



# A Computer Model to Analyze Strains in a 3D Printed Spine Implant

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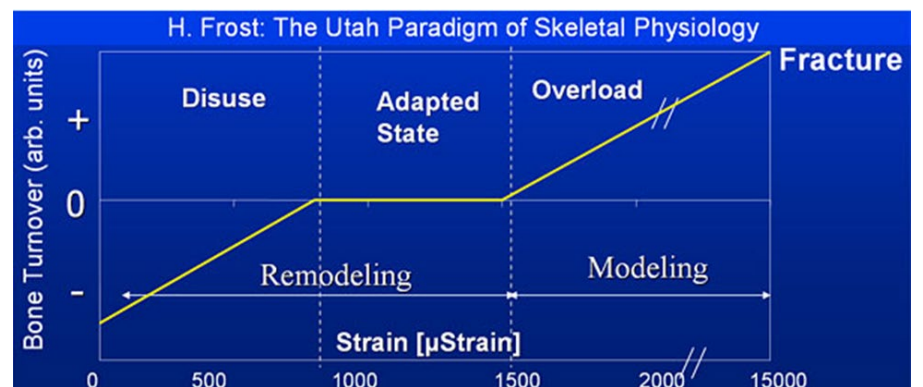
The aim of this project is to get a reliable estimation of the mechanical strains present in a 3D printed cage implemented in a relevant subset of patients.

❑ Could the strain regimes that are present promote bone formation?

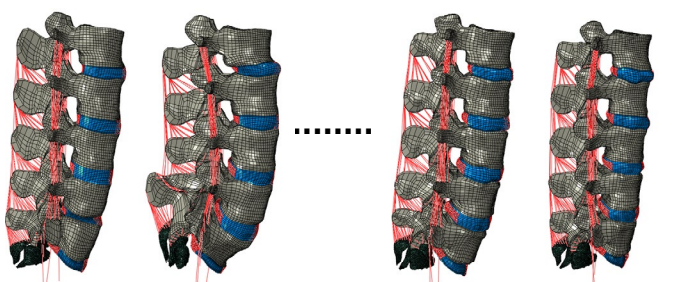
## BONE MECHANOBIOLOGY

Surface strains regimes, on which bone cells are attached, are known to influence bone homeostasis<sup>[1]</sup>.

**>1500  $\mu\epsilon$  induces bone formation**



## PATIENT DATASET<sup>[2]</sup>

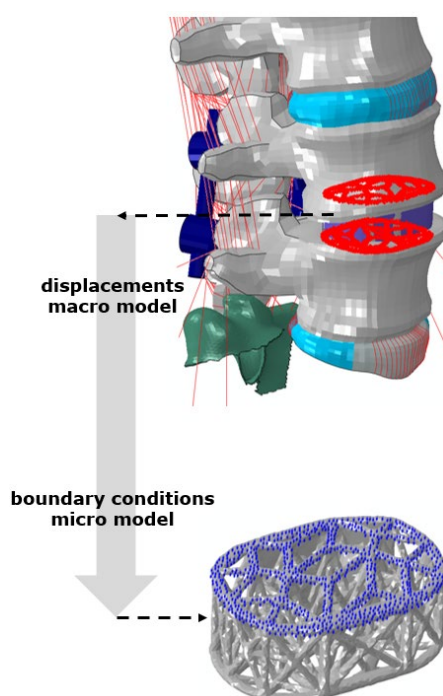


PT1 PT2 ..... PT9 PT10

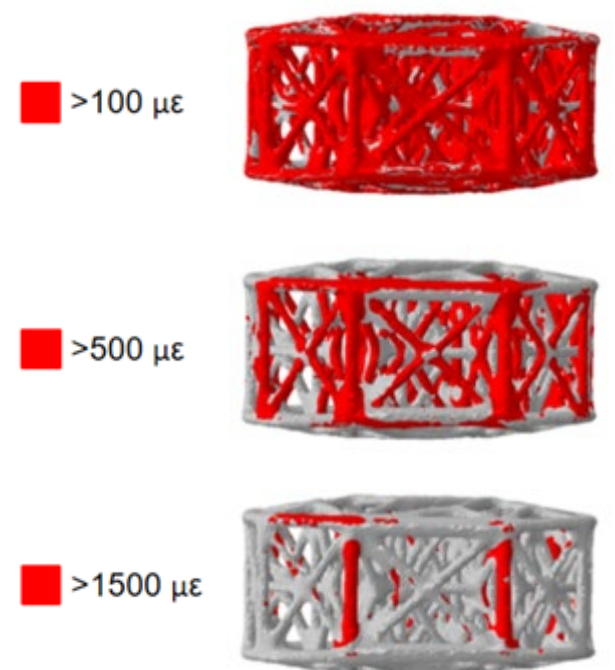
### PATIENT SPECIFIC PROPERTIES

- 10 patients with lower back pain
- Geometry of model based on patient scans
- Material parameters based on patient scans
- Loads based on patient height/weight

## MACRO – MICRO



## PRELIMINARY RESULTS (N=1)



✓ Design optimization might be interesting in order to realize bone promoting strain regimes on more struts