

Nicolas F. Ponchaut, Ph.D., P.E., CFEI
Senior Engineer**Professional Profile**

Dr. Nicolas Ponchaut is a Senior Engineer in Exponent's Thermal Science practice. He performs investigations and analyses related to fires, explosions, chemical releases, and equipment failures. Dr. Ponchaut specializes in heat transfer problems involving phase changes such as LNG evaporation, water condensation, and fog formation. He also specializes in the area of computational fluid dynamics and heat transfer modeling. He has extensive experience in the development and the use of numerical codes for the purpose of studying fluid dynamics problems, multi-phase flow behaviors, and flow-structure interactions.

Dr. Ponchaut also has significant experience in turbomachinery and has been involved in the investigation of compressor surge events and blade vibration problems. He has capabilities in analyzing a variety of phenomena using experimental, numerical, and theoretical methods.

Prior to joining Exponent, Dr. Ponchaut worked as a post doctorate fellow at McGill University and as a research assistant at the California Institute of Technology. He has been responsible for the development of various experimental measurement techniques in both subsonic and supersonic flows. He wrote several numerical solvers and used them to investigate the flow features in the explosion of reacting spheres. These solvers are still currently used in defense research laboratories. In addition to his expertise in fluid mechanics, Dr. Ponchaut obtained a minor in solid mechanics.

Academic Credentials and Professional Honors

Ph.D., Aeronautics, California Institute of Technology, 2005
M.S., Aeronautics, California Institute of Technology, 2001
B.S., Electro Mechanical Engineering, Université de Liège, 2000

Rolf D. Buhler Memorial Award in Aeronautics, 2001
High and Highest Academic Honors, 1996–2000
Pisart Organization Fellowship, 1995–1996

Licenses and Registrations

Registered Professional Engineer, California, #35390

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

Languages

French

Publications

Hornung HG, Pullin PI, Ponchaut NF. On the question of universality of imploding shock waves. *Acta Mechanica* Dec 2008; 201(1–4).

Ponchaut NF, Hornung HG, Pullin DI, Mouton CA. On imploding cylindrical and spherical shock waves in a perfect gas. *J. Fluid Mech* 2006; 560:103–122.

Ponchaut NF. Part I: 3DPTV: Advances and error analysis. Part II: Extension of Guderley's solution for converging shock waves. Ph.D. Thesis, California Institute of Technology, June 2005.

Presentations

Ponchaut NF, Kytömaa HK, Ibarreta AF. Modeling the vapor source associated with spills of LNG into troughs and trenches. AIChE Spring National Meeting, Chicago, IL, March 2011.

Ponchaut NF, Kytömaa HK, Morrison DR, Chernovsky MK. Modeling the vapor source associated with the spill of LNG into a sump or an impoundment area. Mary Kay O'Connor Process Safety Center. 2010 International Symposium, College Station, TX, October 2010.

Ponchaut NF, Kytömaa HK. Cooldown of large pipes during the commissioning phase of cryogenic facilities. AIChE Spring Meeting, 10th Topical Conference on Natural Gas Utilization, San Antonio, TX, March 2010.

Myers TJ, Kytömaa HK, Ibarreta AF, Ponchaut NF. Analyzing historic process data to identify near misses and warning signs: Examples from the Buncefield incident. AIChE Spring Meeting, 6th Global Congress on Process Safety, San Antonio, TX, March 2010.

Kytömaa HK, Myers TJ, Ibarreta AF, Ponchaut NF. Using real time process models to detect loss of containment and mitigate hazards. AIChE Spring Meeting, 6th Global Congress on Process Safety, San Antonio, TX, March 2010.

Ponchaut NF, Kytömaa HK. Transient spreading of LNG on water. Mary Kay O'Connor Process Safety Center. 2009 International Symposium, College Station, TX, October 2009.

Kytömaa HK, Myers TJ, Ibarreta A, Ponchaut NF. Anatomy of the failures that led to the Buncefield explosion and fire. Mary Kay O'Connor Process Safety Center, 2009 International Symposium, College Station, TX, October 2009.

Ponchaut NF, Chernovsky M, Gavelli F, Kytömaa HK. Modeling the spreading of large LNG spills on water. AIChE Spring Meeting, 9th Topical Conference on Natural Gas Utilization, Tampa, FL, April 2009.

Ponchaut NF, Zhang F, Lee JHS. Blast wave from the explosion of a reacting sphere. Combustion Institute/Canadian Section Spring Technical Meeting, Waterloo, ON, Canada, May 2006.

Ponchaut NF, Mouton CA, Hornung HG. Development of three dimensional particle tracking velocimetry for supersonic flow. 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, January 2004.

Ponchaut NF, Mouton CA, Valiferdowski B, Hornung HG. Design of a Mach 2.3 Ludwig tube. Invited Presentation, Korea and Japan, March 2003.

Ponchaut NF, Mouton CA, Hornung HG. Implementation of 3D-particle triangulation velocimetry. Invited Presentation, Korea and Japan, March 2003.

Academic Appointments

McGill University, Mechanical Engineering, Postdoctoral Fellow, 2005–2006

Peer Reviewer

- Physics of Fluids
- Shock Waves