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10 AM BOSTON, 3 PM LONDON, 10 PM BEIJING



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ADVANCED MATERIALS TOWARD A SUSTAINABLE FUTURE: MECHANICS DESIGN

The ever-growing world population demands material consumption and drives material discovery. The progress of modern society accompanies the advent of advanced materials to enable new performance and functionalities, as epitomized by the invention of two most representative man-made materials: steels (4000 years ago) and petroleum-derived plastics (80 years ago). The widespread use of steels (and other alloys) and plastics as structural and functional materials has radically revolutionized our daily life, which, however, also comes with heavy environmental impacts. The tremendous energy/water cost and carbon footprint to manufacture steels as well as the ever-devastating global white pollution due to plastic waste pose grand challenges to the sustainable future of humankind. Aiming to address such grand challenges, we have been working on developing advanced sustainable materials that hold the promise to replace steels (and alloys) and plastics in recent years. To this end, we focus particularly on cellulose, the most abundant biopolymer on Earth as the source of sustainable materials. In this talk, I will showcase a few examples of advanced sustainable materials developed in our Laboratory for Advance Sustainable Materials and Technology (LASMAT) at UMD, including superwood as a potential structural material to replace steels and alloys; transparent strong and tough cellulose nanopaper to replace plastic foils; cellulose-based composites to replace petroleum-derived plastic straws and packaging foam, etc. These high-performance, low-cost and nature-based advanced materials offer an array of promising material solutions toward a sustainable future.

Teng Li is the Keystone Professor in the Clark School of Engineering at the University of Maryland, College Park, US. He received his Ph.D. degree in Engineering Science from Harvard University in 2006, following earlier studies at Princeton University and Tsinghua University. His research interests focus on mechanics of sustainable materials, low dimensional materials, energy materials, soft materials and biomaterials, flexible electronics and nanoelectronics. Among his awards include R&D100 Award in 2018, Samuel P. Langley Distinguished Professorship from National Institute of Aerospace in 2017, Society of Engineering Science (SES) Young Investigator Medal in 2016, E. Robert Kent Outstanding Teaching Award in 2012, Ralph E. Powe Jr. Faculty Award in 2007. He currently serves as the Associate Editor of Extreme Mechanics Letters. With Zhigang Suo, he co-founded iMechanica.org, the world's largest online community of mechanics.

Discussion leader: **Professor Zheng Jia**, Zhejiang University

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