Exponent®
Engineering & Scientific Consulting

Elizabeth K. Reilly, Ph.D., P.E., PMP

Principal Engineer | Materials & Corrosion Engineering
149 Commonwealth Drive | Menlo Park, CA 94025
(650) 688-6902 tel | ereilly@exponent.com

Professional Profile

Dr. Reilly is an expert in natural gas pipeline integrity management. She has worked extensively on projects spanning Root Cause Analysis (RCA), asset management, and materials validation and traceability. She has performed RCA services part of a continuous improvement program, and to support insurance claims and pending litigation. Her asset management work has helped clients develop and implement corrosion control programs by performing, among other functions, health assessments to determine gaps in procedures and field practices, and by writing procedures to align with industry best practices. In a multi-year effort with a major utility, she worked to validate line pipe and fitting material properties and maximum allowable operating pressures (MAOP) through leading data collection, attribution, and storage activities, performing non-destructive technology research, development, and performance evaluations, performing and leading metallurgical and fracture mechanics evaluations, and performing end-to-end quality assurance reviews. Dr. Reilly's technical competencies supporting pipeline and facilities projects include manufacturing defects, construction defects, internal and external corrosion, stress corrosion cracking, and selective seam weld corrosion.

Prior to joining the Materials and Corrosion Engineering Practice, Dr. Reilly worked as a Principal Engineer in the Engineering Management Consulting Practice and, before that, as a Senior Associate in the Mechanical Engineering Practice. Her extended areas of expertise include microelectromechanical and nanoelectromechanical systems (MEMS and NEMS) device design and process technology, and lithium-ion batteries (with an emphasis on failure mechanisms and safety). She also has significant experience with composite ceramics, piezoelectrics, and ferroelectrics, in addition to extensive knowledge of mechanical behavior of materials and manufacturing techniques. Her practical skills include finite element modeling (FEM), optical interferometry, electrical characterization, and dynamic characterization of resonant microdevices.

Before joining Exponent, Dr. Reilly was a researcher at The University of California at Berkeley focusing on the development of microscale vibrational energy scavenging devices. The work leveraged expertise in design and fabrication of microscale devices to grow and characterize piezoelectric epitaxial PZT thin-films directly on silicon substrates using pulsed laser deposition (PLD). Past work at Physical Sciences Inc. (Andover, MA) focused on lithium battery technologies in both primary and secondary cells, specifically the development of 3D carbon anodes via electrospinning and investigation of novel polymer separator materials to prevent over charging.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of California, Berkeley, 2007

M.S., Mechanical Engineering, University of California, Berkeley, 2004

Sc.B., Chemical Engineering, Brown University, honors, 2001

Bar Admissions, United States Patent and Trademark Office, Reg. No. 65,778

Luce Fellow, 2002-2004

Kesten Award for Excellence in Thermodynamics, 2001

Licenses and Certifications

Licensed Professional Mechanical Engineering, California, #36360

Project Management Professional, Project Management Institute

Prior Experience

Post Doctoral Researcher, Berkeley Manufacturing Institute and Berkeley Wireless Research Center, University of California, Berkeley, 2008-2010

Principal Scientist, Physical Sciences Inc., 2007-2008

Professional Affiliations

Society of Women Engineers — SWE

American Gas Association — AGA; Transmission Pipe Operations Committee

Publications

Reilly E, Burghardt F, Fain R, Wright P. Powering a wireless sensor node with a vibration-driven piezoelectric energy harvester. Smart Materials and Structures 2011; 20:125006.

Reilly E, Miller R, Fain R, Wright P. A study of ambient vibrations for piezoelectric energy scavenging. International Workshop on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (POWERMEMS), Washington DC, 2009.

Reilly E, Wright P. Modeling, fabrication, and stress compensation of an epitaxial thin film piezoelectric microscale energy scavenging device. Journal of Micromechanics and Microengineering 2009; 19(9):095014.

Ho C, Mark M, Koplow M, Miller L, Chen A, Reilly E, Rabaey J, Evans J, Wright P. Technologies for an autonomous wireless home healthcare system. International Workshop on Wearable and Implantable Body Sensor Networks, pp. 38-41, Berkeley, CA, 2009.

Newman A, Lang C, Pawle R, Dohkan A, Reilly E, Lenhoff J. Structural li ion battery. 43rd Power Sources Conference, Philadelphia, PA, 2008.

Reilly E, Wright P. Integration of thin film piezoelectrics on Si for application in vibrational energy scavenging. International Workshop on Micro and Nanotechnology for Power Generation and Energy Conversion Applications (POWERMEMS), pp. 73-76, Freiburg, Germany, 2007.

Reilly E. Modeling and fabrication of a thin film piezoelectric microscale energy scavenging device. Ph.D. Dissertation, University of California Berkeley, Berkeley, CA, 2007.

Reilly E, Miller L, Wright P. Optimization of on-chip piezoelectric energy scavenging for integration of medical sensors with low-power wireless networks. International Workshop on Wearable and Implantable Body Sensor Networks, Aachen, Germany, 2007.

Mitchenson, P, Reilly E, Toh T, Wright P, Yeatman E. Performance limits of the three MEMS inertial energy generator transduction types. Journal of Micromechanics and Microengineering 2007; 17:S211-S216.

Reilly E, Wright P. Thin film piezoelectric energy scavenging systems for an on-chip power supply. International Workshop on Micro and Nanotechnology for Power Generation and Energy Conversion Applications, pp. 161-165, Berkeley, CA, 2006.

Reilly E, Carleton E, Wright P. Thin film piezoelectric energy scavenging system for long term medical monitoring. International Workshop on Wearable and Implantable Body Sensor Networks, pp. 38-41, Cambridge, MA, 2006.

Reilly E, Carleton E, Wright P. Thin film piezoelectric energy scavenging systems. Patent pending with the Office of Technology Licensing at UC Berkeley, 2006.

Zavaliche F, Zheng H, Mohaddes-Ardabili L, Yang SY, Zhan Q, Shafer P, Reilly E, Chopdekar R, Jia Y, Wright P, Schlom DG, Suzuki Y, Ramesh R. Electric field-induced magnetization switching in epitaxial columnar nanostructures. Nano Letters 2005; 5:1793.

Roundy S, Leland ES, Baker J, Carleton E, Reilly E, Lai E, Otis B, Rabaey JM, Wright PK, Sundararajan V. Energy scavenging in support of ambient intelligence; techniques, challenges, and future directions. AmIware, Hardware Technology Drivers of Ambient Intelligence, Springer, pp. 265-283, Dordrecht, Netherlands, 2006.

Roundy S, Leland ES, Baker J, Carleton E, Reilly E, Lai E, Otis B, Rabaey JM, Wright PK, Sundararajan V. Vibration-based energy scavenging for pervasive computing: new designs and materials that increase power output. IEEE Pervasive Computing 2005; 2(1):28-35.

Reilly E. Fabrication of a thin film piezoelectric energy scavenging system. Master's Thesis, University of California Berkeley, Berkeley, CA, 2004.