

# Fengming Yao | Curriculum Vitae

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🌐 <https://mia-1999.github.io/Mia/>

## EDUCATION

**University of Electronic Science and Technology of China (UESTC)**

**Chendu, CHN**

*M.E. in Aeronautical and Astronautical Science and Technology* September 2021 - June 2024 (expected)

– GPA: 3.90/4.0 (Rank: 3/69)

**Zhejiang University of Technology (ZJUT)**

**Hangzhou, CHN**

*B.E. in Mechanical Engineering*

September 2017 - June 2021

– GPA: 3.62/5.0 (Rank: 11/239)

## RESEARCH EXPERIENCE

**Research on Maintenance Scheduling under Limited Capacities**

2023 - 2024 (expected)

– **Keywords:** Maintenance Scheduling Problem, Reinforcement Learning

- **Background:** This research investigates the optimization of maintenance scheduling in scenarios with limited capacities and uncertain maintenance time durations, with the goal of enhancing mission availability.
- **Work:** The problem is formulated as an integer programming model, an innovative approach that combines Operations Research (OR) algorithms and Reinforcement Learning (RL) is proposed.
- **Outcome:** This research aims to provide robust solutions that maximize system availability for future missions while meeting real-world response requirements in maintenance scheduling management.

**Maintenance Policy for Systems Subject to Non-Homogeneous Gamma Degradation**

2021 – 2023

– **Keywords:** Maintenance Policy, Markov Decision Process, value iteration

- **Background:** This research focuses on developing maintenance strategies for systems whose degradation rates increase over operation time, which is modeled as non-homogeneous gamma process.
- **Work:** An innovative approach is introduced, involving non-periodic inspection models and a time-dependent cost function. The problem is formulated as a semi-Markov decision process framework, with the goal of minimizing long-term average costs. Value iteration is introduced to derive optimal action policies and inspection intervals.
- **Outcome:** Comparative experiments have demonstrated the superior performance of this proposed approach in contrast to traditional models, emphasizing the theoretical significance of preventive maintenance for accelerating degradation systems. The outcomes of this research are documented in the form of a research paper [1].

**Maintenance Policy for Balanced Systems using Deep Reinforcement Learning**

2021 – 2023

– **Keywords:** Maintenance Policy, Reinforcement learning, DQN

- **Background:** This research program focuses on multi-unit balanced systems and their failure modes. Deep Reinforcement Learning (DRL) was employed to address the intricate challenge posed by the complex state space in condition-based maintenance for balanced systems.
- **Work:** I implemented the code in comparative experiments, involving algorithms like standard DQN, DDQN and Dueling DQN.
- **Outcome:** My work contributes to research papers [2] and [3].

## SELECTED COURSES

### ● Postgraduate:

Machine Learning (92), Matrix Theory (93), Stochastic Processes and Applications(87)

### ● Undergraduate:

Calculus (91), Probability and Statistics (95), Linear Algebra(90), Numerical Methods (91), Theoretical Mechanics(94), Engineering Fluid Dynamics (90), The Basic on Electronics (96)

## PUBLICATIONS

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- [1] **Non-periodic inspection and replacement policy of system subject to non-homogeneous gamma degradation process**  
Fengming Yao, Jiawen Hu, Bo Li\*, Hengchang Liu, Feng Gong  
Published in *Quality and Reliability Engineering International*, 2023. **IF: 2.3, Rank: Q2.**
- [2] **A deep reinforcement learning method for replacement optimization of aero-engine**  
Hengchang Liu, Bo Li\*, Fengming Yao, Liying Jiang  
Published in *2022 Global Reliability and Prognostics and Health Management (PHM-Yantai)*
- [3] **Maintenance optimisation of multi-unit balanced systems using deep reinforcement learning** (Under Revision)  
Hengchang Liu, Bo li\*, Fengming Yao, Wentao Xu, Lei Xie  
Accepted to *Reliability Engineering & System Safety*, 2023. **IF: 8.1, Rank: Q1.**
- [4] **Imbalanced multi-domain generalization for electro-mechanical actuator fault diagnosis under variable noisy working conditions**  
Hengchang Liu, Bo li\*, Fengming Yao, Wentao Xu, Lei Xie  
Submitted to *Chinese Journal of Aeronautics*, 2023. **IF: 5.7, Rank: Q1.**

## ACADEMIC APPOINTMENT

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### Teaching Assistant

*University of Electronic Science and Technology of China*

2022

- I supported the course *Intelligent Manufacturing in Aeronautics and Astronautics* by leading discussions, conducting tutorials, and assisting in curriculum development.

### Volunteer Teaching

*Bozhou, Anhui Province, China*

2018

- I was responsible for the mathematics and geography curriculum of the elementary school.

## AWARDS & HONORS

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- UESTC Postgraduate Scholarship (First Class), 2022
- UESTC Postgraduate Scholarship (First Class), 2021
- Outstanding graduates of Zhejiang Province, 2021
- Zhejiang Provincial Government Scholarship, 2020
- Zhejiang Provincial Government Scholarship, 2019
- Zhejiang Provincial Government Scholarship, 2018

## SKILLS

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<b>Programming</b>	Matlab, LaTeX, Python, Pytorch
<b>Languages</b>	Chinese, English (IELTS 7.5)

## REFERENCES

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| ● <b>Dr. Jiawen Hu</b><br>Associate Professor, School of Aeronautics and Astronautics, University of Electronic Science and Technology of China, Chendu, CHN<br>Email: hdl@sjtu.edu.cn | ● <b>Dr. Bo Li</b><br>Professor, School of Aeronautics and Astronautics, University of Electronic Science and Technology of China, Chendu, CHN<br>Email: libo@uestc.edu.cn |
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