DESIGN, OPTIMIZATION, AND ANALYSIS OF WAVE SPRINGS USING HIGH-SPEED ADDITIVE MANUFACTURING

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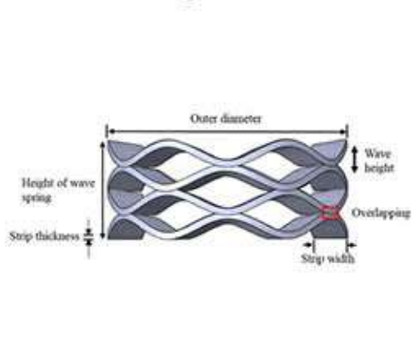
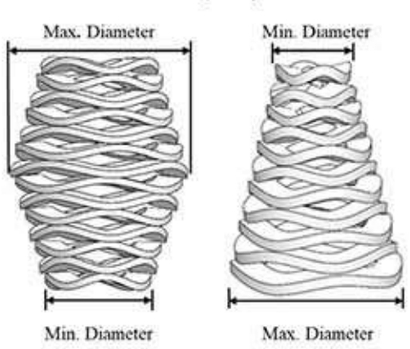
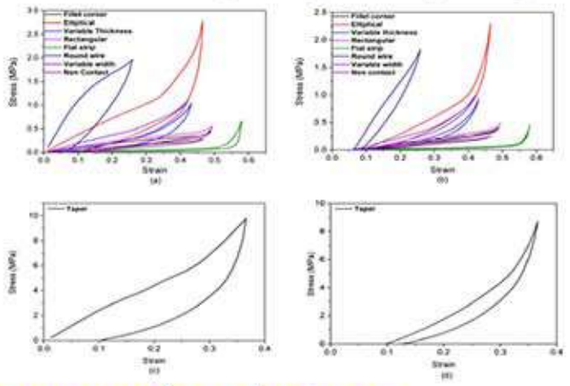
This study aims to design and additive manufacture (AM) contact and non-contact wave springs along with complex designs having geometric as well as dimensional variations and analyzed for different mechanical properties. All designs were printed using MultiJet fusion technology (HP, 4200) which is a hybrid and fast process as compared to other AM techniques. Both experimental and simulation-based studies were carried out to investigate and validate the mechanical properties of wave springs.

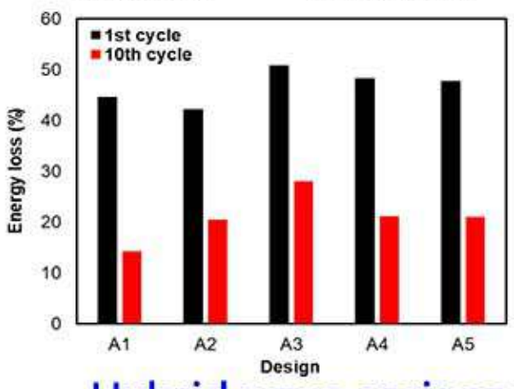




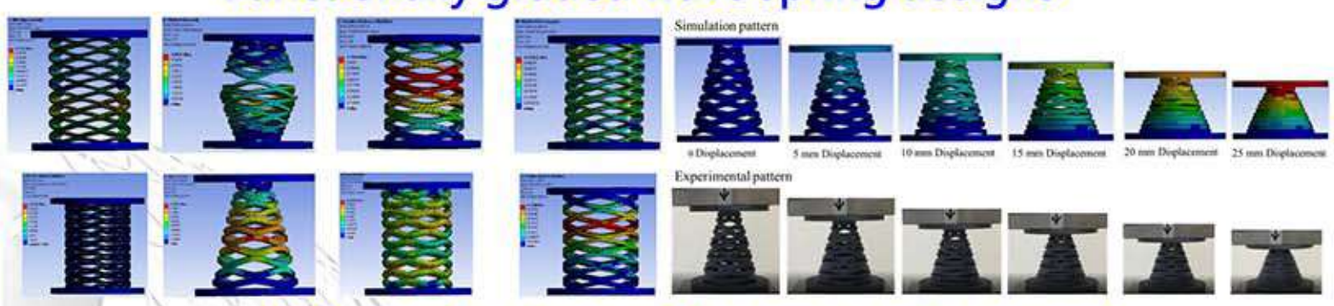
Terminologies of wave springs

Springs in spring

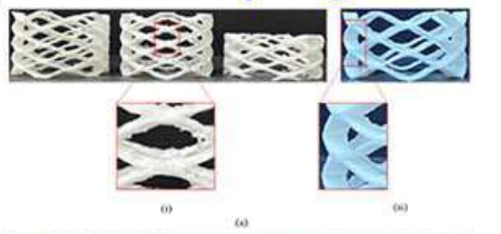




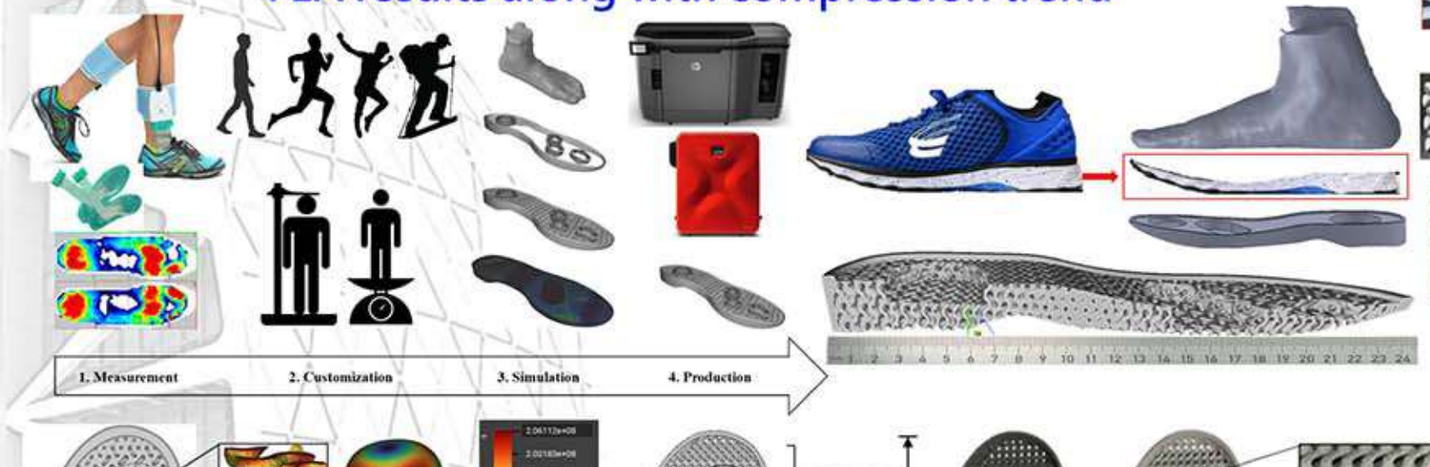
Functionally graded wave spring designs

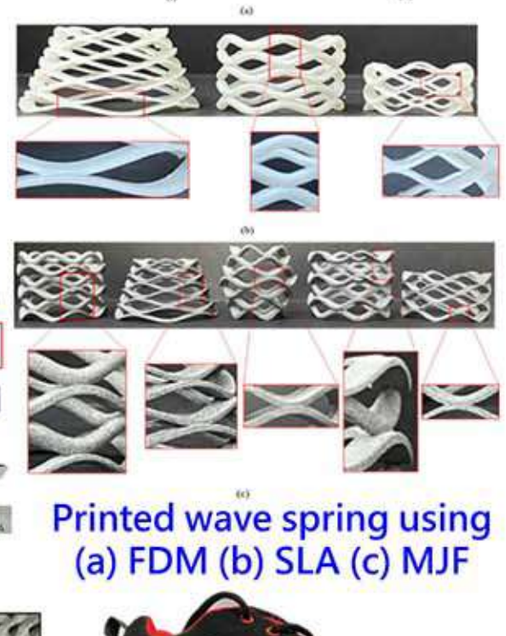


Hybrid wave springs

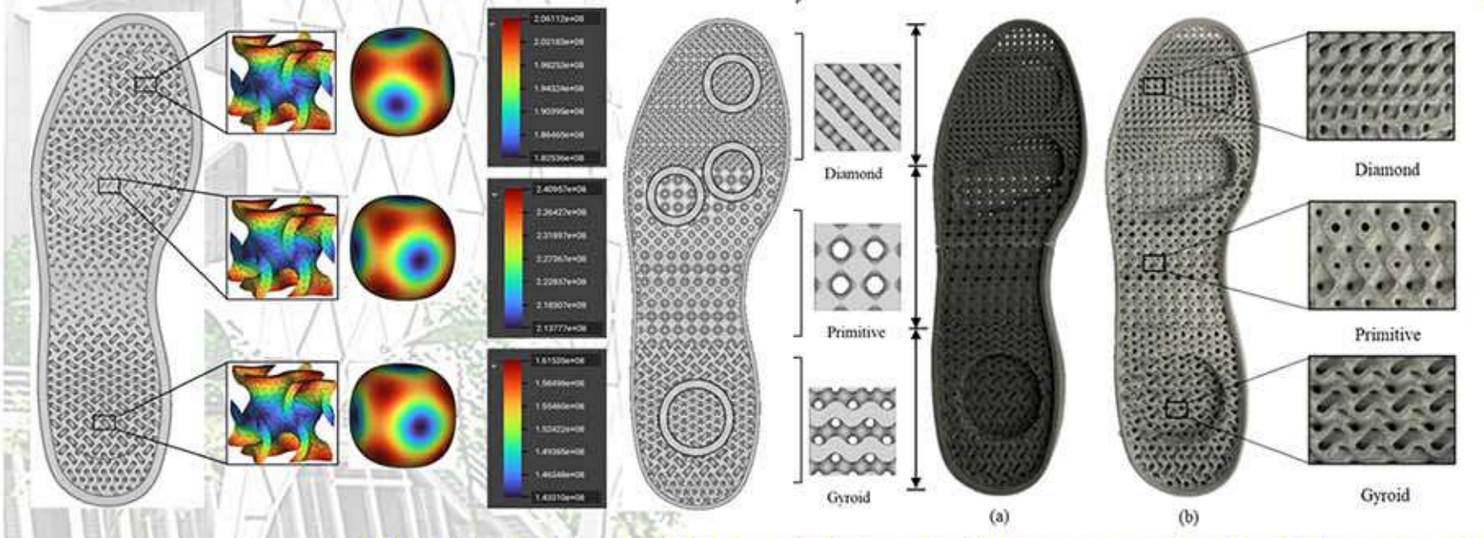


FEA results along with compression trend





Printed wave spring using (a) FDM (b) SLA (c) MJF



Multifunctional Shoe Midsole incorporated with wave springs*

* Taiwan and US patent Awaiting