Fiber Reinforced Plastics, Finite Element Method, Forming

## Q. Wu LAB.

## [Multi-scale Simulation of Composite Forming]

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## Harmony of composite materials on multiple scales

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Fiber reinforced composite is a strong and light material which contains fibers and resins, and is widely used in various industrial sectors like aerospace, automotive, and civil engineering. However, its heterogeneous properties lead to the difficulty in analysis and simulation.

Our lab studies the multi-scale mechanics of composite during its forming process using highperformance finite element simulation, and try to discover the harmonious beauty of composite materials at both macroscopic and microscopic scales.

## **HOMOGENIZATION from Micro to Macro**

Time- and temperature-dependent viscoelasticity of composite is homogenized using asymptotic expansion



One-side cooling induced warpage is large-scale finite element simulated using FrontCOMP (post-K project)





