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Mark N. Callender

Education

Middle Tennessee State University, Murfreesboro, TN
1996 - 1999

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

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

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)

Appointments

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

- Incorporate mathematics, physics and engineering into the Aerospace curriculum primarily through AERO 1020, 3440, 4071, 4440, & 6611
- Mentor undergraduate students through research projects in AERO 4071
- 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
- Provide 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

Outreach

Civil Air Patrol E-Tech Camp

2017-Present

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-Present

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

2012-2013

Provided instruction and guidance to a senior magnet school student in a computational fluid dynamics (CFD) research project. The student was led through the aerodynamic concepts, the computational methods, and the preparation of the final document and its defense.

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

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.

Publications

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

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

Central Magnet School Calculus Student Group. April 10th, 2019. Integral Calculus in Aerospace.

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

Central Magnet School Calculus Student Group. December 5th, 2018. Differential Calculus in Aerospace.

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.

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.

Funded External Grants & Contracts

Angle of Attach Indicators 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

Honors

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 and 2016

Most Challenging Class Award, 1st Annual MTSU LEGACY Awards Banquet, 2012

Excellence in Teaching Award, MTSU College of Basic and Applied Sciences, 2010

Outstanding EXL Collaborations, MTSU College of Basic and Applied Sciences, 2007, 2008, 2009, and 2010

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