Dr. Laura Moyer, FASM
Trustee-Elect (2026-2029)

Dr. Laura Moyer, FASM
Professor, Materials Science and Engineering
Lehigh University
Bethlehem, PA

Dr. Laura Moyer spent eight years at Alcoa, where she served as Technical Services Manager and Chief Metallurgist. In this capacity, she led critical materials and process areas including metallography, heat treatment, welding, chemical processing, and nondestructive testing, supporting advanced aerospace applications. Moyer currently serves in the Department of Materials Science and Engineering at Lehigh University where she teaches undergraduate courses, directs summer outreach programs for high school students, and is a key contributor to the development of Moyer Experiential Learning Initiatives. She also earned her B.S., M.S., and Ph.D. in Materials Science and Engineering at Lehigh.

Since returning to Lehigh in 2013, Moyer has played a central role in supporting research, training students in metallographic techniques, and fostering strong industry collaboration. She is widely recognized for her commitment to education and mentorship, having taught and guided hundreds of students while also leading outreach initiatives such as ASM Materials Camps and Lehigh University's SEI program. She is also a three-time recipient of the Gilbert Doan Award, presented annually by Lehigh MSE students.

Moyer has served in numerous leadership roles with ASM International at both the local and international levels. She has been on ASM's Lehigh Valley Chapter executive board since 2013, having served as chair for several years and is the current Awards chair. She has taught ASM's Steel Metallography and Metallographic Techniques courses, served on the ASM Education Committee and ASM Content and Data Products Council, and is currently on the editorial board for the Metallography, Microstructure, and Analysis journal. She is the immediate past president of ASM's International Metallography Society and last year's recipient of the ASM Materials Education Foundation's George A. Roberts Award.

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Abstract

From Forge to Microscope: Building Experiential Learning Environments That Connect Processing, Structure, and Properties

The structure-property-processing triangle is the organizing framework of materials science education, but too often it is taught as an abstraction rather than a lived experience. This talk describes the design and implementation of a suite of hands-on learning environments at Lehigh University that put students in direct contact with the full materials science cycle: casting, forging, blacksmithing, heat treatment, metallographic preparation, and microstructural analysis. Drawing on over a decade of experience developing and delivering experiential curriculum from first-year engineering modules to upper-level laboratory courses to pre-college summer programs, Dr. Moyer believes the laboratory is not where students go after they have learned something, but where they go to learn it. Specific examples illustrate how hands-on experiences can be designed with clear learning objectives, explicit connections to lecture content, and built-in opportunities for reflection and analysis. The talk includes practical guidance for faculty interested in developing or expanding experiential components in their own curricula, including lessons learned from building programs from the ground up.

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X-ray Diffraction as a Practical Characterization Tool: Connecting Diffraction Results to Real-World Materials Problems

X-ray diffraction is a powerful and versatile characterization technique, but its outputs are only as useful as the practitioner's ability to connect diffraction data to the actual materials question being asked. This talk bridges the gap between diffraction theory and practical application, using real case studies to demonstrate how XRD results can be interpreted in the context of industrial and research problems. Examples are drawn from consulting and research practices. The talk addresses common pitfalls in XRD interpretation, including the effects of fluorescence, texture, preferred orientation, and nanocrystallinity on peak shape and intensity, and discusses how to design a characterization strategy that combines XRD with complementary techniques such as SEM/EDS for a more complete picture. The talk also addresses the practical realities of running XRD in a shared academic facility serving a diverse user base, including instrument qualification, sample preparation best practices, and communicating results to non-specialist clients and collaborators.

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Building the Pipeline: Lessons from Over a Decade of Pre-College Engineering Outreach

The decision to pursue engineering is made quite often long before a student ever sets foot in a university classroom. Pre-college outreach programs are one of the most powerful tools available to the engineering community for broadening participation, building interest, and ensuring that students from all backgrounds have the opportunity to discover that engineering is for them. Dr. Moyer has over a decade of experience designing, building, and directing the Lehigh University Summer Engineering Institute, a month-long immersive pre-college program, as well as the ASM Student Materials Camp and ASM Teacher Camp. Dr. Moyer will describe the design principles that make pre-college programs effective: hands-on experiences that make abstract concepts tangible, inclusive program structures that meet students where they are, deliberate exposure to diverse engineering role models, and intentional connections to the academic and professional pathways that follow. The talk includes practical guidance for faculty and departments interested in developing or expanding their own pre-college outreach efforts, including lessons learned from building programs with limited resources and broad ambitions.

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From Chief Metallurgist to the Classroom: What Industry Experience Actually Teaches You About Teaching

The path from industry engineer to engineering educator is less common than it should be but those who do it bring something to the classroom that cannot be replicated by any amount of pedagogical training alone. This talk is an honest and personal account of that transition, told through the lens of over 13 years of teaching at Lehigh University following a career at Alcoa that spanned process engineering, project leadership, and chief metallurgist responsibilities. The talk focuses on what industry experience actually teaches you about teaching, not just the obvious things like knowing what employers need, but the subtler gifts: how to read a room of people who are not yet convinced something matters, how to connect abstract principles to consequential decisions, how to design problems that have more than one right answer, and how to give feedback that builds capability rather than just correcting mistakes. The talk also addresses the challenges of the transition, the things the industry does not prepare you for, and the adjustments that can take years to make. Engineering departments have a significant untapped opportunity in recruiting and supporting faculty with deep industry backgrounds, and students taught by professors with industry experience develop a fundamentally different relationship to their discipline than those taught exclusively by research academics.

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Staying in the Room: Building Belonging and Persistence for Women and Underrepresented Students in Materials Science and Engineering

Recruiting women and underrepresented students into materials science and engineering is necessary but not sufficient, the harder and less discussed challenge is keeping them there. Attrition is not random. It follows predictable patterns driven by belonging uncertainty, lack of role models, unwelcoming laboratory and classroom cultures, and the accumulating weight of small exclusions that individually seem minor but collectively become unbearable. This talk addresses the retention side of the diversity equation, drawing on personal experience as a woman who built a career in metallurgy, a field that has not always been welcoming to women, combined with over a decade of mentoring women and underrepresented students at Lehigh University through teaching, advising, outreach programs, and professional society leadership. Dr. Moyer describes the specific interventions that research and experience suggest actually work: mentoring relationships that normalize struggle and model persistence, classroom and laboratory cultures that make competence visible for all students, professional society engagement that builds identity and community, and outreach programs that reach students before they have already decided engineering is not for them. The talk is honest about what does not work and offers a framework for faculty and departments genuinely committed to building environments where all students can thrive.