

INTEGRATING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING WITH MATERIALS EDUCATION

Kaitlin Tyler

Artificial Intelligence (AI) and Machine Learning (ML). What may have sounded like terms better suited for a science fiction novel decades ago are now commonplace in industry.

AI & ML



This is certainly my experience, anyway, as an employee of a large simulation software company. Add in the recent launch of ChatGPT, and you find the buzzwords on everyone's mind. But what does this mean for the materials community?

In particular, what does this mean for our classrooms and the next generation of material scientists and engineers?

New tools like this, I find, lead to more questions when first implemented than answers. How do we assess our students now, when ChatGPT can just write their essays for them? How exactly do I incorporate yet another tool into my already packed curriculum? What is industry expecting students to know about AI and ML when they get to the work force?

To help shed some light on this topic, I wanted to get opinions from members of the materials community using these tools in education. Our first article in this series is an interview with a professor (**Taylor Sparks** from University of Utah), a Ph.D. candidate (**Enze Chen** from University of California Berkeley), and a consultant (**Bryce Meredig**) about the role that AI and machine learning can play in materials and how these tools can be incorporated into the classroom.

The second article goes into the classrooms at University of Michigan, where TMS Education Committee Member **Tim Chambers**, along with his colleagues **Wenhao Sun** and **Katsuyo Thornton**, are

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teaching computational methods in a variety of ways.

Finally, TMS Education Committee Member **Alison Polasik** from Campbell University shares here responses to some questions she tasked her students to ask ChatGPT and how she has pivoted to using this new tool to support her classroom learning goals.

I hope this set of articles illustrates how AI and machine learning can be an asset to the materials community, particularly in the education space. As someone whose job straddles the line between industry and academia, I see both sides. There are so many opportunities that utilizing computational tools like AI can help us advance. Therefore, our students need to not only know about the tools but also how to use them.

I understand that AI tools like ChatGPT can be intimidating, especially with their ability to possibly outsmart plagiarism detection software. Something

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I like to remind myself of when I get bogged down with the negatives of these new technologies is that at one point in time, people were skeptical of digital calculators over slide rules and computer-aided drawing (CAD) programs over traditional paper and pencil drafting. AI and ML are tools, just like our calculators and CAD programs. They will certainly take some time to adjust to, especially when it comes to how we assess our students. But I certainly think, and so do our peers who contributed to this article series, that the positives outweigh the negatives. We simply need to understand the potential, educate both ourselves and our students, and watch the next generation flourish.



Kaitlin Tyler

Kaitlin Tyler is currently an academic content development program manager at Ansys, with an emphasis on materials-related topics. Her role focuses on supporting academics using Ansys software in the classroom through engaging educational resources. She received her Ph.D. at the University of Illinois Urbana-Champaign in 2018. She is currently the JOM liaison for the TMS Education Committee and a member of the TMS Diversity, Equity, and Inclusion Committee.