

**Aerospace Systems Design • Aerospace Engineering • Computer Aided Engineering**

**Skills Summary**

System Design	Aviation Science	Computer Aided Engineering	Manufacturing
Fixed- & Rotary-wing Design	Commercial Pilot SEL	3D Part / Assembly/ Dwgs	Rapid Prototyping
Aerodynamics/Aeromechanics	Instrument Rating	Concept Development	Injection Mold Design
Systems Engineering	Aerobatic Competition	Structural Analysis	Theory of Constraints
Design Optimization	CFI in Training	Patent Application	Lean Manufacturing

**Education**

BS / Mechanical Engineering / March, 1995 / Georgia Institute of Technology (with Certificate in Bioengineering)  
 MS / Aerospace Engineering / December, 2003 / Georgia Institute of Technology  
 PhD / Aerospace Engineering / December, 2008 / Georgia Institute of Technology

**Project Work Highlights**

Oct 2019 – Present	Research Assistant Professor	Embry-Riddle Aeronautical University
Modeling and Simulation of Hybrid-Electric Power System - <i>Boeing</i> Modeling and Simulation of Powered Parachute Vehicle - <i>Odark30</i> Development of Electric Fixed-wing and Rotary-wing Aircraft - <i>Eagle Flight Research Center IRAD</i> Prepared lecture material, homework, quizzes, and exams for AE506 – Airplane Stability and Control		
Jan 2009 – Sep 2019	Research Engineer II	Georgia Tech Aerospace Engineering
Helicopter Operations Routine Flight Data Analysis Metrics Development – <i>Federal Aviation Administration</i> Contest Multi-attribute Scoring Model Development – <i>DARPA’s Fast Adaptable Next-Generation Ground Vehicle (FANG) Challenge</i> Aeroacoustic Analysis of Active Rotor Technologies for Tilt Rotors – <i>Bell/Boeing for the DARPA Mission Adaptive Rotor</i> Aeromechanic/Aeroacoustic Optimization of Active Rotor Technologies for Edgewise Rotors – <i>Boeing for the DARPA Mission Adaptive Rotor</i> Quantitative Technology Assessment of Active Rotor Systems to Full Spectrum Operations of Rotorcraft – <i>Army Research Office</i> Quantitative Technology Assessment for the Future Joint Multi-Role Rotorcraft Program – <i>Army Research Laboratory</i> Aeromechanical Analysis of Heliplane High Speed VTOL Configuration – <i>Defense Advanced Research Projects Agency (DARPA)</i>		
Jan 2017 – May 2018	Instructor	Georgia Tech Lorraine
Prepared lecture material, homework, quizzes, and exams for AE3030 - Aerodynamics Prepared lecture material, homework, quizzes, and exams for AE3340 – Design and Systems Engineering		
Aug 2002 – Dec 2008	Graduate Research Assistant	Georgia Tech Aerospace Systems Design Lab
System Analysis of Vectored Thrust Ducted Propeller Compound Helicopter – <i>Office of Naval Research</i> Pre-Concept Design Study For Advanced VTOL UAV – <i>Korean Aerospace Research Institute</i> Creation of Sensitivity Environments for the ESTOL Aircraft Sector – <i>NASA Ames Research Center</i> Analysis of Helicopter Compounding Technologies for High Speed Flight – <i>United States Air Force</i> Advanced Computational tools for the Redesign of Rotors for Reduced Noise Footprint – <i>Center for Rotorcraft Innovation</i>		
Nov 1999 – Aug 2002	President	Creative Development, Jacksonville, FL
Parachute System Design – <i>Relative Workshop, DeLand, FL</i> Automated Parachute Container Design System – <i>Sunpath Products, Zephyrhills, FL</i> Computer Interface Design – <i>I.D. Magazine’s Annual Design Review</i> Biomedical Product Design – <i>Bioquate, Inc., Clearwater, FL</i> U.S. Patent Application – <i>Smith &amp; Hopen, PA, Tampa, FL</i> Computer Aided Design Consultation		
Nov 1995 – Nov 1999	Parachute Systems Engineer	United Parachute Technologies, DeLand, FL
Patented Life Saving Automatic Riser Release Lanyard (Pat. No.: 6056242) Instituted Theory of Constraints (TOC) Management Philosophy into Company’s Manufacturing System Managed Testing, Analysis, and Evaluation of Prototypes, and Products Improved Safety and Reliability of Company’s Patented Parachute Release System Produced Product Specification Drawings & Illustrated Instruction Manuals		

**Computer Skills**

AutoDesk Inventor CATIA	AutoCAD ModelCenter	Matlab Fortran	Rotorcraft Comprehensive Analysis System (RCAS) Penn State Aeroacoustic Code (PSU-WOPWOP) NASA's Design and Analysis of Rotorcraft (NDARC)
----------------------------	------------------------	-------------------	--

**Extra**

47 Years Old • Married to Jen • Sons Riley (11) and Noah (10) • Mid-west Georgia Native • Instrument Rated Commercial Pilot • Aerobatic Competitor • Formation Skydiving Competitor (*USA & World Medalist*) • R/C Modeling • Running

**Graduate Coursework Highlights**

**Rotorcraft Design I**

*System approach to conceptual design of aerospace systems with emphasis on rotorcraft. Comprehensive methodologies for aerospace vehicle synthesis and sizing. Integration of technologies.*

**Rotorcraft Design II**

*Using knowledge gain in Rotorcraft Design I to complete the preliminary design stage of a specific rotorcraft. Exposure to disciplinary and interdisciplinary issues with application to the annual AHS graduate student design competition.*

**Rotary Wing Aerodynamics**

*Vortex wake modeling; analytical inflow theories; modern computational methods for rotary wing aerodynamic analysis; aerodynamic noise.*

**Linear Systems and Controls**

*Introduction to linear system theory and feedback control. Topics include state space representations, controllability and observability, linear feedback control.*

**Helicopter Stability and Control**

*Helicopter general equations of motion; rotor forces and moments; helicopter stability and control characteristics; handling qualities; flight control system design.*

**Advanced Dynamics**

*Kinematics of particles and rigid bodies, angular velocity, inertia properties, holonomic and nonholonomic constraints, generalized forces.*

**Advanced Flight Dynamics**

*Reference frames and transformations, general equations of unsteady motion, application to fixed-wing, rotary-wing and space vehicles, stability characteristics, flight in turbulent atmosphere*

**Publications**

1. D. Mavris, K. Collins, D. Schrage; "A Method Of Qualitative Analysis During Conceptual Design As Applied To Unmanned Aerial Vehicles". in Proceedings of the AHS International 60th Annual Forum & Technology Display. 2004. Baltimore, MD: American Helicopter Society.
2. K. Collins, J. Bain, L. Sankar, T.A. Egolf, R.D. Janakiram, K. Brentner, and L. Lopes. "Pareto Frontier Method for Multi-Disciplinary Optimization of Helicopter Rotors". in Proceedings of the AHS Specialist's Conference on Aeromechanics. 2008. San Francisco, CA: American Helicopter Society.
3. K. Collins, J. Bain, L. Sankar, T.A. Egolf, R.D. Janakiram, K. Brentner, L. Lopes, and N. Rajmohan. "Toward a High-Fidelity Helicopter Rotor Redesign Framework". in Proceedings of the AHS International 64th Annual Forum & Technology Display. 2008. Montreal, Canada: American Helicopter Society.
4. K. Collins, L. Sankar. "Application of Low and High Fidelity Simulation Tools to Helicopter Rotor Blade Optimization". in Proceedings of the AHS International 65th Annual Forum & Technology Display. 2009. Grapevine, TX: American Helicopter Society.

5. J. Bain, K. Collins. "Aerodynamic and Acoustic Design of a Low Noise Dual Rotor Tail-Sitter". Presented at the American Helicopter Society Aeromechanics Specialists Conference. San Francisco, California. January 20-22, 2010
6. B.Y. Min, L. Sankar, K. Collins, K. Brentner. "CFD-CSD Coupled Study in the BVI Characteristics of a Saw-Tooth Blade Platform". in Proceedings of the AHS International 67th Annual Forum & Technology Display. 2011. Virginia Beach, Virginia: American Helicopter Society.
7. J. Arruda, L. Hamel, K. Collins. "A Method for Quantitative Technology Analysis of Active Rotor Technologies". in Proceedings of the AHS International 67th Annual Forum & Technology Display. 2011. Virginia Beach, Virginia: American Helicopter Society.
8. Collins, Kyle B.; Sankar, Lakshmi N.; Mavris, Dimitri N., "Application of Low- and High-Fidelity Simulation Tools to Helicopter Rotor Blade Optimization, Journal of the American Helicopter Society", Volume 58, Number 4, October 2013, pp. 1-10(10)
9. Paola Zanella, Kyle Collins, Dimitri N. Mavris, "Propulsion System Sizing Methodology for a Hybrid-Electric Helicopter", Proceedings of the 2015 American Helicopter Society Sustainability 2015 - International Conference on Environmental Sustainability in Air Vehicle Design and Operations of Helicopters and Airplanes, Montreal, QC, Canada, September 22-24, 2015
10. Manish Pokhrel, Jonathan Gladin, Kegan Ali, Kyle Collins, Dimitri N. Mavris, "Modeling and Requirements Definition for a Hybrid-Electric Powered Helicopter", in Proceedings of the 2015 American Helicopter Society Sustainability 2015 - International Conference on Environmental Sustainability in Air Vehicle Design and Operations of Helicopters and Airplanes, Montreal, QC, Canada, September 22-24, 2015
11. A. Gavrilovski, K. Collins, D. Mavris, "Model-Enhanced Analysis of Flight Data for Helicopter Flight Operations Quality Assurance", Proceedings of the 72nd Annual American Helicopter Society Forum and Technology Display, May 17-19, 2016, West Palm Beach, Florida
12. Z. Ernst, R. Armstrong, K. Collins, Eric Spero, Dimitri Mavris, "Reconfigurable Discrete Event Simulation of Rotorcraft Maintenance and Operations", Proceedings of the 72nd Annual American Helicopter Society Forum and Technology Display, May 17-19, 2016, West Palm Beach, Florida
13. M. Schmit, S. Briceno, K. Collins, D. Mavris, K. Lynch, and G. Ball, "Semantic Design Space Refinement for Model-Based Systems Engineering", Proceedings of the 2016 IEEE International Systems Conference, April 18-21, 2016, Orlando, Florida
14. Hiller, B., Karagoz, E., Cai, Y., Wilhelms, C., Chakraborty, I., Briceno, S., Collins, K., and Mavris, D., "Framework for Assessing Impact of Active Flow Control Technologies for Commercial Aircraft", Proceedings of the American Institute of Aeronautics and Astronautics Aviation 2016 Conference, 13-17 June 2016, Washington Hilton, Washington, D.C.
15. Sarojini, Darshan, Collins, Kyle, Mavris, Dimitri, "Requirements Analysis for Design Optimization of Aerobatic Aircraft", Proceedings of the 2017 AIAA SciTech Forum, 9-13 January in Grapevine, Texas
16. Smith, Andrew, Collins, Kyle, Mavris, Dimitri, "Survey of Technology Forecasting Techniques for Complex Systems", Proceedings of the 2017 AIAA SciTech Forum, 9-13 January in Grapevine, Texas
17. Bucsan, George, Collins, Kyle, Mavris, Dimitri, "Generalized methodology for sizing unconventional propulsion and configuration aircraft", Proceedings of the 2017 AIAA SciTech Forum, 9-13 January in Grapevine, Texas
18. Bouchard, Etienne D., Schmit, Matthew L., Collins, Kyle B., Mavris, Dimitri N., "A Numerical Method to Calibrate and Forecast Technology Improvements for the UH-60 Helicopter using NDARC", Proceedings of the 73rd Annual American Helicopter Society Forum and Technology Display, Fort Worth, Texas, USA, May 9-11, 2017
19. Price, Joshua K., Ashok, Sylvester, Armstrong, Ryan, Collins, Kyle B., Mavris, Dimitri N., Schrage, Daniel P., "Integrated Discrete-Event Simulation Environment for Analysis of Rotorcraft Reliability, Availability, and Maintainability", Proceedings of the 73rd Annual American Helicopter Society Forum and Technology Display, Fort Worth, Texas, USA, May 9-11, 2017
20. Robinson, Joseph N., Kyle B. Collins, and Dimitri N. Mavris. "Development of a Comprehensive Rotorcraft Model to Study the Susceptibility of Teetering Rotors to Mast Bumping Accidents". In: Vertical Flight Society 75th Annual Forum & Technology Display. Vertical Flight Society. June 2019
21. Paola Zanella, Kyle B. Collins, Dimitri N. Mavris, Charles 'Cliff' Johnson, "Filter-Based Detection of the Proximity to Loss of Tail Rotor Effectiveness within Helicopter Flight Data Monitoring", In: Vertical Flight Society 75th Annual Forum & Technology Display. Vertical Flight Society. June 2019
22. Ruthvik Chandrasekaran, Alexia Payan, Kyle Collins, Dimitri Mavris, "Helicopter wire strike protection and prevention devices: Review, challenges, and recommendations", Journal of Aerospace Science and Technology, 98-2020

**References**

Richard P. Anderson, Professor  
Director, Eagle Flight Research Center  
Embry-Riddle Aeronautical University  
andersop@erau.edu

Dimitri Mavris, Professor  
Director, Aerospace Systems Design Laboratory  
Georgia Institute of Technology  
dimitri.mavris@aerospace.gatech.edu  
404.894.1557

Daniel Schrage, Professor  
Director of Center for Aerospace Systems Analysis  
Georgia Institute of Technology  
daniel.schrage@aerospace.gatech.edu  
404.894.6257

Marilyn Smith, Professor  
Director, Vertical Lift Research Center of Excellence  
Georgia Institute of Technology  
marilyn.smith@aerospace.gatech.edu  
404.894.0197

Brian German, Associate Professor  
Georgia Institute of Technology  
brian.german@aerospace.gatech.edu  
404.385.3299