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Christopher S. Buehler, Ph.D., P.E.
Senior Managing Engineer

Professional Profile

Dr. Christopher Buehler is a Senior Managing Engineer in Exponent's Thermal Sciences practice. Dr. Buehler specializes in the application of chemical engineering principles to the analysis, investigation, and prevention of accidents with emphasis on fires, explosions, and chemical releases. He has investigated numerous fires and explosions at petroleum refineries, natural gas and chemical process facilities, and other locations where chemicals were involved such as warehouse storage and containerized transport. Further, Dr. Buehler has characterized, quantified, and evaluated the chemical fate of numerous atmospheric releases and spills, including flare emissions during periods of a process upset as well as developed test programs and engineering analysis for examination of indoor air quality.

Dr. Buehler's projects have involved the performance evaluation and failure analysis of a wide range of process equipment. He has developed chain-of-events scenarios from various sources of evidence including physical artifacts, process measurement data, sample analyses, electronic event logs, eyewitness accounts, surveillance video, and simulations. Dr. Buehler's area of expertise further extends to the stability and hazard potential of chemicals and chemical mixtures and the compatibility of materials with specific chemical environments. He has investigated incidents involving self-heating or thermal runaway of chemicals and unintentional chemical reactions of incompatible materials.

The production and use of hydrogen, biogas, and other alternative sources of energy interests Dr. Buehler. Of particular interest are gasification systems to convert materials such as coal or organic wastes into hydrogen, syngas, and synthetic fuels.

Prior to joining Exponent, Dr. Buehler has held research positions with academic institutions such as Villanova University and Purdue University and has also worked as a researcher for the ARCO Chemical Company.

Academic Credentials and Professional Honors

Ph.D., Chemical Engineering, Purdue University, 1991
M.S., Chemical Engineering, Purdue University, 1989
B.S., Chemical Engineering, Villanova University, 1984

Phi Lambda Upsilon; Phi Kappa Phi; Tau Beta Pi; Magoon Award for Outstanding Undergraduate Teaching Assistant 1988

Licenses and Certifications

Registered Professional Engineer, Texas, #100498
Hazardous Waste Operation and Emergency Response Certification, 29 CFR 1910.120
Confined Space Entry Certification, 29 CFR 1910.146

Publications

Gunaseelan P, Buehler C, Chan WR. Greenhouse gas emissions: Characterization and management. Hydrocarbon Process 2009; September.

Gunaseelan P, Buehler C. Changing US crude imports are driving refinery upgrades. Oil Gas J 2009; August.

Buehler CS, Caruthers JM, Franses EI. Spectroturbidimetry theory for determining orientation distributions of spheroidal particles in the Rayleigh-Debye-Gans and Rayleigh scattering segimes. J Chem Phys 1994; 100:2422–2428, February.

Buehler CS, Caruthers JM, Franses EI. Theory and measurements of orientation distributions of spheroidal particles by Rayleigh-Debye-Gans light scattering. J Chem Phys 1993; 98:3600–3611, March.

Buehler CS. Measurement of orientation distributions of spheroidal particles by light scattering. Ph.D. Dissertation, Purdue University, 1991.

Buehler CS, Caruthers JM, Franses EI. Light scattering theory from monodisperse spheroidal particles in the Rayleigh-Debye-Gans regime. J Chem Phys 1990; 92:140–156, January.

Buehler CS. Light scattering determination of size, shape, and orientation of spheroidal particles in the Rayleigh-Debye-Gans regime. Master's Thesis, Purdue University, 1989.

Invited Presentations

Gunaseelan P, Buehler C, Chan WR. In profile: Carbon dioxide emissions from U.S. petroleum refining. 2009 AWMA Annual Conference & Exhibition, Detroit, MI, June 19, 2009.

Gunaseelan P, Buehler C. U.S. crude oil imports—Recent trends and their impact on refining. 2009 NPRA National Meeting, San Antonio, TX, March 24, 2009.

Buehler CS. The need for SNG production in the US. Advanced Gasification Systems 2008, Houston, TX, November 6, 2008.

Buehler CS. SNG could prevent a US natural gas supply shortfall. Designing & Operating Coal-Based Substitute Natural Gas (SNG) Plants, Houston, TX, April 10, 2008.

Buehler CS. Insights on failure analysis. Department of Chemical & Biomolecular Engineering Graduate Student Association, Rice University, Houston, TX, February 26, 2008.

Buehler CS. Meeting Canadian hydrogen demand through gasification. Canadian Hydrogen Association Workshop: Hydrogen Defense Against Climate Change, Gatineau, Québec, October 24, 2007.

Buehler CS. Meeting Canadian hydrogen demand through gasification. Processing Canadian Oils ands Coal Using Gasification, Calgary, Alberta, August 16, 2007.

McGoran B, Nunes S, Buehler C, Ross B. Role of process monitoring in a chemical plant explosion. Proceedings, 2006 International Symposium on Safety Science and Technology, Changsha, China, October 24–27, 2006.

McGoran B, Ross B, Nunes S, Buehler C, Reza A, Kemal A, Fessler J, Belanger J, Arnold D. Evaluation of a chemical plant explosion and lessons learned. Proceedings, Safety and Reliability, Annual Meeting of the Chinese Mechanical Engineering Society and 1st Annual Meeting of the Chinese Academy of Engineering, Mechanics and Transportation Engineering Division, pp. 252–257, 2006.

McGoran B, Nunes S, Buehler C, Ross B. Role of process monitoring in a chemical plant explosion. 35th Annual Loss Prevention Symposium, American Institute of Chemical Engineers Spring National Meeting, Houston, TX, April 2001.

Buehler CS, Caruthers JM, Franses EI. The inverse problem of determining orientation of spheroids from Rayleigh-Debye-Gans (RDG) light scattering regime. American Institute of Chemical Engineers National Meeting, San Francisco, CA, November 1989.

Buehler CS, Caruthers JM, Franses EI. Determination of orientation distribution of nonspherical particles in the Rayleigh-Debye-Gans scattering regime. American Institute of Chemical Engineers National Meeting, Miami, FL, November 1986.

Keville KM, Franses EI, Caruthers JM, Buehler CS. Characterization of novel microspheroidal polymer particles. 60th Colloid and Surface Science Symposium, Atlanta, GA, June 1986.

Reports

Zannetti P, Buehler C, Rouson D, Goodman M. Investigation of the off-site impact of a herbicide application at A-1 auto body, Inc., Racine, WI. Exponent, Inc., January 1999.

Buehler C, Goodman M. A microbiological assessment of E-pod indoor environment at Walnut Grove Elementary School. Exponent, Inc., April 1998.

Whitehouse G, Petersen J, Buehler C, Picard B. Supplemental report to the analysis of overtime and productivity for the reconstruction project at NIPSCO's Bailly Generating Station. Failure Analysis Associates, July 1992.

Whitehouse G, Petersen J, Buehler C, Picard B. Analysis of overtime and productivity for the reconstruction project at NIPSCO's Bailly Generating Station. Failure Analysis Associates, January 1992.

Professional Affiliations

- American Institute of Chemical Engineers (member)
- American Chemical Society (member)
- National Fire Protection Association (member)

Depositions

M/V DG HARMONY, (Consolidated Actions) v. PPG Industries, Inc. et al., and Dow Agrosciences L.L.C., et al. v. PPG Industries, Inc. et al., U.S. District Court, Southern District of New York, Case Nos. 98. Civ. 8394 and 99. Civ.1518, March 2004.

Brenda Stevens, et al. v. Conoco Phillips Company, Fourteenth District Court, Parish of Calcasieu, State of Louisiana, Case No. CC-2181, September 2004.

Contship Containerlines, Ltd. v. PPG Industries, Inc., Conti Zweite Cristallo Schiffarhrts GMBH & Co. KG MS CONTSHIP FRANCE, et al. v PPG Industries, Inc., U.S. District Court, Southern District of New York, Case Nos. 00 Civ. 0194 and 99 Civ. 10545, September 2004.

Chevron Phillips Chemical Company LP v. Sulzer Chemtech USA, Inc., et al., Twenty Third Judicial District Court, Parish of Assumption, State of Louisiana, Case No. 28083, March 2005.

Debra Spradlin, et al. v. Brazos M&E, Ltd., et al., District Court, Brazoria County, State of Texas, Case No. 28029, September 2005.

Cedarcrest Boron Trifluoride Release August 2, 1999 (Consolidated Cases), Nineteenth Judicial District Court, Parish of East Baton Rouge, State of Louisiana, Case Nos. 463184, 463723, 471662, 474559, 474797, 474769, 474770, 474865, 474944, and 474978, January 2006.

Kathy Traweek v. Hunt Refining Company, Inc., et al., Riley Spain and Lillie Spain v. Hunt Refining Company, Inc., et al., and Terry Williams and Dorothy Williams v. Hunt Refining Company, Inc., et al., Circuit Court of Tuscaloosa County, State of Alabama, Case Nos. CV-2002-852, CV-2002-851, and CV-2002-853, March 2006.

INEOS USA, L.L.C. v. BP Products North America, Inc., American Arbitration Association, Arbitration No. 13 158 Y 01929 06, October 2008.

Jose Nevarez, et al. v. Pasadena Refining Systems, Inc., District Court, 333rd Judicial District, Harris County, State of Texas, Case No. 2007-03919, December 2008.

Trials

M/V DG HARMONY, (Consolidated Actions) v. PPG Industries, Inc. et al., U.S. District Court, Southern District of New York, Case No. 98. Civ. 8394, May 2004.

Jimmy Valmont v. Conoco Phillips Company, Fourteenth District Court, Parish of Calcasieu, State of Louisiana, Case No. CC-2180, November 2004.

Contship Containerlines, Ltd. v. PPG Industries, Inc., U.S. District Court, Southern District of New York, Case No. 00 Civ. 0194, December 2004.

Cedarcrest Boron Trifluoride Release August 2, 1999 (Consolidated Cases), Nineteenth Judicial District Court, Parish of East Baton Rouge, State of Louisiana, Case Nos. 463184, 463723, 471662, 474559, 474797, 474769, 474770, 474865, 474944, and 474978, June 2006.