

## Peter C. Hinze, Ph.D. Managing Engineer

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### Professional Profile

Peter C. Hinze, Ph.D. is a Managing Engineer at GexCon US Inc. He specializes in the application of mechanical engineering principles to the analysis and investigation of automotive systems, industrial processes, fires, and explosions. He has investigated fires and explosions involving vehicles, industrial and manufacturing processes, and residential appliances. Dr. Hinze has particular experience investigating fires associated with automobiles, heavy equipment, motorcycles, and trucks, where common fire scenarios include post-collision fires, vehicles involved in fires in garages and other structures, and fires that occur while the vehicle is being operated. He analyzes how these fire scenarios, along with design, operation, maintenance, and presence of aftermarket equipment, are related to mechanisms of fire causation and spread. Dr. Hinze is also responsible for fire and explosion consulting, including investigation of accidents and performing risk assessments and safety studies for petrochemical facilities, oil and gas platforms, and various other industries. This work includes explosion safety assessment, analysis of explosion pressures and blast waves, release and dispersion of toxic and flammable gases, hydrogen safety, ventilation, and gas detector placement using the world-leading FLACS software developed by GexCon.

Dr. Hinze's primary areas of expertise are automotive engineering, power generation technology and combustion, and his research has concentrated on the investigation of flow and combustion phenomena in spark ignition engines. Dr. Hinze has used high-speed visualization as well as laser diagnostic techniques such as laser Doppler velocimetry (LDV), laser induced fluorescence (LIF), and Raman spectroscopy in his research. In addition, he has performed computational analyses involving combustion chemistry, fluid mechanics, heat and mass transfer, and thermodynamics.

Prior to joining GexCon, Dr. Hinze worked as a manager at Exponent and as a researcher at the Combustion Research Facility at Sandia National Laboratories in Livermore, California. He has also performed research at the Sloan Automotive Laboratory of the Massachusetts Institute of Technology.

### Academic Credentials and Professional Honors

Ph.D., Mechanical Engineering, Massachusetts Institute of Technology, 1997

M.S., Mechanical Engineering, Massachusetts Institute of Technology, 1993

B.S., Mechanical Engineering, Massachusetts Institute of Technology, 1991

Pi Tau Sigma, Mechanical Engineering Honor Society; Sigma Xi, Scientific Research Honor Society; Tau Beta Pi, Engineering Honor Society; Whitelaw Prize for Original and Inspiring Design Performance, 1990

### Licenses and Certifications

Fire Investigation 1A Certification accredited by the California State Fire Marshal

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## Publications

Hansen, OR, Hinze, PC, Engel, D, Davis SG. Using CFD for blast wave predictions. Proceedings, 2009 Mary Kay O'Connor Process Safety Center International Symposium, College Station, TX.

Myers TJ, Hinze, PC, Kytömaa, HK. Fire and explosion in an explosives conditioning bunker. Proceedings, 42nd Annual Loss Prevention Symposium, American Institute of Chemical Engineers Spring National Meeting, New Orleans, LA, 2008.

Davis SG, Diamond A, Gans W, Hinze PC, Kytömaa H. Don't judge a crimp by its cover. Connector Specifier 2004; 20(10).

Carpenter AR, Hinze, PC. System safety analysis of hydrogen and methanol vehicles fuels. Process Safety Progress, 2004.

Martin RJ, Myers TJ, Hinze PC, Kytömaa HK. Test your incinerator knowledge. Chemical Engineering Progress 2003; 99(2):36-39.

Martin RJ, Hinze PC, Myers TJ, Kytömaa HK. Thermal oxidizing systems. Hydrocarbon Processing 2002; 81(11):79-80.

Knaus DC, Gouldin FC, Miles PC, Hinze, PC. Measurement of instantaneous flamelet surface normals and the burning rate in a SI engine. SAE Paper 1999-01-3543, SAE International Fuels and Lubricants Meeting and Exposition, SAE Trans., Vol. 108, October 1999.

Hinze PC, Miles PC. Quantitative measurements of residual and fresh charge mixing in a modern SI engine using spontaneous Raman scattering. SAE Paper 1999-01-1106, SAE International Congress and Exposition, SAE Trans., Vol. 108, March 1999.

Miles PC, Hinze PC. Characterization of the mixing of fresh charge with combustion residuals using laser Raman scattering with broadband detection. SAE Paper 981428, SAE International Fuels and Lubricants Meeting, SAE Trans., Vol. 107, May 1998.

Han, SB, Hinze, PC. Experimental investigation of smoke emission dependent upon engine operating conditions. SAE Paper 971658, SAE International Fuels and Lubricants Meeting, May 1997.

Shen H, Hinze PC, Heywood JB. A study of cycle-to-cycle variations in SI engines using a modified quasi-dimensional model. SAE paper 961187, SAE International Fuels and Lubricants Meeting, SAE Trans., Vol. 105, May 1996.

Shen H, Hinze PC, Heywood JB. A model for flame initiation and early development in SI engines and its application to cycle-to-cycle variations. SAE paper 942049, SAE International Fuels and Lubricants Meeting and Exposition, SAE Trans., Vol. 103, October 1994.

Hinze PC, Cheng WK. Flame kernel development in a methanol fueled engine. SAE paper 932649, SAE International Fuels and Lubricants Meeting and Exposition, SAE Trans., Vol. 102, October 1993.

## Presentations

Hinze PC, Cheng WK. Assessing the factors affecting SI engine cycle-to-cycle variations at idle. 27th Symposium (International) on Combustion, The Combustion Institute, 1998.

Hinze PC, Cheng WK. Effects of charge composition on SI engine cyclic variations at idle. Fourth International Symposium on Diagnostics and Modeling of Combustion in Internal Combustion Engines (COMODIA 98), Kyoto, Japan, July 1998.

**Prior Experience**

Managing Engineer in Exponent's Thermal Science Practice, Exponent – Failure Analysis Associates, Boston, MA (1999–2008)

Postdoctoral Fellow, Sandia National Laboratories, Livermore, CA (1997–1999)

Graduate Research Assistant, Mechanical Engineering, Massachusetts Institute of Technology (1991–1997)

**Professional Affiliations**

- Society of Automotive Engineers (member)
- American Society of Mechanical Engineers (member)
- National Fire Protection Association (member)
- National Association of Fire Investigators (member)