

# PENGLI ZHAO

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## RESEARCH INTERESTS

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Arrival Management, Air Traffic Simulation, Traffic Engineering and Big Data.

## EDUCATION

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**Nanjing University of Aeronautics and Astronautics, Nanjing** *September 2017 - Present*  
M.S. Candidate in Transportation Planning and Management, College of Civil Aviation  
Research focus: Arrival Sequencing and Scheduling.  
Advisor: Prof. Junfeng Zhang

**Nanjing University of Aeronautics and Astronautics, Nanjing** *September 2013 - June 2017*  
B.S. in Air Traffic Management, College of Civil Aviation

## FELLOWSHIPS & AWARDS

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<b>Foundation of Graduate Innovation Center in NUA</b>	<b>2018</b>
<b>Third-class Scholarship for Graduate Freshmen</b>	<b>2017</b>

## PROJECT EXPERIENCE

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**AMAN Performance Evaluation** *December 2017 - November 2019*  
*Collaboration with Central South Air Traffic Management Bureau, CAAC*

This project was aiming to analyze historical radar data to evaluate the potential benefits after using AMAN in Changsha Approach. I cooperate with a partner, my work focuses on radar data decoding and AMAN structure research. His work focuses on indicator selection and evaluation.

- Design and development of tool for radar data decoding and visualization.
  - Studied radar-encoding documentation.
  - Development of automatic decoding tool and trajectory visualization tool for analysis.
- Design of test scenarios for AMAN functions verification.
- Research based on KPI and arrival flight tightness.
  - Analyzed and clarified the KPIs and modeling for multi-objective optimization under CDO.
  - Research about the relationship between arrival tightness and computation time.

**DST for AMAN under CDO** *December 2017 - July 2019*  
*Collaboration with Boeing (China) Research and Technology and COMAC*

This project was aiming to develop a Decision Support Tool (DST) for AMAN under Continue Descent Operation (CDO). It could receive real-time data from ATC simulator and make real-time sequencing and scheduling. My work focuses on functions development and experiment verification.

- Integration of trajectory prediction method for multi-type aircrafts.
  - 4D trajectory prediction for step-down and CDO based on BADA3 model.
  - Development of online trajectory prediction function.

- Design and development of sequencing algorithm and functions.
  - Algorithms development for sequencing with different objectives. FCFS and SA can be alternative according to the volume of arrival flights.
  - Support sequencing under different mode of operations and special case.
- Design and development of trajectory generation strategies.
  - Trajectory allocated suggestion based on Scheduled Time of Arrival (STA).
  - Trajectory generation strategies (route, height and speed scheduling).
  - Function realization of continually trajectory monitoring and deviation detecting.
- Design and development of AMAN
  - Missed-approach scheduling function and holding suggestion function.
  - Interface developed for timeline and aircraft display.
  - Programming with UDP sockets for AMAN and simulator connection.
  - Proficient with function development on Qt platform using C++.

## RESEARCH EXPERIENCE

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### Criteria Selection and Multi-Objective Optimization for ALP

July 2018 - July 2019

- Criteria selection, reduction and model development of Multi-Objective Optimization.
- Algorithm design to solve the problem.
- Demonstration about the relationship between arrival flight tightness and computation time.

### Multi-Objective Optimization Under CDO

March 2019 - July 2019

- Modeling based on the KPIs of terminal operation under CDO context.
- Experimented use public data and real case.

### Composite Dispatching Rule-Based Method for Multi-Objective ALP

January 2018 - September 2018

- Adopted two stages method for sequencing and scheduling
- First, using Composite Dispatching Rule (CDR) to decide the sequence.
- Then, using CPLEX to calculate to scheduled time of arrival.

### Sequencing of Arrival and Departure Flights on Parallel Runways

March 2017 - June 2017

- Algorithm based on Tabu search is implemented on single and parallel runways with arrival and departure flights.

## PUBLICATIONS

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Zhang, Junfeng, Pengli Zhao, Yu Zhang, Ximei Dai, and Dong Sui. "Criteria selection and multi-objective optimization of aircraft landing problem." *Journal of Air Transport Management* 82 (2020): 101734.

**Zhao, Pengli**, Junfeng Zhang, Songwei Liu, Dong Sui and Rong Hu. “Scheduling Landing Aircraft with Multiple Objectives under Continuous Descent Operation” In TRB 2020(**Poster Presentation**)

**Zhao, Pengli**, Junfeng Zhang, and Lubao You. “A Composite Dispatching Rule-Based Method for Multi-Objective Aircraft Landing Problem.” In CICTP 2019, pp. 4902-4913. 2019.

Zhang, Junfeng, Zhixiang Zheng, **Pengli Zhao**, and Rong Hu. “Multi-objective integrated arrival departure aircraft sequencing under the influence of sequential flights.” In 2018 Integrated Communications, Navigation, Surveillance Conference (ICNS), pp. 3B3-1. IEEE, 2018.

Zhang, Junfeng, **Pengli Zhao**, Dong Sui and Ximei Dai. “A new meta-heuristic approach for aircraft landing problem” *Journal of Computational and Applied Mathematics*, 2019 (Under Review)

## SKILLS

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<b>Programming Language</b>	C++, MATLAB, Python, SQL
<b>Tools</b>	Qt, Git, L <sup>A</sup> T <sub>E</sub> X, Google Earth
<b>Operating System</b>	Windows, Linux

## LANGUAGE

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<b>Chinese &amp; English</b>	
<b>TOEFL</b>	93 (R28 \ L23 \ S20 \ W22)
<b>GRE</b>	V142 \ Q168 \ AW3.0

## COURSE TAKEN

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Flight Procedure Design, Air Navigation Study, Human Factors, Aeronautical Meteorology, etc.  
Mathematical Optimization Modeling, Operations Research, etc.

## PERSONAL TRAITS

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Highly Motivated and eager to learn new thing  
Strong determination and enforcement  
A stable personality and high sense of responsibility