

2022 - 2023 Colloquium Series

Dr. Yong Lin Kong

Department of Mechanical Engineering
University of Utah

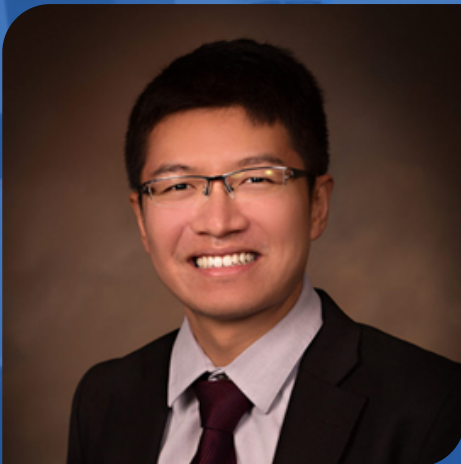
Addressing unmet clinical needs with 3D printed electronics and ingestible systems

The integration of electronics with medical devices can enable advanced sensing, actuation, and adaptive capability. Indeed, advancement in bioelectronics has significantly improved our ability to diagnose, treat and prevent diseases as well as introduced novel strategies to partially restore and even augment some of the complex functionalities of the human body. Yet, at the fundamental level, such integration remains challenging due to the inherent geometrical, mechanical, and material dichotomies between conventional manufactured electronics and three-dimensional systems. My research develops electronics freeform fabrication strategies that are fundamentally free from the constraints of the conventional manufacturing approach, enabling the creation of devices with an unprecedented level of functional integration. For example, we demonstrated the ability to seamlessly incorporate active electronics with a three-dimensional construct by achieving multiscale control of nanomaterials assembly with soft matter physics phenomena. Further, we show the ability to selectively anneal nanomaterials, enabling local programming of electronics and mechanical properties on a temperature-sensitive multi-materials construct. Finally, we explore the integration of freeform electronics with digitally designed architecture to realize novel digital-based diagnosis and treatment strategies. For example, we designed ingestible gastric resident electronics systems capable of leveraging the significant space and immune-tolerant environment available within the gastrointestinal tract to circumvent the potential complications associated with surgically placed medical implants. Ultimately, we strive to overcome challenges associated with the conventional manufacturing approach, creating fundamentally new classes of bioelectronics to address unmet clinical and societal needs.

THURSDAY, NOVEMBER 10, 2022

WCH 205/206

11:00 AM - 12:00 PM



Yong Lin Kong is an Assistant Professor at the Department of Mechanical Engineering at the University of Utah (2018 – Present). He received his Ph.D. in mechanical engineering and materials science from Princeton University in 2016 and was a postdoctoral associate at the Massachusetts Institute of Technology (2016–2017). Yong Lin's research focuses on the additive manufacturing of nanomaterial-based functional devices and biomedical devices. For example, he has been awarded patents in “3D printed active electronic materials and devices” and “3D printed multi-functional hybrid devices and structures”, and invented “gastric resident electronics”. He is a recipient of the Office of Naval Research Young Investigator Program (ONR YIP) Award, NIH Trailblazer Award, NIH R01 Award, CDMRP Discovery Award, 3M Non-Tenured Faculty Award, SPIE Rising Researcher Award, TMS Young Leaders Professional Development Award, Ralph E. Powe Junior Faculty Enhancement Award and Technology Review Innovators Under 35 Asia Award.