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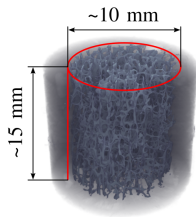# Fabric-Elasticity Relationships in Healthy and Diabetic Individuals
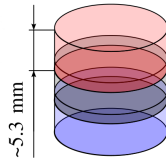
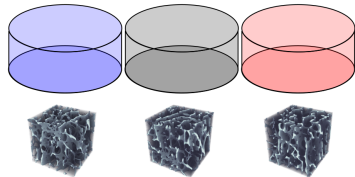**Mathieu Simon**

January, 2025

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Samples

~10 mm

~15 mm

~5.3 mm

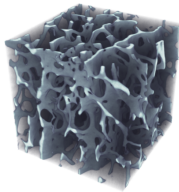31 Samples   3 Stacks   1 Cubic region of interest (ROI) per stack
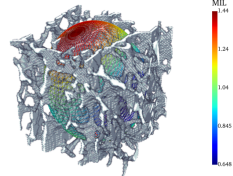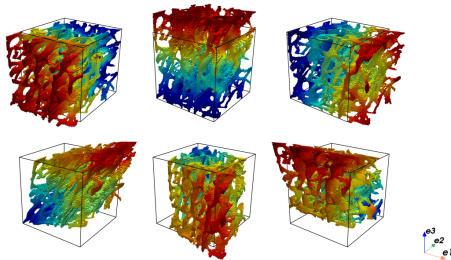
Medtool 4.8

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93 ROIs
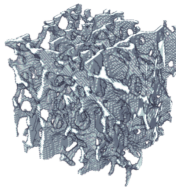
Downsampling (Factor 4)
Segmentation

Morphometry
Fabric

Abaqus 2023

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Homogenization (KUBCs)

Stiffness Tensor

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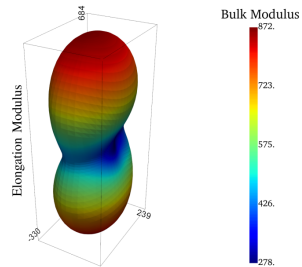
Morphometry

Femoral head samples
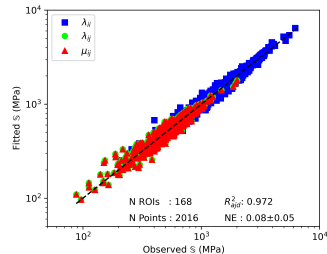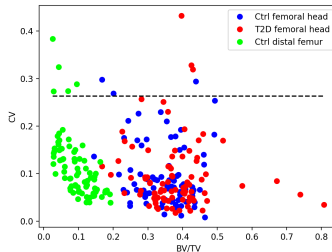
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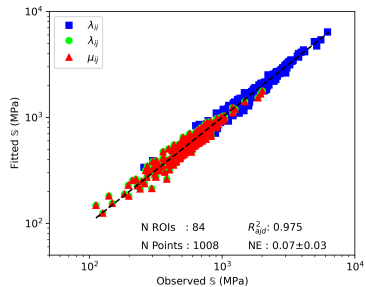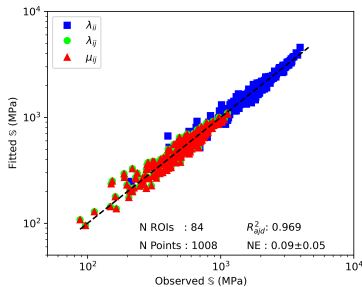BERN
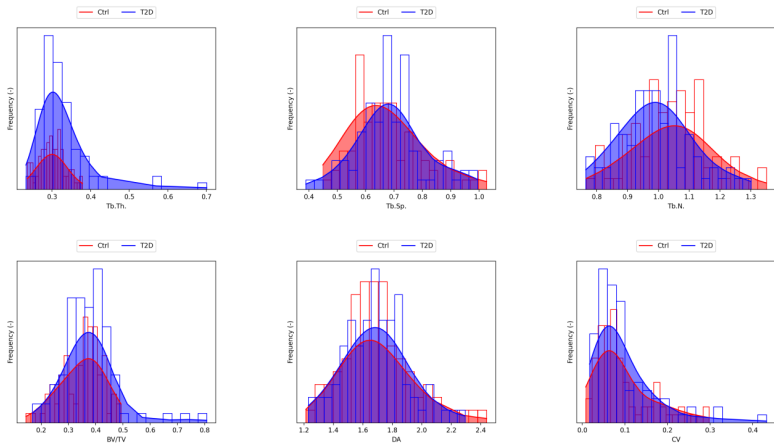
Fabric-Elasticity Relationships

Coefficient of variation (CV)

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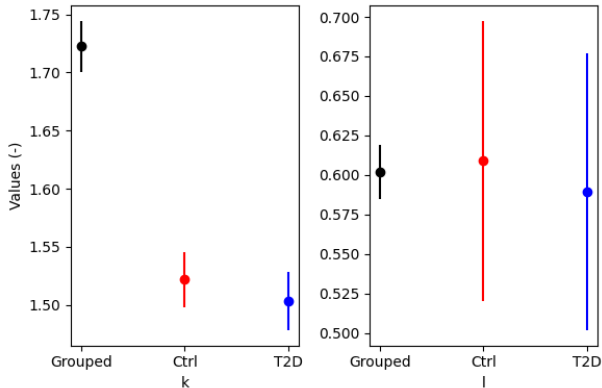- Threshold defined in Panyasantisuk et al. [1]

Matching femoral head Ctrl with T2D for BV/TV and DA [2]

Fabric-Elasticity Relationships II

Fabric-Elasticity Relationships III

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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