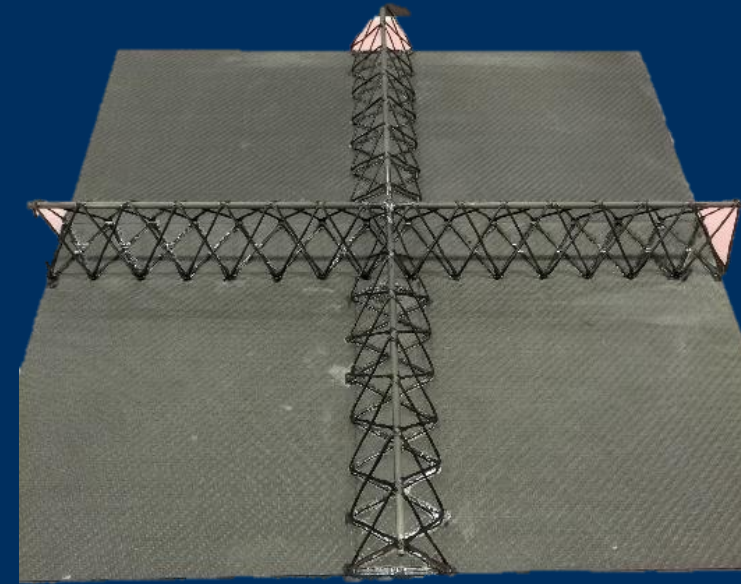
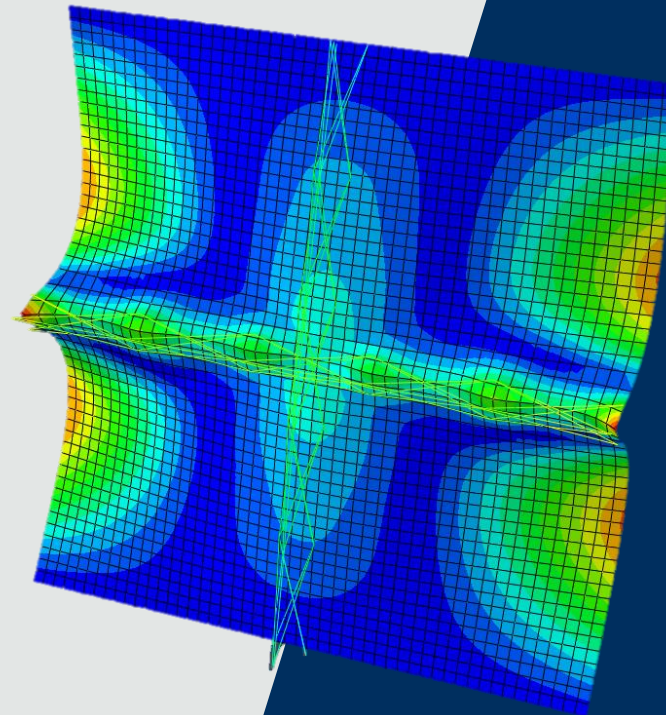
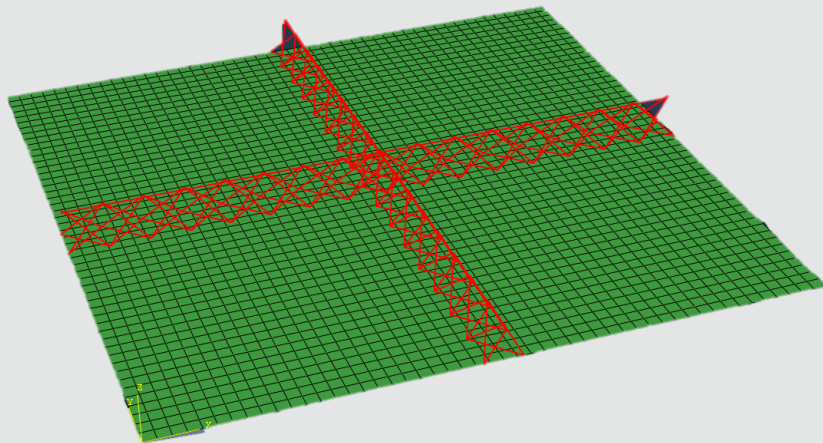


# Experimental Testing of WrapToR Truss Stiffened Composite Skin Panels

Chris Grace  
University of Bristol



# What is WrapToR?

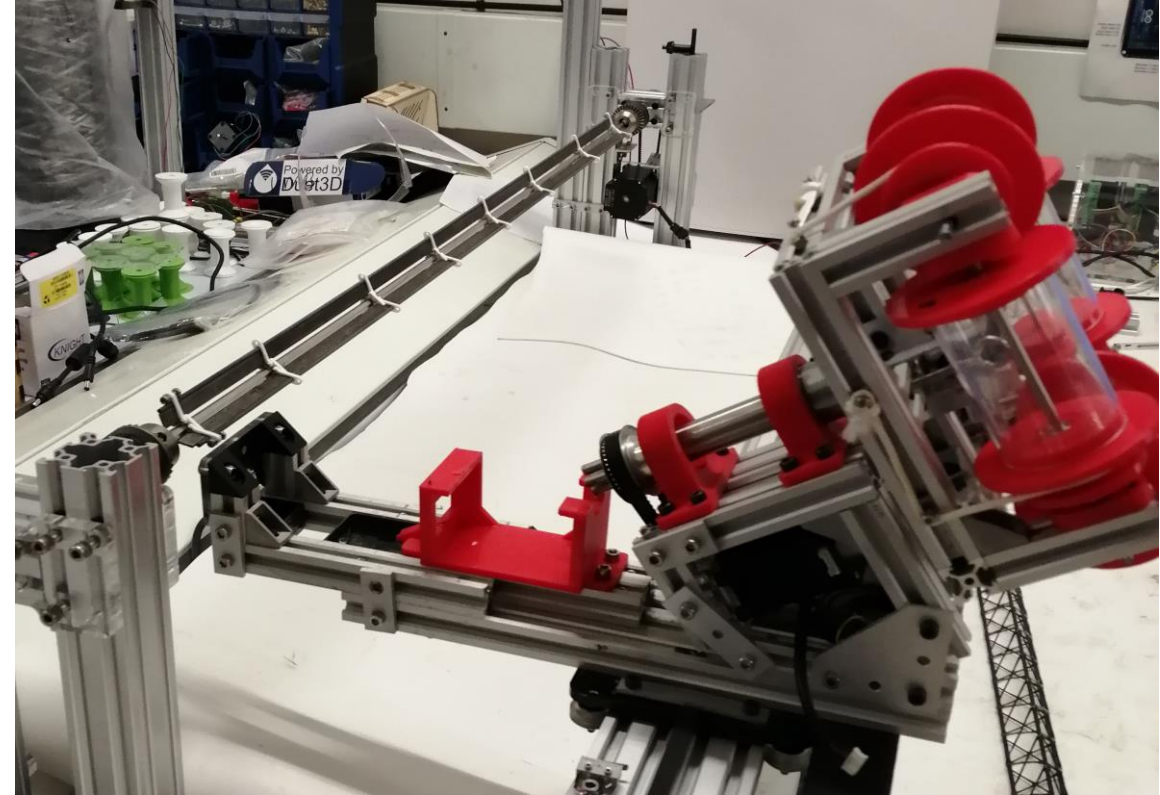
## ➤ Wrapped Tow Reinforced Truss

### ➤ 3 longitudinal chord members

- Pultruded Composite tubes

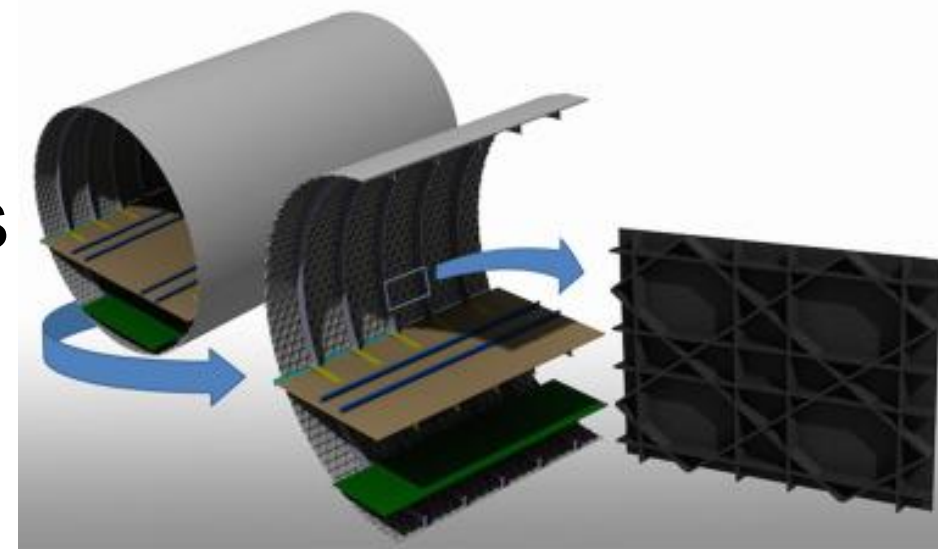
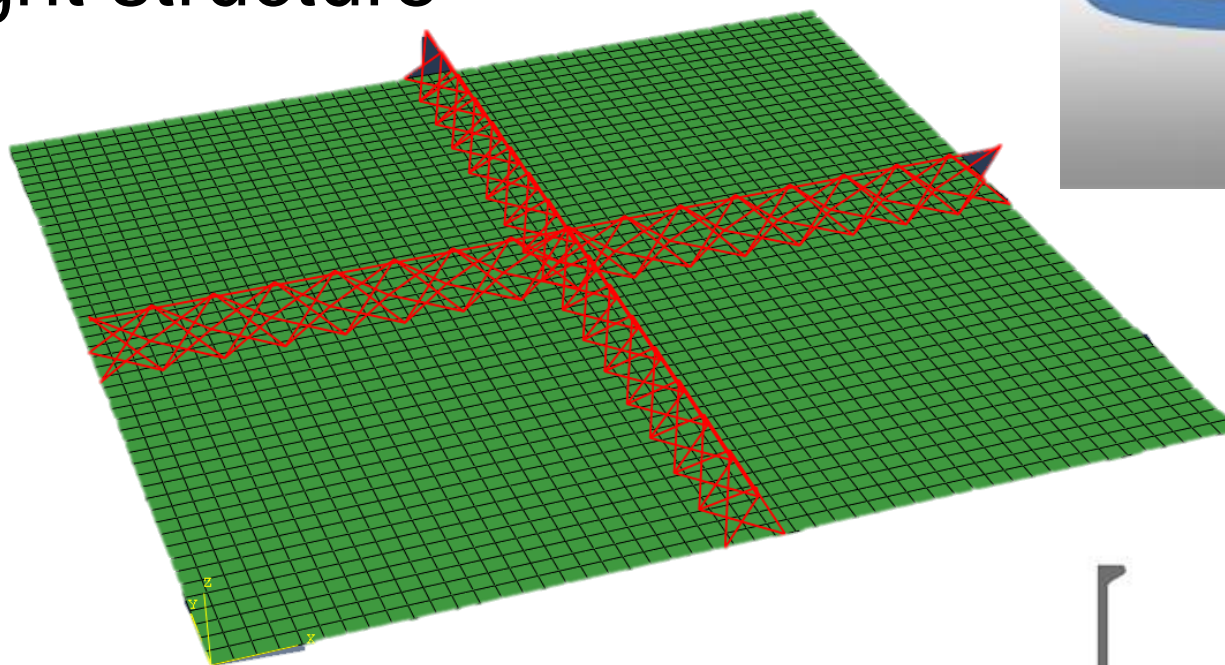
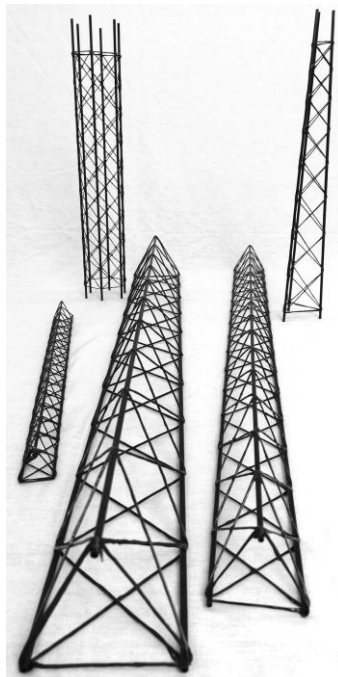
### ➤ Shear members –

- Continuous Resin Wetted Fibre
- Adapted filament winding technique



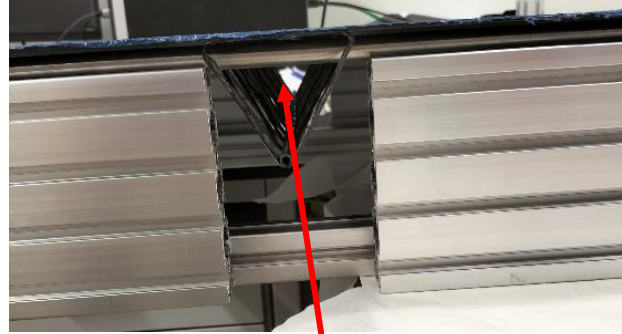
# WrapToR Truss Stiffeners

- Stiffened Panel
  - Reinforcement targeted at load paths
  - Lightweight structure

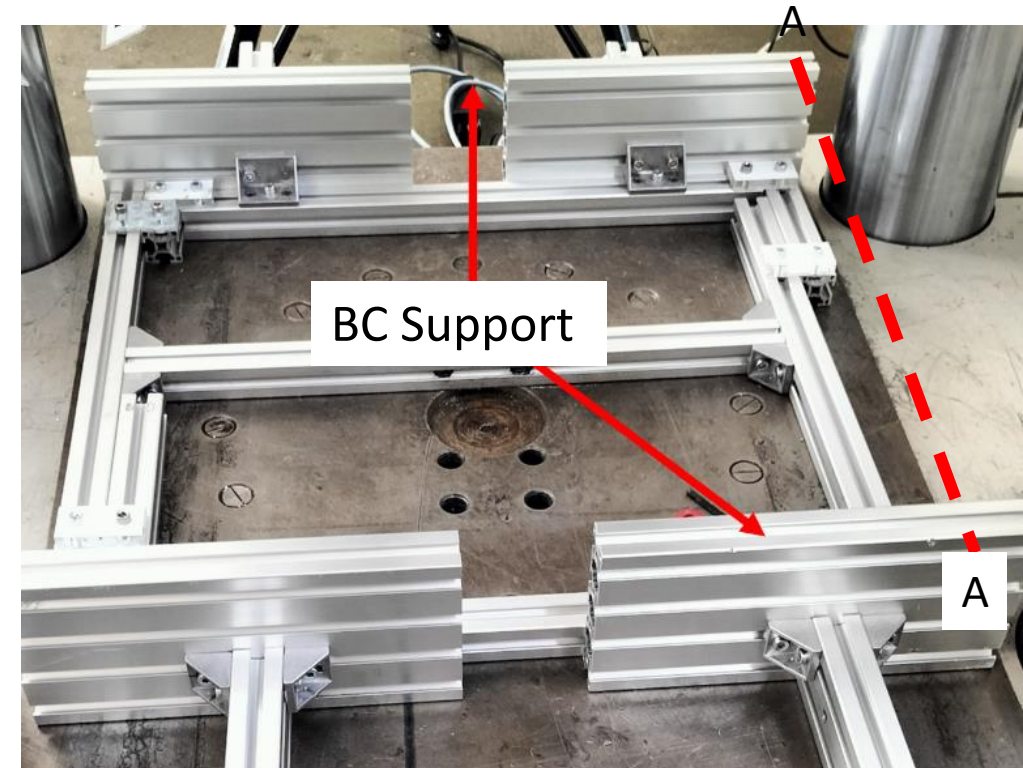
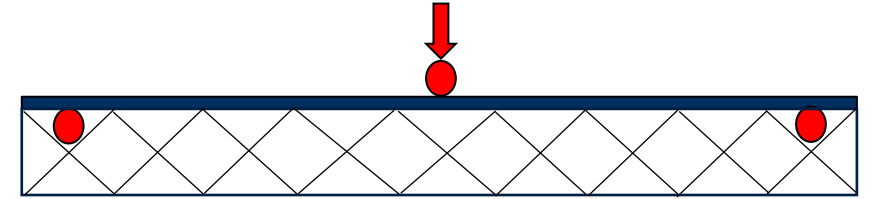


# Experimental Setup

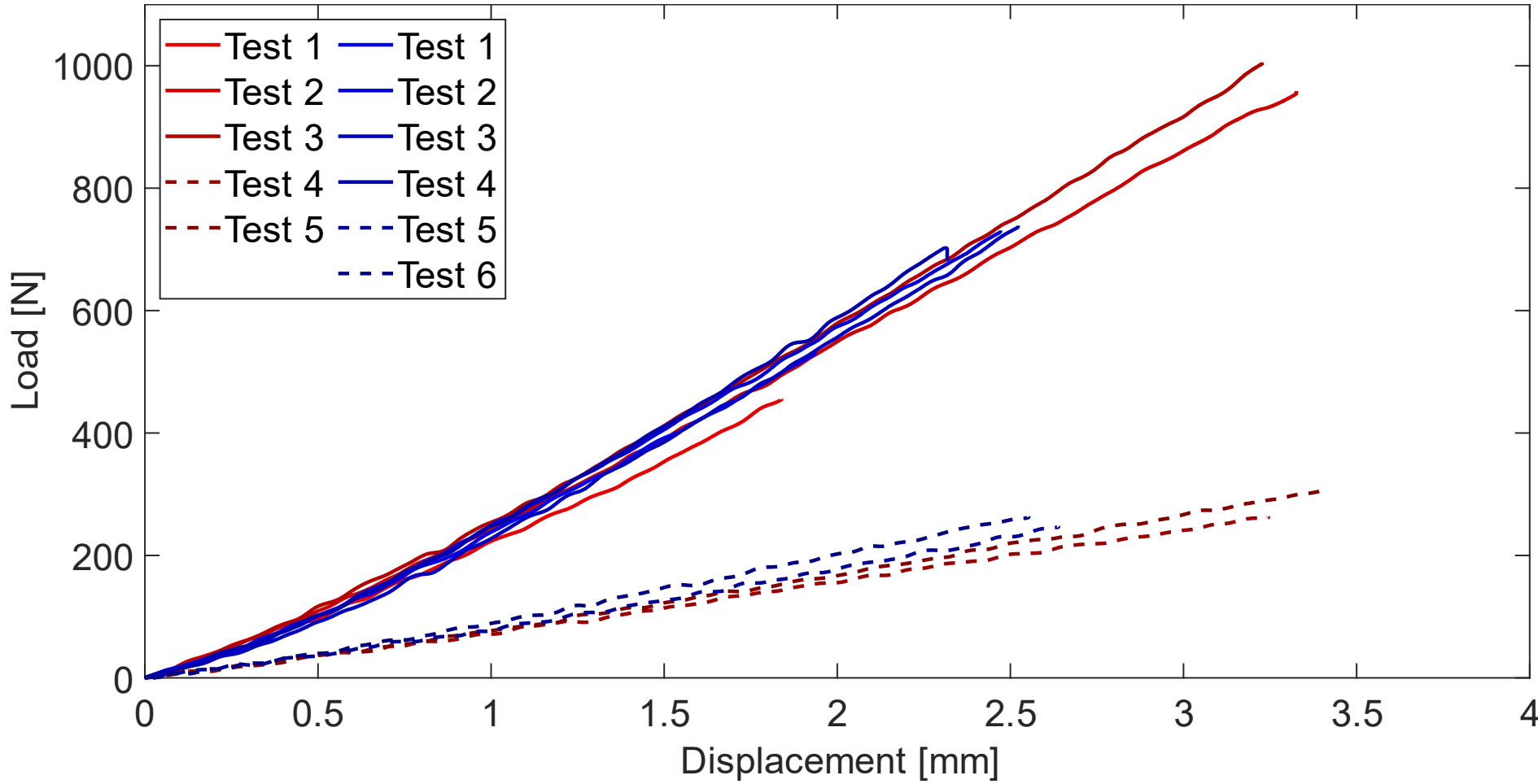
- 3-point bend test
- Panel:
  - 600 x 600 mm
- Truss:
  - Ctc: 60 mm
  - Chord Diameter: 6 mm
  - Shear Diameter: 2.5 mm
  - Shear Angle: 30°



A-A View



# Experimental Data



## Pre-failure stiffness

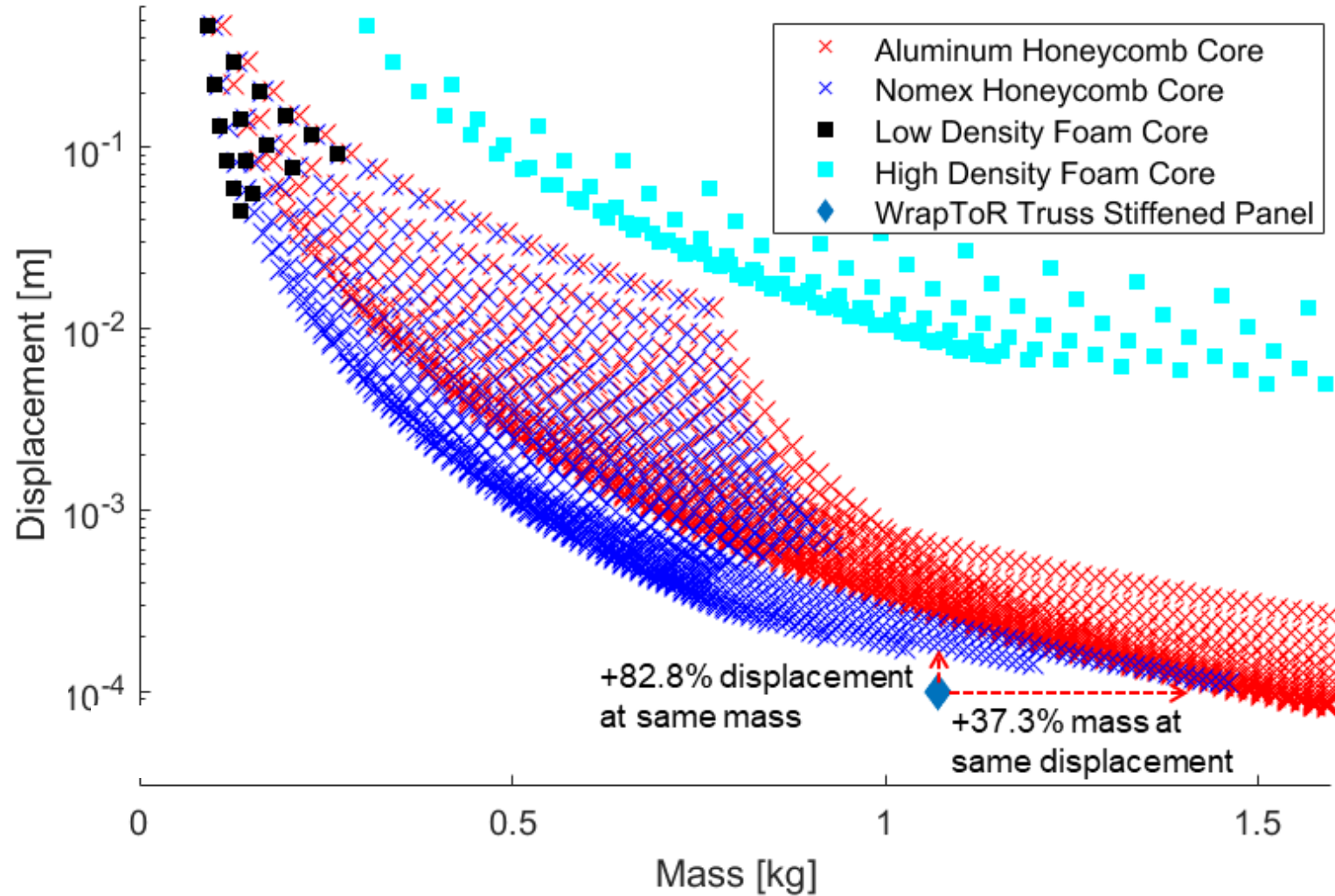
Panel 1	Panel 2
297.1 N/mm	326.3 N/mm
10.79 %	4.87 %



# Comparative Analysis

- Sandwich Panel modelling exercise

- Vary **skin thickness**
  - 0.05 – 10 mm
- Vary **core thickness**
  - 0.5 – 50 mm
- Vary **core material**
  - Aluminum Honeycomb
  - Nomex Honeycomb
  - Low Density Foam
  - High Density Foam



# Future Work

- Use experimental data to improve model accuracy and results
- Improve fabrication process and test for strength
- Investigate grid stiffening through FEA
- Move into more complex structures – curved truss?





# Thank You for Listening

## Chris Grace

Email: [chris.grace@bristol.ac.uk](mailto:chris.grace@bristol.ac.uk)