

Programmable Materials and Structures for Next Generation Robotics

Jyun Kim<sup>†</sup>

Ulsan National Institute of Science and Technology

(jiyunkim@unist.ac.kr<sup>†</sup>)

A robot is a machine capable of carrying out a complex series of actions automatically, mimicking forms and functions of specific living organisms, such as human, cheetah, octopus, etc. Beyond mimicking biomimetic forms, if we are able to directly program the morphology, properties and transformation of a robot body in situ, the boundary between virtual and real world will be dramatically blurred. Therefore, our group aims to develop robotic matters and systems capable of programming its morphologies, physical properties and functions. In this paradigm of robotics, challenges require the innovation in all level of system including materials, components, architectures to integrate them, manufacturing process and operation. In this talk, I introduce recent research outcomes in our group, including programmable smart materials, metamaterial structures, 4D printing methods and soft robotic applications, and try to share my visions for next generation robotics.