Keji Wei

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EDUCATION

Dartmouth College, Thayer School of Engineering — *Hanover NH*
Ph.D. in Operations Research — *2014 - 2019*
Co-advisors: Vikrant Vaze, Alexandre Jacquillat (MIT)
- Dissertation: Schedule Planning and Endogeneity of Travelers Decisions in Congested Large-Scale Transportation Networks
- Committee: Vikrant Vaze, Alexandre Jacquillat (MIT), Robert Shumsky (Tuck), Amro Farid

Xi'an Jiaotong University — *Xi'an China*
BEng in Automation with Best Undergraduate Thesis Award — *2007 - 2011*

POSITIONS

Assistant Professor — *Apr 2023 - present*
School of Economics and Management, Tongji University, Shanghai

Research Scientist — *Apr 2022 - Apr 2024*
Civil Flight Services CAE, Irving, TX

Senior Operations Research Engineer — *Sep 2019- Mar 2022*
Sabre Labs & Product Strategy, Southlake, TX

Operations Research Intern — *Summer 2018*
Sabre Airline Solutions, Southlake, TX — 🎓: Xiaodong Luo

TEACHING

01112201: Discrete Mathematics (undergrads) — *Spring 2024, Spring 2025*
School of Economics and Management, Tongji University, Shanghai

SELECTED JOURNAL PUBLICATIONS

IN REVERSE CHRONOLOGICAL ORDER

[1] Navid Rashedi, Nolan Sankey, Vikrant Vaze, and **Wei, Keji**. A machine learning approach for solution space reduction in aircraft disruption recovery. *European Journal of Operational Research*, 323(1):297–308, 2025

[2] **Wei, Keji**, Vikrant Vaze, and Alexandre Jacquillat. Transit planning optimization under ride-hailing competition and traffic congestion. *Transportation Science*, 56(3):725–749, 2022
   - Featured in media *OR/MS Today*.

[3] **Wei, Keji**, Vikrant Vaze, and Alexandre Jacquillat. Airline timetable development and fleet assignment incorporating passenger choice. *Transportation Science*, 54(1):139–163, 2020
   - Winner, AGIFORS Anna Valicek Award for Innovative Research in Airline Operations Research, 2019.

[4] Reed Harder, **Keji Wei**, Vikrant Vaze, and James E. Stahl. Simulation analysis and comparison of point of care testing and central laboratory testing. *MDM Policy & Practice*, 4(1), 2019

[5] **Wei, Keji** and Vikrant Vaze. Modeling crew itineraries and delays in the national air transportation system. *Transportation Science*, 52(5):1276–1296, 2018
   - Second Place Winner, AGIFORS Anna Valicek Award for Innovative Research in Airline Operations Research, 2017.
   - Featured in media like *ScienceDaily*.

[6] Wuhua Hu, Jianfeng Mao, and **Keji Wei**. Energy-efficient rail guided vehicle routing for two-sided loading/unloading automated freight handling system. *European Journal of Operational Research*, 258(3):943 – 957, 2017

WORK IN PROGRESS

- Graph Attention Networks for Efficient Construction of Arc-Based Transportation Network Models with V. Vaze, Major Revision at Transportation Science.
- Airline Fleet Assignment and Timetabling with Context-dependent Choice model with X. Niu, Y.Cao, Work in Progress.
- Bike lanes reduce and equalize urban transport emissions: Evidence from Chicago with L. Liu, X. Niu, J. Zhang, Submitted to Nature Communication.
- Dynamic Discretization Discovery for Large-scale Airline Schedule Design model with R. Ojha1, L.Marshall, Work in Progress.

RESEARCH FUNDING

- NSFC Research Funding (Excellent Young Scientists Overseas), Airline Network Operations Management. (Principal Investigator). Total Amount: RMB. 2025-2029.
- NSFC Research Funding 72301197, *Machine Learning Based Aircraft Recovery Optimization.* (Principal Investigator). Total Amount 300,000 RMB. 2024 - 2026.
- NSFC Research Funding 72231006, *Integrated Aviation Operations Optimization and Innovation.* (Major Participant, Principal Investigator: Zhe Liang). Total Amount 2,000,000 RMB. 2023 - 2027.

HONORS & AWARDS

- Excellent Young Scientists Overseas, NSFC — *Oct 2024*
- Transportation Science Meritorious Service Award, INFORMS — *Oct 2022*
- Shanghai Oversea Talent Program, Shanghai Government — *Nov 2021*
- First Place Best Dissertation Award, Aviation Application Section, INFORMS — *Nov 2020*
- Anna Valicek Silver Medal for Innovative Research in Airline, AGIFORS — *Oct 2019*
- Anna Valicek Bronze Medal for Innovative Research in Airline, AGIFORS — *Oct 2017*
- Neukom Travel Grant, Dartmouth College — *July 2017*

- GSC Conference Travel Grant, Dartmouth College *July 2017*
- XJTU Outstanding Bachelor Thesis (1%), Xian Jiaotong University *July 2011*
- Meritorious Winner, Mathematical Contest in Modeling (10%), *July 2010*
- Outstanding Student (10%), Xian Jiaotong University *July 2009*

CONFERENCE PRESENTATIONS

IN REVERSE CHRONOLOGICAL ORDER

POMS-HK 2025   *Optimizing Food Delivery Services: Reinforcement Learning for Enhanced Efficiency and Equity.* The 15th POMS-HK International Conference. Hong Kong, 01/2025.

AGIFORS 2024   *Airline Fleet Assignment and Timetabling with Context-dependent Choice model.* The 64th AGIFORS Annual Symposium. Cayman, UK, 11/2024.

INFORMS 2024   *Bike Lane Network Expansion: Traffic, Emissions, and Equity Implications.* INFORMS Annual Meeting. Seatle, WA, 10/2024.

ORDS 2024   *Bike Lane Network Expansion: Traffic, Emissions, and Equity Implications.* Chinese Society of Operations Research Data Science and Intelligent Operations 2024 Annual Conference. Beijing, 09/2024.

CTS 2024   *Bike Lane Network Expansion: Traffic, Emissions, and Equity Implications.* The 15th Workshop on Computational Transportation Science. Chengdu, 06/2024.

ITSO 2024   *Revolutionizing Aircraft Recovery: Graph Attention Networks for Efficient Transportation Network Modeling & Supervised Machine Learning Approach for Solution Space Reduction.* The 1th Workshop on Integrated Transport System Operation. Nanjing, 03/2024.

POMS-HK 2024   *Efficient Construction of Arc-Based Transportation Network Models using Graph Attention Networks.* The 14th POMS-HK International Conference. Hong Kong, 01/2024.

ATRS 2023   *Efficient Construction of Arc-Based Transportation Network Models using Graph Attention Networks.* The 5th Workshop on Transportation Research. Beijing, 11/2023.

CTS 2023   *Graph Attention Networks for Efficient Construction of Arc-Based Transportation Network Models.* The 14th Workshop on Computational Transportation Science. Shanghai, 09/2023.

AGIFORSOps 2022   *Machine Learning in Aircraft Recovery Problem with Dependent Connection Time.* Virtual AGIFORS Airline Operations & Aircraft Maintenance Conference. 05/2022.

INFORMS 2021   *Learning to Handling Connection based Turn Time in Flight Schedule Recovery Problem.* Virtual INFORMS Annual Meeting. 11/2021.

INFORMS 2019   *Optimal Transit Planning: Interactions with Ridehailing, Congestion and Passenger Choice.* INFORMS Annual Meeting. Seattle, WA, 11/2019.

INFORMS 2018   *Airline Timetable Development And Fleet Assignment Incorporating Passenger Choice.* INFORMS Annual Meeting. Phoenix, AZ, 11/2018.

INFORMS 2017   *Modeling and Quantifying Crew Itineraries and Delays.* INFORMS Annual Meeting. Houston, TX, 10/2017.

INFORMS 2017   *Integrated Timetable Development and Fleet Assignment Model Incorporating Passenger Choice.* INFORMS Annual Meeting. Houston, TX, 10/2017.

TSL 2017   *Airline Timetable Development and Fleet Assignment.* INFORMS Transportation and Logistics Society Conference. Chicago, IL, 07/2017.

INFORMS 2016   *Modeling and Understanding Crew Itineraries and Delays under Uncertainty.* INFORMS Annual Meeting. Nashville, TN, 11/2016.

INFORMS 2015   *Quantifying Delay Propagation Through Crew Connections.* INFORMS Annual Meeting. Philadelphia, PA, 11/2015.

CASE 2013   *Energy-efficient Dispatching Solution in an Automated Air Cargo Terminal.* IEEE International Conference on Automation Science and Engineering. Madison, WI, 07/2013.

INVITED TALKS

NUAA 2024   *Revolutionizing Aircraft Recovery: Graph Attention Networks for Efficient Transportation Network Modeling & Supervised Machine Learning Approach for Solution Space Reduction.* Internal seminar. Nanjing, China, 04/2024.

HKPolyU 2024   *Revolutionizing Aircraft Recovery: Graph Attention Networks for Efficient Transportation Network Modeling & Supervised Machine Learning Approach for Solution Space Reduction.* AAE Research seminar. Hong Kong, China, 01/2024.

SRIBD 2023   *Stochastic Nested Sales-Based Linear Program for Network Revenue Management Under Customer Choice.* Internal seminar. Shenzhen, China, 11/2023.

UT Arlington 2023   *Graph Attention Networks for Constructing Arc-Pair Dependent Connections Transportation Model.* Internal seminar. Arlington, TX, 01/2023.

Texas A&M 2022   *Model and Algorithmsfor Airline Planning- The case for Crew Pairing and Timetabling.* ETID seminar. College Station, TX, 09/2022.

SUFE 2020   *Planning and Endogeneity of Travelers Decisions in Congested Large-Scale Transportation Network.* Weekly Seminar. Virtually, 12/2020.

INFORMS 2020   *Schedule Planning and Endogeneity of Travelers Decisions in Congested Large-Scale Transportation Networks.* Virtual INFORMS Annual Meeting. 11/2020.

TSINGHUA 2019   *Modeling Crew Itineraries and Delayss in the National Air Transportation System.* Weekly Seminar. Beijing, CHN, 12/2019.

AGIFORS 2019   *Airline Timetable Development and Fleet Assignment Incorporating Passenger Choice.* The 59th AGIFORS Annual Symposium. Seatle, WA, 10/2019.

SABRE 2018   *Large Scale Fleet Assignment with Infeasibility Finder.* Sabre Airline Solutions. Dallas, TX, 08/2018.

AGIFORS 2017   *Modeling Crew Itineraries and Delays in the National Air Transportation System.* The 57th AGIFORS Annual Symposium. London, UK, 10/2017.

SKILLS

Languages	Chinese Mandarin (Native), English (Full Professional Proficiency)
Office Software	Git, Linux, CPLEX, LaTex, Vim

RELEVANT COURSEWORK

Core Courses	**Other Courses**
Foundation of Biostatistics I	Communicating Science
Optimization Methods for Engineering Applications	Modern Control Theory
Machine Learning and Statistical Data Analysis	Decision-Making under Risk and Uncertainty
Statistical Methods in Engineering	Advanced Topics in Machine Learning (*Audit*)
Operations Research	Workshop: Grammar in Academic Writing
Topics in Probability: Game Theory	Convex Optimization (*Audit*)
Probability Theory and Stochastic Processes	Java Programming
Data Structures and Algorithms	Mathematical Modeling
Discrete Mathematics	Databases
System Engineering	Object Oriented Programming

PROFESSIONAL EXPERIENCE

IN REVERSE CHRONOLOGICAL ORDER

Senior Operations Research Engineer, Civil Flight Services, CAE   *Apr 2022 - Present*
Airline Aircraft Recovery Module (RMOPS)   🎓: Norbert Lingaya

- Delivery Aircraft recovery product to multiple airline in the world.

- Lead a operations research team in design, development and maintenance of decision support systems.
- Cooperate with sales, product and delivery team to support airline recovery product regularly.

Senior Operations Research Engineer, Sabre Labs & Product Strategy *Sep 2019 - Mar 2022*
Airline Aircraft Recovery Module (RMOPS) 🎓: Sureshan Karichery

- Designed and implemented the operations research and machine learning techniques to improve the solution quality to serve more than +20 airlines in the world.

Airline Passenger Recovery Module (Reaccomm) 🎓: Sureshan Karichery

- Implement multiple constraints (Same Flight, Similar Flight and Max Co-terminal) to migrate schedule change product based on Passenger Recovery Product.

Research Assistant, Dartmouth College *Aug 2018 - Aug 2019*
Performance Improvement of Crew Trip (Pairing) 🎓: Vikrant Vaze, Sujayandra Vaddagiri
Optimization for Airlines

- Designed a novelty solution approach to solve 1- month crew pairing problem (*14,888* Flights) in *85* mins with *0.06%* optimally gap.
- Implemented and tested the solution approach in Java with Cplex solver
- Cooperated with *Laminaar Aviation InfoTech* to disucss project details, wrote mid-term and final reports, delivered code and algorithm details.

Operations Research Intern, Sabre Airline Solutions *May 2018 - Aug 2018*
Large Scale Fleet Assignment with Infeasibility Finder 🎓: Xiaodong Luo

- Designed and implemented the operations research techniques to improve the solution quality and solution time of Sabre's flagship fleet assignment module (*34,651* Flights)
- Addressed numerical difficulties in Cplex which cann't be solved before
- Productized the Fleet Assignment module in Java for Alaska Airline

Research Assistant, Dartmouth College *Sep 2014 - Dec 2016*
Analyzing Flight Delay Propagation due to Crew Scheduling Constraints 🎓: Vikrant Vaze

- Selected the factors that influence the extent of crew propagated delays and disruptions and incorporate these factors into a robust crew scheduling model.
- Built learning hyper-models to generate crew pairings that are similar to those in the real world crew pairing samples.
- Presented the general approach to estimate crew-related delays and disruptions for any given network under a variety of data availability scenarios.
- Tested results to demonstrate the accuracy and stability of proposed modeling framework and algorithms.

Project Officer, Nanyang Technological University *Aug 2012 - July 2013*
Energy-efficient Rail Guided Vehicle Routing 🎓: Jianfeng Mao, Wuhua Hu

- An MILP model for the RGV dispatching problem in an arbitrary static scenario
- Investigation of the effect of using differently capacited RGV and meanwhile show the computational complexity

PROFESSIONAL AND LEADERSHIP ACTIVITIES

INFORMS, AVIATION APPLICATIONS SECTION
- Chair and Member of the Best Student Presentation Competition Committee, 2021,2022
- Cluster Chair, 2021
- Session Chair, 2016-present

Air Transport Research Society China Chapter
- Liaison Committee Tongji University, 2023 - 2026

International Workshop on Computational Transportation Science,
- Session Chair, 2024

Reviewer Ad hoc referee for *Transportation Science,Transportation Research B and C, Computers & Industrial Engineering, Omega, OR Spectrum, Journal of Big Data Analytics in Transportation, Journal of Transportation Engineering and Information*, AGIFORS Anna Valicek Award (2022 - 2024),

Membership: Institute for Operations Research and the Management Sciences (INFORMS), Airline Group of the Int. Fed. of Operational Research Societies (AGIFORS)

MEDIA COVERAGE

- "*Dartmouth Engineering Study Shows Machine Learning Can Help Airlines Recover Faster After Disruptions*", Dartmouth College, Dec 15, 2024.
- "*Optimizing transportation scheduling for a win, win, win situation for all*", ORMS Today, May 21, 2021.
- "*Research Shows Millions of Dollars Saved Daily When Transit Schedules Align with Commuter Preferences*", Dartmouth College, JUL 20, 2021.
- "*Featured Article*", AAS Newsletter, MAY 2021.
- "*Dartmouth Receives Eight 2020 CASE Awards*", Dartmouth News, JAN 2021.
- "*Flying In The Face of Danger Keji Wei Th'19 is re-designing the technology of Airline travel*", Dartmouth Engineer Magazine, Summer 2020.
- "*No flights when you want them? Throw some math at the problem!*", ConcordMonitor, FEB 03, 2020.
- "*Thayer Engineers and MIT Create New Airline Scheduling Tools*", Dartmouth College, JAN 24, 2020.
- "*Xi'an Jiaotong University Alumni Honored with Airline Research Award*", Xi'an Jiaotong University, OCT 18, 2019.
- "*Dartmouth Engineering Student Honored with Airline Research Award*", Dartmouth College, OCT 4, 2019.
- "*Engineering PhD Student Wins Anna Valicek Bronze Medal*", Dartmouth College, JAN 17, 2018.
- "*Airlines and Passengers Save Billions through Crew Planning*", ScienceDaily, JUN 6, 2018 .

PH.D. STUDENTS

- Xiaoyun Niu, Tongji University, Management Science and Engineering. *Oct 2023-*
  2024 KEN WANG SCHOLARS, AGIFORS

MASTERS STUDENTS

- Binbin Chen, Tongji University, Management Science and Engineering. *June 2023-*
- Shizhe Wang, Tongji University, Management Science and Engineering. *Sept 2024-*
- Yiheng Kang, Tongji University, Management Science and Engineering. *Sept 2024-*

PERSONAL

Citizenship: Chinese
Interests: Tennis, Frisbee, Ski, Swimming, History

EXTRACURRICULAR ACTIVITIES

Upper Valley Frisbee League, NH   *May 2015 - 2019*
Frisbee training twice a week and play summer league (3rd in 6 teams)
After School Science & Engineering, Lyme, NH   *May 2016 - 2019*
Help lead fun, hands-on science activities with elementary school students
Dartmouth Admissions Ambassador Program, Dallas, TX   *Nov 2019 - Present*
The primary responsibility is as an interviewer to communicate with applicants, and Dartmouth.