

**2024-2025 CHARLES S. BARRETT SILVER MEDAL and LECTURE
Presented by the Rocky Mountain Chapter of ASM International**

In 1984 the award and lecture were established to recognize Dr. Charles S. Barrett, a pioneer in the study of the structure of metals and the application of x-ray diffraction techniques and a long-time member of the Rocky Mountain ASM Chapter. This annual program is usually hosted on the Colorado School of Mines campus.

Date: Thursday, April 3, 2025

Dinner Location: Friedhoff Hall, in the basement of the Green Center on the Colorado School of Mines Campus

Check-in Time: 6:00 to 6:30 pm

Buffett dinner: 6:30 pm

Program Location: Metals Hall, on the entry floor of the Green Center, to follow dinner

Cost: \$30

Students - free* (*supported by Mines MME Department)

Reservations: By March 26, send to asmrockymountain@gmail.com

Recipient:

Prof. Chris Schuh
Dean, Robert R. McCormick School of Engineering and
Applied Science
Northwestern University



Lecture:

**“The Coming Age of Computationally Designed Grain
Boundary Chemistry”**

ABSTRACT: We have known for many decades that grain boundaries (GBs) not only affect, but often dominate, the properties of polycrystals. And yet, our understanding of structure-chemistry-property connections for GBs has largely focused on individual cases, specific alloys, and certain high-symmetry boundaries. Through that focused effort, GB science has come a long way in its ability to explain specific observations. The premise of this talk, however, is that we are now entering the age of GB design, in which the tools of computation and data science allow us, for the first time, to rigorously address the “inverse problem”: designing polycrystalline materials from a blank slate to achieve GB networks with desired structures and properties. The key to this paradigm shift is the ability to treat all the diverse atomic environments in the GB network as a quantifiable spectrum, producing a so-called “spectral model” connecting GB structure, chemistry, and properties. This talk will review what is now a complete first draft of the GB spectral model for GB chemistry in metal alloys, including all the thermodynamic elements needed to make predictions of GB configuration and energetics across the full span of an alloy phase diagram. Applications to experiments, to materials design, and to the commercialization of new alloys will be discussed.

BIOGRAPHY: Christopher A. Schuh is the dean of the Robert R. McCormick School of Engineering and Applied Science at Northwestern University where he is also John G. Searle Professor of Materials Science and Engineering. Schuh was previously POSCO Professor of Materials Science and Engineering at the Massachusetts Institute of Technology, where he served as Head of the Department of Materials Science and Engineering from 2011 to 2020. Schuh earned his BS at the University of Illinois at Urbana-Champaign and PhD from Northwestern. He is a member of the National Academy of Engineering and the National Academy of Inventors. Prof. Schuh has received numerous professional society awards including being recognized as the recipient of the 2024 Edward DeMille Campbell Memorial Lecture and is an ASM Fellow. He is also a Coordinating Editor and Governor of Acta Materialia.