



**ROBERT J. BUTLER, Ph.D., P.E.**  
**PRINCIPAL**  
**DIRECTOR OF AUTOMOTIVE**  
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Dr. Butler is a Mechanical/Aeronautical Engineer. He is a Principal of the Firm and the Director of the Automotive Practice Group for 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.

### **Areas of Specialization**

Motor vehicle and aircraft accident investigation and reconstruction

Commercial vehicles, human factors, visibility, motorcycles, bicycles, pedestrians, and racecar performance

Mechanical design, heat transfer, aerodynamics, fluid dynamics, and experimental testing

### **Education**

Ph.D., Mechanical Engineering, University of California, Davis, 1995

M.S., Aerospace Engineering, University of Tennessee, 1989

B.S., Aeronautical Engineering, Embry-Riddle Aeronautical University, 1985

*June 2019*

## **Licensed Professional Engineer (P.E.)**

State of Colorado ..... License No. 40194

## **Professional Affiliations/Honors**

### **Society of Automotive Engineers (SAE) – Member**

Member of the CDCA Data Collection and Archiving Standard Committee  
Leads 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

### **National Association of Professional Accident Reconstruction Specialists – Member**

**Senior Professional of the Quarter, USAF Propulsion Directorate, Wright-Patterson AFB, OH, 2001**

**Nominee for the Frank J. Seiler Award for Research Excellence, 1996**

**American Institute of Aeronautics and Astronautics Young Engineer of the Year (seven-state Rocky Mountain Section), 1996**

**Company Grade Officer of the Quarter, USAF Academy, Department of Aeronautics, 1991**

**New Instructor of the Year, USAF Academy, Aeronautics Department, 1991**

**Company Grade Officer of the Year, Arnold AFB, TN, 1987**

**Pratt and Whitney Engineering Award, 1985**

**American Military Engineers Award, 1984**

## **Positions Held**

### **Engineering Systems Inc., Colorado Springs, Colorado**

Principal and Director of the Automotive Practice Group, June 2017 – Present  
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

**USAF Professor of Aerospace Studies and Commander, University of South Florida**  
2002 - 2005

**USAF C-17 Jet Engine Program Manager, WPAFB, Ohio**  
1999 – 2002

**USAF Lead Engineer, Joint Strike Fighter F120 Jet Engine, WPAFB, Ohio**  
1998 - 1999

**Associate Professor of Aeronautics, USAF Academy, Colorado**  
1995 - 1998

**Instructor of Aeronautics, USAF Academy, Colorado**  
1989 - 1992

**USAF Reentry Systems Test Manager, Arnold AFB, Tennessee**  
1987 - 1989

**USAF Aerospace Test Facility Manager, Arnold AFB, Tennessee**  
1985 - 1987

## **Continued Education**

Traffic Signal Timing Records Interpretation and Analysis, Traffic Signal Academy, University of Tennessee

Applied Vehicle Dynamics Course, Precision Auto Research & PowerTrain 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 Investigation, 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 and 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 Systems Management College, Defense Acquisition Workforce Improvement Act  
(DAWIA) certified in Systems, Planning Research, Development, and Engineering, Test  
and Evaluation, and Program Management

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

## **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.

## **Publications**

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

- Bedsworth, K., **Butler, R.**, Rogers, G., Breen, K., and Fischer, W., "Commercial Vehicle Skid Distance Testing and Analysis," SAE International 2013-01-0771, April, 2013
- Slane, J., **Butler, R.**, Morris, S., "Using GPS and Accelerometer Data to Reconstruct Aircraft Flight Parameters," AIAA-2008-7032, Honolulu, Hawaii, August, 2008
- Butler, R.**, Winn, R., Morris, S., Slane, J., Turnquist D., and Wooddell, M., "Using GPS-based Data Acquisition to Evaluate Vehicle and Driver Performance," AIAA-2008-1146, Reno, Nevada, January, 2008
- Morris, S., **Butler, R.**, Slane, J., McLaughlin, T., Gamble, C., and Martin, J., "Analysis of a Hoverwing in Ground Effect," AIAA-2008-0431, Reno Nevada, January, 2008
- Butler, R.J.**, Breen, K.C., Fischer, W.J., Bedsworth, K.D., and Haupt, N.R., "Using GPS-based Data Acquisition in Forensic Accident Reconstruction," Collision - International Compendium of Crash Research, Volume 2, Issue 2, Fall 2007
- Slane, J.H., **Butler, R.J.**, Emmerling, J.J., Morris, S.L., Winn, R.C., and Kumley, K.B. "Evaluation of a General Aviation Flight Data Recorder," AIAA 2007-6365, Hilton Head South Carolina, August 2007
- Bedsworth, K.D., **Butler, R. J.**, Miller, J., and Breen, K.C., "Analysis of Occupant Kinematics During a Commercial Vehicle/Passenger Vehicle Crash Test," Classroom material and presentation at the Institute of Police Technology and Management, University of North Florida, April, 2007
- Butler, R. J.**, Byerley, A. A., VanTreuren, K., and Baughn, J. W., "The Effect of Turbulence Intensity and Length Scale on Low-Pressure Turbine Blade Aerodynamics," International Journal of Heat and Fluid Flow, Volume 22, 2001
- Butler, R. J.**, The Effect of Gearing on Racetrack Vehicle Acceleration - "Track Gearing", NSX Driver (publication of the NSX Club of America), Q1, 2001
- Butler, R. J.**, Power, Torque and Acceleration - "Vehicle Acceleration", NSX Driver (publication of the NSX Club of America), Q3, 2000
- Zuber, M. E., Towne, M. C., Chen, A. J., Bertin, J. J., and **Butler, R. J.**, "Aerothermodynamic Environment for a Generic Missile," Journal of Spacecraft and Rockets, Volume 36, Number 1, 1999
- Baughn, J. W., Mayhew, J. E., **Butler, R. J.**, Byerley, A. A., and Rivir, R. B., "Turbine Blade Flow Separation and Reattachment at Low Reynolds Number," Journal of Heat Transfer, Volume 121, 1999
- Butler, R. J.**, The Physics of an Internal Combustion Engine - "Engine Basics", NSX Driver (publication of the NSX Club of America), Volume 3, No. 13, 1999
- Baughn, J. W., Mayhew, J. E., Anderson, M. R., and **Butler, R. J.**, "A Periodic Transient Method using Liquid Crystals for the Measurement of Local Heat Transfer Coefficients," Journal of Heat Transfer, Volume 120, 1998

- Butler, R. J.**, Ketsdever A., Leland, J., Roveda, R., Tsuyuki, G., and Wood, B.,  
“Thermophysics,” Year-In-Review Article, Aerospace America, December, 1998
- Welsh, S. T., Barlow, D. N., **Butler, R. J.**, and VanTreuren, K. W. “Effect of Passive and Active Air-Jet Turbulence on Turbine Blade Heat Transfer,” International Gas Turbine Conference, Orlando, FL, 1997
- Zuber, M. E., Towne, M. C., Chen, A. J., Bertin, J. J., and **Butler, R. J.**, “Determining the Aerothermodynamic Environment of a Generic Missile”, AIAA 97-12-09a, 6th AIAA/BMDO Technology Readiness Conference, San Diego, California, 1997
- Baughn, J. W., Mayhew, J. E., Anderson, M. R., and **Butler, R. J.**, “A Periodic Transient Method using Liquid Crystals for the Measurement of Local Heat Transfer Coefficients,” ASME National Heat Transfer Conference, Dallas, Texas, 1997
- Butler, R. J.** and Baughn, J. W., “The Effect of the Thermal Boundary Condition on Transient Method Heat Transfer Measurements on a Flat Plate with a Laminar Boundary Layer,” Journal of Heat Transfer, Volume 118, No. 4, 1996
- Hassan, B., Blanchard, D., **Butler, R. J.**, Hennessey, Meyer, M., Taylor, J., Tsuyuki, G., and Wiese, J., “Thermophysics,” Year-In-Review Article, Aerospace America, December, 1996
- Baughn, J. W., **Butler, R. J.**, Byerley, A. R., and Rivir, R. B., “An Experimental Investigation of Heat Transfer, Transition and Separation on Turbine Blades at Low Reynolds Number and High Turbulence Intensity,” ASME 95-WA/HT-25, 1995
- Butler, R. J.**, and Baughn, J. W., “Shroud Technique using the Transient Method for Local Heat Transfer Measurements,” The Journal of Experimental Heat Transfer, Volume 8, 1995
- Butler, R. J.**, and Baughn, J. W., “Validation of an In-Situ Heated Transient Technique with Local Heat Transfer Measurements on a Cylinder in Cross-Flow,” AIAA 94-2009, 6th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, Colorado Springs, Colorado, 1994
- Butler, R. J.**, “Trisomic Wind Tunnel Envelope Expansion,” Department of Aeronautics Report, United States Air Force Academy, Colorado, 1992
- Butler, R. J.**, “Boundary Layer Transition on Reentry Vehicle Nosetips,” Arnold Engineering Development Center, AEDC-TMR-91-P5, August, 1991

## Presentations

- Butler, R.**, “Accident Reconstruction – Interesting Cases,” L&C 4th Annual CLE Seminar, Denver, CO, June 14, 2019
- Chinni, J., **Butler, R.**, Yang, S., “Simulations of Heavy Truck Rollovers and Sleeper Restraint System Effectiveness,” SAE 2014 Commercial Vehicle Engineering Congress, Rosemont, IL, October 7, 2014

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

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

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

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

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

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

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

**Butler, R.J.**, Motor Vehicle Accident Reconstruction, Colorado Continuing Legal Education Approved, Colorado Defense Lawyers Association, March, 2006

**Butler, R.J.**, The use of Simulation Software in Accident Reconstruction, National ESi Accident Reconstruction Training, Florida, January, 2006

Daughters of the American Revolution annual meeting (Tampa), **Butler, R.J.**, "The Constitution," 2004, (Invited speaker)

Golden Key International Honors Society annual induction ceremony, **Butler, R.J.**, "Leadership," 2003, (Invited speaker)

Putnam Racetrack Classroom Instructor (IN), **Butler, R.J.**, "Vehicle Dynamics", BMW Club of America, May, 2001

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

Road America Racetrack Classroom Instructor (WI), **Butler, R.J.**, "Vehicle Dynamics", NSX Club of America, October, 2001

University of Kentucky, **Butler, R.J.**, "Turbulence and Turbine Blade Heat Transfer," November, 2000 (Invited speaker)

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



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January 2020

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