2410 Taylor Close, Murfreesboro, TN 37130
nate.callender@mtsu.edu
(615) 598-6552

Mark N. Callender

Education

The University of Tennessee Space Institute, Tullahoma, TN
2006 - 2013

- Doctor of Philosophy
- Major in Engineering Science
- Concentration in Thermal-Fluid Mechanics
- Doctoral research on aerodynamic efficiency of rotating biquadratic bodies of revolution (BBOR)

The University of Tennessee Space Institute, Tullahoma, TN
2000 - 2003

- Master of Science
- Major in Aviation Systems
- Masters research on integration of hands on throttle and stick (HOTAS) controls in general aviation aircraft
- Specific training in Flight Test Engineering

Middle Tennessee State University, Murfreesboro, TN
1996 - 1999

- Bachelor of Science
- Major in Aerospace Technology
- Minors in Mathematics and Engineering Technology and Industrial Studies

Appointments

Professor of Aerospace
2005 - Present Middle Tennessee State University, Murfreesboro, TN

- Associate Department Chair, 2020 - Present
- Incorporate mathematics, physics and engineering into the Aerospace curriculum primarily through AERO 1020, 3440, 4071, 4410, 4440, & 6611
- Provide future engineers, professional pilots, and drone operators rigorous courses in aerodynamics (AERO 3440) and aircraft performance (AERO 4440)
- Provide a flight test experience for Aerospace Technology students in AERO 4440
- Mentor undergraduate students through research projects in AERO 4071 and 4410
- Mentor graduate students through thesis and capstone research projects
- Coordinate the Technology Concentration which prepares students for graduate education in an engineering discipline
- Provide recommendations for qualified students seeking admission to graduate school
- Perform research in various areas independently and with faculty/student teams
- Serve on and Chair various Department, College and University Committees
- Graduate, Experiential Learning, and Honors Faculty
- Created and operates the Aerospace Technology Laboratory

- Provided instruction in the Aerospace Department's Basic Summer Camp
- Developed the Aerospace Department's Aerodynamics Advanced Camp

Instructor of Mathematics

2001 - 2005 Dyersburg State Community College, Dyersburg, TN

- Instructed College and Developmental mathematics
- Coordinated and trained adjunct mathematics faculty
- Served as a Master Advisor
- Served on various Departmental and College committees

Aerospace Engineer

2001 - 2001 Titan Aerospace, Fort Rucker, AL

- Determined data requirements for instrumentation of an AH-64D Longbow Apache flight test aircraft
- Authored test plans, reports and other technical memoranda in support of developmental testing of U.S. Army flight test aircraft
- Performed Flight Test Engineer duties to include the determination of flight test data requirements, the monitoring of real time data, and the reduction and presentation of the data

Publications

Callender, N. (2025). A pilot's guide to the engine-out glide: the effect of wind on best glide speed. Collegiate Aviation Review International, 43(1), 149-163.

Callender, M. (2023). Innovation in engine-out glide performance from sawtooth descent testing of a Beechcraft Bonanza. *The 54th Annual Symposium of the Society of Flight Test Engineers*.

Callender, M. (2023). Pilot's guide to maximum glide performance: optimum bank angles in gliding turns. *Collegiate Aviation Review International*. 41(1), 180-208.

Callender, M. (2022). Sound pressure level measurements with standard and low noise propellers on a phantom 4 pro+. *Current Trends in Engineering Science*. 2 (2).

Callender, M. (2020). A möbius analogy to the Trinity. *Journal of the International Society of Christian Apologetics*. 13, 7-20.

Callender, M. (2018). Uas rotor sound pressure level reduction through leading edge, upper surface, and trailing edge modification. *Proceedings of AUVSI's XPonential 2018 Conference*.

Callender, M. (2017). Uas propeller/rotor sound pressure level reduction through leading edge modification. *Journal of Applied Mechanical Engineering*. 6:254. doi:10.4172/2168-9873.1000254.

Callender, M., Robinson, V. (2016). Small uas propeller/rotor sound pressure level and thrust testing: bioinspired modifications for uas noise reduction. *Proceedings of AUVSI's XPonential 2016 Conference.*

Callender, M. (2015). Rotating cylindrical bodies at low Re. *Proceedings of the 45th AIAA Fluid Dynamics Conference*.

Callender, M., Campbell, D. (2015). Design considerations for a martian unmanned aerial system. *Proceedings of the AUVSI Unmanned Systems 2015 Conference*.

Callender, M. (2014). The theoretical extension of Prandtl's inviscid lifting line theory to the viscous flow over rotating cylinders. *Journal of the Tennessee Academy of Science*. 89(1).

Callender, M., Dornan, W. A., Craig, P., Beckman, W., & Gossett, S. (2009). Transfer of skills from microsoft flight simulator x to an aircraft. *Proceedings of the International Symposium on Aviation Psychology,* USA, 221-226.

Operational test director's quick reference target guide. (2008). Murfreesboro, TN: Middle Tennessee State University.

Craig, P. A., Beckman, W. S., Callender, M., Gossett, S., & Dornan, W. (2008). Results from the first faa industry training standards (fits) commercial pilot training course – a student's perspective. *Proceedings of the International Symposium on Aviation Psychology*, USA, 402-407.

Callender, M. N. (2007). Transfer and cost effectiveness as guides to simulator/flight training device use. *Collegiate Aviation Review*. 26(1), 28-32.

Beckman, W. S., Callender, M. N., Gossett, S., Dornan, W. A., & Craig, P. A. (2007). Moving fits training from the laboratory to the flight line. Manuscript submitted for publication. *Collegiate Aviation Review*. 26(1), 21-27.

Pupalaikis, R., Smith, C. F., & Callender, N. (2001). *Preliminary airworthiness evaluation of the ah-64d helicopter equipped with the digital electronic control (dec) 2000* (DTC Project No. 4-AI-100-LBA-063/KF). Fort Rucker, AL: U.S. Army Aviation Technical Test Center.

Ernst, C., Miller, W., Correia, J., Callender, N., Warren, J., Paris, S., Fell, W., & Chapman, A. (2001). *Nondevelopment item 2.75-Inch rocket motor airworthiness qualification test on the ah-64a helicopter* (DTC Project No. 4-MU-014-000-057/KF). Fort Rucker, AL: U.S. Army Aviation Technical Test Center.

Presentations

Nashville IMC Club. October 28, 2025. A Pilot's Guide to the Engine-Out Glide.

Providence Christian School's (PCA) Capio. October 21, 2025. God and Science.

2025 UAA Collegiate Aviation Education Conference. October 2nd, 2025. A Pilot's Guide to the Engine-Out Glide.

EAA AirVenture Oshkosh 2025 (for AOPA). July 22nd, 2025. A Pilot's Guide to the Engine-Out Glide.

NAFI Summit 2024. January 15th, 2025. Engine-Out Glide Performance.

2024 UAA Collegiate Aviation Education Conference. September 27th, 2024. Incorporating Flight Test into Undergraduate Aerodynamics and Aircraft Performance Courses.

The 54th Annual International Symposium of the Society of Flight Test Engineers. October 19th, 2023. Innovation in Engine-Out Glide Performance from Sawtooth Descent Testing of a Beechcraft Bonanza.

2023 UAA Collegiate Aviation Education Conference. September 28th, 2023. Pilot's Guide to Maximum Glide Performance: Optimum Bank Angles in Gliding Turns.

101st Airborne Division/EagleWerx and MTSU Aerospace Collaboration. October 26th, 2022. An Investigation and Optimization of Coaxial Rotors for UAS Noise and Thrust.

Jones College of Business Executive Education Series: Rethinking Church Leadership. October 13th, 2022. Components of Culture: 1) A Participating Population and 2) Intellectual Engagement.

10th International Conference on Mechanical & Aerospace Engineering. September 22nd, 2022. An Investigation and Optimization of Coaxial Rotors for UAS Noise Reduction

Annual Conference of the International Society of Christian Apologetics. March 25th, 2022. A Möbius Analogy to the Trinity.

Living Sent Ministries. April 14th, 2021. Platforms.

Open Arms Faculty and Staff Fellowship. October 23rd & November 13th, 2020. The Trinity.

9th International Conference on Mechanical & Aerospace Engineering. September 16th, 2021. Utilizing Automated and Randomized Quizzes and Exams in Undergraduate Aerodynamics: Lessons Learned from a Year of Remote Instruction.

LT&ITC Workshop. September 15th, 2021. D2L Quizzes: Tips for Increasing the Effectiveness of Numeric and Non-numeric Quizzes.

8th International Conference on Mechanical and Aerospace Engineering and Aerodynamics 2020 Webinar. September 17th, 2020. Autonomous Lecture Capture in Undergraduate Aerodynamics: System Description, Demonstration, and Benefits for Traditional and Remote Instruction.

Beginnings: International Christian Embassy Jerusalem's 2019 North America Conference. May 24th, 2019. Class Has Begun: Lessons from the Beginning about the Beginner.

MTSU Aerospace Department's Aerospace Innovative Research Seminar (AIRS). February 14th, 2019. Quieter Props and Tastier Hops.

MTSU College of Liberal Arts Lifelong Learning Program. May 7th, 14th, and 21st, 2018. Science and God.

AUVSI's XPonential 2018 Conference. May 2018. UAS Rotor Sound Pressure Level Reduction Through Leading Edge, Upper Surface, and Trailing Edge Modification.

Providence Christian School's (PCA) School of Rhetoric. April 2018. A Characteristic of God: A Mathematical Investigation of His Power.

City College Student Club Meeting. April 8th, 2018. Christian Worldview of Science.

The Orchard Student Club Meeting. November 14th, 2017. A Christian Worldview of Life in the Academy.

5th International Conference and Exhibition on Mechanical and Aerospace Engineering. October 2017. UAS Rotor Sound Pressure Level Reduction Through Leading Edge, Upper Surface, and Trailing Edge Modification.

Nashville IMC Club. August 28, 2017. Glide Advisor.

MTSU LT&ITC Workshop. January 26th, 2017. There's a Robot in my Classroom!

MTSU LT&ITC Fall Faculty Fair. October 26th, 2016. The Swivl System for Lecture Capture.

MTSU College of Basic and Applied Sciences (CBAS) Teaching Exchange Panel. October 14th, 2016. The Swivl System for Lecture Capture.

Southern Illinois University Applied Sciences and Arts Multidisciplinary Research Symposium. October 2016. A Bioinspired Modification for UAS Propeller/Rotor Noise Reduction.

4th International Conference and Exhibition on Mechanical and Aerospace Engineering. October 2016. UAS Propeller/Rotor Sound Pressure Level Reduction Through Leading Edge Modification.

AUVSI's XPonential 2016 Conference. May 2016. Small UAS Propeller/Rotor Sound Pressure Level and Thrust Testing: Bioinspired Modifications for UAS Noise Reduction.

AUVSI's XPonential 2016 Conference. May 2016. A Student Robot Challenge using the Meccanoid G15KS Personal Robot.

Tennessee Board of Regents (TBR) Emerging Mobile Technologies and Immersive Virtual (VR) and Augmented Realities (AR) Faculty Forum and Hands-On Exploration. February 11th, 2016. The Swivl System for Lecture Capture

3rd International Meeting and Exposition on Mechanical and Aerospace Engineering. October 2015. Theoretical Optimization of a Cylindrical Body of Rotation Using Magnus Effect Lift.

Open Arms Faculty and Staff Fellowship. September 24th, 2015. Mere Christianity.

45th AIAA Fluid Dynamics Conference. June 2015. Rotating Cylindrical Bodies at Low Re.

AUVSI Unmanned Systems 2015 Conference. May 2015. The Design Considerations for a Martian Unmanned Aerial System.

MTSU Research Exchange Luncheon of the College of Basic and Applied Sciences (CBAS). Spring 2015. Aerospace Technology Laboratory Research.

Open Arms Faculty and Staff Fellowship. Fall 2014. Love the Lord With All of Your Mind.

MTSU Research Exchange Luncheon of the College of Basic and Applied Sciences (CBAS). Spring 2014. Aerospace Technology Laboratory Research.

Campus Crusade for Christ Student Club Meeting. September 6th, 2013. My Science and My Faith.

2013 Meeting of the Tennessee Academy of Science. 2013. The Theoretical Extension of Prandtl's Inviscid Lifting Line Theory to the Viscous Flow over Rotating Cylinders.

Alpha Omega (AO) Student Club Meeting. October 5th, 2009. The 2nd Law of Thermodynamics and Its Implications.

2009 International Symposium on Aviation Psychology. 2009. Transfer of Skills from Microsoft Flight Simulator X to an Aircraft.

MTSU Scholars Week. 2009. Transfer of Skills from Microsoft Flight Simulator X to an Aircraft.

2008 University Aviation Association's (UAA) National Fall Conference. 2008. Transfer and Cost Effectiveness as Guides to Simulator/Flight Training Device Use.

Experimental Aircraft Association (EAA) Murfreesboro Chapter Meeting. July 10th, 2008. Aerodynamics.

University Aviation Association's (UAA) National Fall Conference. September 29th, 2006. The Introduction of Aerospace Students to Flight: A Five-Hour Flight Experience.

Outreach

Aerospace Technology Laboratory Demonstrations
2013-present
Provided introduction to aerodynamic ground test equipment (wind tunnels, water tunnels, CFD software, etc.) for groups to include: Aerospace Department alumni, Columbian government officials,

United Arab Emirates student group, Hobgood Elementary School's Extended School (ESP) program, and Rutherford County School's Summer K-6 STEM Camp.

Cason Lane Academy Rocket Lab
2022
Presented topics pertaining to aviation, rocketry, and my career to the 5th grade classes at Cason Lane Academy.

Science National Honor Society at Central Magnet School
2022
Presented topics pertaining to my career and education as well as a lesson and demonstration of Bernoulli's principle.

Overall Creek Elementary
2021
Presented topics pertaining to gravity, friction, momentum, drag, experimentation, and aerospace engineering careers to the 2nd grade classes at Overall Creek Elementary.

Erma Seigel Elementary
2020
Presented on careers in the aerospace industry to the 5th grade classes at Erma Seigel Elementary.

Central Magnet School's Calculus Classes
2018-2019
Presented topics pertaining to aerospace engineering to magnet high school students who were enrolled in calculus courses.

Civil Air Patrol E-Tech Camp
2017-2019
Instructor for E-Tech National summer camp for 9th-12th grade Civil Air Patrol cadets interested in pursuing engineering education. Primary areas of instruction include aerodynamics, propeller testing, and data visualization.

MTSU Aerospace Summer Camp Instructor
2012-2019
Instructor for MTSU Aerospace Department summer camps for 8th - 12th grade students. Primary areas of instruction include aerodynamics, aircraft design, and ground and flight testing.

Central Magnet Senior Thesis Mentor
2012-2020
Provided instruction and guidance to senior magnet high school students on topics to include CFD, aviation curricula, and morality.

Central Magnet School's Engineering Club Speaker
2011
Presented topics pertaining to aerospace engineering to magnet high school students who are participating in the school's engineering club.

Homer Pittard Campus School's Career Day Speaker
2011

Presented aviation career information specific to aerospace and flight test engineering to students at MTSU's elementary education laboratory school.

Experimental Aircraft Association Presentation
2008
Presented principles of aerodynamics to the Murfreesboro chapter of the Experimental Aircraft Association (EAA).

DA40 Flight Training Device Demonstrations
2006-2007
Provided a Department tour and flight training device (FTD) experience to high school students from a west Tennessee Upward Bound summer academic program. Upward Bound is a college preparatory program for students from low income families or from families with no college
graduates. Provided the tour and FTD experience for Lebanon Special School District's EXTEND Gifted Program.

Rotary Club Presentation
2006
Presented information about MTSU's Aerospace Department, the Aerospace Technology concentration, and principles of fluid dynamics to Murfreesboro's Rotary club.

Funded External Grants & Contracts

Angle of Attack Indicator Incorporation in an MTSU Flight School DA-40, 2016
$1,000

Bonanza Performance Characterization Flight Test, 2015
$5,600

Design and Costing Study Services for a 5th Generation Aerial Target Contract, 2012
$80,763

Navy Quick Reference Guide for Targets Contracts
Department of Defense, 2008
$55,629

Assessment and Implementation of Microsoft Flight Simulator X as a Component of Private Pilot Training in the General Aviation Population
Air Safety Foundation, 2007
$169,010

Expert Witness & Litigation

Byron Cocke, et al., v. United States of America, et al. March 16th, 2022-Present. Power-off glide flight test design and engineering, aircraft glide performance calculations, aerodynamic drag calculations, and aerodynamics expert witness.

Stantec v. Nielson. 2010. Takeoff performance calculations.

Certifications

Private Pilot Single Engine Land, Tailwheel and High Performance Endorsements

Rotary Wing Stability and Control Flight Test Certificate

H2 USHPA Hand Glider Rating

Introduction to ANSYS Fluent Certificate

Awards & Honors

Faculty Contribution to Research. MTSU Faculty Senate (2025)

Outstanding Honors Faculty Award. MTSU Honors College (2018)

Outstanding Teacher Award. MTSU Foundation (2016)

Influential Faculty Member. The Honor Society of Phi Kappa Phi (2014, 2016, 2017, 2021, 2022)

Most Challenging Class Award. LEGACY Student Club (2012)

Excellence in Teaching Award. MTSU College of Basic and Applied Science (2010)

Person Who Makes a Difference. MTSU Student Affairs (2009, 2010, 2011, 2013, 2014, 1016, 2017, 2018, 2019, 2020, 2021, 2023, 2024, 2025)

Outstanding EXL Collaborations. MTSU College of Basic and Applied Science (2007, 2008, 2009, 2010)