USC Viterbi
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Advanced Manufacturing Seminar Series

Friday, September 25, 2020
10:00 AM – 11:30 AM (Pacific Time)
Registration link: https://usc.zoom.us/webinar/register/WN_2JFhjr_cSpGe3ajwy1WUFQ

Harness Natural Wisdom to Design 3D-Printed Bionic Materials

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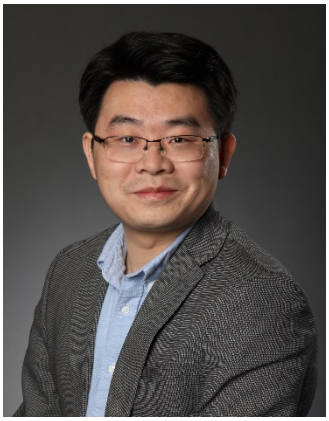
Abstract: Living creatures are continuous sources of inspiration for designing synthetic materials. However, living creatures are typically different from synthetic materials in two aspects: First, living creatures typically feature sophisticated microstructures and architectures that are challenging to reproduce in traditional engineering practice. Second, living creatures consist of living cells to support their metabolisms, such as growth, regeneration, and remodeling, which are typically impossible in traditional synthetic materials. In this talk, by harnessing modern additive manufacturing technologies, dynamic chemistry, and/or living organisms, we report a series of 3D-printed bionic materials to imitate both architectures and metabolisms of living creatures. For example, with the aid of dynamic chemistry, 3D-printed lightweight structures can self-heal large-scale impact damages and fractures. With the aid of living bacteria, 3D-printed polymers can self-grow into structural composites with pre-designed microstructures. With the aid of living plant cells, 3D-printed artificial trees can harness photosynthesis to self-remodel into multifunctional materials.



Biography: Qiming Wang is an Assistant Professor in the Department of Civil and Environmental Engineering of the University of Southern California. Prior to this position, he received a Postdoc training at Massachusetts Institute of Technology (2014-2015) and earned his Ph.D. degree at Duke University (2014). His research interest is centered around additive manufacturing and mechanics of unprecedented materials and structures that can potentially address grand engineering challenges, including infrastructure, water, environment, robotics, and healthcare. His research has been widely reported by prestigious media, such as Science News, Nature News, Discovery, Washington Post, NBC News, Wall Street Journal, Physics Today, Materials Today, and NASA Tech Briefs. He received a number of academic awards, including NSF CAREER (2020), SME Outstanding Young Manufacturing Engineer (2020), AFOSR YIP (2018), MRS Graduate Student Award (2014), ACS Arthur K. Doolittle Award, Duke Kewaunee Student Achievement Award (2013), Duke Lew Pre-doctoral Fellowship (2012), and ASME Best Paper Award (2011). He was elected as the Editor (2018) of ASME Technical Committee of Mechanics of Soft Materials and become Secretary in 2019, Vice-chair in 2020, and Chair in 2021.