>Application of System Identification, classical control, and non-linear control methods on plants (motors, SpaceX Grasshopper);</li><li>Visual Odometry classical algorithm implementation on self-recorded datasets around my home.</li></ul>	
<b>Tsinghua University</b>	September 2021 - September 2023
<ul style="list-style-type: none"><li>Fault-Tolerant Flight Control via Reinforcement Learning</li><li>Audio analysis and separation via Deep Learning techniques</li></ul>	
<b>Beijing University of Aeronautics and Astronautics</b>	September 2020 - May 2021
<ul style="list-style-type: none"><li>Conceptual design of a lightweight sport aircraft.</li><li>Preliminary design of an helicopter.</li><li>Flight simulator modeling with MATLAB/SIMULINK using the RCAM model. <a href="#">[Code]</a></li></ul>	
<b>General Aviation Aircraft Design</b>	Sept 2020 - May 2021
<i>Beijing University of Aeronautics and Astronautics</i>	
<ul style="list-style-type: none"><li>Conceptual design of a lightweight sport aircraft.</li><li>Preliminary design of an helicopter.</li></ul>	

## POSITION OF RESPONSIBILITY AND EXPERIENCE

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<b>Graduate Teaching Assistant</b>	January 2025 - May 2025
<i>George Washington University, School of Mechanical and Aerospace Engineering</i>	
<ul style="list-style-type: none"><li>Course: Linear Systems Dynamics (MAE 3134), Spring 2025</li><li>Responsibilities: Grading assignments and exams;</li><li>conducting recitations (office hours) to reinforce the lecture material.</li></ul>	
<b>Graduate Research Assistant</b>	September 2024 - Present

<b>Research Assistant</b>	September 2021 - May 2024
<i>Tsinghua University Navigation and Control Lab</i>	
<ul style="list-style-type: none"><li>Participated in various lab projects, including Trajectory-Based Optimization Performance Graphical Simulation</li><li>Research on applying AI to Flight Control: Fault-tolerant flight control</li><li>Resulting in a publication to the International Conference on Guidance, Navigation, and Control (ICGNC 2024).</li><li>Reviewer of ICGNC 2024.</li></ul>	

## **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**

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### **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**

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### **George Washington University Fellowship**

Fall 2024 - Present

Graduate Research and Teaching Assistantship Recipient

Funded by NASA, as part of NASA's University Leadership Initiatives (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**

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

April 2024

September 2023 - July 2024

September 2021 - May 2024

May 2023

## **REFERENCES**

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### **Dr. Peng Wei**

*Associate Professor, Department of Mechanical and Aerospace Engineering*

The George Washington University, Washington, DC, USA.

[pwei@gwu.edu](mailto:pwei@gwu.edu)

### **Prof Li Qing**

*Professor, Department of Automation*

Tsinghua University, Beijing, China  
[liqing@tsinghua.edu.cn](mailto:liqing@tsinghua.edu.cn)

**Dr. Ying Zhao**  
*Associate Professor, Department of Computer Science and Technology*  
Tsinghua University, Beijing, China  
[yingz@tsinghua.edu.cn](mailto:yingz@tsinghua.edu.cn)

## **DECLARATION**

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