



**D E S I G N
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E N G I N E E R I N G**

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Eric S. Winkel, Ph.D.

Professional Specialization

Fluid dynamics, acoustics, heat transfer, and thermodynamics along with other general mechanical engineering disciplines. Marine dynamics, resistance and propulsion, maneuvering, and stability of boats and personal watercraft. Accident investigation, analysis and reconstruction related to recreational watercraft. Digitization and CAD rendering of accident scenes and vessels.

Design and development of instrumentation for measurement of turbulent, multi-phase, and polymeric flows. Design and execution of large scale and laboratory scale fluid dynamics experiments related to ship resistance, propulsion, and acoustics involving instrumentation, data reduction, and analysis. Numerical and analytical modeling of single-phase and multi-phase flows.

Professional Background

B.S.E. (Mechanical Engineering), University of Michigan - Ann Arbor, 2003

M.S.E (Mechanical Engineering) University of Michigan - Ann Arbor, 2004

Ph.D. (Mechanical Engineering) University of Michigan - Ann Arbor, 2007

Project Engineer,

Design Research Engineering

January 2007-present

Research Consultant,

Sandia National Laboratories

April 2006-December 2006

Honors

Magna cum Laude, University of Michigan

Rackham Merit Fellowship, University of Michigan

Presentations

“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. L. Ceccio, and D. R. Dowling).

“Structural Monitoring from Noise Cross-Correlation,” Acoustical Society of America, Summer Meeting, June 2006, Providence, RI (with K. G. Sabra, D. A. Bourgoyne, D. R. Dowling, S. L. Ceccio, M. Perlin, and W. A. Kuperman).

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

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

“Bubble Friction Drag Reduction at High Reynolds Number,” American Physical Society Division of Fluid Dynamics, November 2003, East Rutherford, NJ (with W. C. Sanders, E. Ivy, J. Cho, S. L. Ceccio, D. R. Dowling, and M. Perlin).

“Flat Plate Turbulent Boundary Layer Measurements at High Reynolds Numbers,” American Physical Society Division of Fluid Dynamics, November 2002, Dallas, TX (with W. C. Sanders, C. Judge, E. Ivy, S. L. Ceccio, D. R. Dowling, and M. Perlin).

“Turbulent Boundary Layer Pressure Fluctuations at Large Scales and High Reynolds Number,” Acoustical Society of America, June 2002, Pittsburgh, PA (with W. C. Sanders, C. Judge, D. R. Dowling, M. Perlin, and S. L. Ceccio).

Publications

“High-Reynolds-Number Turbulent-Boundary-Layer Wall Pressure Fluctuations with Bubble or Polymer Additives,” *Journal of the Acoustical Society of America*, (under review) 2007 (with B.R Elbing., S. L. Ceccio, M. Perlin, D. R. Dowling).

“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*, (in press) 2007 (with K. G. Sabra, D. A. Bourgoyne, B. R. Elbing, S. L. Ceccio, M. Perlin, and D. R. Dowling).

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

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

“High-Reynolds-Number Turbulent-Boundary-Layer Surface Pressure Fluctuations with Bubble or Polymer Additives,” ASME International Mechanical Engineering Congress and Exposition, 2005, Orlando, FL (with B. R. Elbing, D. R. Dowling, M. Perlin, and S. L. 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. R. Dowling, M. Perlin, and S. L. 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. L. Ceccio, and 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. C. Garwood, S. Vanapalli, B.R. Elbing, D. T. Walker, S. L. Ceccio, M. Perlin, and M. J. Solomon)

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

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

Doctoral Dissertation

“High Reynolds Number Turbulent Boundary Layer Measurements and Skin-friction Drag Reduction with Gas or Polymer Injection,” The University of Michigan, Ann Arbor, MI, January 2007.