Mathieu Simon

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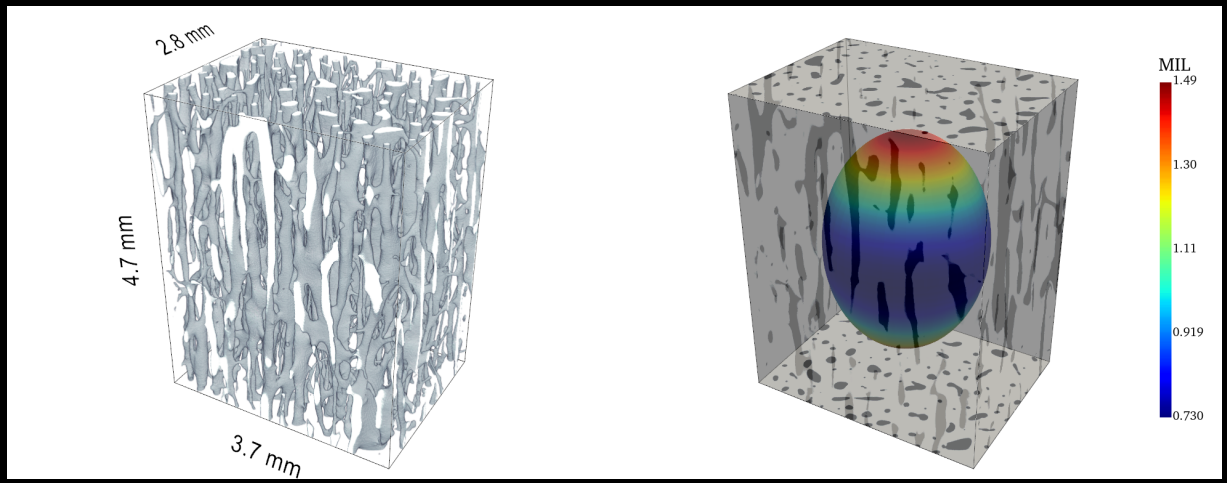
Data

- 59 scans
- 6.5 µm voxel size
- RUS measurements
- CTAnalyser



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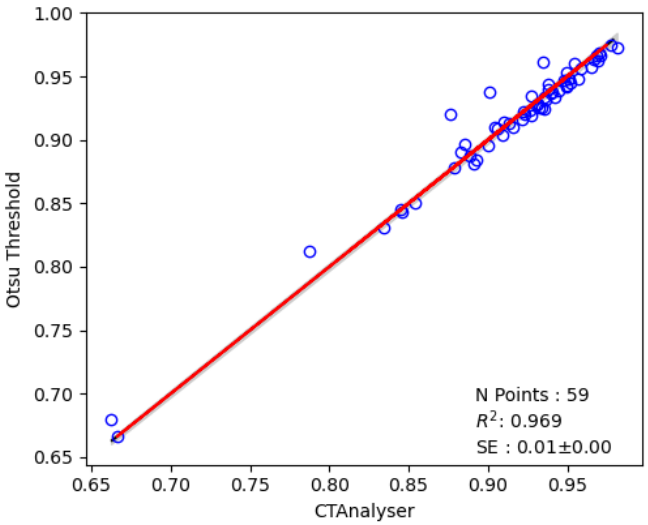
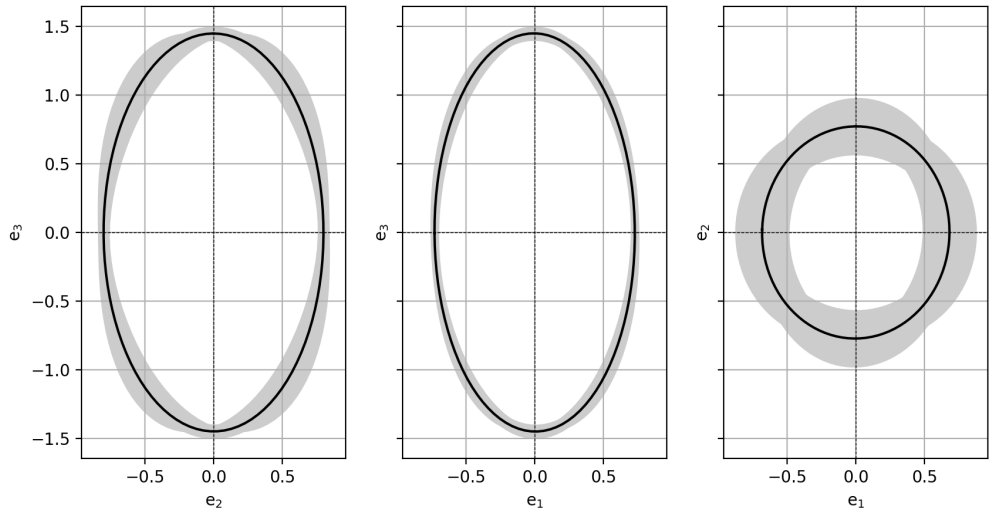
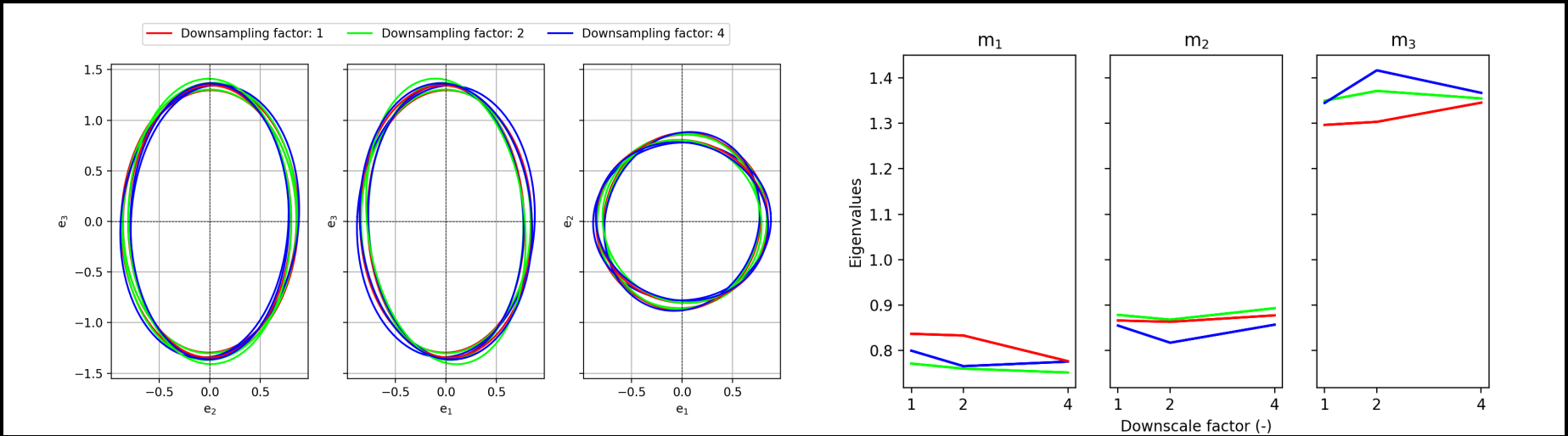
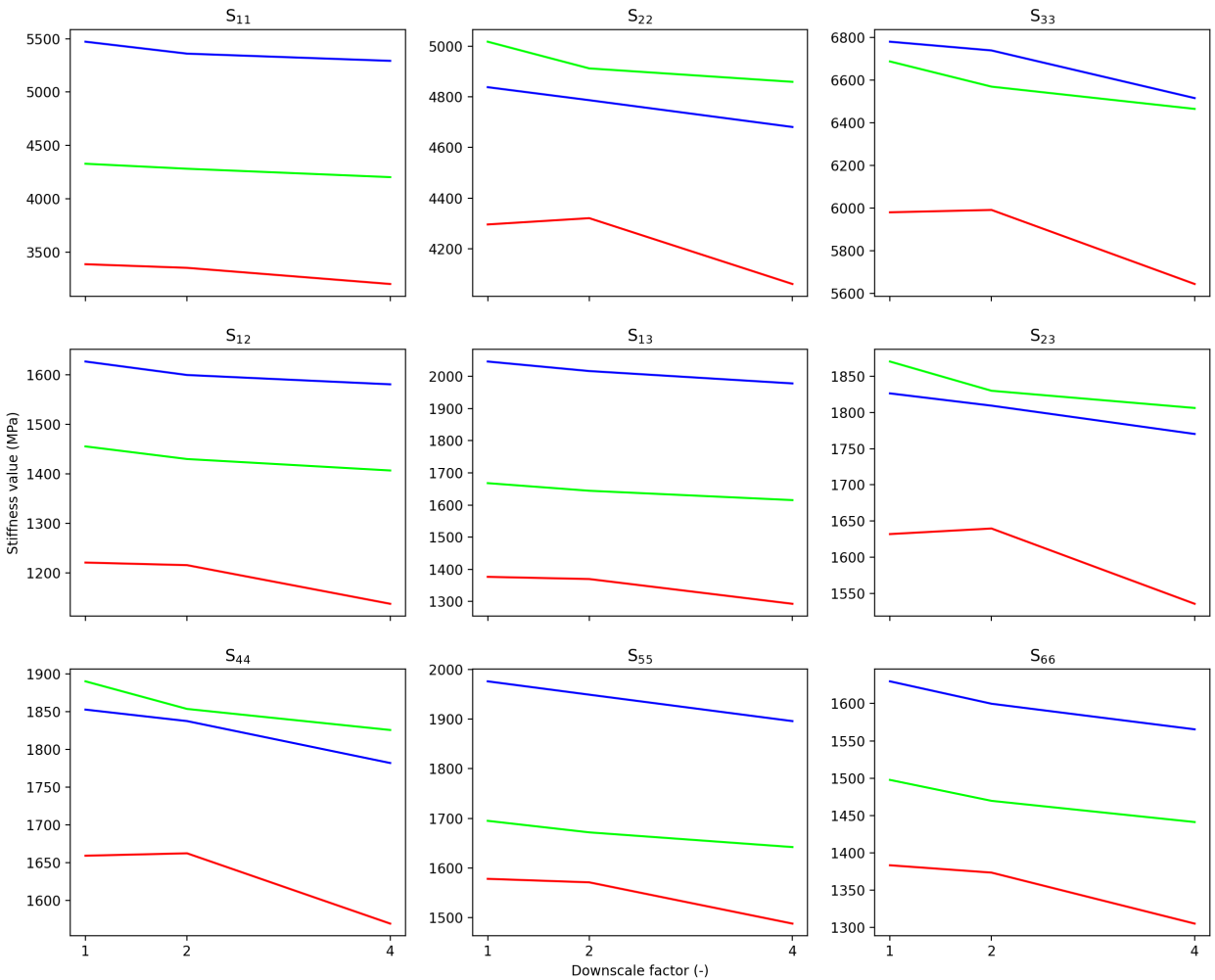
Mean Otsu threshold

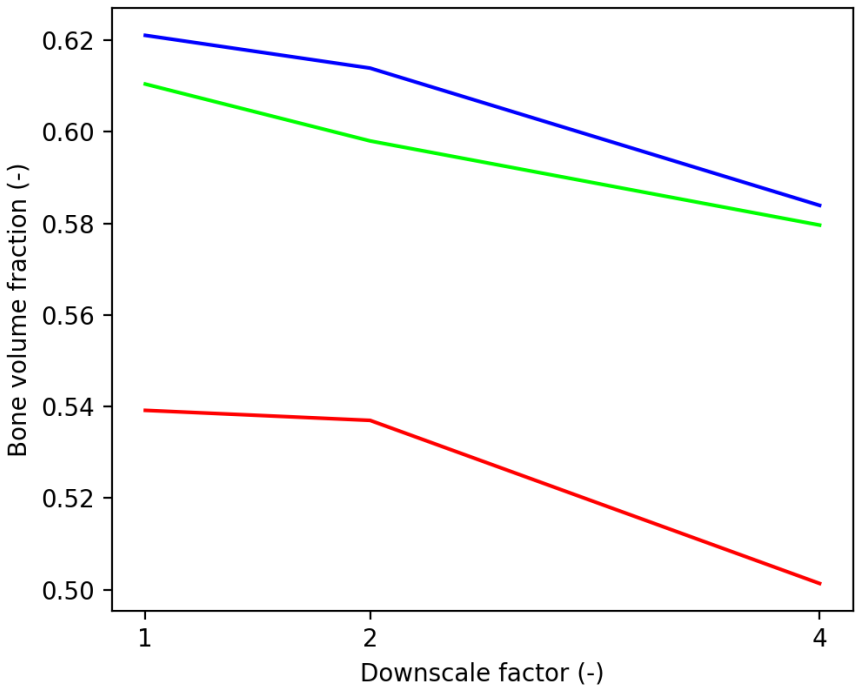


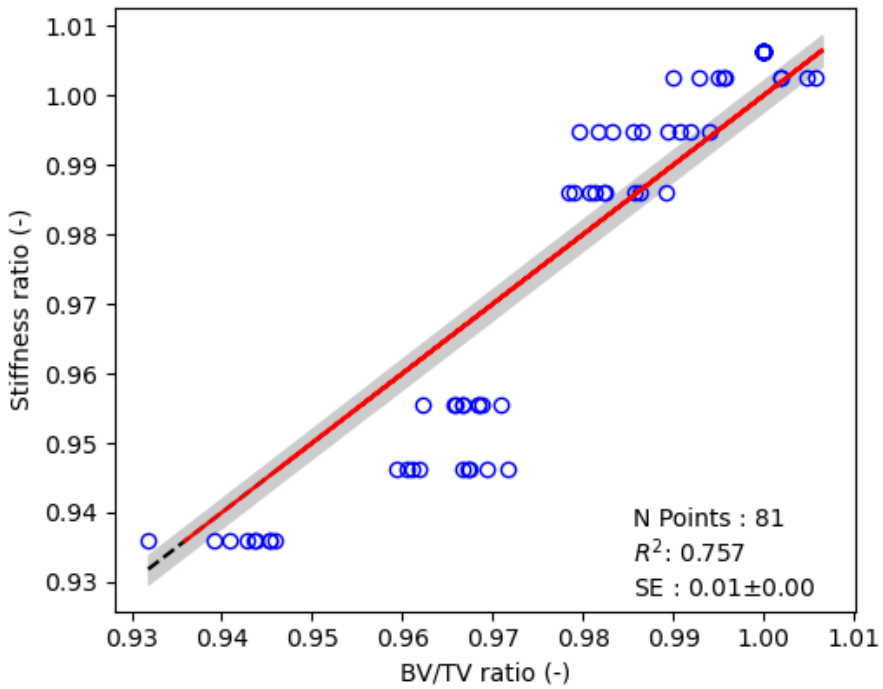
Fabric distribution




Downsampling factor: 1
Downsampling factor: 2
Downsampling factor: 4
e3
e2
e1
m1
m2
m3
Eigenvalues
Downscale factor (-)


S11
S22
S33
S12
S13
S23
S44
S55
S66
Stiffness value (MPa)
Downscale factor (-)

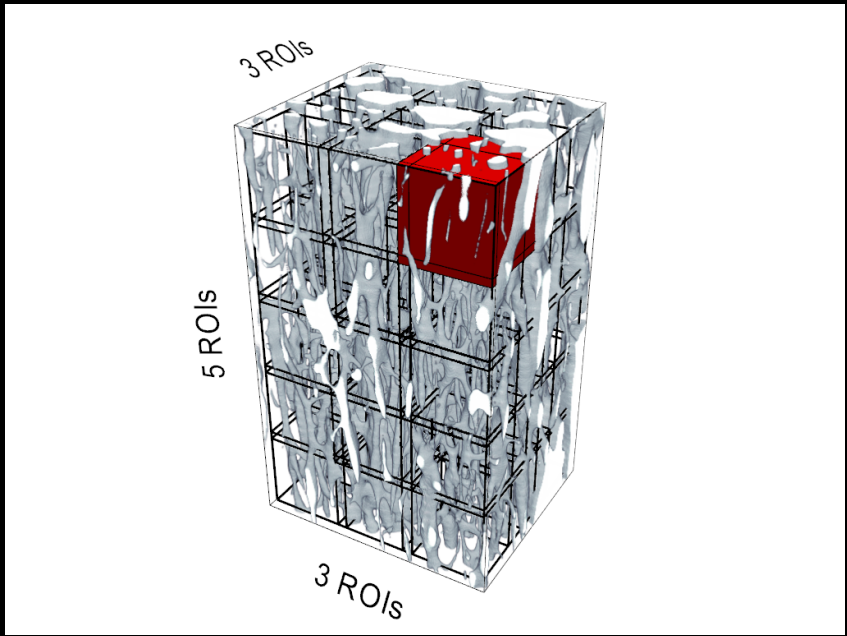

Bone volume fraction (-)
0.62
0.60
0.58
0.56
0.54
0.52
0.50
1
2
4
Downscale factor (-)


Stiffness ratio (-)
1.01
1.00
0.99
0.98
0.97
0.96
0.95
0.94
0.93
N Points : 81
R^2: 0.757
SE : 0.01±0.00
0.93
0.94
0.95
0.96
0.97
0.98
0.99
1.00
1.01
BV/TV ratio (-)

Setup

- 1mm ROI side length
- 3x3x5 ROIs
- 65 µm margin
- Groups of 1, 2, ..., 45 ROIs

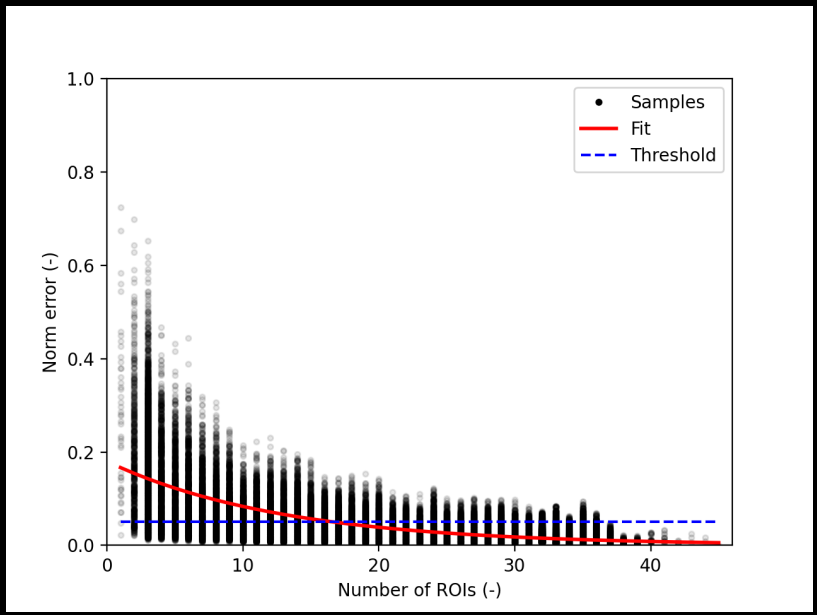
→ ~2^{45} possibilities

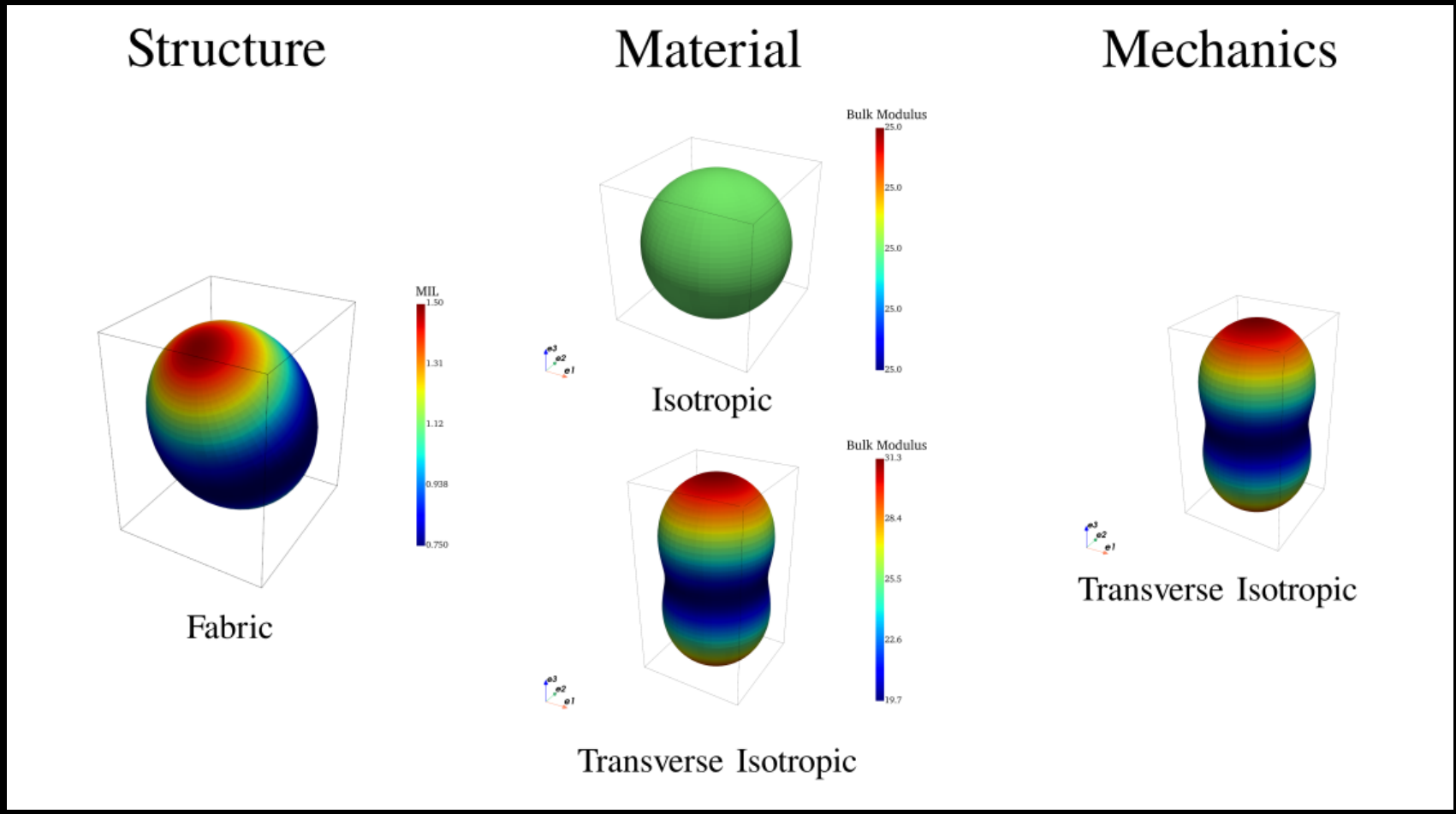


Sampling

- Balanced clustering
  → Linear sum assignment
  → $216*10^6$ possibilities
- N samples = 1000
- Norm Error
- Threshold = 0.05

→ 15-16 ROIs




Structure
Material
Mechanics
MIL
1.50
1.31
1.12
0.938
0.750
Fabric
Bulk Modulus
25.0
25.0
25.0
25.0
25.0
Isotropic
Bulk Modulus
31.3
28.4
25.5
22.6
19.7
Transverse Isotropic
Transverse Isotropic

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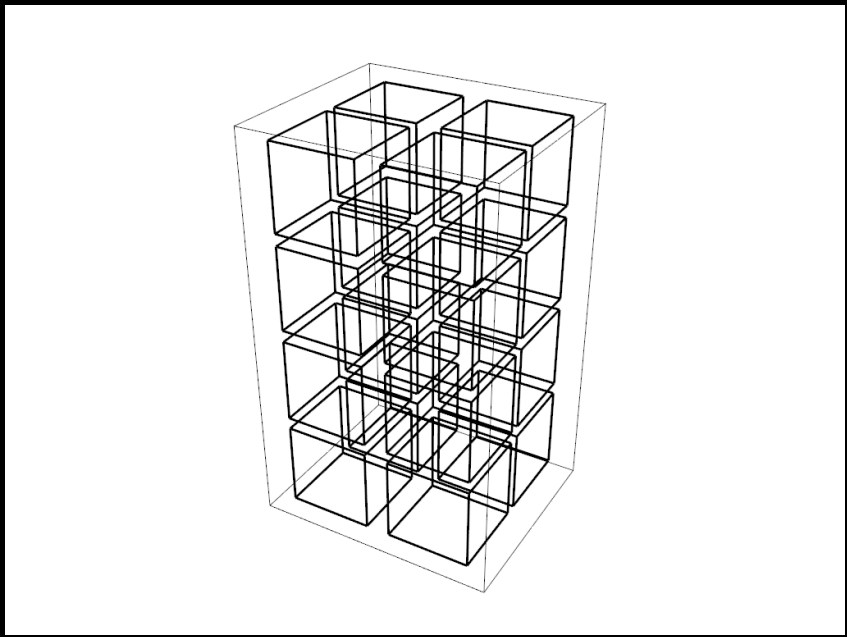
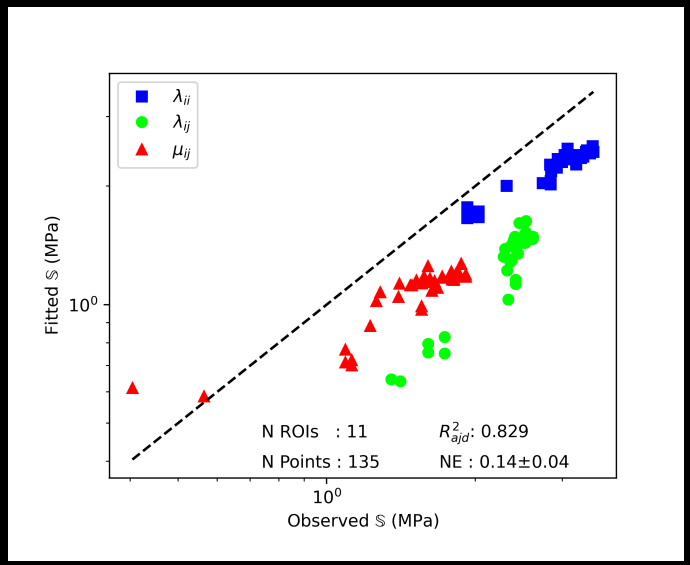
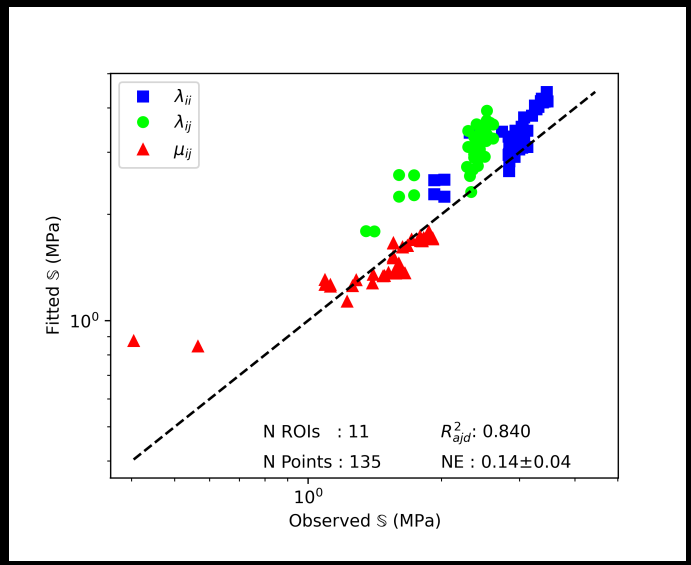
Setup

- Downsampling factor: 2
- 16x1mm^3 ROIs
- Isotropic vs transverse
- Mean $\mathbb{S}$ / Sample





Isotropic Material



Transverse Isotropic Material

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Setup

- Fabric at original resolution
- BV/TV at original resolution
- Isotropic material
- Mean $\mathbb{S}$ / Sample

Parameters:

λ_0	λ'_0	μ_0	k	l
3132	4944	4944	1.978	0.121