

# OBJECTIVE 3D-ULTRASOUND ANALYSIS OF TIBIALIS ANTERIOR MUSCLE ARCHITECTURE AND APONEUROSIS GEOMETRY

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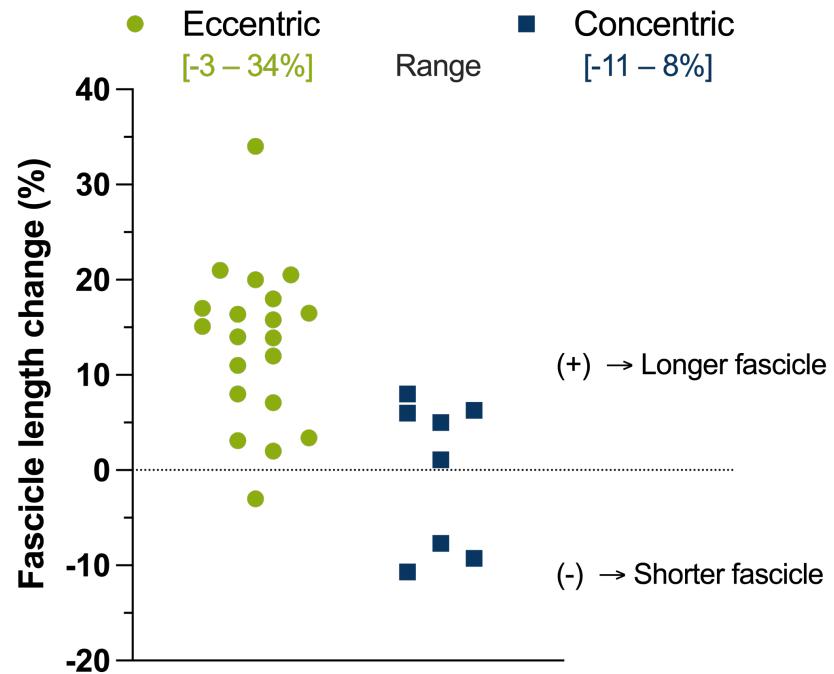
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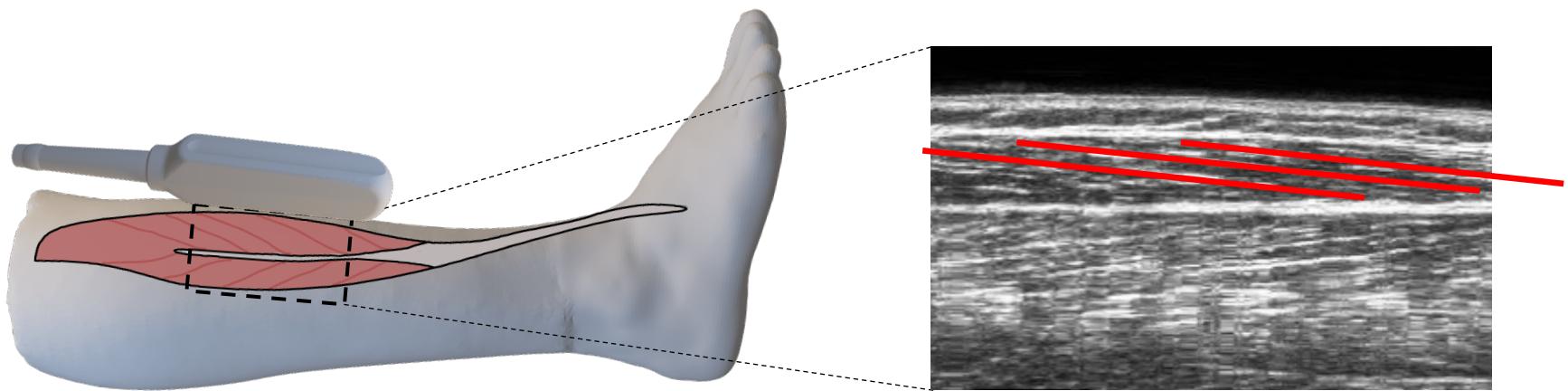
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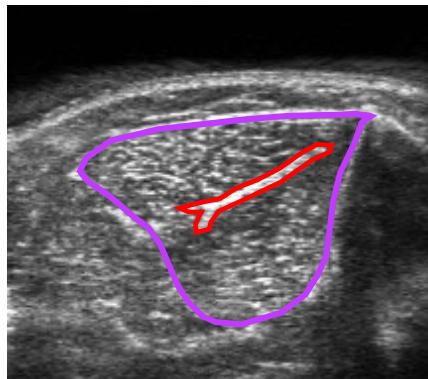
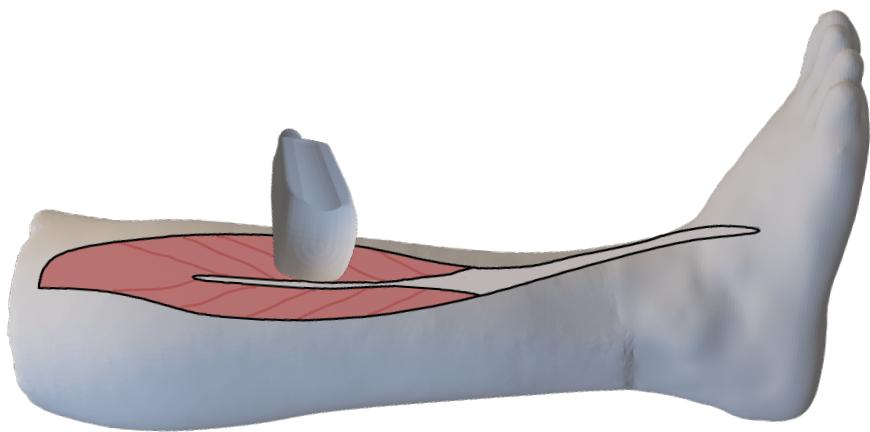
# Ultrasound (US) for morphological assessment: friend or foe? Can we standardize US?



# Ultrasound – “sagittal plane”



# Ultrasound – “transverse plane”

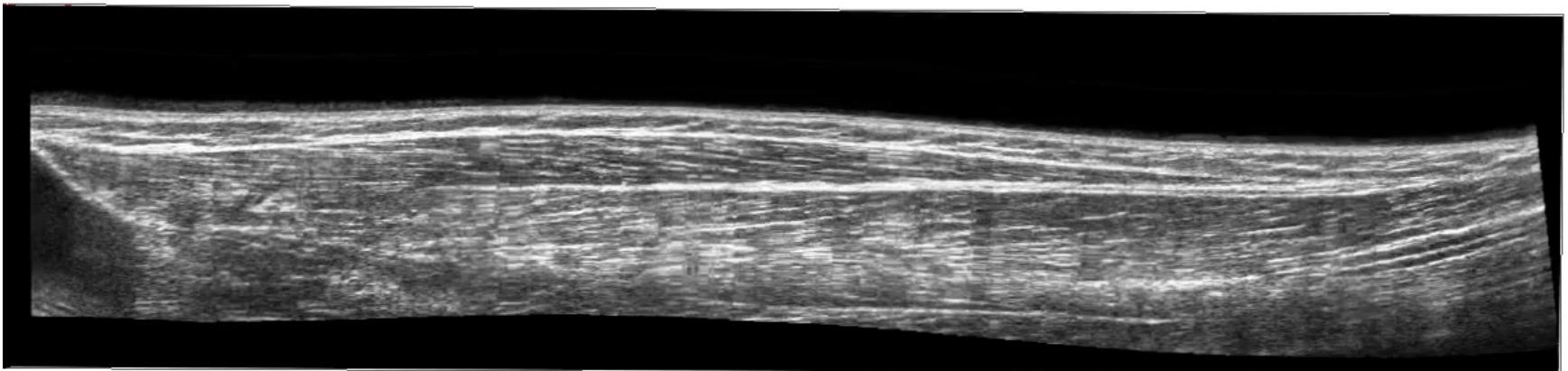


# Freehand 3D – Ultrasound (3DUS) in a nutshell



# 3DUS – where is the fascicle plane?

Translations  
Rotations

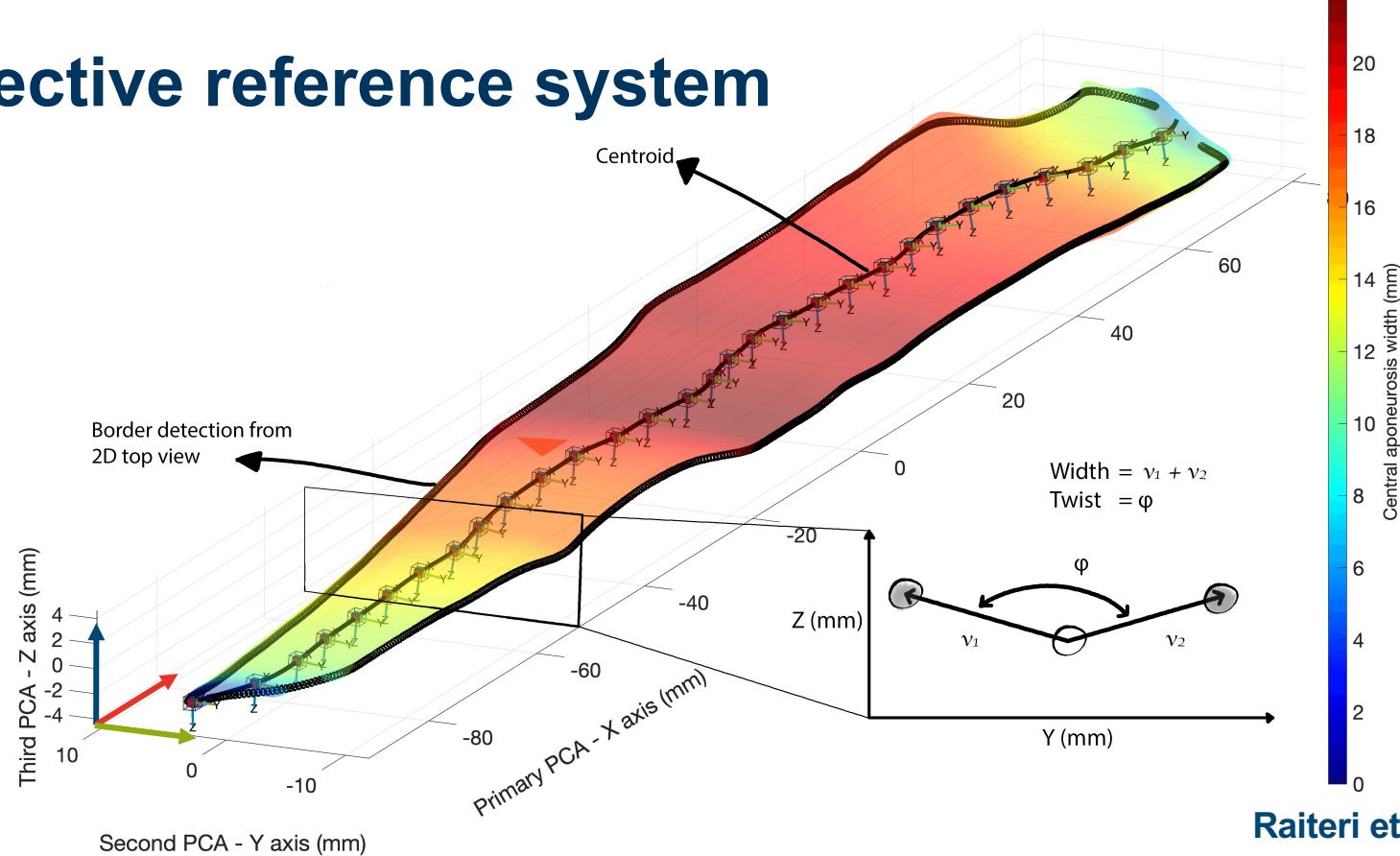


# Methods – Segmentation

$n = 4$  ( $37.6 \pm 7.4$  yrs, 1 woman, ongoing)

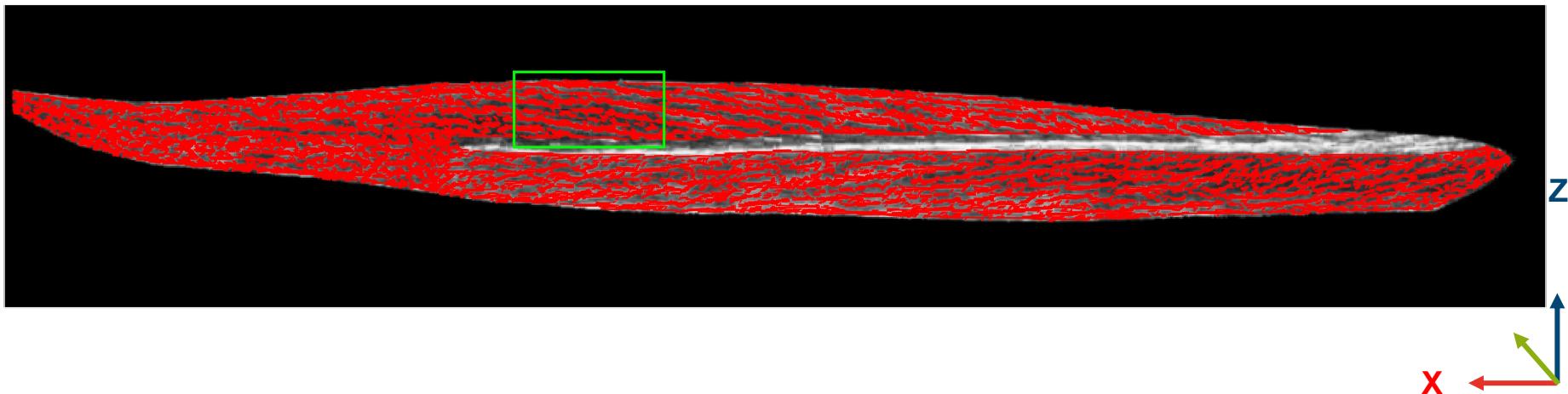


# Objective reference system

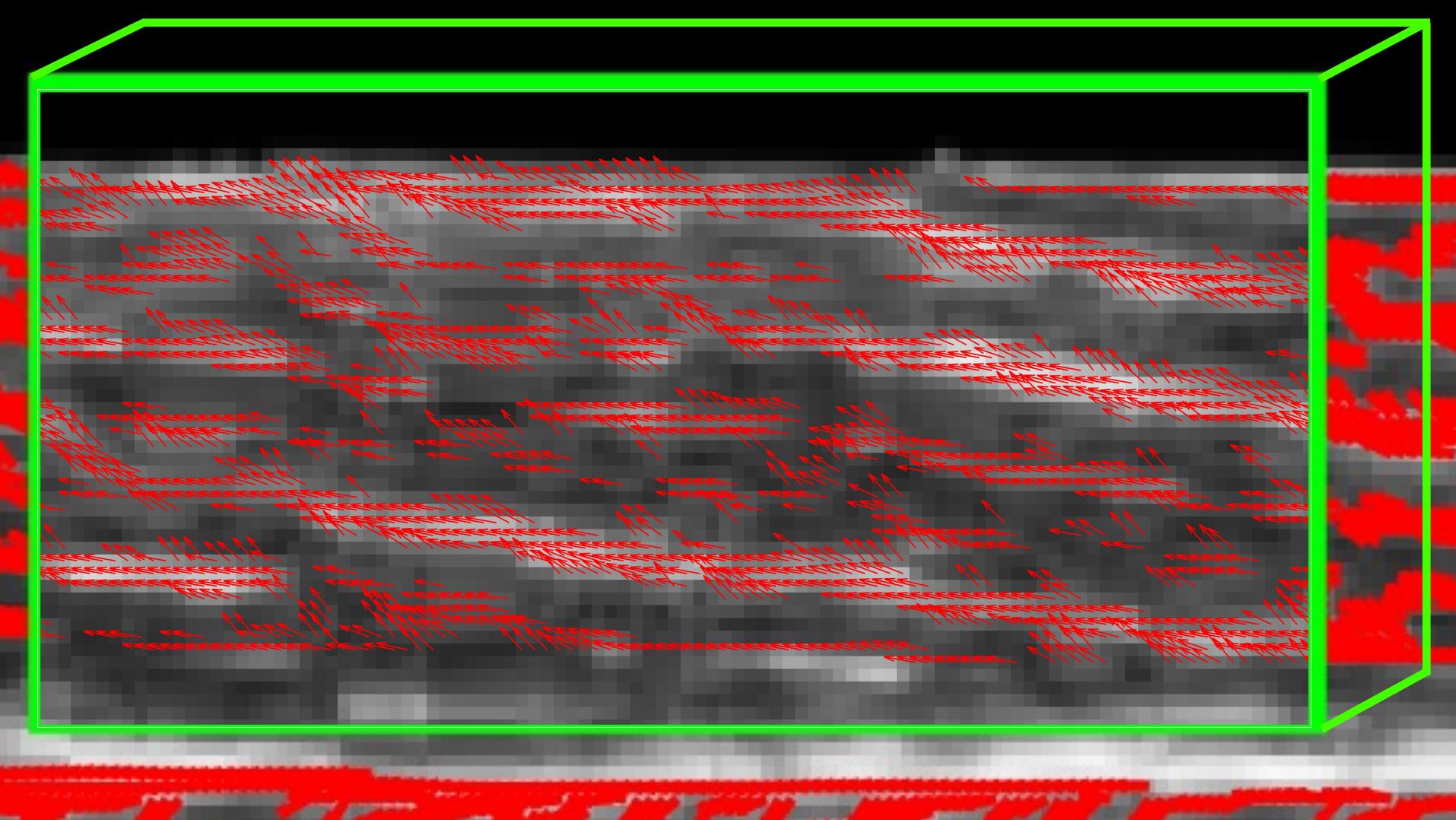


Raiteri et al., 2016

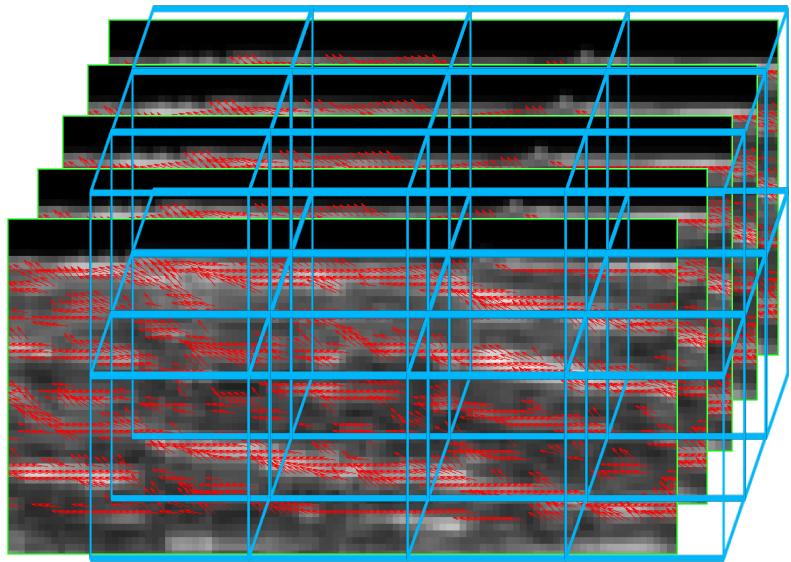
# Objectively-orientated parasagittal slice



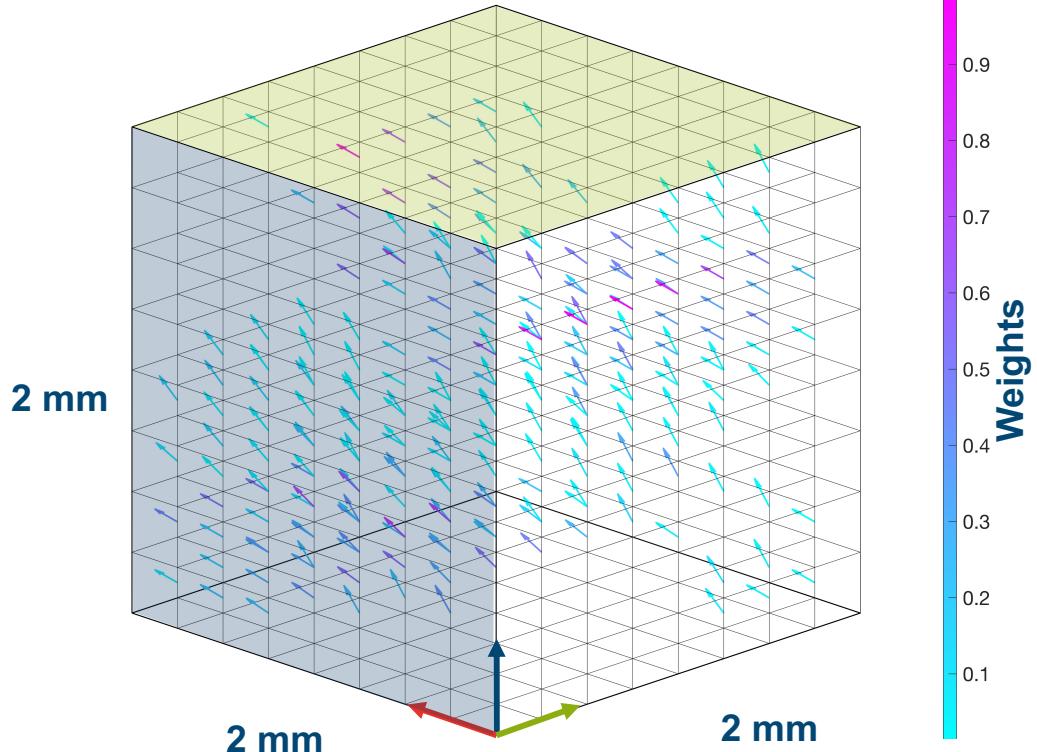
Kilpatrick et al., 2023  
Rana et al., 2009



# 3D fascicle tracking



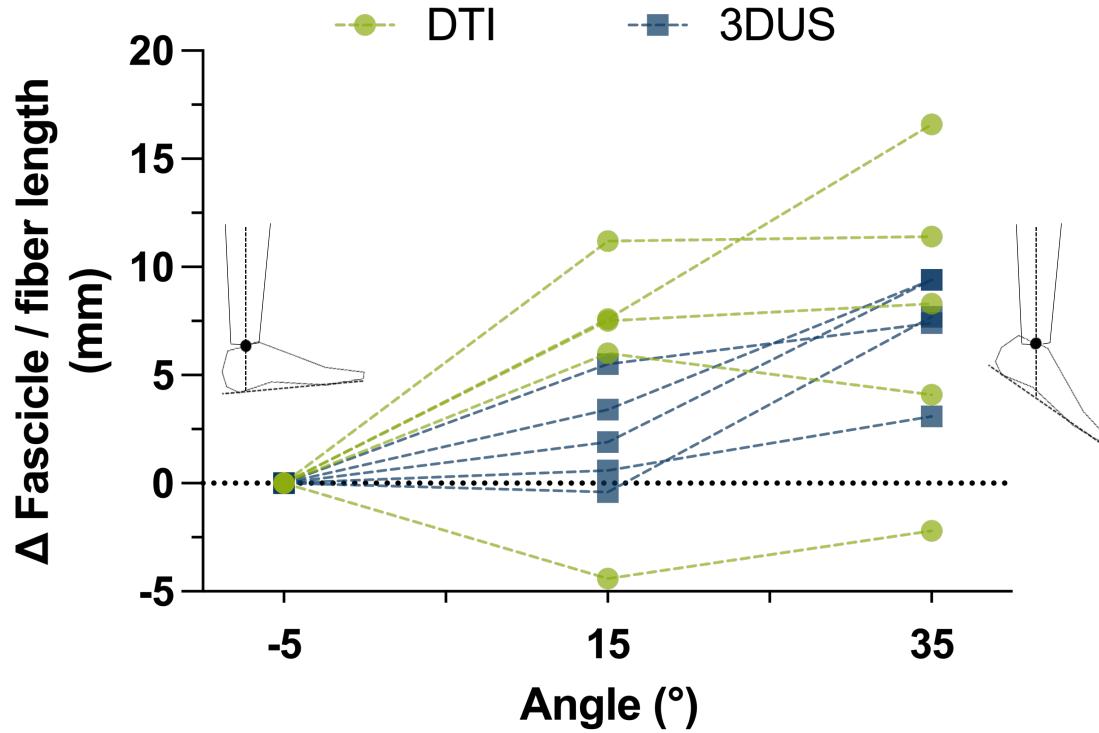
Isotropic single voxel size of 0.25 mm



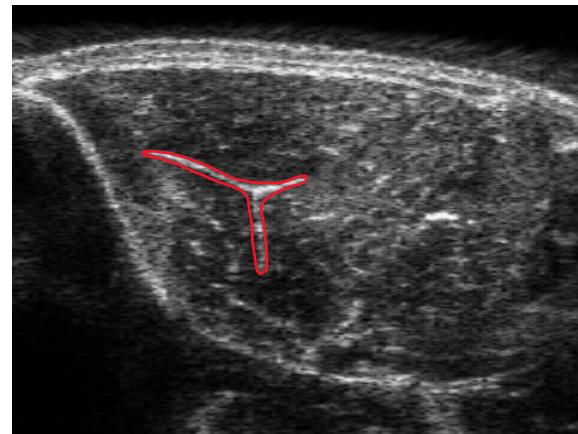
# Methods – 3D fascicle reconstruction



# Preliminary results – 3DUS vs DTI



# Preliminary results – aponeurosis geometry



# Conclusions

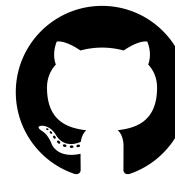
- 3DUS objective reference system allows for unbiased morphology & architecture analysis
- Agreement between objective 3DUS and DTI?!

*“The absence of a common objective reference system makes any measurement or statement incomparable” – Paolino*



# Grazie für your attention! Tack!

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PaulT95



Brentrat



NeuromecHAHNics



Check our lab's ISB work

