

# PENGLI ZHAO

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## RESEARCH INTERESTS

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Air Traffic Management, Trajectory Based Operation, Intelligent Transportation Systems, Transportation System Modeling and Simulation

## EDUCATION

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**University of South Florida, Tampa, FL**

*August 2020 - Present*

Ph.D. student in Civil Engineering, Civil and Environmental Engineering Department

Advisor: Dr. Yu Zhang

Research Focus: environmental impact analysis on the transportation system.

**Nanjing University of Aeronautics and Astronautics, Nanjing**

*September 2017 - April 2020*

M.S. in Transportation Planning and Management, College of Civil Aviation

Advisor: Prof. Junfeng Zhang

Research Focus: sequencing and scheduling of arrival flights.

**Nanjing University of Aeronautics and Astronautics, Nanjing**

*September 2013 - June 2017*

B.S. in Air Traffic Management, College of Civil Aviation

## RESEARCH PROJECT EXPERIENCE

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**AMAN Performance Evaluation**

December 2017 - November 2019

*Collaboration with Central South Air Traffic Management Bureau, CAAC*

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

- Design and development of a tool for radar data processing 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 ANAN under Continue Descent Operation (CDO). It could receive real-time data from Air Traffic Simulator and make real-time sequencing and scheduling. My work focuses on function 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 algorithms and functions.
  - Algorithms development for sequencing with different objectives. FCFS and GA can be alternatives according to the volume of arrival flights.
  - Support sequencing under different modes of operation and special cases.
- 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++.

## FELLOWSHIPS & AWARDS

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Foundation of Graduate Innovation Center in NUAA	2018
Third-class Scholarship for Graduate Freshmen	2017

## 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.

Zhang, Junfeng, **Pengli Zhao**, Dong Sui and Ximei Dai. “A new meta-heuristic approach for aircraft landing problem” *Transactions of Nanjing University of Aeronautics and Astronautics*, 37(2):197-208, 2020

**Pengli Zhao**, Junfeng Zhang,Songwei Liu,Dong Sui and Rong Hu. “Scheduling landing aircraft with multiple objectives under continuous descent operation” In TRB 2020(**Poster Presentation**)

**Pengli Zhao**, 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.

## 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
<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>	V149 \Q167 \AW2.5

## COURSE TAKEN

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

## PERSONAL TRAITS

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