430 Technology Parkway NW
Peachtree Corners, GA 30092

PIERCE D. UMBERGER, Ph.D., P.E.
PRINCIPAL
DIRECTOR, APPLIED MECHANICS

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Dr. Pierce Umberger is a Principal and Director with Engineering Systems Inc. (ESi). His background includes mechanical engineering and materials science, with expertise in applied mechanics, stress analysis, fatigue and fracture mechanics, finite element analysis (FEA), as well as characterization and analysis of polymers, metals, and composite materials. In addition to his analytical background, Dr. Umberger has experience in instrumentation and testing, including data acquisition and development of custom fixture and test designs.

Dr. Umberger has broad experience in analysis of complex, multidisciplinary failures involving mechanical components and systems in the automotive, rail, aviation, consumer products, construction, and building industries. His investigative background includes consumer products, automotive, truck, and rail mechanical systems, vehicle dynamics, exercise and recreational equipment, medical devices, as well as elevators, lifting equipment, and material handling systems.

At ESi, Dr. Umberger applies his expertise to a wide range of investigative scenarios including accident reconstruction, product and premises liability litigation, recall campaigns, and mechanical and materials design consulting. Dr. Umberger is experienced in leveraging ESi's broad range of technical and consulting capabilities to perform large scale complex failure investigations across a broad range of industries.

Prior to joining ESi, Dr. Umberger conducted research including numerical and analytical modeling as well as mechanical testing with both the Virginia Tech Materials Response Group (MRG), as well as the U.S. Army Research Lab (ARL).

Areas of Specialization

- Accident Reconstruction
- Applied Mechanics
- Automotive Research
- Contact and Impact
- Design Analysis
- Engineering Failure Analysis
- Fatigue and Fracture Mechanics
- Lift and Material Handling Systems
- Mechanics
- Mechanical and Materials Design
- Mechanical Engineering
- Mechanical Testing
- Mechanics of Materials
- Metallic and Non-Metallic Materials
- Polymers and Composites

April 2025

Education

Ph.D., Engineering Mechanics, Virginia Tech

M.S., Engineering Mechanics, Virginia Tech

B.S., Mechanical Engineering, Virginia Tech

Licensed Professional Engineer (P.E.)

State of Georgia License Number: PE043353

Continuing Education

Institute of Police Technology and Management (IPTM) – Bosch CDR Tool Technician

University of Tennessee – Traffic Signal Academy: Traffic Signal Timing Records Interpretation and Analysis

Northwestern University Center for Public Safety – Traffic Crash Reconstruction

Precision Auto Research and PowerTrain Technology – Applied Vehicle Dynamics

Southwest Research Institute (SwRI) – NASGRO Fatigue and Fracture Mechanics

Aircraft Propeller Accident Investigation Course, Hartzell Propeller

Positions Held

Engineering Systems Inc., Peachtree Corners, GA

Principal, 2024 - Present

Director, Applied Mechanics, 2023 - Present

Senior Managing Consultant, 2022 - 2023

Senior Consultant, 2019 - 2021

Senior Staff Consultant, 2016 - 2018

Staff Consultant, 2014 - 2015

US Army Research Laboratory, Aberdeen Proving Ground, Aberdeen, MD

Weapons and Materials Research Directorate, Visiting Research Associate, 2009

Materials Response Group, Virginia Tech., Blacksburg, VA

Graduate Research Assistant, 2008 - 2013

Georgia-Pacific, LLC, Big Island, VA

Project Engineering Co-op, 2005 - 2007

Professional Affiliations

American Society of Mechanical Engineers (ASME)
Member

ASM International
Member

Society of Automotive Engineers (SAE)
Member

Society of Plastics Engineers (SPE)
Member

Publications & Presentations

"Fracture Appearance and Mechanisms of Deformation and Fracture," M.E. Stevenson, **P.D. Umberger**, S.F. Uchneat, ASM Handbook, Volume 11, ASM International, 2021.

"Failure Analysis of a Circular Saw Blade with a Fractured Carbide Tip," S.F. Uchneat, **P.D. Umberger**, M.E. Stevenson**,** J.L. McDougall, *Journal of Failure Analysis and Prevention,* Manuscript ID JFAP-19-06-2230.R1, accepted October 2019.

"The Little Plane that Could: Failure Analysis of a Robust Turbine Engine," presented at Materials Science & Technology Technical Meeting and Exhibition (MS&T 2019); D.E. Alexander, R.P. Baron, M.A. Lewis, C.M. Smith, **P.D. Umberger**, E.E. Wright, Portland, OR, September 30, 2019.

"Failure Analysis of Plastic Products through Stress Analysis Method," Eight-hour course taught by **P.D. Umberger**, part of the ESi Plastics Failure Analysis Workshop, August 17, 2018.

"Failure Analysis of an Aluminum Chiller Pipe by Experimental Simulation and Stress Analysis," M.E. Stevenson**,** H.C. Iwand, J.L. McDougall, **P.D. Umberger**, J.A. Wilkinson, M.T. Kenner, D.H. Stone, *Journal of Failure Analysis and Prevention, Vol. 17, Issue 5, 2017.*

"Applications of Failure Analysis Techniques in ATV Accident Investigation," presented at Materials Science & Technology Conference & Exhibition (MS&T 2015), Columbus, OH, October 5, 2015.

"Time-temperature Superposition and High Rate Response of Thermoplastic Composites and Constituents," Conference Proceedings of the Society for Experimental Mechanics, 2011, **P.D. Umberger**, S.W. Case, and F.P. Cook.

"Through Thickness Shear and Membrane Behavior of UHMWPE Composites," Proceedings of the 42nd Annual International SAMPE Technical Conference, 2010, **P.D. Umberger** and S.W. Case.