Peng Wei

Assistant Professor
Black and Veatch Faculty Fellow
Department of Aerospace Engineering
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Affiliations	FAA Center of Excellence for General Aviation (PEGASAS) Virtual Reality Applications Center (VRAC) - Human Computer Interaction

EDUCATION

Purdue University, West Lafayette, Indiana
Ph.D. in Aerospace Engineering, May 2013
Dissertation title: *Maximizing algebraic connectivity in air transportation networks*

Stony Brook University, Stony Brook, New York
M.S. in Electrical and Computer Engineering, August 2009

Tsinghua University, Beijing, China
B.S. in Information Science and Control Theory, July 2007

AWARDS

Best Paper Award, IEEE/CSAA Guidance, Navigation and Control Conference (GNCC)	2018
Best Paper Award, International Conference for Research in Air Transportation (ICRAT)	2018
Black and Veatch Faculty Fellow at Iowa State University College of Engineering	2017
Purdue College of Engineering Outstanding Research Award	2013

RESEARCH INTERESTS

By contributing to the intersection of control, optimization, machine learning, and artificial intelligence, I develop autonomy and human-in-the-loop decision making systems for aeronautics, aviation and aerial robotics. My current focus is on safety, efficiency, and scalability for decision making in uncertain and dynamic environments. Recent applications include: Air Traffic Control/Management (ATC/M), Airline Operations, UAS Traffic Management (UTM), eVTOL Urban Air Mobility (UAM) and Autonomous Drone Racing (ADR).

ACADEMIC EXPERIENCE

Assistant Professor, Department of Aerospace Engineering, Iowa State University — Jan. 2015 - Onward

Research Assistant, School of Aeronautics and Astronautics, Purdue University — Jan. 2010 - May 2013

MAJOR PROJECTS

Principal Investigator, *Intelligent Low-Altitude Air Traffic Management System* — Aug. 2017 - Onward
Budget to date: ~$1M.
The objective of this **NSF** project is to develop a system prototype to support the increasing autonomy in low-altitude

airspace among other manned/unmanned air traffic. This project explores novel strategies of coordinating and managing the air traffic to ensure low-altitude airspace safety and efficiency in near future.

Principal Investigator, *Urban Air Mobility* June. 2017 - Onward
Budget to date: ∼$133K.
In order to enable on demand air transportation in an urban setting, we have been working with **Airbus** teams on new concept of operations, modeling and simulation, and algorithm design and analysis to provide safe, efficient, sustainable and intelligent solutions for urban air operations..

Principal Investigator, *Aviation Weather Impact on Flight Operations* Nov. 2015 - Oct. 2017
Budget to date: ∼ $65K.
We have been working with **Rockwell Collins** Advanced Technology Center to study the flight en route time variation under different convective weather events. Machine learning algorithms are being developed and analyzed by mining the large-scale nationwide flight data sets (AOTP) and meteorology data sets (ASOS, HRRR, NEXRAD). The resulted predictive model is expected to provide estimation for aircraft en route time before departure given weather forecast, which is critical for decision makings in both airline operations and air traffic management.

Principal Investigator, *Towards an Intelligent Low-Altitude UAS Traffic Management System* Sept. 2016 - Onward
Budget to date: ∼ $175K.
This **NSF** Cyber-Physical Systems (CPS) project focuses on establishing the framework and core algorithms for UAS traffic coordination and management to enable autonomous operations in low-altitude airspace.

Principal Investigator, *Passenger Direct Share Forecast* May 2017 - Onward
Budget to date: ∼ $30K.
The objective of this **FAA** project is to build machine learning based predictive models to forecast the direct passenger ratios for all the origin-destination airport pairs in the United States. The result is a macro-level indicator of passenger's trip itinerary preference. More importantly, the newly developed model is expected to replace the current FAA forecasting model.

INDUSTRY EXPERIENCE

Operations Research Analyst, Operations Research Division, American Airlines June 2013 - Dec. 2014

Research Intern, Aviation Systems Division, NASA Ames Research Center May 2012 - Aug. 2012

Research Intern, Air Traffic Management Division, Intelligent Automation Inc. May 2011 - Aug. 2011

TEACHING EXPERIENCE

AERE 504 Fall 2017-2019
Intelligent Air Transportation Systems (Reinforcement Learning and Autonomy)

AERE 574 Spring 2019
Optimal Control

AERE 563 Spring 2015-2016
Introduction to Multidisciplinary Design Optimization (MDO)

AERE 461 Fall 2015-2016, 2018
Modern Design Methodology with Aerospace Applications (Aircraft Design I)

AERE 462 Spring 2017, 2019
Design of Aerospace Systems (Aircraft Design II)

AERE 362 Spring 2018
Aerospace Systems Integration

PAST RESEARCH SUPERVISION

Past Ph.D. students

Guodong Zhu, Aerospace Engineering 2019
Ph.D. dissertation title: *Decision Making under Uncertainties for Air Traffic Flow Management*

Priyank Pradeep, Aerospace Engineering 2019
Ph.D. dissertation title: *Arrival Management for eVTOL Aircraft in On-Demand Urban Air Mobility*

Past M.S. students

Mohammad Anwar Manjanoor, Electrical and Computer Engineering 2019
M.S. project title: *Autonomous Drone Racing Platform*

Daniel Zhou, Aerospace Engineering 2019
M.S. thesis title: *Airline Fleet Planning and Utilization Hours Comparison Studies*

Imke Kleinbekman, Aerospace Engineering 2019
M.S. thesis title: *eVTOL Arrival Sequencing and Scheduling for On-Demand Urban Air Mobility*

Abdullah Alnaqeb, Aerospace Engineering 2017
M.S. thesis title: *Online Prediction of Battery Discharge and Flight Mission Assessment for Electrical Rotorcraft*

CURRENT RESEARCH SUPERVISION

Xufang Zheng, Ph.D. candidate
Syed Shihab, Ph.D. candidate (co-advise with Christina Bloebaum)
Xuxi Yang, Ph.D. candidate
Marc Brittain, Ph.D. candidate
Josh Bertram, Graduate student (electrical and computer engineering)

ACADEMIC SERVICE

Service to the College of Engineering

Faculty Advisor for Iowa State AIAA DBF Team	2016 - 2019
Faculty Advisor for Iowa State Drone Racing Club	2017 - 2019
Faculty Advisor for AirOne Club	2018
Faculty Advisor for CyNest Club	2015 - 2017
Faculty Advisor for ISUAV Club	2015 - 2016

Service to the Aerospace Engineering Department

Department Chair Search Committee	2018
Faculty Search Committee for Dynamics and Control	2017-2018
Faculty Search Committee for Intelligent Systems	2015-2016
Curriculum Committee	2017 - 2019
Academic Standards Committee	2015 - 2019
Faculty Advisor for ISU Airbus Fly Your Ideas	2017
Faculty Advisor for ISU Airbus Innovation Showdown	2016

PROFESSIONAL AFFILIATIONS

American Institute of Aeronautics and Astronautics (AIAA), Senior Member
Institute of Electrical and Electronic Engineers (IEEE), Member
Institute for Operations Research and the Management Sciences (INFORMS), Member

PROFESSIONAL SERVICE

Advisory Board/Group

Member, Advisory Board for A^3 by Airbus	2017 - 2019
Member, Working Group for NASA UAS Traffic Management (UTM)	2016 - 2018
Member, Advisory Group for NASA Prognostics As A Service (PaaS)	2018

Technical and Program Committees

Member, AIAA Air Transportation Systems Technical Committee	2016 - present
Member, TRB Standing Committee on Airfield and Airspace Capacity and Delay - AV060	2016 - 2019

Panels

Panelist, "UAS Traffic Management", AIAA Aviation, Demand for Unmanned Symposium, Washington D.C., June, 2016

Conference Organizer

Program Co-Chair 2018 - 2019
"Air Traffic Operations, Management, and Systems"
AIAA Aviation, Dallas, TX

Conference Session Organizer

Session Chair Nov. 2018
"Urban Air Mobility"
INFORMS Annual Meeting, Phoenix, AZ

Session Chair June 2018
"UAS in the NAS"
AIAA Aviation, Atlanta, GA

Session Chair June 2018
"ATM/ATC/NEXTGEN"
AIAA Aviation, Atlanta, GA

Committee Chair Oct. 2017
"INFORMS Aviation Applications Section (AAS) Best Student Presentation Competition"
INFORMS Annual Meeting, Houston, TX

Session Chair June 2017
"UAS Traffic Management"
AIAA Aviation, Denver, CO

Session Chair Nov. 2016
"UAS Traffic Management and Low-altitude Airspace Operations"
INFORMS Annual Meeting, Nashville, TN

Session Chair Nov. 2016
"Air Traffic Management and Airline Operations"
INFORMS Annual Meeting, Nashville, TN

Session Chair Nov. 2015
"Air Traffic Management and Airline Operations"
INFORMS Annual Meeting, Philadelphia, PA

Session Chair Dec. 2011
"Aerospace IV"
IEEE Conference on Decision and Control and European Control Conference, Orlando, FL

Session Chair Nov. 2011
"Transportation Science and Logistics"
INFORMS Annual Meeting, Charlotte, NC

Reviewer Activities

- *Editorial board*
  - Associate Editor for AIAA Journal of Aerospace Information Systems 2018-present

- *Book reviewer*
  - AIAA, "Aircraft Design: A Conceptual Approach, Sixth Edition" 2018
  - Elsevier, "Air Transport and Tourism" 2016

- *Journal referee*
  - AIAA Journal of Aerospace Information Systems 2017-2019
  - AIAA Journal of Air Transportation 2017-2019
  - AIAA Journal on Guidance, Control and Dynamics 2010-2012, 2016-2019
  - IEEE Transactions on Aerospace and Electronic Systems 2019
  - IEEE Transactions on Intelligent Transportation Systems 2010, 2014-2019
  - Transportation Research Part B 2011-2019
  - Transportation Research Part C 2015-2019
  - Journal of Aerospace Engineering Part G 2018
  - Journal of Optimization Theory and Applications 2017

- *Conference referee*
  - AIAA Aviation 2015-2018
  - AIAA Conference on Guidance, Control and Dynamics 2011-2013
  - SESAR Innovation Days 2017-2019
  - American Control Conference (ACC) 2011-2013
  - IEEE Conference on Decision and Control (CDC) 2010-2014
  - IEEE International Conference on Intelligent Transportation Systems 2018
  - Transportation Research Board (TRB) Annual Meeting 2016-2019

- *Other*
  - INFORMS Aviation Applications Section (AAS) Best Ph.D. Dissertation Award 2017

- *Thesis committee member (outside of my own graduate students)*
  - Iowa State University, over 35 PhD and MS students 2015 - present

PUBLICATIONS

Journal Publications

Published, in press, accepted

1. P. Pradeep and **P. Wei**, "Energy Efficient Arrival with RTA Constraint for Multirotor eVTOL in Urban Air Mobility", *AIAA Journal of Aerospace Information Systems*, accepted, 2019.
2. C. Yang, J. Mao, X. Qian, and **P. Wei**, "Designing Robust Air Transportation Network via Minimizing Total Effective Resistance", *IEEE Transactions on Intelligent Transportation Systems*, accepted, 2018.
3. C. Yang, J. Mao, and **P. Wei**, "Air Traffic Network Optimization via Laplacian Energy Maximization", *Aerospace Science and Technology*, vol.49, pp.26-33, 2016.
4. L. Du, S. Peeta, **P. Wei**, and D. Sun, "A Quantitative and Systematic Methodology to Investigate Energy Consumption Issues in Multimodal Intercity Transportation Systems", *International Journal of Transportation Science and Technology*, vol.4, no.3, pp.229-256, December 2015.
5. **P. Wei**, G. Spiers, and D. Sun, "Algebraic Connectivity Maximization for Air Transportation Networks", *IEEE Transactions on Intelligent Transportation Systems*, vol.15, no.2, pp.685-698, Apr. 2014.
6. **P. Wei**, L. Chen, and D. Sun, "Algebraic Connectivity Maximization of an Air Transportation Network: The Flight Routes' Addition/Deletion Problem", *Transportation Research Part E*, vol.61, pp.13-27, Jan. 2014.
7. H. Nagarajan, **P. Wei**, S. Rathinam and D. Sun, "Heuristics for Synthesizing Robust Networks with a Diameter Constraint", *Mathematical Problems in Engineering*, Volume 2014, Article ID 326963, 11 pages, 2014.
8. **P. Wei**, T. Kim, S. Han, S. Landry, D. Sun, and D. DeLaurentis, "Optimal Metroplex Routing Paradigm and its Performance Analysis", *AIAA Journal of Guidance, Control, and Dynamics*, vol.36, no.4, pp.1221-1225, 2013.
9. **P. Wei**, Y. Cao, and D. Sun, "Total Unimodularity and Decomposition Method for Large-Scale Air Traffic Cell Transmission Model", *Transportation Research Part B*, vol.53, pp.1-16, July 2013.
10. S. Chu, **P. Wei**, X. Zhong, X. Wang and Y. Zhou, "Deployment of a Connected Reinforced Backbone Network with a Limited Number of Backbone Nodes", *IEEE Transactions on Mobile Computing*, vol.12, issue 6, pp.1188-1200, 2012.

Conference Publications

Published, in press, accepted

1. M. Brittain and **P. Wei**, "Autonomous Air Traffic Control: A Deep Multi-Agent Reinforcement Learning Approach", Workshop on Reinforcement Learning for Real Life, International Conference on Machine Learning (ICML), Long Beach, CA, June 2019.
2. S.A.M Shihab, C. Logemann, D.G Thomas, and **P. Wei**, "Autonomous Airline Revenue Management: A Deep Reinforcement Learning Approach to Seat Inventory Control and Overbooking", Workshop on Reinforcement Learning for Real Life, International Conference on Machine Learning (ICML), Long Beach, CA, June 2019.
3. J. Bertram, X. Yang and **P. Wei**, "Online Flight Planner with Dynamic Obstacles for Urban Air Mobility", AIAA Aviation, Dallas, TX, June 2019.
4. G. Zhu and **P. Wei**, "Pre-Departure Flight Planning for Urban Air Mobility Flights with Dynamic Aerospace Reservation", AIAA Aviation, Dallas, TX, June 2019.
5. X. Yang and **P. Wei**, "Multi-Agent Autonomous On-Demand Free Flight Operations in Urban Air Mobility using Monte Carlo Tree Search", AIAA Aviation, Dallas, TX, June 2019.
6. X. Zheng and **P. Wei**, "Air Transportation Direct Share Time Series Analysis and Forecast", AIAA Aviation, Dallas, TX, June 2019.
7. S.A.M. Shihab, **P. Wei**, D. Jurado, R.M. Arango and C. Bloebaum, "By Schedule or On Demand? - A Hybrid Operation Concept for Urban Air Mobility", AIAA Aviation, Dallas, TX, June 2019.

8. S.A.M. Shihab, **P. Wei** and C. Bloebaum, "A Data-Driven Decision Making Framework for Value-Based Engineering Design of Complex Network Systems", AIAA Aviation, Dallas, TX, June 2019.

9. G. Hunter and **P. Wei**, "Service-Oriented Separation Assurance for Small UAS Traffic Management", Integrated Communication, Navigation and Surveillance technologies (ICNS) Conference, Herndon, VA, Apr. 2019.

10. N. Polaczyk, E. Trombino, **P. Wei** and M. Mitici, "A Review of Current Technology and Research in Urban On-Demand Air Mobility Applications", 8th Biennial Autonomous VTOL Technical Meeting & 6th Annual Electric VTOL Symposium, Mesa, AZ, Jan. 2019.

11. G. Zhu, **P. Wei**, R. Hoffman, and B. Hackney, "Risk-hedged Multistage Stochastic Programming Model for Setting Flow Rates in Collaborative Trajectory Options Programs (CTOP)", AIAA SciTech, San Diego, CA, Jan. 2019.

12. G. Zhu, **P. Wei**, R. Hoffman, and B. Hackney, "Saturation Technique for Optimizing Planned Acceptance Rates in Traffic Management Initiatives", IEEE International Conference on Intelligent Transportation Systems, Maui, Hawaii, Nov. 2018.

13. P. Pradeep and **P. Wei**, "Heuristic Approach for Arrival Sequencing and Scheduling for eVTOL Aircraft in On-Demand Urban Operations", AIAA/IEEE Digital Avionics Systems Conference (DASC), London, England, UK, Sept. 2018.

14. I.C. Kleinbekman, M. Mitici and **P. Wei**, "eVTOL Arrival Sequencing and Scheduling for On-Demand Urban Air Mobility", AIAA/IEEE Digital Avionics Systems Conference (DASC), London, England, UK, Sept. 2018.

15. G. Zhu, **P. Wei**, R. Hoffman, and B. Hackney, "Centralized Disaggregate Stochastic Allocation Models for Collaborative Trajectory Options Program (CTOP)", AIAA/IEEE Digital Avionics Systems Conference (DASC), London, England, UK, Sept. 2018.

16. P. Pradeep and **P. Wei**, "Energy Optimal Speed Profile for Arrival of Tandem Tilt-Wing eVTOL Aircraft with RTA Constraint", IEEE/CSAA Guidance, Navigation and Control Conference (GNCC), Xiamen, China, Aug. 2018.

17. M. Brittain and **P. Wei**, "Towards Autonomous Air Traffic Control for Sequencing and Separation - A Deep Reinforcement Learning Approach", AIAA Aviation, Atlanta, GA, June 2018.

18. G. Zhu and **P. Wei**, "An Interval-based TOS Allocation Model for Collaborative Trajectory Options Program (CTOP)", AIAA Aviation, Atlanta, GA, June 2018.

19. R. Hoffman, B. Hackney, G. Zhu and **P. Wei**, "Enhanced Stochastic Optimization Model (ESOM) for Setting Flow Rates in Collaborative Trajectory Options Programs (CTOP)", AIAA Aviation, Atlanta, GA, June 2018.

20. G. Zhu, C. Matthews, **P. Wei**, M. Lorch, and S. Chakravarty, "En Route Flight Time Prediction Under Convective Weather Events", AIAA Aviation, Atlanta, GA, June 2018.

21. M. Brittain and **P. Wei**, "Autonomous Aircraft Sequencing and Separation with Hierarchical Deep Reinforcement Learning", International Conference on Research in Air Transportation (ICRAT), Barcelona, Spain, June 2018.

22. G. Zhu, **P. Wei**, R. Hoffman, and B. Hackney, "Aggregate Multi-commodity Stochastic Models for Collaborative Trajectory Options Program (CTOP)", International Conference on Research in Air Transportation (ICRAT), Barcelona, Spain, June 2018.

23. X. Yang and **P. Wei**, "Autonomous On-Demand Free Flight Operations in Urban Air Mobility using Monte Carlo Tree Search", International Conference on Research in Air Transportation (ICRAT), Barcelona, Spain, June 2018.

24. P. Pradeep, S.G. Park and **P. Wei**, "Trajectory Optimization of Multirotor Agricultural UAVs", IEEE Aerospace Conference, Big Sky, MT, Mar. 2018.

25. P. Pradeep and **P. Wei**, "Energy Efficient Arrival with RTA Constraint for Urban eVTOL Operations", AIAA SciTech, Kissimmee, FL, Jan. 2018.

26. A. Alnaqeb, Y. Li, Y.H. Lui, P. Pradeep, J. Wallin, C. Hu, S. Hu, and **P. Wei**, "Online Prediction of Battery Discharge and Flight Mission Assessment For Electrical Rotorcraft", AIAA SciTech, Kissimmee, FL, Jan. 2018.

27. P. Pradeep and **P. Wei**, "Predictability, Variability and Operational Feasibility Aspect of CDA", IEEE Aerospace Conference, Big Sky, MT, Mar. 2017.

28. G. Zhu, and **P. Wei**, "Low-Altitude UAS Traffic Coordination with Dynamic Geofencing", AIAA Aviation, Washington DC, June 2016.

29. L. Du, S. Peeta, **P. Wei**, and D. Sun, "A Quantitative and Systematic Methodology to Investigate Energy Consumption in Multimodal Transportation Systems", Transportation Research Board 93rd Annual Meeting, Jan. 2014.

30. **P. Wei**, B. Sridhar, N. Chen, and D. Sun, "Vertical Grid Shifting Approach to the Development of Contrail Reduction Strategies with Sector Capacity Constraints", AIAA Conference on Guidance, Navigation and Control, Boston, MA, Aug. 2013.

31. J. Ponton, **P. Wei**, and D. Sun, "Weighted clustering coefficient maximization in the Air Transportation Network", European Control Conference, Zurich, Switzerland, July 2013.

32. **P. Wei**, Q. Gu, and D. Sun, "Wireless sensor network data collection by connected cooperative UAVs", American Control Conference, Washington DC, June 2013.

33. C. Surakitbanharn, **P. Wei**, S. Landry, and D. Sun, "Evaluation of Stream Air Traffic Operations by Adapting Dynamic Density Complexity Measure", 12th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference, Indianapolis, IN, Sept. 2012.

34. G. Spiers, **P. Wei**, and D. Sun, "Algebraic Connectivity Optimization of Large Scale and Directed Air Transportation Network", 13th IFAC Symposium on Control in Transportation Systems, Sofia, Bulgaria, Sept. 2012.

35. **P. Wei**, B. Sridhar, N. Chen and D. Sun, "A Linear Programming Approach to the Development of Contrail Reduction Strategies Satisfying Operationally Feasible Constraints", AIAA Conference on Guidance, Navigation and Control, Minneapolis, MN, Aug. 2012.

36. G. Spiers, **P. Wei** and D. Sun, "Algebraic Connectivity Optimization of the Air Transportation Network", American Control Conference, Montreal, Canada, June 2012.

37. **P. Wei**, T. Kim, S. Landry, D. Sun and D. DeLaurentis, "An Optimal Routing Paradigm For Flexible Flights", American Control Conference, Montreal, Canada, June 2012.

38. **P. Wei**, A. Meksoub and D. Sun, "Optimal Sequential Backward Flow Saturation For Cell Transmission Model", American Control Conference, Montreal, Canada, June 2012.

39. H. Nagarajan, **P. Wei**, S. Rathinam and D. Sun, "Air transportation network robustness optimization under limited legs itinerary constraint", the 5th International Conference on Research in Air Transportation (ICRAT 2012), Berkeley, CA, May 2012.

40. **P. Wei**, C. Surakitbanharn, S. Landry and D. Sun, "Workload Comparison Between Sectorized Air Traffic Control and Stream Management", Integrated Communications, Navigation, and Surveillance (ICNS) Conference, Herndon, VA, Apr. 2012.

41. **P. Wei** and D. Sun, "Total Unimodularity and Degeneracy-Aware Dantzig-Wolfe Decomposition for Large-Capacity Cell Transmission Model", the 50th IEEE Conference on Decision and Control and European Control Conference, Orlando, FL, Dec. 2011.

42. **P. Wei** and D. Sun, "Weighted Algebraic Connectivity: An Application to Air Transportation Network", 18th IFAC World Congress 2011, Milan, Italy, Aug. 2011.

43. **P. Wei**, J. Chen, D. Andrisani and D. Sun, "Routing Flexible Traffic into Metroplex", AIAA Conference on Guidance, Navigation and Control, Portland, OR, Aug. 2011.

44. **P. Wei**, S. Chu, X. Wang and Y. Zhou, "Deployment of a Reinforcement Backbone Network with Constraints of Connection and Resources", IEEE International Conference on Distributed Computing Systems, Genoa, Italy, June 2010.

Technical Reports

1. X. Yang, G. Zhu and P. Wei, "Flight Planning, Trajectory Prediction and Collision Resolution for Urban Air Mobility Operations", A^3 by Airbus, 2018.

2. G. Zhu and P. Wei, "En Route Flight Time Prediction Under Convective Weather Events", Rockwell Collins, 2017.

Doctoral Thesis

- P. Wei, "*Maximizing algebraic connectivity in air transportation networks*", Ph.D. dissertation, School of Aeronautics and Astronautics, Purdue University, May 2013.

RESEARCH GRANTS

Grants and donations obtained as a sole PI

1. *Amazon AWS Research Credits*, FY 19-20 $2.4K
   Project title: "Advancements for Priority Experience Replay"

2. *NVIDIA GPU Grant*, FY 18-19 $1.5K
   Project title: "Hierarchical Deep Reinforcement Learning for Autonomous Air Traffic Control"

3. *Airbus* A^3, FY 17-18 $133K
   Project title: "Altiscope"

4. *Rockwell Collins*, FY 16-17 $65K
   Project title: "Convective Weather Impact on Flight En Route Time"

5. *National Science Foundation*, FY 16-18 $175K
   Project title: "Towards an Intelligent Low-Altitude UAS Traffic Management System"

6. *Federal Aviation Administration*, FY 17-18 $30K
   Project title: "Passenger Direct Share Forecast"

Grants obtained as the PI for a multiple investigator grant

1. *National Science Foundation*, FY 17-19 $1M
   Project title: "Intelligent Low-Altitude Air Traffic Management System"
   Co-Investigators: Prof. Kristin Rozier (Iowa State), Prof. Thomas Schnell (University of Iowa), Prof. Ella Atkins (University of Michigan), Dr. George Hunter (Mosaic ATM)

Grants obtained as a co-PI on multiple investigator grants

1. *National Science Foundation*, FY 17-21 $2.4M
   Project title: "Cyber-based Decision Support Strategies to Achieve Consensus for FEW System Sustainability using Incentive and Policy Structures"
   Co-investigators: Prof. Christina Bloebaum, PI (Iowa State), Prof. James Oliver (Iowa State), Prof. Clark Wolf (Iowa State), Prof. Amy Kaleita (Iowa State), Prof. Ali Abbas (University of Southern California)

2. *Federal Aviation Administration*, FY 16 $46K
   Project title: "Airport Safety Database and Analysis"
   Co-investigators: Prof. Halil Ceylan, PI (Iowa State), Michael Dorneich (Iowa State)