

Transformative Architecture: Enabling Technology for Next Generation Structures

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Advanced structures are a key enabling technology in many engineering fields, such as aerospace, automotive, biomedical, civil engineering, and robotics. In this talk, I will demonstrate how “transformative architecture” that changes shape and functionality on demand can be used to realize such advanced structural systems. Specifically, I will show three examples: (1) reconfigurable tessellations with tailorable mechanical properties; (2) origami-based waveguide with a counter-intuitive impact mitigation mechanism; and (3) topological architecture with superb dynamic characteristics. Computational simulation and experimental demonstration results will be presented along with the discussion on the target engineering applications. I will also touch briefly upon other engineering applications of such transformative architecture.

Biosketch: Jinkyu Yang is a Professor in Mechanical Engineering at Seoul National University. He was formerly a Professor in Aeronautics & Astronautics at the University of Washington. He received his Ph.D. degree in Aeronautics and Astronautics from Stanford University (2005) and BS degree in Aerospace Engineering from KAIST (2000). His research has been directed towards developing novel engineered materials and structures, e.g., metamaterials, phononic crystals, and nonconventional composites, for aerospace, biomedical and mechanical applications. His research has been featured in news media, such as Reuters, NSF News, and U.S. Public Broadcasting Service, and he is currently an Associate Fellow in AIAA and an Associate Editor for AIAA’s Journal of Aircraft.