

Exponent®
Engineering & Scientific Consulting


## Janille Maragh, Ph.D., P.E.

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## Professional Profile

Dr. Maragh is a materials scientist and mechanical engineer with extensive experience solving complex, interdisciplinary engineering problems across a range of industries, including consumer electronics, batteries and energy storage systems, and utility infrastructure. Her consulting work includes failure analysis and root cause analysis, regulatory compliance support, intellectual property disputes, product liability matters, and product recalls. She regularly supports clients in litigation and dispute contexts, providing technical analysis and clear communication of complex scientific and engineering concepts.

In the utility and pipeline integrity space, Dr. Maragh serves as a subject matter expert in the analysis and interpretation of destructive and nondestructive chemical composition data for materials verification of pipeline steels, supporting integrity management programs and regulatory compliance efforts under the Pipeline and Hazardous Materials Safety Administration (PHMSA). Her expertise includes the development and evaluation of robust validation and quality control strategies for field and laboratory composition data, quantification and communication of measurement uncertainty, and statistical analysis of chemical datasets used to inform engineering and regulatory decisions. Her work frequently involves assessing data reliability, method comparability, and fitness-for-purpose in the context of materials verification and integrity management decision making. In addition to her chemical composition and materials verification expertise, Dr. Maragh has experience analyzing in-line inspection (ILI) data and supporting corrosion evaluation and corrosion tracking efforts as part of broader pipeline integrity and risk management programs.

Dr. Maragh has broad laboratory experience in materials characterization and failure analysis techniques, including scanning electron microscopy (SEM), quantitative energy-dispersive X-ray spectroscopy (EDS), confocal Raman microscopy (CRM), computed tomography (CT), Fourier transform infrared spectroscopy (FTIR), optical microscopy (OM), microindentation testing, and nanoindentation testing. She routinely integrates results across multiple analytical techniques to develop robust, defensible conclusions regarding material composition, degradation mechanisms, and failure modes.

In addition to experimental and laboratory work, Dr. Maragh has significant experience applying computational and data-driven methods to engineering and materials science problems. She has developed analytical tools and workflows using image processing, machine vision, and statistical techniques to extract quantitative insights from complex datasets. Her work often involves synthesizing large volumes of chemical, mechanical, and imaging data to support root cause determinations, materials characterization, and engineering judgments. Her expertise in these areas is further reflected in her coauthorship of a technical book chapter on applied image processing and computer vision methods for materials science and engineering applications.

Dr. Maragh earned her PhD from the Massachusetts Institute of Technology (MIT), where her doctoral research focused on chemomechanical characterization of complex composite materials. Her work integrated advanced chemical and mechanical characterization techniques, data science, and finite

element modeling to study a wide range of heterogeneous materials systems, including cement-based composites and historically significant materials such as ancient Roman concrete. This research required the synthesis of rich experimental datasets with computational modeling to understand material behavior, degradation mechanisms, and long-term durability.

Across her consulting and research career, Dr. Maragh has been recognized for her ability to bridge laboratory science, field work, engineering analysis, and real-world decision making. She brings a rigorous, data-driven approach to complex technical problems and is experienced in communicating technical findings to both technical and non-technical audiences.

## Academic Credentials & Professional Honors

Ph.D., Civil and Environmental Engineering, Massachusetts Institute of Technology (MIT), 2021

S.M., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2016

S.B., Mechanical Engineering, Massachusetts Institute of Technology (MIT), 2013

## Licenses and Certifications

Professional Engineer Mechanical, California, #42660

## Prior Experience

Advanced Development Intern, Festo AG & Co. KG 2012

Research Assistant, Karlsruhe Institute of Technology, 2011

Research Assistant, MIT Photovoltaics Lab, 2010

## Professional Affiliations

American Gas Association – Piping Materials Committee

## Languages

German

## Publications

Maragh J, Morley C, Delshad P, Martin P, Veloo P. Identification of composition measurement errors and their effects on calculated pipe grade. Proceedings of the Thirty-Eighth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, 2026.

Maragh J, Brady E, Kornuta J, Lopez-Oneal O, Veloo P. Determination of destructive strength and chemical composition uncertainties for material property verification. Proceedings of the Thirty-Seventh Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, 2025.

Sharma S, Maragh J, Han S, Yi C, Chen C. Applied image processing and computer vision for materials science and engineering. In: D'Andrade B, editor. Computer Engineering Applications in Electronic, Biomedical, and Automotive Systems. Nova Science Publishers 2024.

Maragh J, Martin P, Gibbs J, Kornuta J, Veloo P. A tool for the identification of anomalous NDT chemical composition measurements during in situ testing. Proceedings of the Thirty-Sixth Annual Pipeline Pigging

and Integrity Management Conference (PPIM), Houston, TX, 2024.

Maragh J, Martin P, Anderson J, Gibbs J, Kornuta J, Veloo P. Identifying irregular and erroneous chemical composition data from in situ nondestructive testing. Proceedings of the Thirty-Fifth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, 2023.

Seymour LM, Maragh J, Sabatini P, Di Tommaso M, Weaver JC, Masic A. Hot mixing: mechanistic insights into the durability of ancient Roman concrete. Science Advances 2023; 9(1):eadd1602.

Maragh J, Liu C, Martin P, Switzner N, Gibbs J, Kornuta J, Veloo P. Reducing bias in chemical composition data with measurements below the limit of detection. Proceedings of the Thirty-Fourth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, 2022.

Maragh J, et al. SEM-EDS and microindentation-driven large-area high-resolution chemomechanical mapping and computational homogenization of cementitious materials. Materials Today Communications 2021; 28:102698.

Raymond SJ, Maragh JM, Masic A, Williams JR. Towards an understanding of the chemo-mechanical influences on kidney stone failure via the material point method. PloS one 2020 Dec 11;15(12):e0240133.

Schuetz R*, Maragh JM*, Weaver JC, Rabin I, Masic A. The Temple Scroll: reconstructing an ancient manufacturing practice. Science Advances 2019 Sep 1;5(9):eaaw7494. *Equal contributors.

Maragh JM, Weaver JC, Masic A. Large-scale micron-order 3D surface correlative chemical imaging of ancient Roman concrete. PloS one 2019 Feb 6;14(2):e0210710.

Kupwade-Patil K, Chin SH, Johnston ML, Maragh JM, Masic A, Büyüköztürk O. Particle size effect of volcanic ash towards developing engineered Portland cements. Journal of Materials in Civil Engineering. 2018 Aug 1;30(8):04018190.

**Presentations**

Maragh J, Morley C, Delshad P, Martin P, Veloo P. Identification of composition measurement errors and their effects on calculated pipe grade. Oral presentation, Thirty-Eighth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, January 2026.

Maragh J, Brady E, Kornuta J, Lopez-Oneal O, Veloo P. Determination of destructive strength and chemical composition uncertainties for material property verification. Oral presentation, Thirty-Seventh Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, January 2025.

Maragh J, Martin P, Gibbs J, Kornuta J, Veloo P. A tool for the identification of anomalous NDT chemical composition measurements during in situ testing. Oral presentation, Thirty-Sixth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, January 2024.

Maragh J, Martin P, Anderson J, Gibbs J, Kornuta J, Veloo P. Identifying irregular and erroneous chemical composition data from in situ nondestructive testing. Oral presentation, Thirty-Fifth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, January 2023.

Maragh J, Liu C, Martin P, Switzner N, Gibbs J, Kornuta J, Veloo P. Reducing bias in chemical composition data with measurements below the limit of detection. Oral presentation, Thirty-Fourth Annual Pipeline Pigging and Integrity Management Conference (PPIM), Houston, TX, January 2022.

Maragh J., Brady E., Kornuta, J., Lopez-Oneal O. & Veloo P. (2025). Determination of destructive strength and chemical composition uncertainties for material property verification. In Proceedings of the Thirty-Seventh Annual Pipeline Pigging and Integrity Management Conference (PPIM). Houston, TX.

Maragh J., Martin P., Gibbs J., Kornuta, J., & Veloo P. (2024). A tool for the identification of anomalous NDT chemical composition measurements during in situ testing. In Proceedings of the Thirty-Sixth Annual Pipeline Pigging and Integrity Management Conference (PPIM). Houston, TX.

Maragh J., Martin P., Anderson J., Gibbs J., Kornuta, J., & Veloo P. (2023). Identifying irregular and erroneous chemical composition data from in situ nondestructive testing. In Proceedings of the Thirty-Fifth Annual Pipeline Pigging and Integrity Management Conference (PPIM). Houston, TX.

Maragh J., Liu C., Martin P., Switzner N., Gibbs J., Kornuta, J., & Veloo P. (2022). Reducing bias in chemical composition data with measurements below the limit of detection. In Proceedings of the Thirty-Fourth Annual Pipeline Pigging and Integrity Management Conference (PPIM). Houston, TX.

Maragh JM, Wong W, Raymond S, Wettermark S, Lo F, Noteware M, Williams JR, Ochsendorf JA, Masic A. Scale model collapse analyses of freestanding multi-drum Pompeian columns. Oral presentation, International Association for Shell and Spatial Structures (IASS), Barcelona, Spain, October 2019. Oral presentation, Technart, Bruges, Belgium, May 2019.

Maragh JM, Schuetz R, Weaver JC, Rabin I, Masic A. The Temple Scrolls: Reconstructing an ancient manufacturing practice. Oral presentation, Technart. Bruges, Belgium, May 2019.

Maragh JM, Weaver JC, Masic A. Multiscale chemomechanical characterization of ancient Roman concrete. Oral presentation, Gordon Research Seminar: Scientific Methods in Cultural Heritage. Casteldefells, Spain, July 2018. Poster presentation, Gordon Research Conference: Scientific Methods in Cultural Heritage. Casteldefells, Spain, July 2018.

Maragh JM, Weaver JC, Masic A. Large-scale micron-order correlative chemical imaging of ancient Roman concrete. Poster presentation, New.Mech, Cambridge, MA, October 2017. Oral presentation, WITec 3D correlative Chemical Imaging Workshop, Cambridge, MA, March 2017.

Maragh JM, Weaver JC, Masic A. Large area, micron-scale 3D chemical characterization of ancient Roman concrete. Oral presentation, Engineering Mechanics Institute (EMI). San Diego, CA, June 2017.

Maragh JM, Weaver JC, Masic A. Large-scale micron-order chemical imaging of ancient Roman concrete. Poster presentation, Gordon Research Conference: Scientific Methods in Cultural Heritage. Sunday River, ME, August 2016.

## Additional Education & Training

Applied Data Science with Python Specialization, MIT Professional Education, January – April 2022.

Graduate Teaching Assistant, 1.057: Heritage Science & Technology, MIT, Cambridge, MA, Fall 2019, Fall 2016.

Graduate Teaching Assistant, ONE-MA3: Materials in Art, Archaeology, and Architecture, MIT, Various cities, Italy, Summer 2019, Summer 2018, Summer 2016.

Graduate Teaching Assistant, 1.102: Civil and Environmental Engineering Design II, MIT, Cambridge, MA, Spring 2019.

Undergraduate Teaching Assistant, 8.02: Electricity & Magnetism, MIT, Cambridge, MA, Spring 2011, Fall 2010.