Isaac J. Tetzloff

Curriculum Vitae

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Education

Purdue University – West Lafayette, IN

2010 to Present **Doctor of Philosophy**, Aeronautics and Astronautics
PhD research being completed in absentia, anticipated completion 12/2019
- **Dissertation:** *Formulating an Allocation and Assignment Problem to Evaluate the Fleet-Level Environmental Impact of Aviation*
- **Advisor:** Prof. William A. Crossley
- **Major Area of Study:** Aerospace Systems
- **Minor Areas of Study:** Computational Engineering, Dynamics and Control
- **GPA:** 3.99 / 4.00

2010 to 2013 **Master of Science**, Industrial Engineering
- **Major Area of Study:** Operations Research
- **GPA:** 4.00 / 4.00

2007 to 2010 **Master of Science**, Aeronautics and Astronautics
- **Thesis:** *An Allocation Approach to Investigate New Aircraft Concepts and Technologies on Fleet-Level Metrics*
- **Advisor:** Prof. William A. Crossley
- **Major Area of Study:** Aerospace Systems
- **Minor Areas of Study:** Computational Engineering, Dynamics and Control
- **GPA:** 4.00 / 4.00

Massachusetts Institute of Technology – Cambridge, MA

2003 to 2007 **Bachelor of Science**, Aerospace Engineering with Information Technology
- **Minor:** Spanish
- **GPA:** 4.3 / 5.0

2003 to 2007 **Bachelor of Science**, Management Science
- **GPA:** 4.5 / 5.0

Work Experience

American Airlines – Fort Worth, TX

2015 to Present **Consultant**, Operations Research & Advanced Analytics
- Developed and maintain the optimization engine for Daily Open Time Coverage/Reserve Assignment System (DOTC/RAS), ensuring the optimal solution maintains contractual obligations while optimizing pilot preferences
- Create Tableau dashboards used by multiple airports and business units to provide information about gate changes, spare crew staffing, airport congestion and gate check bags
- Assist in the development of simulation models and analyses for flight dispatchers and terminal bag room operations to perform a variety of what-if scenarios for planning and policy creation
- Perform many ad hoc analyses for a variety of airports and business units ranging from baggage data, flight service delay prediction, turn time analysis, baggage pier assignments, schedule changes, predicted taxi times, and assignment of crews for recurrent training

Research Experience

Purdue University – West Lafayette, IN

2007 to 2015 **Fleet-Level Environmental Impact of New Aircraft Concepts**, School of Aeronautics and Astronautics
- Developed Fleet Level Environment Evaluation Tool (FLEET) to assess the impact of current and future aircraft on fleet-level emissions using mixed integer linear programming based on resource allocation and fleet assignment problems
- Expanded original FLEET model to handle additional airports, aircraft models, airlines and objectives
- Examined impact of future supersonic aircraft on fleet-level emissions and productivity

2012 to 2013 **Impact of Maintenance on Naval Fleet Ownership Cost**, School of Aeronautics and Astronautics
- Developed a total ownership cost model to optimize maintenance and operations of Arleigh Burke-class guided missile destroyers

Teaching Experience

Purdue University – West Lafayette, IN

2013 to 2014 **Instructor**, School of Engineering Education
- Served as instructor for ENGR 132 Transforming Ideas to Innovation II, one of two core courses in Purdue's First Year Engineering Program
- Developed course material and curriculum for solving complex problems from formulation to implementation in a team-based environment using Excel and MATLAB

2008 to 2013 **Graduate Teaching Assistant**, School of Aeronautics and Astronautics
- Created, solved and graded homework, assessments and projects for AAE 550 Multidisciplinary Design Optimization, AAE 551 Design Theory and Methods for Aerospace Systems, and AAE 451 Aircraft Design

Internship Experience

Orbital Sciences Corporation – Dulles, VA

2011 **Systems Engineering Intern**, Cygnus / Commercial Orbital Transportation Services Program
- Performed systems engineering tasks on the Cygnus space vehicle as part of the Commercial Orbital Transportation Services / Commercial Resupply Services (COTS/CRS) Program, including evaluating and implementing a Test Like You Fly philosophy into Cygnus testing procedures

2006 & 2007 **Engineering Intern**, Guidance, Navigation, and Control (GNC) Design and Analysis
- Modeled multiple-flexible-body systems within MATLAB and Simulink for use in future satellite designs
- Developed a software tool using MATLAB and STK/Connect rapid re-planning of a sequence of burns to bring a spacecraft from a geosynchronous transfer orbit to a geostationary orbit

Publications

Journal Articles

[1] Tetzloff, I. J. and Crossley, W. A., "Measuring Systemwide Impacts of New Aircraft on the Environment," *Journal of Aircraft*, Vol. 51, No. 5, Sept. 2014, pp. 1483–1489, doi: `https://doi.org/10.2514/1.C032359`.

Conference Papers

[1] Bairaktarova, D., Pilotte, M., and Tetzloff, I., "Relevance-Based Learning in Students' Early Engineering Education Experience," *2014 IEEE Frontiers in Education Conference (FIE) Proceedings*, IEEE, Madrid, Spain, Oct. 2014, doi: `https://doi.org/10.1109/FIE.2014.7044008`.

[2] Tetzloff, I. J. and Pilotte, M. K., "Learning by Sharing – The Impact of Students Teaching Material to Classmates," *Sixth Annual First Year Engineering Experience Conference (FYEE)*, College Station, TX, Aug. 2014, url: `http://fyee.asee.org/FYEE2014/papers/1008.pdf`.

[3] Tetzloff, I. J. and Crossley, W. A., "Using Allocation / Assignment Problems as Simulation Tools to Investigate Aviation Policies for Environmental Impact," *4th International Engineering Systems Symposium*, CESUN, Hoboken, NJ, June 2014.

[4] Tetzloff, I. J. and Crossley, W. A., "The Environmental Impact of New Aircraft Concepts in a Multi-Airline Network," *AIAA Aviation 2014 | 3AF Aircraft Noise and Emissions Reduction Symposium*, AIAA, Atlanta, GA, June 2014, doi: `https://doi.org/10.2514/6.2014-2878`.

[5] Tetzloff, I. J. and Crossley, W. A., "Incorporating Fleet Assignment with Aircraft Allocation to Measure Fleet-Level Metrics," *AIAA Aviation 2013 | 13th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference*, AIAA, Los Angeles, CA, Aug. 2013, doi: `https://doi.org/10.2514/6.2013-4338`.

[6] Marais, K. B., Rivas, J., Tetzloff, I. J., and Crossley, W. A., "Modeling the Impact of Maintenance on Naval Fleet Total Ownership Cost," *2013 IEEE International Systems Conference (SysCon)*, IEEE, Orlando, FL, April 2013, pp. 801–808, doi: `https://doi.org/10.1109/SysCon.2013.6549975`.

[7] Tetzloff, I. J. and Crossley, W. A., "Measuring System-Wide Impacts of New Aircraft on the Environment," *28th International Congress of the Aeronautical Sciences (ICAS 2012)*, ICAS, Brisbane, Australia, June 2012, pp. 4866–4875, url: `http://www.icas.org/ICAS_ARCHIVE/ICAS2012/PAPERS/110.PDF`.

[8] Tetzloff, I. J. and Crossley, W. A., "Exploring Different Problem Formulations to Evaluate Environmental Impacts of Aviation," *12th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference*, AIAA, Indianapolis, IN, Sept. 2012, doi: `https://doi.org/10.2514/6.2012-5465`.

[9] Tetzloff, I. J. and Crossley, W. A., "Evaluating Market and Environmental Impacts of an N+3 Supersonic Aircraft," *49th AIAA Aerospace Sciences Meeting*, AIAA, Orlando, FL, Jan. 2011, doi: `https://doi.org/10.2514/6.2011-463`.

[10] Tetzloff, I. J. and Crossley, W. A., "Impact of Future Generation Aircraft on Fleet-Level Environmental Emission Metrics," *10th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference*, AIAA, Fort Worth, TX, Sept. 2010, doi: `https://doi.org/10.2514/6.2010-9205`.

[11] Zhao, J., Tetzloff, I. J., et al., "Assessing New Aircraft and Technology Impacts on Fleet-Wide Environmental Metrics including Future Scenarios," *48th AIAA Aerospace Sciences Meeting*, AIAA, Orlando, FL, Jan. 2011, doi: `https://doi.org/10.2514/6.2010-282`.

[12] Tetzloff, I. J. and Crossley, W. A., "An Allocation Approach to Investigate New Aircraft Concepts and Technologies on Fleet-Level Metrics," *9th AIAA Aviation Technology, Integration, and Operations Conference (ATIO) Conference*, Hilton Head, SC, Sept. 2009, doi: `https://doi.org/10.2514/6.2009-6979`.

Technical Presentations

[1] Tetzloff, I. J., "Introducing Crew Watch: From Large-Scale Crew Repair to Daily Ops Management," *2017 AGIFORS Crew Management Study Group*, AGIFORS, Johannesburg, South Africa, May 2017.

[2] Tetzloff, I. J., "Optimizing the Pairing of Reserve Pilots to Open Sequences via Ballots," *2016 AGIFORS Crew Management Study Group*, AGIFORS, Doha, Qatar, May 2016.

[3] Tetzloff, I. J. and Crossley, W. A., "Modeling an Airlines Use of New Concepts Under Environmental Constraints," *INFORMS Annual Meeting*, INFORMS, Minneapolis, MN, Oct. 2013.

[4] Tetzloff, I. J., "The Challenge of Meeting 2050 CO_2 Emission Goals in Aviation," *5th Computational Science and Engineering Student Conference (CSESC)*, SIAM, Purdue Student Chapter, West Lafayette, IN, April 2013.

[5] Tetzloff, I. J. and Crossley, W. A., "Analysis of Economic and Environmental Impact of New Aircraft Concepts via Allocation and Scheduling," *INFORMS Annual Meeting*, INFORMS, Phoenix, AZ, Oct. 2012.

[6] Tetzloff, I. J., "Using Linear Relaxations to Approximate Integer Programming Solutions for Aircraft Allocation," *4th Computational Science and Engineering Student Conference (CSESC)*, SIAM, Purdue Student Chapter, West Lafayette, IN, April 2012.

[7] Tetzloff, I. J. and Crossley, W. A., "Exploring Different Problem Formulations to Evaluate Environmental Impacts of Aviation," *INFORMS Annual Meeting*, INFORMS, Charlotte, NC, Nov. 2011.

[8] Tetzloff, I. J., "Using Aircraft Allocation to Assess Environmental and Market Impacts of New Aircraft Concepts," *NASA Langley Research Center (LaRC) Aeronautics Systems Analysis Branch (ASAB) Technical Forum*, Hampton, VA, June 2011.

[9] Tetzloff, I. J., "Evaluating Market and Environmental Impacts of an N+3 Supersonic Aircraft," *3rd Computational Science and Engineering Student Conference (CSESC)*, SIAM, Purdue Student Chapter, West Lafayette, IN, April 2011.

[10] Tetzloff, I. J. and Crossley, W. A., "Evaluating Market and Environmental Impacts of an N+3 Supersonic Aircraft," *2011 AAE Research Symposium Series*, West Lafayette, IN, Feb. 2011.

[11] Tetzloff, I. J. and Crossley, W. A., "Decomposition Approach for Aircraft Allocation Under Environmental Considerations," *INFORMS Annual Meeting*, INFORMS, Austin, TX, Nov. 2010.

[12] Tetzloff, I. J. and Crossley, W. A., "Impact of Future Generation Aircraft on Fleet-Level Environmental Emission Metrics," *7th Postgraduate Academic Forum of Beijing University of Aeronautics and Astronautics*, Beijing, China, Oct. 2010.

[13] Tetzloff, I. J., "Using Aircraft Allocation and Fleet-Level Metrics to Analyze NASA's Subsonic Fixed Wing Emission Goals," *NASA Langley Research Center (LaRC) Aeronautics Systems Analysis Branch (ASAB) Technical Forum*, Hampton, VA, July 2010.

[14] Tetzloff, I. J., "Using Aircraft Allocation and Fleet-Level Metrics to Analyze NASA's Subsonic Fixed Wing Emission Goals," *2nd Computational Science and Engineering Student Conference (CSESC)*, SIAM, Purdue Student Chapter, West Lafayette, IN, April 2010.

[15] Tetzloff, I. J. and Crossley, W. A., "Using Aircraft Allocation and Fleet-Level Metrics to Analyze NASA's Subsonic Fixed Wing Emission Goals," *2010 AAE Research Symposium Series*, West Lafayette, IN, March 2010.

[16] Tetzloff, I. J., Crossley, W. A., and Mane, M., "Assessing Market and Environmental Impacts of an N+3 Supersonic Aircraft," *INFORMS Annual Meeting*, INFORMS, San Diego, CA, Oct. 2009.

[17] Tetzloff, I. J. and Crossley, W. A., "Assessing Impacts on Airline Fleet Emissions and Direct Operating Costs through Aircraft Allocation," *INFORMS Annual Meeting*, INFORMS, Washington, DC, Oct. 2008.

Theses

[1] Tetzloff, I. J., *An Allocation Approach to Investigate New Aircraft Concepts and Technologies on Fleet-Level Metrics*, Master's thesis, Purdue University, May 2010, doi: `https://docs.lib.purdue.edu/dissertations/AAI1479855`.

Certifications

2014	Advanced Graduate Teaching Certificate, Purdue University Center for Instructional Excellence

Professional Affiliations

Current

2015 to Present	Airline Group of the International Federation of Operational Research Societies (AGIFORS)

Former

2003 to 2016	American Institute of Aeronautics and Astronautics (AIAA)
2008 to 2016	Institute for Operations Research and the Management Sciences (INFORMS)
2009 to 2014	Society for Industrial and Applied Mathematics (SIAM)

Fraternal Organizations and Honor Societies

2008	Tau Beta Pi Engineering Honor Society, Indiana–Alpha Chapter, Purdue University
2007	Sigma Gamma Tau Aerospace Engineering Honor Society, Alpha Chapter, Purdue University
2007	Order of Omega Greek Honor Society, MIT Chapter
2003	Delta Tau Delta International Fraternity, Beta Nu Chapter, MIT

Awards

2014	Estus H. and Vashti L. Magoon Award, Award for Graduate Student Instructors
2011 to 2013	Purdue University School of Aeronautics and Astronautics Forever Fellowship
2009 to 2012	NASA Graduate Student Researchers Project (GSRP) Fellowship Award
2010	School of Aeronautics and Astronautics Research Symposium Series Best Abstract
2007	MIT Stewart Award, Institute Award for Contributions to Student Life
2007	MIT FSILG Senior Legacy Award, Student Life Award for Contributions to Greek Life

Professional Development

2014	College Teaching Workshops, Purdue University Center for Instructional Excellence
2014	Preparing Future Faculty, Purdue University Graduate School

Volunteering

2007 to Present	MIT Alumni Association, Educational Counselor
2012 to Present	MIT Alumni Association, Class of 2007 Treasurer

Leadership

2010 to 2013	Aero Assist Graduate Student Organization, Treasurer
2008 to 2009	Sigma Gamma Tau, Treasurer
2005 to 2006	MIT Interfraternity Council (IFC), President
2004 to 2005	MIT Interfraternity Council (IFC), Executive Assistant
2004 to 2007	MIT Undergraduate Advising and Academic Programming, Associate Advisor
2006 to 2007	Delta Tau Delta Fraternity, Risk Manager
2004 to 2006	Delta Tau Delta Fraternity, New Member Educator

Technical Skills

Advanced	Java, LaTeX, MATLAB, Microsoft Office, SAS, SQL, Tableau
Intermediate	Gurobi, Python, R, Simio, Simulink, Xpress

Last Updated: March 19, 2019