

# Alex Baowend Soom M. A. Zongo

George Washington University, Washington, DC, USA, 20052

✉ [alexanicetzongo@gmail.com](mailto:alexanicetzongo@gmail.com) — [a.zongo@gwu.edu](mailto:a.zongo@gwu.edu)  
🌐 [Website](#) — [LinkedIn](#) — [GitHub](#)

## RESEARCH INTERESTS

Multi-Agent Reinforcement Learning for safety-critical autonomous systems, with applications to Advanced Air Mobility (AAM) and Urban Air Traffic Management. Current research focuses on robust decision-making under uncertainty, GNSS spoofing resilience, and eVTOL pre-flight energy estimation and energy efficient tactical deconfliction. NASA-funded research on airspace conflict resolution in high-density environments towards efficient AAM operations.

## EDUCATION

### Ph.D. in Mechanical and Aerospace Engineering

George Washington University, School of Engineering and Applied Sciences

Advisor: Dr. Peng Wei — Research: *Multi-Agent Reinforcement Learning, AI, Flight Control, Optimization*

August 2024 – Present

Washington, DC, USA

GPA: 3.9/4.0

### M.S. in Control Sciences and Engineering

Tsinghua University, Department of Automation,

Advisor: Prof. Li Qing — Research: *Reinforcement Learning, and Flight Dynamics and Control*

September 2021 – May 2024

Beijing, China

GPA: 3.81/4.0

### Machine Learning Summer School

University of Oxford

June 2022 – August 2022

Oxford, United Kingdom

### B. Eng. in Aircraft Design

Beijing University of Aeronautics and Astronautics, Department of Aeronautics,

Advisor: Dr. Jidong Wang — Research: *Aircraft Design, Flight Dynamics and Control, Aerodynamics*

September 2018 – June 2021

Beijing, China

GPA: 3.78/4.0

### Freshman Year in Aeronautics and Astronautics

National Cheng Kung University

GPA: 4.05/4.3

September 2017 - June 2018

Tainan, Taiwan

## PUBLICATIONS

### Published

- **Zongo, A.B.**, Qing, L. (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. [\[PDF\]](#) [\[Code\]](#)

Published, March 2025

### Under Review

- **Zongo, A.**, Wei, P. *eVTOL Aircraft Energy Consumption Estimation with Conflict Resolution in High-Density Airspaces*. Abstract accepted at the Integrated Communications Navigation, and Surveillance (ICNS) Conference 2026.
- **Zongo, A.**, Wei, P. *Robust Multi-Agent Reinforcement Learning for Small UAS Separation Assurance under GNSS Degradation and Spoofing*. Abstract submitted to the Digital Avionics Systems conference (DASC) 2026.

Abstract accepted, January 2026

Abstract submitted, January 2026

### In Preparation

- Sharifi, I., **Zongo, A.**, Wei, P. *Fine-Tuning Large Language Models for Autonomous Tactical Deconfliction of Small Unmanned Aerial Systems*. Target: Air Transportation Research and Development Symposium (ATRD) 2026.

In preparation, December 2025 – February 2026

*Fine-Tuning Large Language Models for Autonomous Tactical Deconfliction of Small Unmanned Aerial Systems*. Target: Air Transportation Research and Development Symposium (ATRD) 2026.

## TECHNICAL ESSAYS

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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](#).

## RESEARCH EXPERIENCE

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### Graduate Research Assistant

September 2024 – Present

*Intelligent Aerospace Systems Lab (IASL), George Washington University*

- Developing pre-flight eVTOL energy consumption estimation with conflict resolution for high-density airspaces (NASA-funded through University Leadership Initiatives)
- Designing robust multi-agent reinforcement learning framework for aircraft separation assurance under GNSS spoofing and degradation
- Organized the Safe and Responsible AI Workshop (September 2024) with participants from FAA, HASS COE, Johns Hopkins APL, MIT Lincoln Labs, TRAILS, NIST AI, and RAIUK

### Research Assistant

September 2021 – May 2024

*Navigation and Control Lab, Tsinghua University*

- Developed intelligent fault-tolerant attitude flight control for fixed-wing aircraft using reinforcement learning, resulting in ICGNC 2024 publication

### Robotics Software Engineer Intern

June 2022 – November 2022

*Popular Robotics, Beijing, China*

- Developed biped robot simulation in Gazebo using ROS/ROS2
- Designed curriculum module on gait motion fundamentals, simulation, and control

## TEACHING EXPERIENCE

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### Graduate Teaching Assistant

January 2025 – May 2025

*George Washington University*

- Course: Linear Systems Dynamics (MAE 3134), Spring 2025
- Conducted recitations, held office hours, graded assignments and examinations

## PROFESSIONAL SERVICE

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### Journal Reviews

- Journal of Aerospace Information Systems (JAIS) – 3 papers (2025)
- Journal of Guidance, Control, and Dynamics – 1 paper (2026)
- Journal of Engineering Applications of Artificial Intelligence (EAAI) – 1 paper (2026)

### Conference Reviews

- International Conference on Guidance, Navigation, and Control (ICGNC) – 3 papers (2024)

## TECHNICAL SKILLS

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<b>Programming</b>	Python, Julia, MATLAB/Simulink, C/C++, ROS/ROS2, Ada
<b>ML/AI Libraries</b>	PyTorch, JAX, NumPy, Scikit-Learn, OpenCV
<b>CAD/Simulation</b>	BlueSky ATM, OpenVSP, SolidWorks, CATIA, ANSYS Fluent
<b>Languages</b>	French (native), English (C2), Chinese (B1)

## AWARDS AND FELLOWSHIPS

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<b>NASA University Leadership Initiatives Fellowship</b>	2024 – Present
George Washington University Graduate Research Assistantship	
<b>Chinese Government Scholarship</b>	2021 – 2024
Tsinghua University, Full funding for Master's program	
<b>Chinese Government Scholarship</b>	2018 – 2021
Beijing University of Aeronautics and Astronautics	
Outstanding Academic Achievement Award (2019, 2020)	
<b>Taiwan Ministry of Foreign Affairs Scholarship</b>	2016 – 2018
National Cheng Kung University & Fu Jen Catholic University	

## SELECTED PROJECTS

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<b>George Washington University</b>	September 2024 – May 2025
<ul style="list-style-type: none"> <li>Visual odometry algorithm implementation on self-recorded datasets</li> <li>System identification and nonlinear control for SpaceX Grasshopper dynamics</li> <li>Graph algorithm analysis: Jack Edmonds' blossom algorithm implementation</li> </ul>	
<b>Beijing University of Aeronautics and Astronautics</b>	September 2020 – May 2021
<ul style="list-style-type: none"> <li>Flight simulator modeling with MATLAB/Simulink using RCAM model <a href="#">[Code]</a></li> <li>Conceptual design of lightweight sport aircraft and preliminary helicopter design</li> </ul>	

## LEADERSHIP AND SERVICE

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<b>Secretary General</b>	May 2022 – May 2024
<i>Tsinghua University African Student Association (THUASA)</i>	
<ul style="list-style-type: none"> <li>Led cultural activities planning and community engagement initiatives</li> <li>Coordinated leadership development programs for international students</li> </ul>	
<b>R&amp;D Engineer</b>	September 2022 – May 2023
<i>Tsinghua AI International Student Association (TAISA)</i>	
<ul style="list-style-type: none"> <li>Developed AI solutions for societal challenges as part of graduate-level club</li> </ul>	

## SELECTED COURSEWORK

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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 (A)

## EXTRA-CURRICULAR

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• Church Musician at <i>North Cathedral of Beijing</i>	September 2023 – July 2024
• Campus Service Volunteer at <i>Tsinghua University</i>	September 2021 – May 2024
• Piano player and performer at the <i>Global Village</i> and <i>Starry Night</i> events at Tsinghua University, Beijing, China	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)