

## Designing a transformative MSc course in materials science for undergraduates majoring in physical sciences

Mengyan Nie

Institute for Materials Discovery, University College London, United Kingdom

Materials science and engineering (MSE) has emerged as critical skills to tackle global challenges in climate change and sustainable development. Students with good understanding of fundamentals of materials science and engineering and the related state-of-the-art technologies are highly demanded to address critical issues from energy to healthcare and to take scientific discoveries to real-world applications. Traditional teaching approaches for physical sciences (e.g., chemistry, physics, chemical engineering) or even MSE are often lack of clear relationships between four components of the paradigm of materials science and engineering, which are materials performance, properties, structure and processing. In this talk, I will present how we design a transformative MSc course in Advanced Materials Science, based on to the paradigm of MS, to train the students majoring in physical sciences as well as materials-related subjects with enhanced understanding of MSE fundamentals and sustainability design mindset through research-based innovative teaching and real-world scenario-based group design project assessments. The MSc course has been proven very successful with a rapid growth in the past 5 years.

[1] <https://www.ansys.com/academic/educators/education-resources/teaching-package-materials-science-engineering-database>

[2] Materials Science and Engineering: An Introduction, William D. Callister Jr., David G. Rethwisch, 10<sup>th</sup> Ed, 2018, Wiley.