Robert J. Butler

PhD, PE

Principal

Dr. Butler is a Mechanical/Aeronautical Engineer and a Principal of Engineering Systems Inc. (ESi). Dr. Butler earned his Ph.D. in Mechanical Engineering researching jet engine turbine blade heat transfer. He joined ESi after serving more than 20 years as an officer in the U.S. Air Force. During his Air Force career, he was the lead Air Force Engineer for the Joint Strike Fighter F120 Jet Engine Program. He led and worked on numerous wind tunnel and ballistic range test projects ranging from subsonic to hypersonic conditions with speeds greater than Mach 20.

Dr. Butler spent over six years teaching aeronautical and Mechanical Engineering courses at the USAF Academy and the USAF Test Pilot School in fluid dynamics, aeronautics, heat transfer, thermodynamics, engineering design, subsonic, supersonic, and hypersonic aerodynamics. He also served as Professor of Aerospace Studies and Commander at the University of South Florida in Tampa. He has been doing research in motor vehicle performance since 1998. In addition to his background in vehicle performance, he has trained in accident reconstruction at Northwestern University, University of North Florida, and the Society of Automotive Engineers (SAE). He is also a certified brake inspector (49 CFR-396.25). Dr. Butler is co-inventor of a laser liquid-crystal measuring method that earned a U.S. Patent. During his career he has authored more than 20 technical papers, reports, and articles, and has given presentations on a wide variety of technical, leadership, and educational topics. Dr. Butler is an accomplished amateur racecar driver, mechanic, high performance driving instructor, and private pilot.

Education

PhD, Mechanical Engineering. University of California. 1995

MS, Aerospace Engineering. University of Tennessee. 1989

BS, Aeronautical Engineering. Embry-Riddle University. 1985

Licenses & Certifications

- State of Colorado P.E. License 40194

Contact Information
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ESi CO – Colorado Springs
5575 Tech Center Dr., Suite 115,
Colorado Springs, CO 80919

Areas of Specialization

- Automotive Investigation Reconstruction
- Aviation Investigation and Reconstruction
- Commercial Vehicles
- Human Factors
- Visibility
- Motorcycles
- Bicycles
- Pedestrians
- Racecar Performance
- Mechanical Design
- Heat Transfer
- Aerodynamics
- Fluid Dynamics
- Experimental Testing

Positions Held

Engineering Systems Inc., Colorado Springs, Colorado

- Principal, 2024 – Present
- Principal and Senior Director, 2021 – 2024
- Principal and Director of the Automotive Practice Group, 2017 – 2021
- Principal and Director of Commercial Vehicles, 2015 – 2017
- Senior Managing Consultant, Director of Commercial Vehicles 2013 – 2015
- Senior Managing Consultant, 2012 – 2013
- Senior Consultant, 2005-2012
- Engineering Systems Inc., Colorado Springs, Colorado

University of South Florida

- USAF Professor of Aerospace Studies and Commander, 2022 – 2005

WPAFB, Ohio

- USAF C-17 Jet Engine Program Manager, 1999 – 2002
- USAF Lead Engineer, Joint Striker Fighter F120 Jet Engine, 1998 – 1999

USAF Academy, Colorado Springs, Colorado

- Associate Professor of Aeronautics, 1995-1998
- Instructor of Aeronautics, 1989-1992

Arnold Air Force Base, Tennessee

- USAF Re-entry Systems Test Manager, 1997-1999

USAF Aerospace Test Facility Manager, 1985-1987

Continuing Education

- **Event Data Recorder Update and Analysis** – Ruth Consulting, 2023
- **Traffic Signal Timing Records Interpretation and Analysis** – Traffic Signal Academy, University of Tennessee
- **Applied Vehicle Dynamics Course** – Precision Auto Research & Power Train Technology at Autobahn Country Club, Joliet, IL
- **Crash Data Retrieval (CDR) Technician Course** – Collision Safety Institute
- **Human Factors in Traffic Crash Reconstruction** – Institute of Police Technology and Management, University of North Florida
- **Bendix Air Brake Systems Training Program**

- **Occupant and Vehicle Kinematics in Rollovers –** Society of Automotive Engineers (SAE)
- **Pedestrian/Bicycle Crash Investigations -** Institute of Police Technology and Management, University of North Florida
- **Electronic Stability Control Systems Compliance Test Program –** NHTSA Technical Workshop and Demonstration, Transportation Research Center, Ohio
- **Investigation of Motorcycle Crashes –** Institute of Police Technology Management, University of North Florida
- **Vehicle Accident Reconstruction Methods –** Society of Automotive Engineers (SAE)
- **Inspection and Investigation of Commercial Vehicle Crashes** - Institute of Police Technology and Management, University of North Florida
- **Human, Vehicle, Environment (HVE) Simulation Software Training** – Engineering Dynamics Corp
- **Traffic Accident Reconstruction** – Northwestern University
- **Defense Acquisition Workforce Improvement Act (DAWIA)** – certified in Systems, Planning Research, Development, and Engineering, Test and Evaluation, and Program Management, Defense Systems Management College
- **Systems Safety Management** – University of Washington
- **Unsteady Aerodynamics** – University of Tennessee
- **Hypersonic Aerodynamics** – University of Tennessee
- **Aircraft Stability and Control Flight Testing** – University of Tennessee

Professional Affiliations/Honors

Society of Automotive Engineers

- Member
- CDCA Data Collection and Archiving Standard Committee
- Lead SAE J2969
- Use of Critical Speed Formula Task Force

American Institute of Aeronautics and Astronautics (AIAA)

- Member since 1990
- Associate Fellow
- Thermophysics Technical Committee, 1995-1998
- Young Engineer of the Year (Seven state Rocky Mountain Section), 1996

National Association of Professional Accident Reconstruction Specialists

- Member

USAF Propulsion Directorate, Wright Patterson AFB, Ohio

- Senior Professional of the Quarter, 2001

Frank J. Seiler Award for Research Excellence

- Nominee, 1996

United States Air Force Academy – Department of Aeronautics

- Company Grade Officer of the Quarter, 1991
- New Instructor of the Year, 1991

Arnold AFB, Tennessee

- Company Grade Officer of the Year, 1987

Pratt and Whitney

- Engineering Award, 1985

American Military

Engineers Award, 1984

Publications

"Simulations of Heavy Truck Rollovers and Sleeper Restraint System Effectiveness," Chinni, J., **Butler, R.**, SAE International, 2014-01-2420, September 2014

"Commercial Vehicle Skid Distance Testing and Analysis," Bedsworth, K, **Butler, R.**, Rogers, G., Breen, K. and Fischer, W., SAE International 2013-01-0771, April 2013

"Using GPS and Accelerometer Data to Reconstruct Aircraft Flight Parameters," Slane, J., **Butler, R.**, Morris, S., AIAA-2008-7032, Honolulu, Hawaii, August 2008

"Using GPS-based Data Acquisition to Evaluate Vehicle and Driver Performance," **Butler, R.**, Winn, R., Morris, S., Slane, J., Turnquist, D., and Wooddell, M., AIAA-2008-1146, Reno, Nevada, January 2008

"Analysis of a Hovering in Ground Effect," Morris, S., **Butler, R.**, Slane, J., McLaughlin T., Gamble, C., and Martin J., AIAA-2008-0431, Reno, Nevada, January 2008

"Using GPS-based Data Acquisition in Forensic Accident Reconstruction," **Butler, R.J.**, Breen, K.C., Fischer, W.J., Bedsworth, K.D., and Haupt, N.R., Collision - International Compendium of Crash Research, Volume 2, Issue 2, Fall 2007

“Evaluation of a General Aviation Flight Data Recorder,” Slane, J.H., **Butler, R.J**., Emmerling, J.J., Morris, S.L., Winn, R.C., and Kumley, K.B., AIAA 2007-6365, Hilton Head South Carolina, August 2007

“Analysis of Occupant Kinematics During a Commercial Vehicle/Passenger Vehicle Crash Test,” Bedsworth, K.D., **Butler, R**. J., Miller, J., and Breen, K.C., Classroom material and presentation at the Institute of Police Technology and Management, University of North Florida, April 2007

“The Effect of Turbulence Intensity and Length Scale on Low-Pressure Turbine Blade Aerodynamics**,” Butler, R. J**., Byerley, A. A., VanTreuren, K., and Baughn, J. W., International Journal of Heat and Fluid Flow, Volume 22, 2001

“The Effect of Gearing on Racetrack Vehicle Acceleration – Track Gearing,” **Butler, R.J**., NSX Driver (publication of the NSX Club of America), Q1, 2001

“Power, Torque and Acceleration - Vehicle Acceleration,” **Butler, R.J**., NSX Driver (publication of the NSX Club of America), Q3, 2000

“Aerothermodynamic Environment for a Generic Missile,” Zuber, M. E., Towne, M. C., Chen, A. J., Bertin, J. J., and **Butler, R. J**., Journal of Spacecraft and Rockets, Volume 36, Number 1, 1999

“Turbine Blade Flow Separation and Reattachment at Low Reynolds Number,” Baughn, J. W., Mayhew, J. E., **Butler, R. J**., Byerley, A. A., and Rivir, R. B., Journal of Heat Transfer, Volume 121, 1999

“Shroud Technique using the Transient Method for Local Heat Transfer Measurements**,” Butler, R. J**., and Baughn, J. W., The Journal of Experimental Heat Transfer, Volume 8, 1995

“Validation of an In-Situ Heated Transient Technique with Local Heat Transfer Measurements on a Cylinder in Cross-Flow,” **Butler, R. J**., and Baughn, J. W., AIAA 94-2009, 6th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Colorado Springs, Colorado, 1994

“Trisonic Wind Tunnel Envelope Expansion,” **Butler, R. J**., Department of Aeronautics Report, United States Air Force Academy, Colorado, 1992

“Boundary Layer Transition on Reentry Vehicle Nosetips,” **Butler, R. J.,** Arnold Engineering Development Center, AEDC-TMR-91-P5, August 1991

Presentations

“Accident Reconstruction-Interesting Cases,” **Butler, R.J**., presented at the Failure Analysis Symposium, L&C 4th Annual CLE Seminar, Denver, CO, June 14, 2019

“Simulations of Heavy Truck Rollovers and Sleeper Restraint System Effectiveness” Chinni, J., **Butler, R**., Yang, S., SAE 2014 Commercial Vehicle Engineering Congress, Rosemont, IL, October 7, 2014

“Commercial Vehicle Skid Distance Testing and Analysis,” Bedsworth, K.D., **Butler, R.J**., SAE World Congress, Detroit, MI, April 17, 2013

"Interesting Cases in Mechanical Engineering Forensics," **Butler, R.J**., Rocky Mountain Association of Special Investigation Units (RMASIU), monthly training, February 7, 2011

"The Latest Methods in Motor Vehicle Accident Reconstruction," **Butler, R.J**., Colorado Defense Lawyers Association Continuing Legal Education Seminar, Denver, Colorado, April 7, 2010

"Vehicle Dynamics," **Butler, R.J**., Colorado Continuing Legal Education Approved, The Track at Centennial, Englewood, Colorado, May 08, 2009

The State of the Art in Accident Reconstruction," Winn, R.C. and **Butler, R.J**., Association of Defense Trial Attorneys Annual Meeting, Scottsdale, Arizona, April 17, 2009

"Using GPS-based Data Acquisition to Evaluate Vehicle and Driver Performance," **Butler, R.J**., The Annual Aerospace Sciences Meeting, Reno NV, January 2008

"Vehicle Dynamics and Racecar Setup," **Butler, R.J**., SAE design competition students, United States Air Force Academy, Colorado, October 2007

"Motor Vehicle Accident Reconstruction," **Butler, R.J**., National ESi Accident Reconstruction Training, Florida, January 2006

"The Constitution," Daughters of the American Revolution annual meeting, Tampa, Florida, 2004

"Leadership," Golden Key International Honors Society Annual Induction Ceremony, 2003

"Vehicle Dynamics," Putnam Racetrack Classroom Instructor (IN), BMW Club of America, May 2001

"Racecar Setup and Handling," Mid-Ohio Sports Car Course Classroom Instructor (OH), BMW Club of America, September 2001

"Vehicle Dynamics," Road America Racetrack Classroom Instructor (WI), NSX Club of America, October 2001

Turbulence and Turbine Blade Heat Transfer," University of Kentucky, November 2000

"An Experimental Investigation of Heat Transfer, Transition and Separation on Turbine Blades at Low Reynolds Number and High Turbulence Intensity," ASME International Mechanical Engineering Congress, San Francisco, California, 1995

"Validation of an In-Situ Heated Transient Technique with Local Heat Transfer Measurements on a Cylinder in Cross-Flow," 6th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Colorado Springs, Colorado, 1994

Patents

United States Patent

US Patent #5,963,292, 1999, (Co-inventor): Laser Thermal Tuft. Method and device for measuring surface flow and boundary layer separation. This method uses a laser to heat a small spot on a liquid crystal coated surface. The flow direction is determined by measuring at the color pattern given off by the liquid crystal surface which produces asymmetric advection from the surface.