

Vijay Somandepalli, Ph.D., P.E., CFEI
Managing Engineer**Professional Profile**

Dr. Vijay Somandepalli is a Managing Engineer in Exponent's Thermal Sciences practice. Dr. Somandepalli specializes in mechanical engineering and engineering analysis of thermal and flow processes and applies his expertise to the investigation and prevention of fires and explosions, and the determination of their cause and origin. He also performs experimental testing and analyses related to fluid mechanics, thermodynamics, heat transfer, and combustion phenomena associated with the operation, performance and failure analysis of consumer products, mechanical systems and industrial equipment, and the investigation of fires and explosions.

Dr. Somandepalli has also been actively involved in the renewable energy and cleantech domain providing services in intellectual property and technology development, review of technology, and technical due diligence.

Dr. Somandepalli specializes in the testing and analysis of heating, ventilation, and air conditioning (HVAC) systems and their components and subsystems. He has investigated incidents involving steam systems, air conditioning units, boilers, gas appliances, electrical appliances, and various types of sensors and their subsystems. Dr. Somandepalli also has expertise in the risks associated with the production and spread of carbon monoxide in HVAC systems, buildings, and vehicles. In addition, he has investigated flooding and damage caused by transient fluid and water hammer effects in pump stations, pipelines, and HVAC systems.

Dr. Somandepalli also actively investigates incidents involving thermal injuries like fires, burns, and scalds that occur during medical procedures in hospitals and home patient care. He is knowledgeable of codes and regulations intended to prevent thermal injury. Dr. Somandepalli has a particular interest in fire risks in operating rooms due to the use of oxygen and flammable gases and solvents.

Prior to joining Exponent, Dr. Somandepalli was a Research Assistant in the High Temperature Gasdynamics Laboratory at Stanford University, where he worked on drag reduction strategies for naval applications. For these experiments, he has extensively used advanced laser-based diagnostic techniques including Particle Imaging Velocimetry (PIV) and Planar Laser Induced Fluorescence (PLIF). Before joining Stanford, he conducted research on combustion in high speed flows with applications in aerospace propulsion and combustion instabilities in large solid rocket motors at the Indian Institute of Science and Indian Institute of Technology.

Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, Stanford University, 2006
M.S., Mechanical Engineering, Stanford University, 2001
B. Tech., Aerospace Engineering, Indian Institute of Technology, 1999

Licenses and Certifications

Registered Professional Engineer, California, #35645

Certified Fire and Explosion Investigator (CFEI) in accordance with the National Association of Fire Investigators National Certification Board per NFPA 921 Section 13.6.5.2

Hazardous Waste Operations and Emergency Response training (29 CFR 1910.120)

Publications and Conference Proceedings

Somandepalli V, Wise J, Arena B, Davis S. Crimp connector failures: Quantifying the cause of resistive heating. Proceedings, ISFI 2010, September 2010.

Somandepalli V, Morse TL. PIV in combustion systems. Laser Diagnostics in Combustion, Lackner M(ed), Verlag ProcessEng Engineering GmbH, 2009.

Somandepalli V, Kelly S, Davis S. Hot surface ignition of ethanol-blended fuels and biodiesel. Proceedings, SAE 2008 World Congress, Detroit, MI, 2008.

Davis S, Wise J, Engel D, Somandepalli V. Crimp connector failures: Quantifying copper oxide growth. Proceedings, International Symposium on Fire Investigation Science and Technology, Cincinnati, OH, 2008.

Hou YX, Somandepalli V, Mungal MG. Streamwise development of turbulent boundary layer drag reduction with polymer injection. Journal of Fluid Mechanics 2008; 597.

Somandepalli V. Combined PIV and PLIF measurements in a polymer drag reduced turbulent boundary layer. Ph.D. Thesis, Mechanical Engineering Department, Stanford University, 2006.

Hou YX, Somandepalli V, Mungal MG. A technique to determine total shear stress and polymer stress profiles in drag reduced boundary layer flows. Experiments in Fluids 2006; 40.

Paschkewitz JS, Dimitropoulos CD, Somandepalli V, Hou YX, Mungal MG, Shaqfeh ESG, Moin P. An experimental and numerical investigation of drag reduction in a turbulent boundary layer using a rigid rod-like polymer. Physics of Fluids 2005; 17.

White CM, Somandepalli V, Mungal MG. The turbulence structure of drag reduced boundary layer flow. Experiments in Fluids 2004; 36.

Somandepalli V, White CM, Mungal MG. Boundary layer studies on polymer drag reduction using PIV and PLIF. Proceedings, Symposium on Microbubble and Polymer Friction Drag Reduction, Hawaii, 2003.

Presentations

Somandepalli V, Wise J, Arena B, Davis S. Crimp connector failures: Quantifying the cause of resistive heating. Proceedings, ISFI 2010, September 2010.

Somandepalli V, Kelly S, Davis S. Hot surface ignition of ethanol-blended fuels and biodiesel. Proceedings, SAE 2008 World Congress, Detroit, MI, 2008.

Davis S, Wise J, Engel D, Somandepalli V. Crimp connector failures: Quantifying copper oxide growth. Proceedings, International Symposium on Fire Investigation Science and Technology, Cincinnati, OH, 2008.

Hou YX, Somandepalli V, Mungal MG. Polymer stress contribution in turbulent boundary layer drag reduction. Proceedings, 5th International Symposium on Turbulence and Shear Flow Phenomena, Munich, Germany, August 2007.

Hou YX, Somandepalli V, Mungal MG. Turbulent boundary layer drag reduction with polymer injection. Proceedings, 11th EUROMECH European Turbulence Conference, Porto, Portugal, June 2007.

Somandepalli V, Davis SG. Hot surface ignition of gasoline, E85, Diesel and E-Diesel. 10th Annual Topical Conference on Refinery Processing, American Institute of Chemical Engineers Spring National Meeting, Houston, TX, April 22–27, 2007.

Somandepalli V, Mungal MG. Improving near-wall resolution in PIV using directional magnification. Proceedings, PIV'05, Pasadena, CA, September 2005.

Hou YX, Somandepalli V, Mungal MG. Determination of total shear stress and polymer stress profiles in drag reduced boundary layer flows with polymer injection. Proceedings ASME, FEDSM2005, Houston, TX, June 2005.

Somandepalli V, Hou YX, Mungal MG. Streamwise evolution of drag reduction in a boundary layer with polymer injection. Proceedings, 2nd International Symposium on Seawater Drag Reduction, Busan, Korea, May 2005.

Somandepalli V, Mungal MG. A novel technique to improve near wall resolution in PIV using cylindrical lenses. Proceedings, 12th International Symposium on Application of Laser Techniques to Fluid Mechanics, Lisbon, Portugal, July 2004.

Somandepalli V, Thaker IH, Chakravarthy SR, Sujith RI, Kurian J. Characterization of acoustic field induced by flow past cavities in supersonic combustors. 36th AIAA/ASME/SAE Joint Propulsion Conference, Los Angeles, CA, July 1999.

Professional Affiliations

- National Association of Fire Investigators—NAFI (member, CFEI)
- National Fire Protection Association—NFPA (member)
- American Society of Mechanical Engineers—ASME (member)
- ASTM International—ASTM (member)