

Exponent®
Engineering & Scientific Consulting

Reeve Dunne, Ph.D., P.E., CFEI

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Professional Profile

Dr. Dunne's background is in mechanical engineering, specializing in fluid mechanics, heat transfer, combustion, experimental design, and renewable energy systems. At Exponent Dr. Dunne has applied his mechanical engineering background across a broad range of topics, and has conducted fire origin and cause analyses in vehicles, residential structures and in the wildland and wildland urban interface (WUI).

Dr. Dunne has project experience with gas and electric distribution and transmission, renewable energy, automotive safety systems, propellants, consumer electronics, power generation, oil and gas, and medical devices.

Dr. Dunne has conducted failure investigations, and risk assessments for potential product recalls for the consumer electronics, machinery and automotive industries. He has performed analyses and provided consultation for disputes in electric generation capacity, building fire codes and standards, oil and gas pipeline failures, and fire incidents in the wildland urban interface and is actively pursuing modelling methods to model and evaluate wildland fire risk. He has also performed technical support in the design and production of kitchen appliances, medical devices, pyrotechnics and consumer electronics.

Prior to joining Exponent, Dr. Dunne completed his Ph.D. thesis at the California Institute of Technology measuring dynamic stall on the blades of vertical axis wind turbines. Toward this goal he designed and implemented experimental apparatus and utilized optical measurement techniques and reduced order modeling to understand the complex fluid dynamics. Through this work he gained extensive experience with water and wind tunnels, mechanical actuation and optical and mechanical sensing.

During his graduate studies at Caltech Dr. Dunne completed teaching assistantships for graduate courses in experimental methods and flow control. Additionally, he served as a machine shop supervisor for graduate and undergraduate research and mechanical design courses and supervised summer students in measurement device fabrication. In this capacity he supervised projects in the control of wake and combustion instabilities, velocity measurement, optical strain measurement, big data analysis, and reduction. Prior to graduate school Dr. Dunne led a small team to design and build a 14" research wind tunnel at Tufts University.

Outside of the laboratory Dr. Dunne applies his knowledge of fluid mechanics to compete internationally in sailing, placing in the top ten in World Championships and was the 2016 North American champion in the International 505 class.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, California Institute of Technology (Caltech), 2016

M.Sc., Mechanical Engineering, California Institute of Technology (Caltech), 2012

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B.S., Mechanical Engineering, Tufts University, 2010

Licenses and Certifications

Professional Engineer Mechanical, California, #39304

Certified Fire and Explosion Investigator (CFEI)

Professional Affiliations

American Institute of Aeronautics and Astronautics (Member)

American Physical Society (Member)

Tau Beta Pi (Member)

American Society of Mechanical Engineers (Member)

Publications

Owens Z, Gilman L, Dunne R, McNulty J, Kemal A. Evaluation of breathable enclosures for thermal management of outdoor electronics. In Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm), 2017 16th IEEE Intersociety Conference on 2017 May 30 (pp. 6-12). IEEE.

Dunne R, Schmid, P.J. McKeon BJ. Analysis of flow timescales on a periodically pitching/surging airfoil. 2016. AIAA Journal. http://dx.doi.org/10.2514/1.J054784

Dunne R, McKeon B. Dynamic stall on a pitching and surging airfoil. 2015. Experiments in Fluids. https://link.springer.com/article/10.1007/s00348-015-2028-1

Conference Proceedings

Dunne R, Tsai, HC, Colonius T, McKeon BJ. Leading edge vortex development on pitching and surging airfoils: A study of vertical axis wind turbines. International Conference on Wakes, Jets and Separated flows, Stockholm, Sweden, June 16-18, 2015. DOI 10.1007/978-3-319-30602-5.

Dunne R, McKeon BJ. A study of separation on airfoil undergoing pitch, surge and combined motions. 33rd AIAA Applied Aerodynamics Conference, Dallas, TX, June 22-26, 2015, http://arc.aiaa.org/doi/pdf/10.2514/6.2015-2882.

Dunne R, McKeon BJ. Dynamic separation on a pitching and surging airfoil as a model for ow over vertical axis wind turbine blades. 32nd AIAA Applied Aerodynamics Conference, Atlanta, GA, June 16-20, 2014. http://arc.aiaa.org/doi/abs/10.2514/6.2014-3142.

Conference Presentations

Dunne R, McKeon BJ. Vortex shedding from vertical axis wind turbine blades under linear motion. Bulletin of the American Physical Society 2014; 59.

Dunne R, McKeon BJ. Dynamic separation on a pitching and surging airfoil as a model for flow over vertical axis wind turbine blades. 32nd AIAA Applied Aerodynamics Conference, Atlanta, GA, June 16-20, 2014. http://arc.aiaa.org/doi/abs/10.2514/6.2014-3142.

Dunne R. McKeon BJ. Experimental investigation of the leading edge vortex on vertical axis wind turbine blades. Bulletin of the American Physical Society 2012; 57.

Additional Education & Training

National Fire Protection Association Training “Assessing Structure Ignition Potential from Wildfire”