



1174 Oak Valley Drive
Ann Arbor, MI 48108

ERIC S. WINKEL, Ph.D., P.E., CFEI, CVFI
SENIOR MANAGING CONSULTANT

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Dr. Eric Winkel has more than 15 years of experience as a forensic consultant specializing in maritime matters. He has expertise in marine accident investigation and reconstruction, vessel and component design analysis, intellectual property matters, and has worked with a variety of other automotive and recreational products. Dr. Winkel has performed hundreds of accident investigations and accident reconstructions involving watercraft ranging from personal watercraft to large commercial vessels. He has extensive experience designing and executing experimental research to evaluate full-vehicle/vessel, system-level, and component-level performance on everything from watercraft to motorcycles to passenger vehicles.

Dr. Winkel also has expertise and experience in fluid mechanics, acoustics, dynamics and vibrations, structural analysis, and fracture mechanics along with other mechanical and marine engineering disciplines. He is a NAFI-certified fire investigator and has conducted numerous investigations of fire and explosion events.

Areas of Specialization

Accident Investigation & Reconstruction
Automotive, Marine, and Recreational Products
Naval Architecture/Marine Engineering
Intellectual Property
Fire & Explosion Investigations
Product Design Analysis

Education

B.S.E., Mechanical Engineering, University of Michigan, 2003
M.S.E., Mechanical Engineering, University of Michigan, 2004
Ph.D., Mechanical Engineering, University of Michigan, 2007

Licensed Professional Engineer (P.E.)

State of Michigan License No. 6201061021

April 2023



Professional Affiliations/Honors

National Association of Fire Investigators (NAFI)

Certified Fire and Explosion Investigator, CFEI #22182-12732
Certified Vehicle Fire Investigator, CFVI #22182-12732v

American Boat & Yacht Council (ABYC)

Certified Technician, Marine Systems
Certified Technician, Marine Electrical
Certified Technician, Marine Corrosion
Master Technician

Acoustical Society of America, Member
Society of Automotive Engineers, Member
Society of Naval Architects and Marine Engineers, Member
Society of Automotive Engineers, Technical Paper Reviewer

Positions Held

Engineering Systems, Inc., Ann Arbor

Senior Managing Consultant, 2023 – Present

Winkel Consulting Services, PLLC, Otsego

Principal Engineer, 2022 – 2023

Design Research Engineering, Novi

Senior Project Engineer, 2010 – 2022
Project Engineer, 2007 – 2010

Continued Education

Staged Vessel Collisions, National Association of State Boating Law Administrators
Chester, VA, September 2007, September 2008, May & September 2009

Training Seminar and Certification, English XL Tribometer
Tampa, FL, January 2008

Conference on Pedestrian Safety, American Society for Testing and Materials
Chester, VA, September 2009

Marine Accident Investigations, MS101, National Transportation Safety Board
Washington, DC, January 2009

FARO Training, FARO Laser Scanner Training
Novi, MI, December 2009

Chesapeake Power Boat Symposium
Annapolis, MD, March 2010

International Boatbuilders Exhibition and Conference
Louisville, KY, October 2010

Professional Level Workshop on Boat Repair, West Systems
October 2011

Educational Seminar, International Boatbuilders Exhibition and Conference



October 2011
Advanced Marine Fire Investigation, International Association of Arson Investigators
Sayreville, NJ, May 2014
Vehicle Fire Arson & Explosion Investigation Science & Technology Seminar, National Association of Fire Investigators
Lexington, KY, 2017
GPS Forensics, National Association of State Boating Law Administrators
Annapolis, MD, November 2018
Vessel Livery Operators, Florida Fish & Wildlife Conservation Commission
Online, October 2020
Corrosion Control, PDH Express
October 2020
Introduction to Wave Generation and Wave Shaping, PDH Express
October 2020
Marine Surveyor and Technician Seminar, American Boat & Yacht Council
February 2023
National Fire Investigator Training Program
Dallas, TX, February 2023

Publications & Presentations

Water Intrusion Injuries: Occupant Kinematics and Pressure Exposure during Rearward Falls from a Personal Watercraft,” Society of Automotive Engineers, Journal of Transportation Safety, 2022 (with M. Schirrmann, K. Zakutansky, K. Breen, and R. Taylor)

“Focus Headform Testing Used to Evaluate Head Injury Risk for Ejected Riders of Personal Watercraft,” Proceedings of the International Mechanical Engineering Congress & Exposition, American Society of Mechanical Engineers, IMECE 2017-72676, Nov 2017, Tampa, Florida (with C. Mkandawire, N. White, E. Schatz)

“Evaluation of Air Bag Electronic Sensing System Collision Performance through Laboratory Simulation,” Society of Automotive Engineers World Congress & Exhibition Occupant Protection: Safety Test Methodology, 2015 (with D. Toomey, R. Krishnaswami)

“Assessment of Compressive Thoracolumbar Injury Potential and Influence of Seat Cushions on Vertical Impact Loading of a Seated Occupant,” Society of Automotive Engineers International Journal of Passenger Cars – Mechanical Systems, 2015 (with D. Toomey, R. Taylor)

“Turbulence Profiles from a Smooth Flat-Plate Turbulent Boundary Layer at High Reynolds Number,” Experimental Thermal and Fluid Science, 2012 (With J. Cutbirth, M. Perlin, S. Ceccio, D. Dowling)

“The Mean Velocity Profile of a Smooth Flat-Plate Turbulent Boundary Layer at High Reynolds Number,” Journal of Fluid Mechanics, 2010 (with G. Oweis, J. Cutbirth, S. Ceccio, M. Perlin, D. Dowling)

“High-Reynolds-number Turbulent-Boundary-Layer Wall Pressure Fluctuations with Dilute Polymer Solutions,” Physics of Fluids, 2010 (with B. Elbing., S. Ceccio, M. Perlin, D. Dowling)

“Vehicle Chassis, Body, and Seat Buckle Acceleration Responses in the Vehicle Crash Environment,” Society of Automotive Engineers International Journal of Passenger Cars – Mechanical Systems, 2(1): 1151-1170, 2009 (with D. Toomey, E. Paddock, R. Burnett)

“High-Reynolds-Number Turbulent Boundary Layer Friction Drag Reduction from Wall-Injected Polymer Solutions,” Journal of Fluid Mechanics, 2009 (with G. Oweis, S. Vanapalli, D. Dowling, M. Perlin, M. Solomon, S. Ceccio)

“Degradation of Homogeneous Polymer Solutions in Large Diameter, High Shear Turbulent Pipe Flow,” Experiments in Fluids, 2009 (with B. Elbing, M. Solomon, S. Ceccio)

“Bubble-Induced Skin-Friction Drag Reduction and the Abrupt Transition to Air-Layer Drag Reduction,” Journal of Fluid Mechanics, 2008 (with B. Elbing, K. Lay, S. Ceccio, D. Dowling, M. Perlin)

“High-Reynolds-Number Turbulent-Boundary-Layer Wall Pressure Fluctuations with Skin-Friction Reduction by Air Injection,” Journal of the Acoustical Society of America, 2008 (with B. Elbing., S. Ceccio, M. Perlin, D. Dowling)

“Investigation of Drag Reduction Methods by Air Injection beneath a Turbulent Boundary Layer at High-Reynolds- Number,” 6th International Conference on Multiphase Flow, Leipzig, Germany, 2007 (with B. Elbing, M. Perlin, D. Dowling, S. Ceccio)

“On Using Cross-correlations of Turbulent Flow-induced Ambient Vibrations to Estimate the Structural Impulse Response: Applications to Structural Health Monitoring,” Journal of the Acoustical Society of America, 2007 (with K. G. Sabra, D. Bourgoyne, B. Elbing, S. Ceccio, M. Perlin, D. Dowling)

“Friction Drag Reduction at High Reynolds Numbers with Wall Injected Polymer Solutions,” 26th Naval Hydrodynamics Symposium, Sep 2006, Rome, Italy (with G. Oweis, S.A. Vanapalli, D. Dowling, M. Perlin, M. Solomon, S. Ceccio)

“Bubble Friction Drag Reduction in a High Reynolds Number Flat Plate Turbulent Boundary Layer,” Journal of Fluid Mechanics, Volume 552, 2006 (with W. Sanders, D. Dowling, M. Perlin, S. Ceccio)

“High-Reynolds-Number Turbulent-Boundary-Layer Surface Pressure Fluctuations with Bubble or Polymer Additives,” International Mechanical Engineering Congress and Exposition, American Society of Mechanical Engineers, 2005, Orlando, FL (with B. Elbing, D. Dowling, M. Perlin, S. Ceccio)

“Turbulent Boundary Layer Drag Reduction at High Reynolds Numbers with Wall-Injected Polymer Solution,” International Conference on Fast Sea Transport, June 2005, St. Petersburg, Russia (with D. Dowling, M. Perlin, S. Ceccio)

“Influence of Bubble Size on Micro-Bubble Drag Reduction,” International Conference on Fast Sea Transport, June 2005, St. Petersburg, Russia (with X. Shen, S. Ceccio, M. Perlin)

“Drag Reduction by a Homogenous Polymer Solution in Large Diameter, High Shear Pipe Flow,” 2nd International Symposium on Seawater Drag Reduction, May 2005, Busan, Korea. (with G. Garwood, S. Vanapalli, B. Elbing, D. Walker, S. Ceccio, M. Perlin, M. Solomon)

“Bubble-size Distributions Produced by Wall Injection of Air into Flowing Freshwater, Saltwater, and Surfactant Solutions,” *Experiments in Fluids*, Volume 37, 2004 (with S. Ceccio, D. Dowling, M. Perlin)

“Bubble Drag Reduction at Large Scales and High Reynolds Numbers,” 25th Symposium on Naval Hydrodynamics, Aug 2004, St. Johns, Newfoundland (with W. Sanders, J. Cho, E. Ivy, R. Etter, D. Dowling, M. Perlin, S. Ceccio)

“Mean Profile of a high-Reynolds-number Smooth-flat-plate Turbulent Boundary Layer,” *American Physical Society – Division of Fluid Dynamics*, 2010, Long Beach, CA (with D. Dowling, G. Oweis, J. M. Cutbirth, S. Ceccio, M. Perlin)

“Air Layer Drag Reduction,” *American Physical Society, Division of Fluid Dynamics*, 2008, San Antonio, TX (with S. Ceccio, B. Elbing, D. Dowling M. Perlin)

“Air Layer Drag Reduction,” *American Physical Society – Division of Fluid Dynamics*, 2007, Salt Lake City, UT (with B. Elbing, M. Perlin, D. Dowling, S. Ceccio)

“Near-wall PTV Measurements in a High-Reynolds-Number Flat-plate Turbulent Boundary Layer,” *American Physical Society, Division of Fluid Dynamics*, 2007, Salt Lake City, UT (with G. Oweis, M. Perlin, S. Ceccio, D. Dowling)

“High-Reynolds-Number Flat-Plate Turbulent Boundary Layer Measurements,” *American Physical Society, Division of Fluid Dynamics*, November 2006, Tampa Bay, FL (with J. M. Cutbirth, M. Perlin, S. Ceccio, D. Dowling)

“Structural Monitoring from Noise Cross-Correlation,” *Acoustical Society of America, Summer Meeting*, Jun 2006, Providence, RI (with K. G. Sabra, D. Bourgoynne, D. Dowling, S. Ceccio, M. Perlin, W. Kuperman)

“PIV and LIF Measurements of a Turbulent Boundary Layer with Injected Drag-reducing Polymers at High Reynolds Numbers,” *American Physical Society, Division of Fluid Dynamics*, 2005, Chicago, IL (with G. Oweis, D. Dowling, M. Perlin, and Ceccio)

“Development of a micro-PIV/ LIF System for the Study of High Reynolds Number Turbulent Boundary Layers,” *American Physical Society, Division of Fluid Dynamics*, Nov 2004, Seattle, WA (with G. Oweis, D. Dowling, S. Ceccio)

“Bubble Size Measurements for Air Injected into a Turbulent Boundary Layer in Fresh Water, Salt Water, and Surfactant Solutions,” *American Physical Society, Division of Fluid Dynamics*, Nov 2004, Seattle, WA (with S. Ceccio, D. Dowling, M. Perlin)

“Drag Reduction in High Shear Turbulent Pipe Flow,” *American Physical Society, Division of Fluid Dynamics*, Nov 2004, Seattle, WA (with G. Garwood, D. Walker, S. Ceccio)

“High-Reynolds-Number Turbulent Boundary Layer Pressure Fluctuations With and Without Bubbles,” *American Physical Society, Division of Fluid Dynamics*, Nov 2003, East Rutherford, NJ (with W. Sanders, S. Ceccio, D. Dowling, M. Perlin)

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