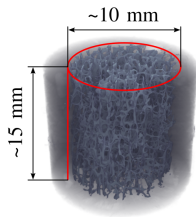


Fabric-Elasticity Relationships in Healthy and Diabetic Individuals

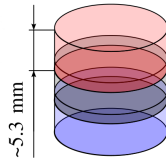
Mathieu Simon

January, 2025

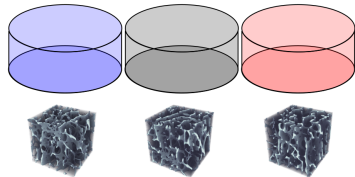
Samples



31 Samples

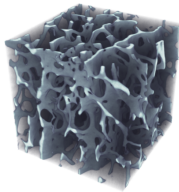


3 Stacks

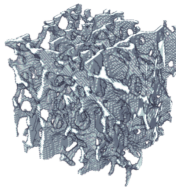


1 Cubic region of interest (ROI) per stack

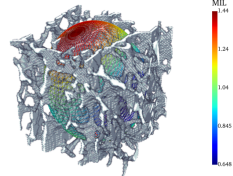
Medtool 4.8



93 ROIs

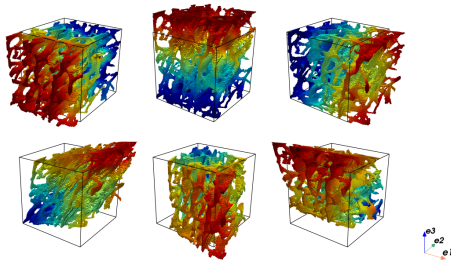


Downsampling (Factor 4)
Segmentation

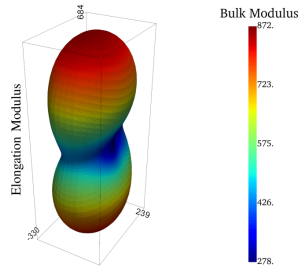


Morphometry
Fabric

Abaqus 2023



Homogenization (KUBCs)



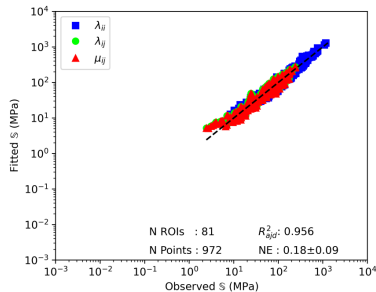
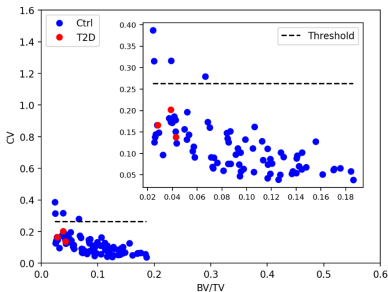
Stiffness Tensor

Fabric-Elasticity Relationships

Coefficient of variation (CV)

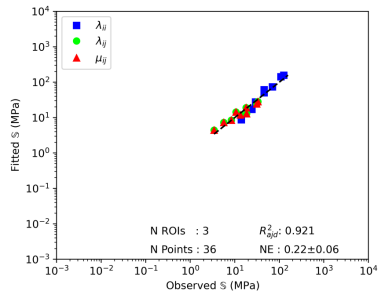
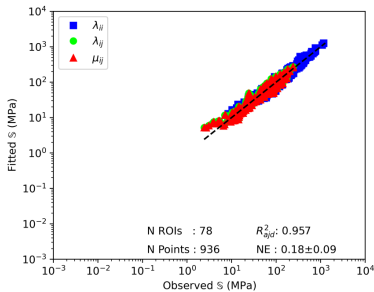
- Homogeneity of mass distribution within the ROI
- Threshold defined in Panyasantisuk et al. [1]

Linear Regression: Simon et al. [2] Appendix A and B



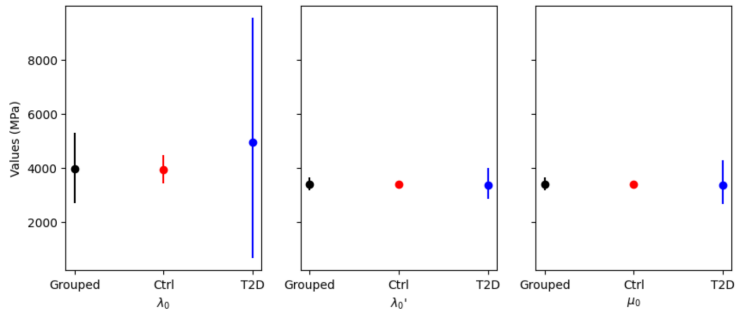
NB: Plots ranges similar as Simon et al. [2] for comparison

Fabric-Elasticity Relationships II



NB: Plots ranges similar as Simon et al. [2] for comparison

Fabric-Elasticity Relationships III



References

- ▶ Panyasantisuk, J., Pahr, D. H., Gross, T., and Zysset, P. K. (2015)
Comparison of Mixed and Kinematic Uniform Boundary Conditions in
Homogenized Elasticity of Femoral Trabecular Bone Using Microfinite Element
Analyses
J Biomech Eng., 137(1)
<https://doi.org/10.1115/1.4028968>
- ▶ Simon M., Indermaur M., Schenk D., Hosseinitabatabaei S., Willie B.M.,
Zysset P. (2022)
Fabric-elasticity relationships of tibial trabecular bone are similar in
osteogenesis imperfecta and healthy individuals
Bone, 155
<https://doi.org/10.1016/j.bone.2021.116282>