



Exponent[®]
Engineering & Scientific Consulting

Lindsey Gilman, Ph.D., P.E., CFEI

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Professional Profile

Dr. Lindsey Gilman is a licensed professional mechanical engineer who specializes in the analysis of thermal (heat), flow, and transport processes. She applies these specialties to the failure analysis, failure prevention, and design support of mechanical devices and systems, electronic devices, and the analysis of environmental systems. Dr. Gilman has experience evaluating a wide variety of products and processes including consumer products, electronics, medical devices, heat exchangers, natural gas pipelines, liquified natural gas (LNG) tankers, heat exchangers, and steam generators in addition to investigating carbon monoxide (CO) exposures. Dr. Gilman has extensive computational fluid dynamics (CFD) modeling experience that includes thermal management of electronics and battery systems, thermal modeling of human skin to evaluate potential for burn injury, drag evaluation for airborne objects, providing design support for the development of new well control technologies, analysis of natural gas pipeline purging, and evaluation of aerosol particle distribution.

Dr. Gilman also applies her expertise in water quality modeling, particularly in both hydrodynamic and sediment contaminant transport (for example, PCBs and PAHs) in complex riverine systems and coastal areas. Dr. Gilman has developed coastal models to evaluate mixing, dispersion, and dilution rates of discharges. She specifically has experience using the Environmental Fluid Dynamics Code (EFDC), DELFT-3D, and STAR-CCM+ for these applications. She has experience using oil spill modeling software such as OSCAR and pyGNOME to perform oil spill and plume modeling for risk assessments and to evaluate the sensitivity of the models to inputs that affect the final fate of the oil, such as the emulsification algorithms.

Prior to joining Exponent, while working as a graduate research assistant at the Massachusetts Institute of Technology in the Department of Nuclear Science and Engineering, Dr. Gilman employed her thermal hydraulics training to develop and implement a new boiling model that can be used in CFD software. During this work, she identified and evaluated key experimental data to formulate the new model and then tested the accuracy and sensitivity of the new model at both low and high pressure flow boiling conditions to illustrate the improvement on wall temperature predictions.

Dr. Gilman has also utilized her chemistry training to perform water quality fieldwork on a watershed and analyzed samples for items such as phosphorous, heavy metals, pH, and oxygen content. She also attended and was a laboratory assistant for the DOE-sponsored Nuclear and Radiochemistry Summer School where she acquired experience using a High Purity Germanium Semi-Conductor detector, a Silicon Surface Barrier Alpha detector, and a Dual Phosphor Scintillation detector.

Academic Credentials & Professional Honors

Ph.D., Nuclear Science and Engineering, Massachusetts Institute of Technology (MIT), 2014

M.S., Nuclear Science and Engineering, Massachusetts Institute of Technology (MIT), 2012

B.S., Chemistry, Valparaiso University, 2010

First Decade Achievement Award, Valparaiso University, 2020

MIT - Energy Initiative Fellow 2010-2011

Licenses and Certifications

Licensed Mechanical Engineer, California, #38379

Licensed Mechanical Engineer, Massachusetts, #55893

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

Professional Affiliations

National Associations of Fire Investigators — NAFI

Alpha Nu Sigma National Honors Society

American Nuclear Society — ANS

Mortar Board National College Senior Honor Society

Phi Lambda Upsilon Honorary Chemical Society

Iota Sigma Pi Chemistry Honor Society (2008-2010)

American Chemical Society — ACS

Alpha Lambda Delta Honors Society

Publications

Barry M, Colella F, Gilman L, and Kytomaa H. "Wear It Well" Consumer Electronics Test & Development. MA Business Ltd., pp. 44-49.
<https://cet.mydigitalpublication.co.uk/publication/?m=66627&i=715899&p=44&ver=html5>

Bradvik PJ, Krause D, Leirvik F, Daling PS, Owens Z, Gilman L, Yun BM, Ahnell A, Carlsen T, Koranek M. Subsea Mechanical Dispersion (SSMD) a Possible New Option for the Oil Spill Response Toolbox? International Oil Spill Conference, May 10-14, 2021.

Gilman L, Bess A, Drollette B, Danmeier D, Murray K. Evaluation and Comparison of Current Emulsification Algorithms and Their Sensitivity in Oil Spill Modeling Software. Poster Presented at: International Oil Spill Conference, May 10-14, 2021.

Gilman L, Flanary C. Sensitivity of Polychlorinated Biphenyl (PCB) fate to Volatilization Models in Long-Term Contaminant Transport Numerical Modeling. 35th Annual International Conference on Soils, Sediments, Water, and Energy, Amherst, MA, October 21-24, 2019.

Goodman J, Gilman L. Battery Technology and Factors that Led to the Samsung Note 7 Failure, The

Newsletter of the Women in the Law Committee. DRI, September 24, 2019.

Kytomaa HK, Boehm P, Osteraas J, Haddad B, Hacker J, Gilman L, Jampole E, Murphy P, Soury S. An integrated method for quantifying and managing extreme weather risks and liabilities for industrial infrastructure and operations. Proc Safety Prog. 2019; e12087.

Gilman L, Gladman S, 3D Printing and Marie Kondo: How Does it Work and How Can It Be Used to Spark Joy? The Newsletter of the Women in the Law Committee, DRI, May 31, 2019.

Kytomaa HK, Boehm P, Osteraas J, Haddad B, Hacker J, Gilman L, Jampole E, Murphy P, Soury S. A Non-Stationary Approach to Conducting Site-Specific Integrative Risk Management Assessments at Industrial Facilities at Risk from Extreme Weather Events, 15th Global Congress on Process Safety, 2019 AIChE Spring Meeting, New Orleans, LA March 31 – April 3, 2019.

Gilman L, Drollette B, O'Reilly K, Skancke J. Improving oil fate and transport models with GCxGC acquired data: enhanced component property characterization over time, Poster Presented at: Gulf of Mexico Oil Spill and Ecosystem Science Conference, February 4-7, 2019.

Murray K, Gilman L, Beegle-Krause CJ. Untangling History, Filling Gaps, and Predicting the Future: The Role of Numerical Models in Oil Spills and Other Environmental Contamination Cases, MCLE Credit Webinar, June 21, 2018.

Owens Z, Gilman L, Dunne R, McNulty J, Kemal A. Evaluation of Breathable Enclosures for Thermal Management of Outdoor Electronics, 16th IEEE IThERM Conference, Orlando, FL, May 2017.

Gilman L, Baglietto E. A self-consistent, physics-based boiling heat transfer modeling framework for use in computational fluid dynamics, International Journal of Multiphase Flow, Vol. 95, 2017, p. 35-53.

Owens Z, Gilman L, Rosen J, Kemal A. Investigation of variables affecting electrical arcing with applications in wildland fire investigations, 2015 Wildland Fire Litigation Conference, Monterey, CA, May 2015.

Gilman L, Forsberg C. Optimum double-wall heat exchanger for containment and trapping of tritium in a salt-cooled reactor. ANS National Meeting, Washington D.C., November 10-14, 2013.

Gilman L, Baglietto E. An advanced heat partitioning approach in CFD for subcooled boiling. 4th International Symposium on Innovative Nuclear Energy Systems, Tokyo, Japan, November 6-8, 2013.

Gilman L, Baglietto E. Advancements on wall boiling modeling in CFD: Leveraging new understanding from MIT Flow Boiling Facility. NURETH-15, Pisa, Italy, May 12-17, 2013.

Gilman L, Baglietto E. Advancements on wall boiling modeling in CFD. ANS National Meeting, San Diego, CA November 11-15, 2012.

Schoer J, Gilman L. Contrasts and similarities in water quality issues facing East Central China and Northwest Indiana: Issues, perceptions, and approaches for resolutions, and water quality changes in the Valparaiso Chain of Lakes Watershed. Council on Undergraduate Research National Meeting, College of Saint Benedict, MN, June 22, 2008.

Gilman L, Schoer J. Water quality changes in the Valparaiso Chain of Lakes Watershed. Water Quality-Indiana State American Water Works Association, Indianapolis, IN, February 20, 2008.

Peer Reviewer

Marine Pollution Bulletin

Journal of Hydrologic Engineering