

# David H. Fikes

University of Alabama in Huntsville  
Department of Mechanical and Aerospace Engineering  
Huntsville, AL 35899

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## **EXPERIENCE:**

42 years of experience as a college instructor/lecturer of engineering and mathematics classes at the University of Alabama Huntsville, Motlow State Community College, and Tennessee State University.

Extensive engineering background of 46 years including stress analysis of aerospace structures, and experimental testing and analysis of aerospace and mechanical systems; including Ballistic Missile Defense booster interceptors, International Space Station element qualification testing, Space Shuttle systems integration, wind tunnel and propulsion test engineering, and development of advanced aerospace systems. Stress analysis of aerospace structures including commercial airliners (767 freighter, 787 airliner), thermoplastic carbon fiber parts for aircraft weight reduction, and various program ground support systems using finite element tools PATRAN and NASTRAN.  
Private Pilot's License.

## **EMPLOYMENT:**

### **Jun 1994 to Present: Engineering Instructor/Lecturer - University of Alabama Huntsville, Huntsville, AL.**

Full-time and Part-time faculty member in the Mechanical and Aerospace Engineering Department at UAH since 1994.

Courses taught include: Statics (MAE 271), Dynamics (MAE 272), Mechanics of Materials (MAE 370), Mechanics and Design of Machine Elements (MAE 466), Aerospace Structures (MAE 371), Computer Aided Structural Analysis Using PATRAN and NASTRAN (MAE 489/589), Senior Design MAE490 for Moon Buggy, Tech Elective MAE495 for developing an Electric Powered Moon Buggy. Developed the course content for the introductory Finite Element Analysis class using Patran and Nastran (MAE 489/589). Initiated and taught the first Maymester (3 week) MAE class at UAH (MAE 489). Senior Design Moon Buggy class won 1<sup>st</sup> place in the NASA competition at the USSRC in April 2018. Have taught 80+ classes during the past 25 years at UAH.

Also have taught Fundamentals of Engineering, and Professional Engineering, review courses for the Continuing Education Department at UAH.

### **Mar 1979 to 2002: Engineering Instructor - Motlow State Community College / Tennessee State University, Tullahoma TN.**

Part-time faculty member in the Engineering Department. Courses taught include: Engineering Graphics, Computer Aided Engineering (CAD), AutoCad, Mechanics of Materials, Architectural Design and Drafting, FORTRAN Computer Programming, Fluid Mechanics, Thermodynamics, Machine Design, College Algebra, Trigonometry, Finite Math, Contemporary Math, Calculus, Design of Thermal/Fluid Systems, Heating and Air Conditioning, Materials Processing, Mechanical Energy Conversion, Mechanical Engineering Laboratory.

### **Jul 2005 to May 2016: Structural Analyst Engineer- Boeing , Huntsville, AL.**

**Responsibilities are structural analysis support of several Boeing aerospace programs including commercial and defense airplanes, space launch systems, and aerospace ground support equipment.**

Performed structural analyses in support of the new Boeing 787 airplane, the Navy P-8A Orion, and the NASA ARES/SLS Vehicle. Performed finite element analyses using PATRAN and NASTRAN. Performed FEA stress analysis on thermoplastic carbon fiber (chopped fiber) composite parts for a design team responsible for aircraft weight reduction in the 787 interior. Made recommendations for reinforcements

where structure was insufficient. Wrote Strength Check Note reports, and provided model files to Everett for inclusion into Interior's Galley and Lavatory assembly FEA models.

Performed FEA structural analysis of mission systems components for Boeing P-8A and P-8I airplanes to verify that the flight environment requirements were met.

Reviewed supplier and contractor component documentation for stress, fatigue, and fracture control for the ARES and SLS vehicle programs to insure that NASA and Boeing design requirements were met. Responsible for reviewing supplier/subcontractor stress and fracture control reports to ensure the hardware is able to survive the expected loading environments as well as ensuring that the supplier uses proper methodology in conducting the analysis. Wrote review item discrepancies and participated in Preliminary Design Reviews and Critical Design Reviews.

Performed structural analyses in support of the 767-200SF project to convert passenger airplanes to freight carriers. Reviewed previous Wichita analyses, provided support to cargo barrier analysis, and provided support for disposition of nonconformance reports.

Performed structural analyses in support of the SLAMRAAM project and many ground support equipment designs.

Mentored and trained recent college graduates in Boeing tools, procedures, methods and other items to help provide these new engineers with training that is directly related to the analysis reviews they are being asked to conduct. Taught 40 hour class at Boeing for Introductory Patran/Nastran FEA.

**Oct 1996 to Jul 2005: Principal Test Engineer - Boeing , Huntsville, AL.**

Test director/lead test conductor for Booster integrated missile avionics testing for BV-4 and BV-5 in support of the Boeing/Huntsville National Missile Defense GBI Booster production. Test Engineer in support of booster production for BV-2 and -3. Authored test procedures for power distribution, command destruct systems, highpressure control systems, and ordnance EED checkout. Responsible for leading a team of engineers and technicians to perform final assembly integration and qualification testing of the GBI. Focal point for conducting Test Readiness Reviews, test equipment management, and release of test procedures to support Phase 1 and 2 level testing. Ordinance qualified. Member of Boeing Huntsville Lab Management Team, and implemented additional Lab Management processes at the AT&C, including safety audits, configuration control, etc.

Principal test engineer supporting the Functional Test Group of Boeing/Huntsville for the US Laboratory (Destiny) and Airlock Modules of the International Space Station, and ISS payload racks. Responsibilities included functional qualification and acceptance testing for hardware/software integration, electrical power systems, command and data handling, acoustics, and other core systems of the ISS Laboratory and Airlock Flight Articles, and ISS EXPRESS Payload Racks. Performed pretest planning and documentation to ensure compliance with the USL Prime Item Development Specification requirements and Statement of Work. Authored test procedures and common sequence documents for performance of qualification testing. Made presentations for test readiness reviews and safety reviews. Primary test conductor responsible for leading a team of 15 people for ISS Laboratory hardware/software integration and systems qualification testing. Lead anomaly resolution teams for investigation of problems/unexpected results. Responsible as lead engineer for the development, data acquisition, and reduction of acoustic test results for the Airlock and Laboratory modules. Developed computer analysis methods for the acquisition and analysis of acoustic data in the frequency and time domains.

**Oct 1993 to Oct 1996: Senior Analytical Engineer - Advanced R&D/USBI, Huntsville, AL.**

Provided experimental and analytical engineering services in support of the Thermal Analysis Group of United Space Boosters Incorporated, Huntsville, AL. Responsibilities included experimental testing and analysis of improved thermal protection systems materials for the Solid Rocket Boosters of the Space Shuttle Vehicle. Performed thermal characterization and qualification tests of ablative insulation materials and paint coverings for the SRB in the MSFC Hot Gas Wind Tunnel and Radiant Lamp Vacuum Chamber

Facilities. Performed data reduction, analysis, computer thermal modeling using SINDA, and reporting of test results.

**Sept 1988 to Oct 1993: Engineering Supervisor - Development Testing and Analysis Group, Rockwell International - Space Systems Division, Huntsville, AL.**

Supervisor of ten-man engineering group responsible for development testing and analysis of mechanical and aerospace systems. Specialties include thermal modeling, acoustics, plume heating, wind tunnel test engineering, structural loads, mechanical testing and analysis of materials, and development of advanced launch systems. Provided responses to STS post flight issues and assisted in the evaluation of flight data and quick-look analyses for flight anomalies.

**Sept 1987 to Sept 1988: Senior Engineer - Simulation/Analysis & Development Testing Group, Rockwell International - Space Systems Division, Huntsville, AL.**

Senior Test and Analysis Engineer responsible for aerodynamics, propulsion, and structures development testing and analysis. Defined requirements for models, facilities, and instrumentation as well as analyzing data and reporting test results. Programs included: NASP wind tunnel model development, B-1B/store separation aerodynamic testing, full-scale SSME airflow testing, cold flow SSME engine-out aerodynamic tests.

**Jan 1981 to Sept 1987: Senior Project Engineer - Von Karman Gas Dynamics Facility, Calspan Corporation/AEDC Division, Arnold AFB, TN.**

Senior Project Engineer responsible for aerodynamic and propulsion test projects. Duties included: interfacing with Air Force and User-contractors for test planning; direction of support groups for test preparation, installation, data reduction, and test conduct; data analysis; technical reporting; and training new engineers. Project engineer for a series of aerodynamic separation tests of the Space Shuttle Orbiter and External Tank. Project engineer for a series of freejet propulsion tests on a ducted rocket, an air-breathing, integral rocket/ramjet air-to-air missile. Conducted supersonic and hypersonic aerodynamic tests on projects including: the MX missile, various aircraft configurations, and interceptor missiles. Conducted aerodynamic flutter tests of a wing/control system of an air-to-air missile.

**May 1973 to Dec 1980: Project Engineer - Engine Test Facility and Von Karman Gas Dynamics Facility, Sverdrup/ARO, Inc., Arnold AFS, TN.**

Conducted aerodynamic and propulsion tests in wind tunnels and engine test cells. Major functions included test planning, direction of testing, data reduction and analysis, documentation, and technical reporting.

**PUBLICATIONS:** (selected)

"Airlock Acoustic Proto-Flight Test Report". T683-53868-9. NAS15-10000. February 2000.

"Acreage, Compatibility, and On-Pad Abort Qualification Tests of MCC-1". USBI-AR-95-0213. April 1995.

"A Probe Designed to Measure Stagnation Pressure Directly in Supersonic Flow". MSME thesis, University of Tennessee. December 1978.

"Demonstrated Capabilities of the AEDC/APTU for Testing Ramjet-Powered Missiles". AEDC-TR-84-1. August 1984.

"Space Shuttle Orbiter and External Tank Separation Force And Moment Test with Simulated RCS Effects at Mach 6". AEDC-TSR-87-V24. March 1988.

"Static Force Tests of the Army/MM Advanced Missile Configuration at Mach Numbers 6, 8, and 10". AEDC-TSR-79-V24. April 1979.

**EDUCATION:**

B.S. - Aerospace Engineering, University of Alabama, Tuscaloosa, AL, May 1973.

M.S. - Mechanical Engineering, University of Tennessee, Knoxville, TN, Dec 1978.

Private Pilot's License, May 2000.