

4D Dynamic Contrast-Enhanced Breast CT: Evaluation of quantitative accuracy

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Disclosures

This work was funded by European Research Council (ERC);
European Union's Horizon 2020,
Grant/Award Number: 864929

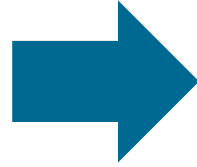
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BREAST4D



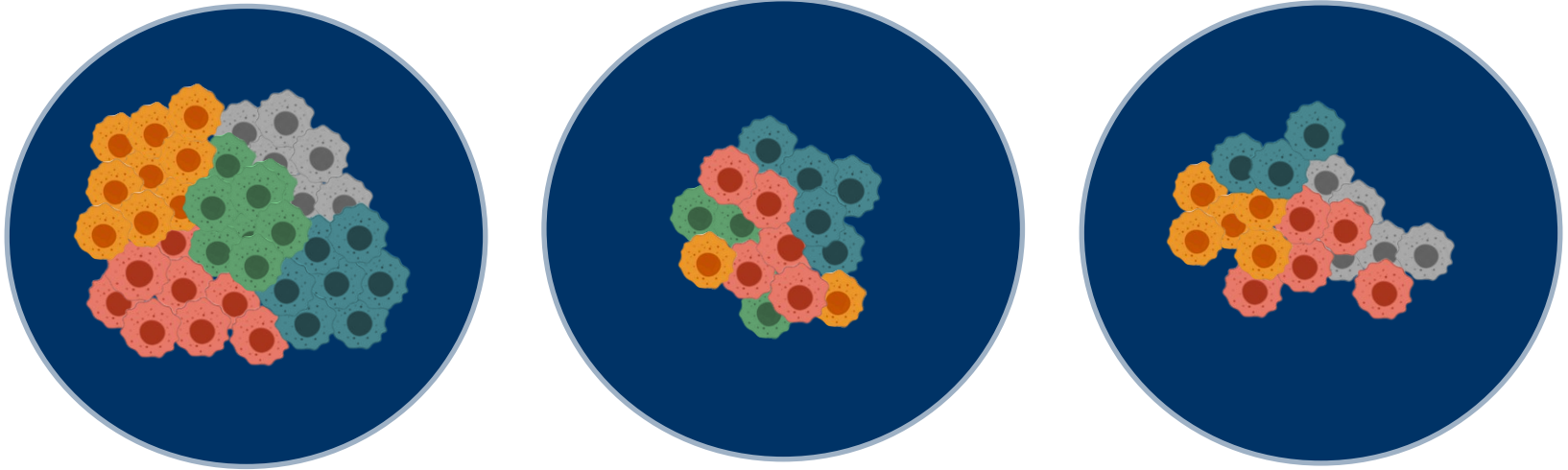
European Research Council
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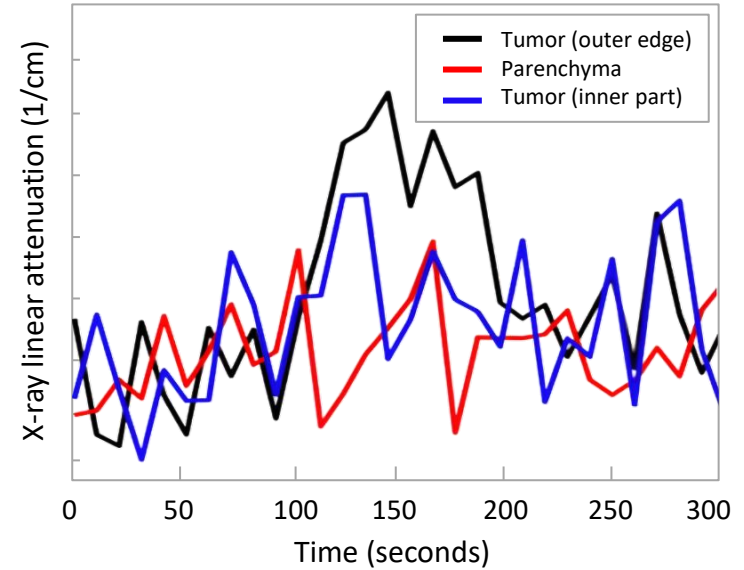
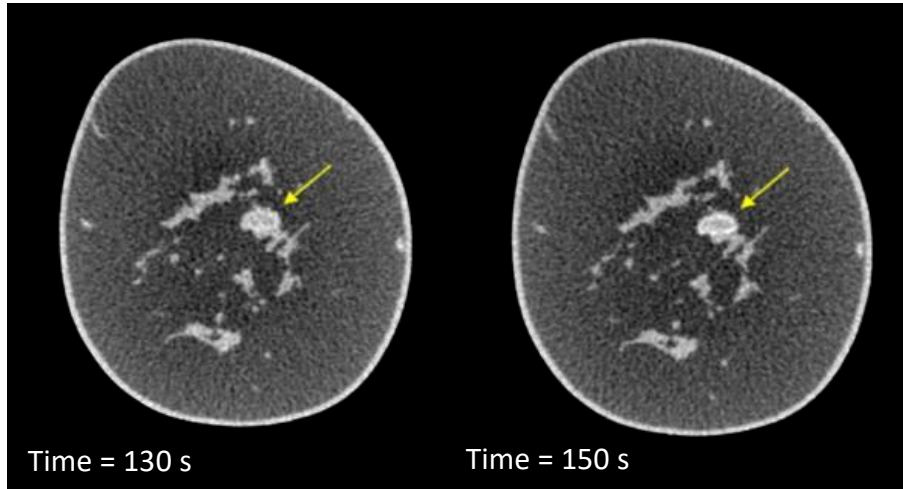


Treatment



Breast cancer heterogeneity





4-dimensional dynamic contrast-enhanced dedicated breast computed tomography



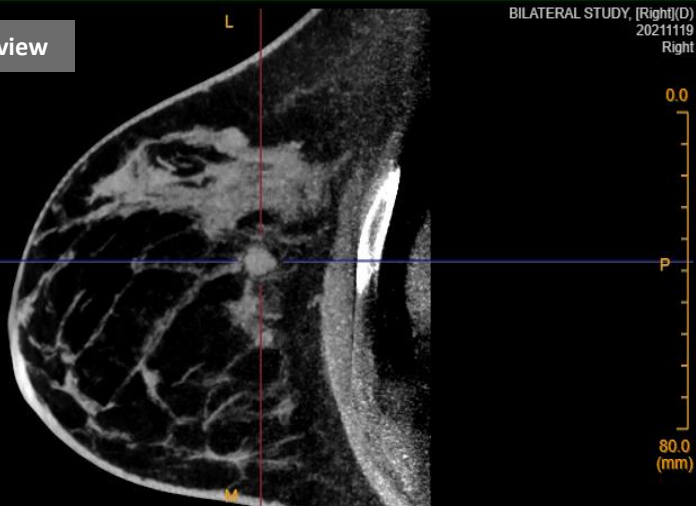
4-dimensional dynamic contrast-enhanced dedicated breast computed tomography



SUBJECT 061
19780813
00061

Transverse view

Looking down
from head

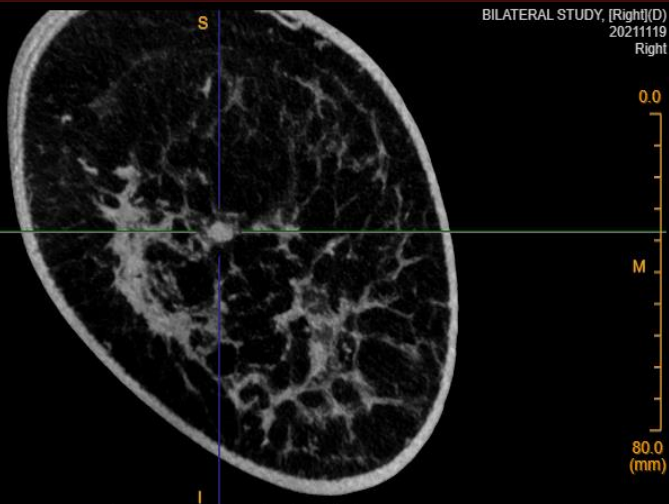


W/L: 456 / 40 Type: MIP Slab: 3.0mm Zoom: 71%

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00061

Coronal view

Looking from
anterior

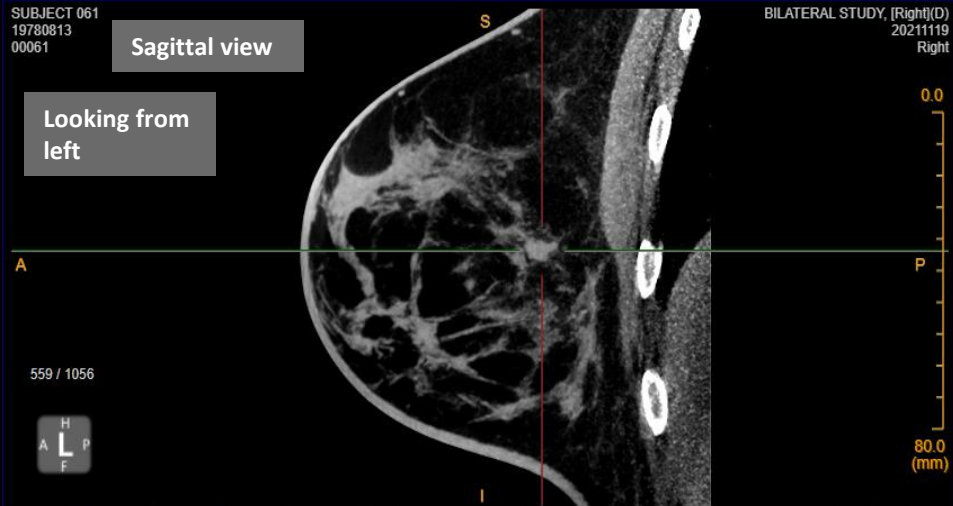


W/L: 456 / 40 Type: MIP Slab: 3.0mm Zoom: 71%

SUBJECT 061
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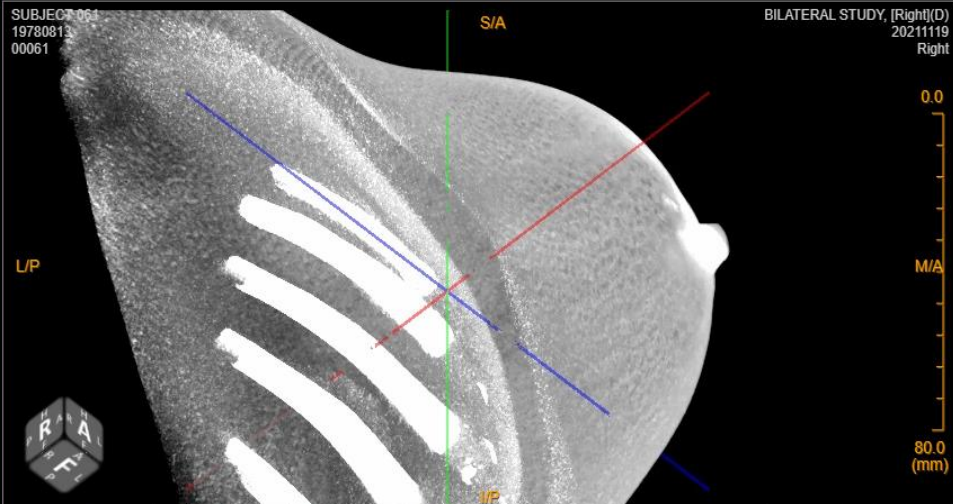
Sagittal view

Looking from
left

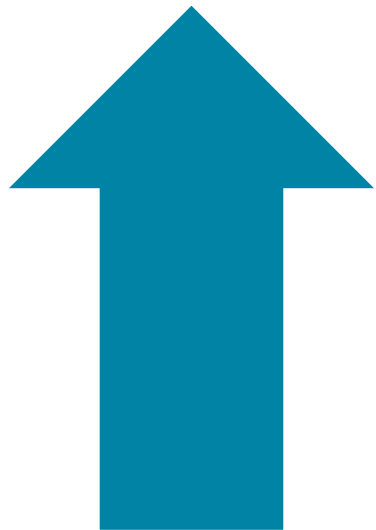


W/L: 456 / 40 Type: MIP Slab: 3.0mm Zoom: 71%

SUBJECT 061
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00061



W/L: 456 / 40 Type: MIP Zoom: 63% Full

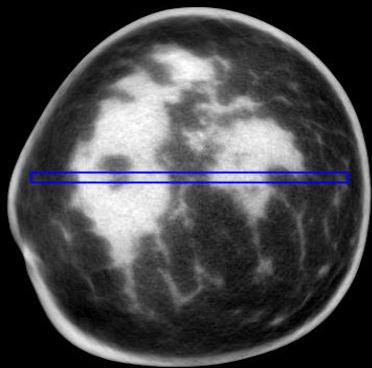


X-ray scatter

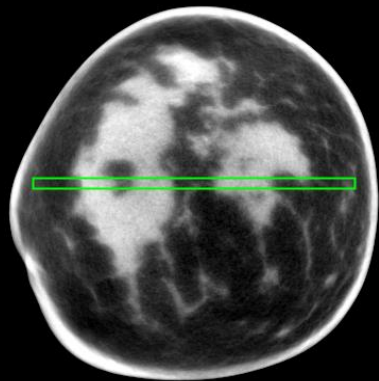


Image quality
(quantitative information)

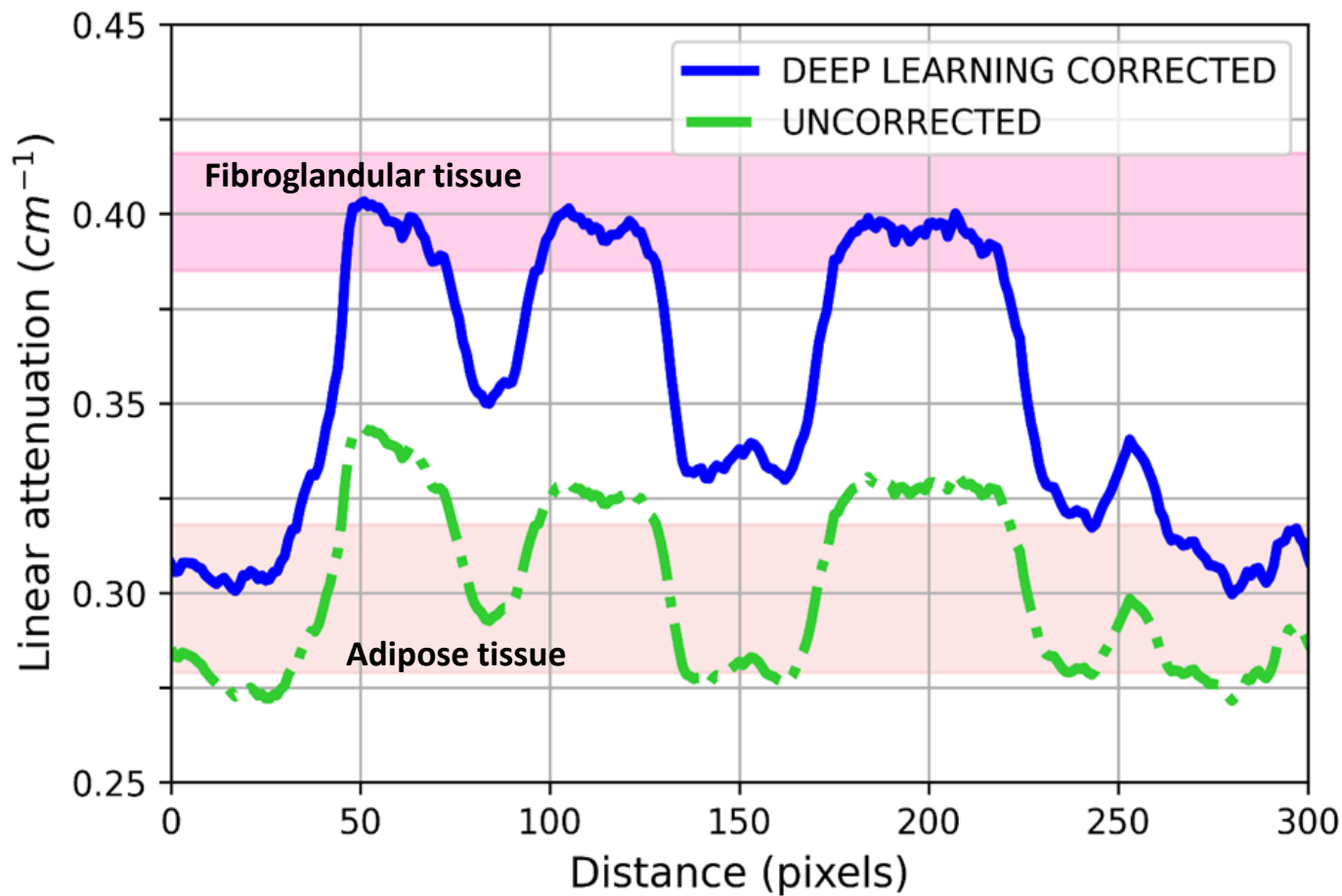
DEEP LEARNING CORRECTED



UNCORRECTED



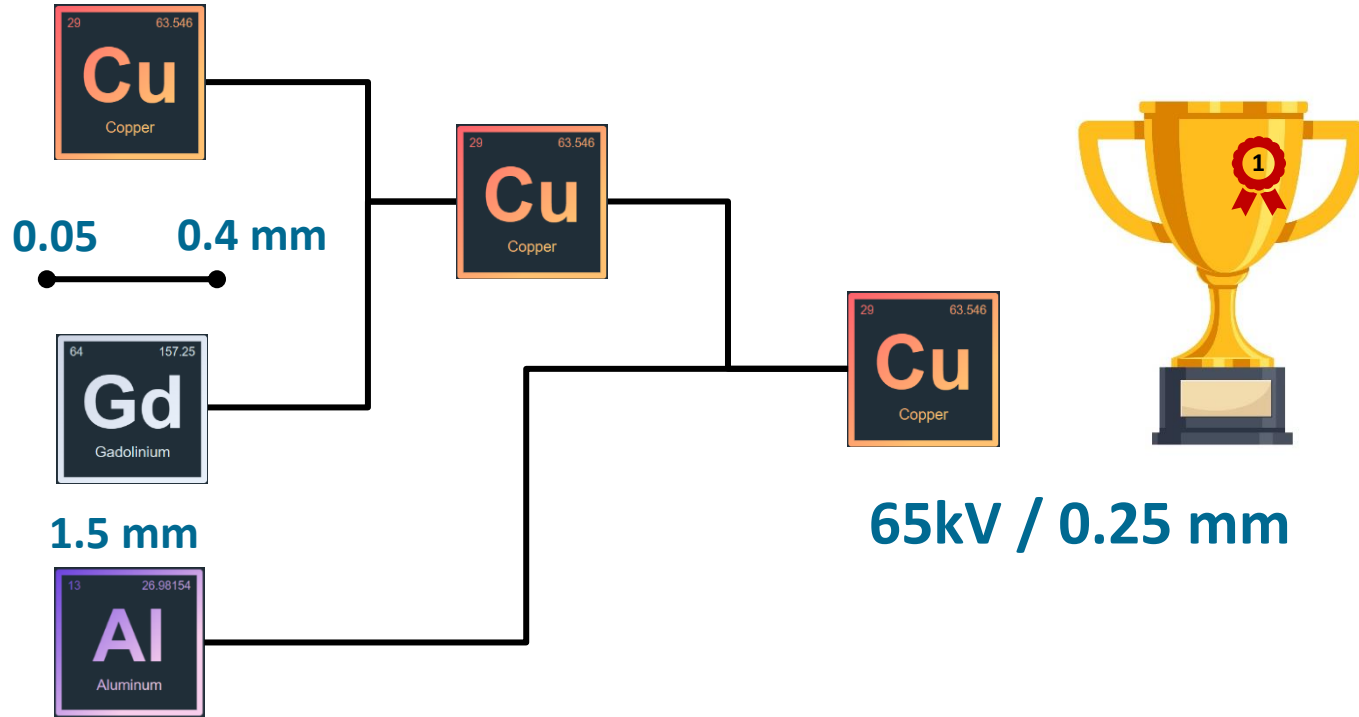
WW/WL: 0.01/0.03 mm^{-1}



Ref.: Pautasso, J. J., Caballo, M., Mikerov, M., Boone, J. M., Michielsen, K., & Sechopoulos, I. (2023). Deep learning for x-ray scatter correction in dedicated breast CT. *Medical physics*, 50(4), 2022-2036.

4-dimensional dynamic **contrast-enhanced** dedicated breast computed tomography

Optimal settings for imaging



4-dimensional dynamic contrast-enhanced dedicated breast computed tomography

4D DCE-bCT protocol

Contrast Enhanced Contrast Timer (sec)  Description **IWBI 2024**

Contrast R 

Pre-contrast

Post-contrast 1

Post-contrast 2

Post-contrast 3

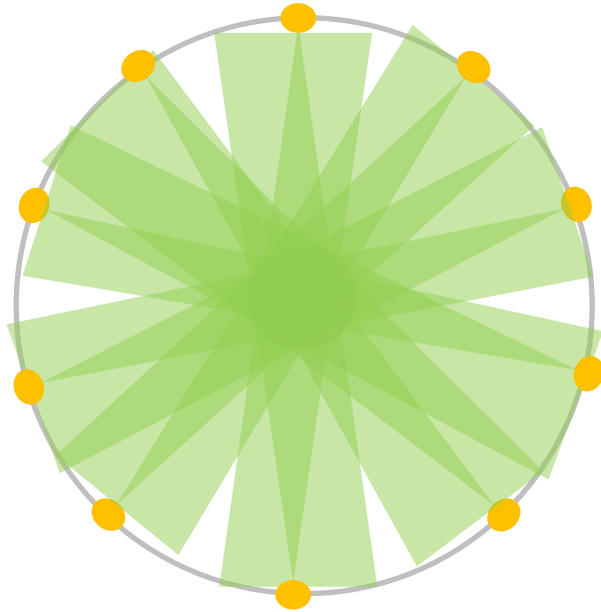
Prep Ends: 0 secs (Inject) 100ml, 2ml/s

Pulse Width (ms):

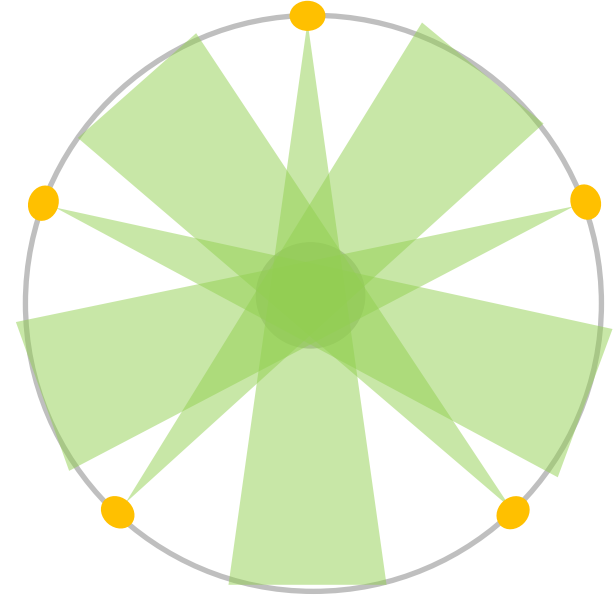
Scan Duration (s):

Total Pulses:

Pulses / Rev:

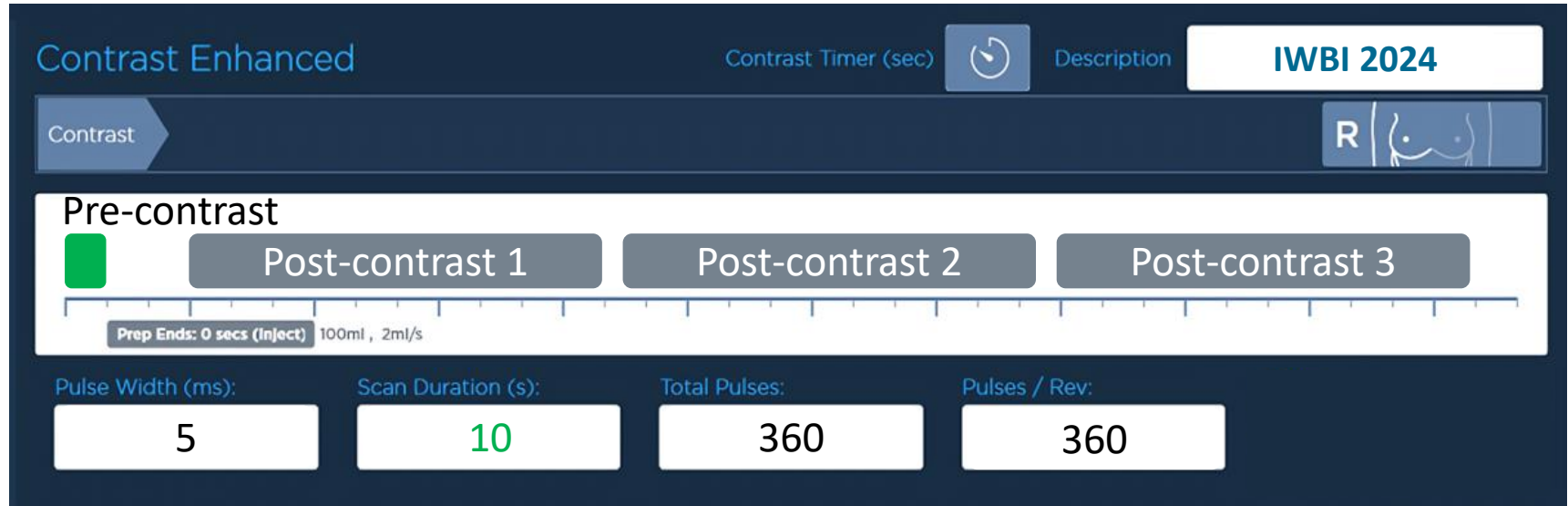


Pre-contrast

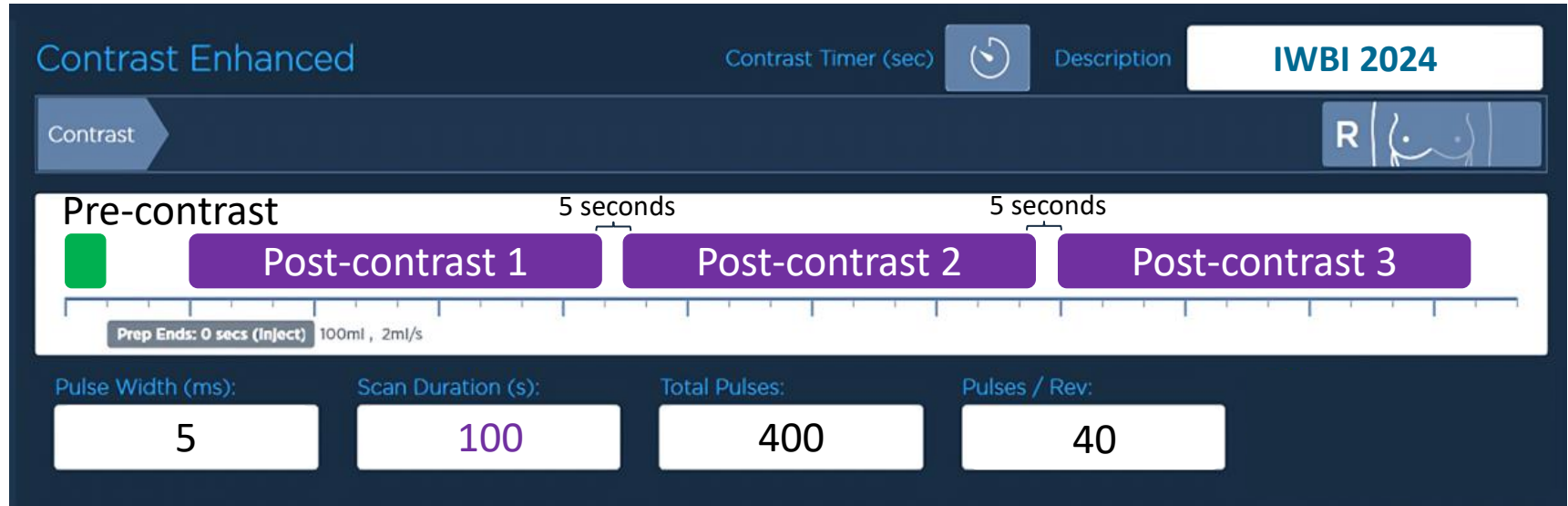


Post-contrast

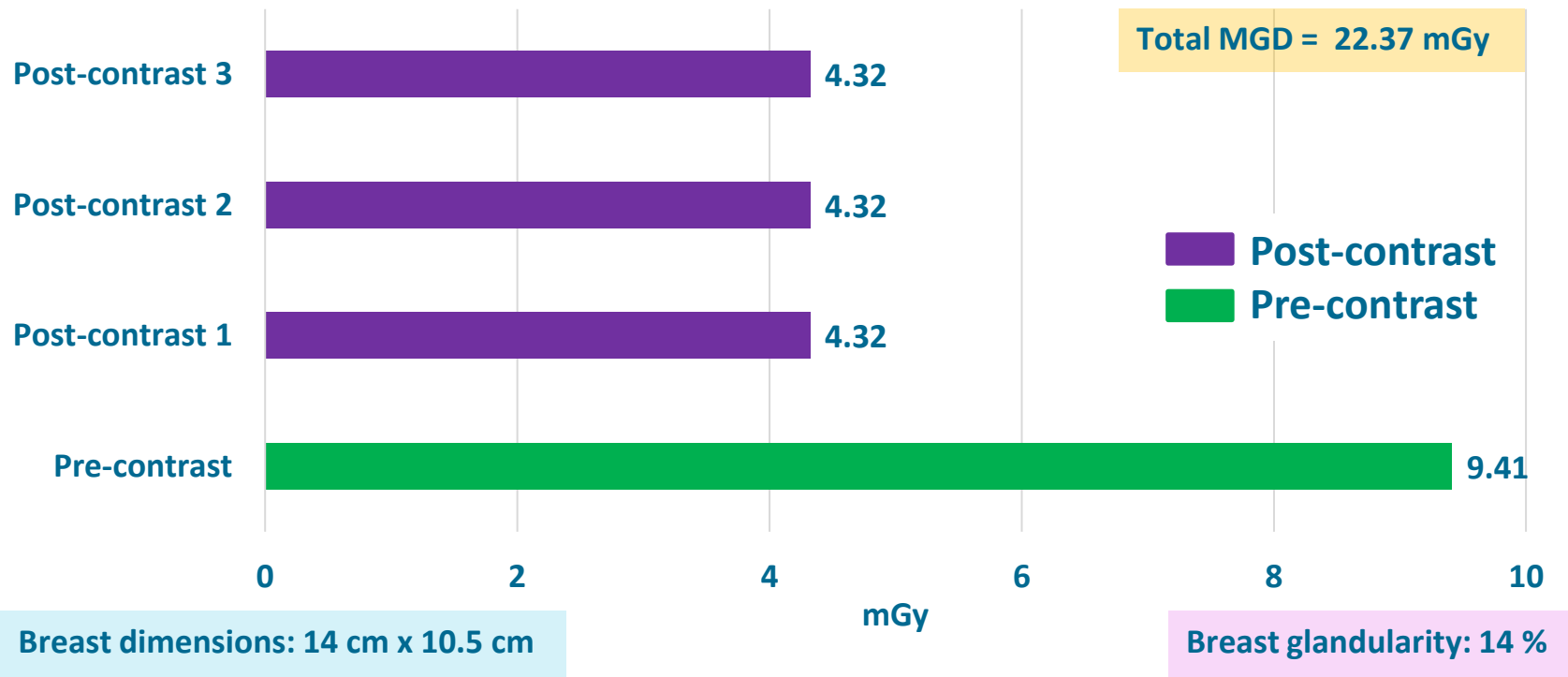
4D DCE-bCT protocol

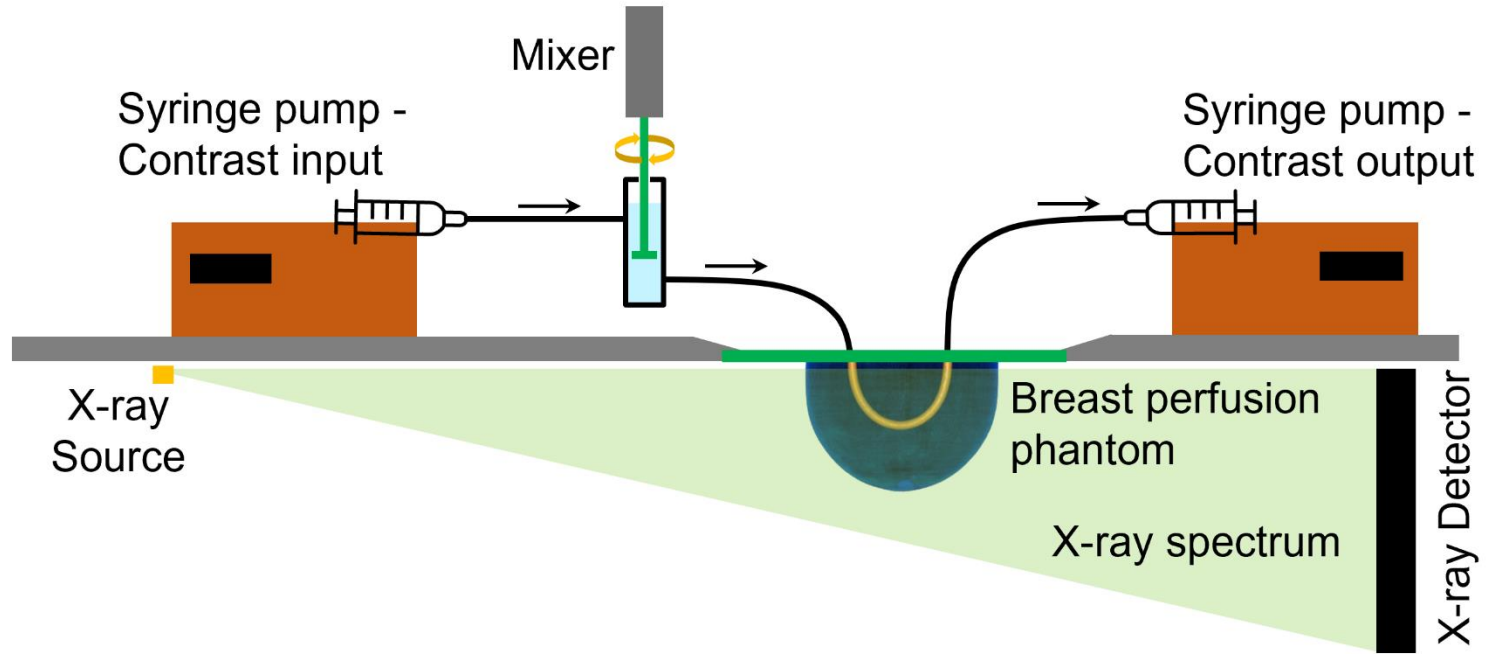


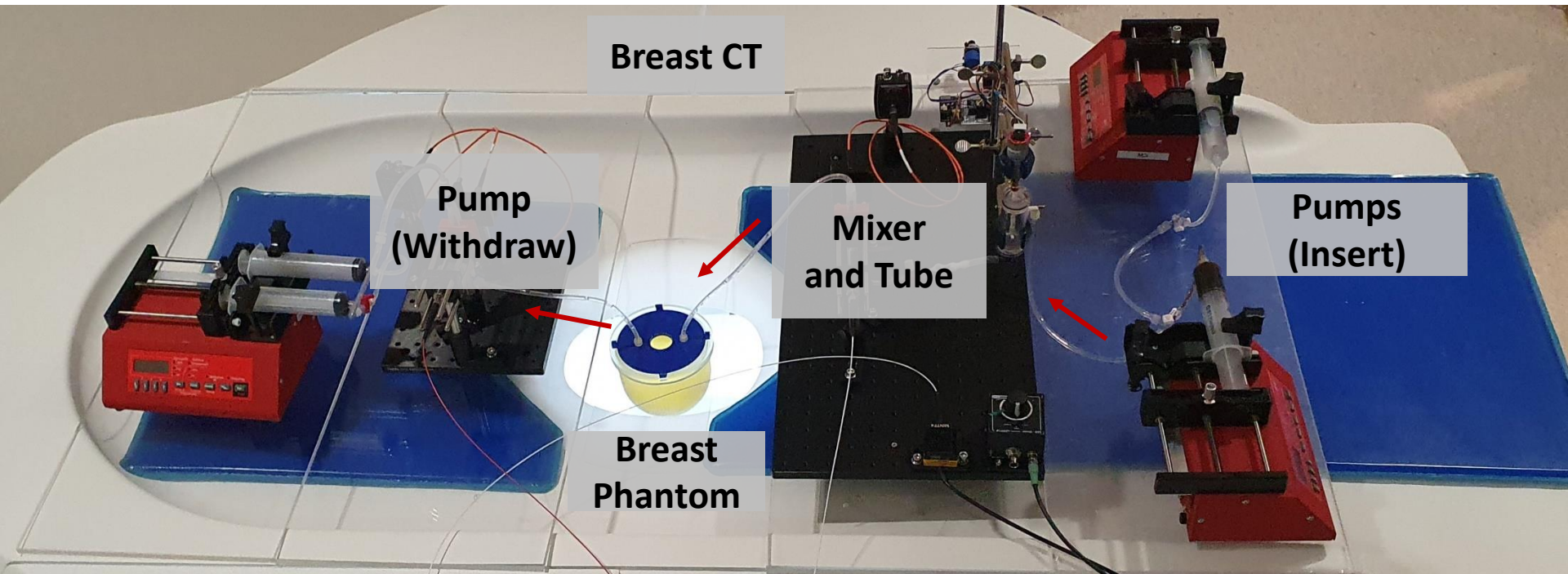
4D DCE-bCT protocol



Mean glandular dose in 4D DCE-bCT protocol








In

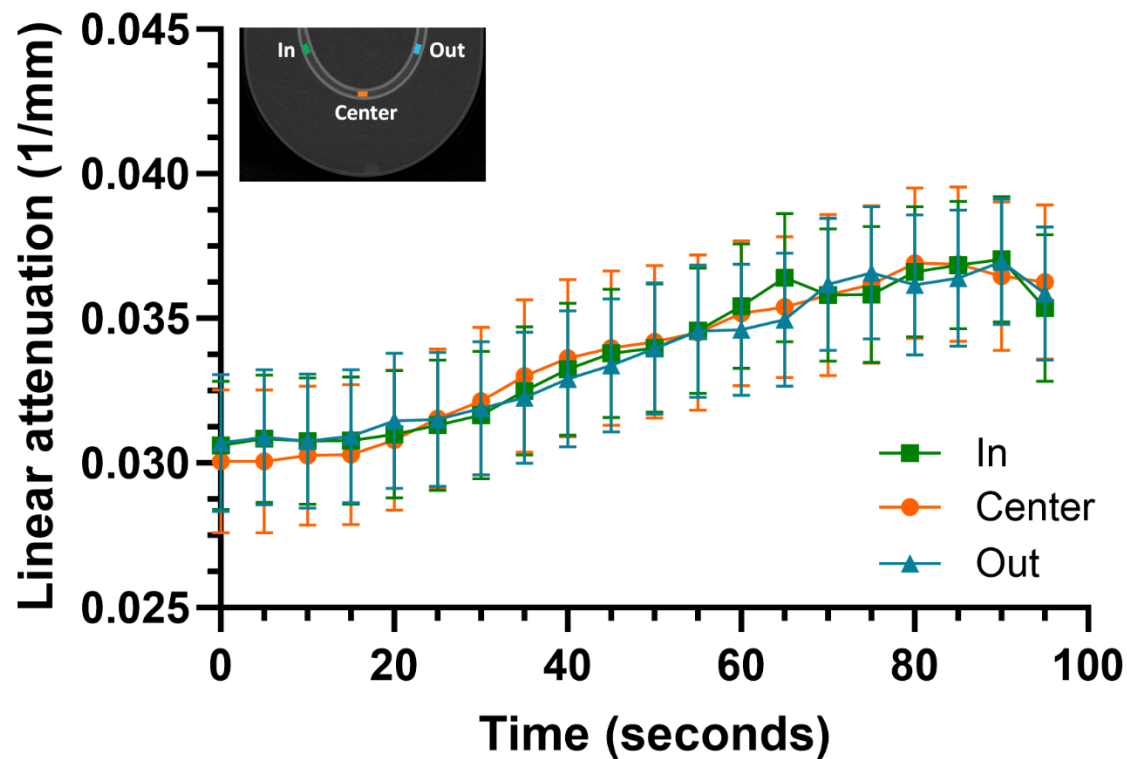


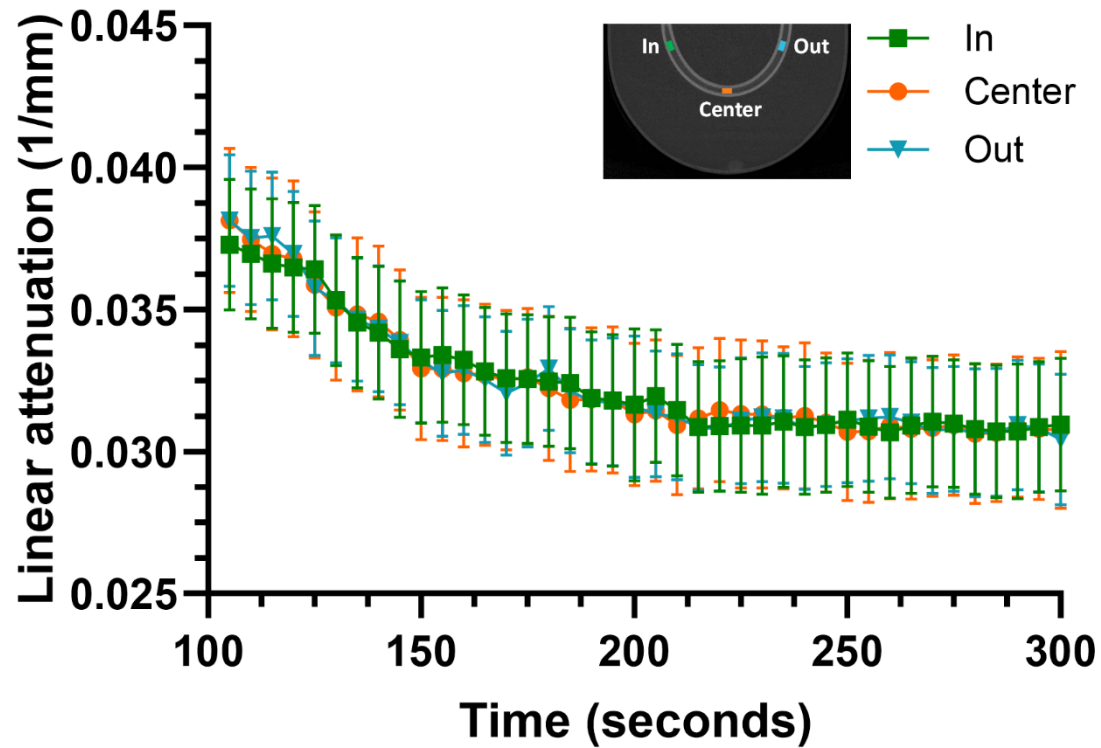
Out

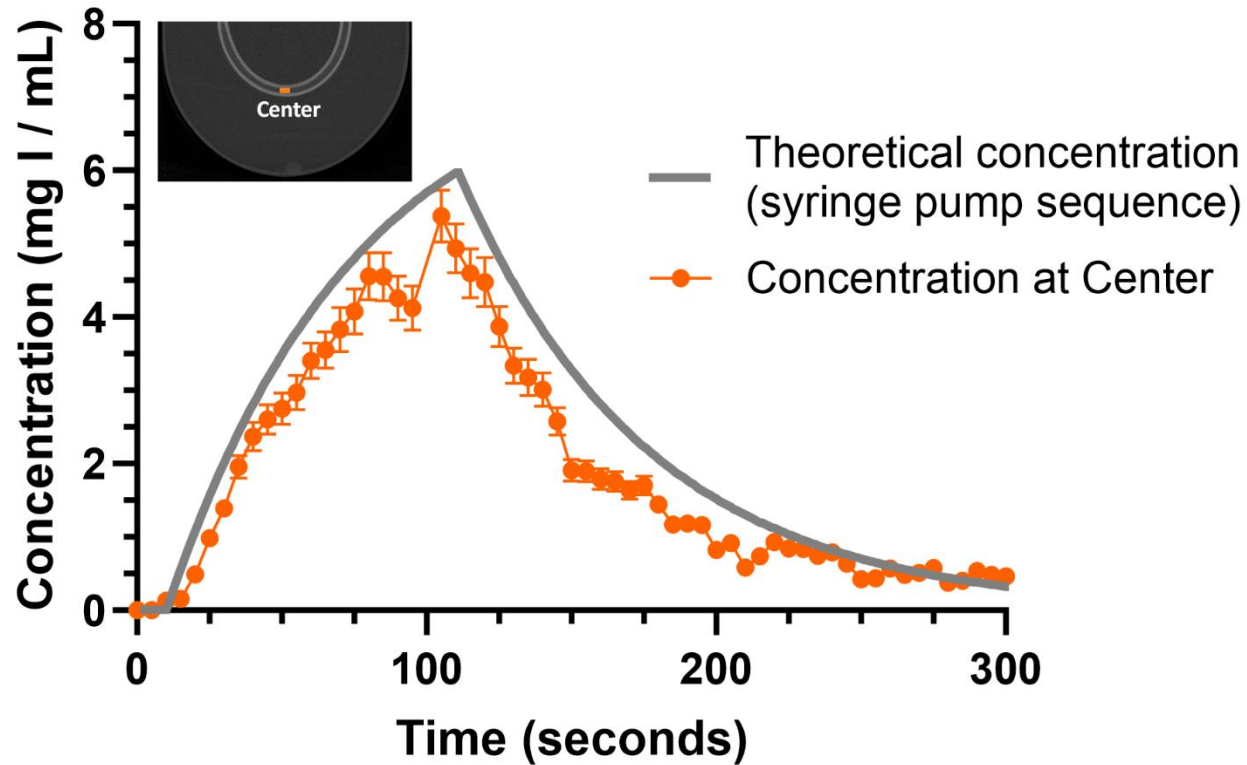


Center

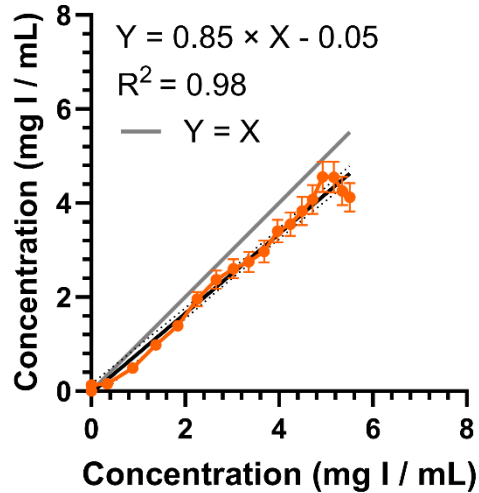
 = 0.25 mm



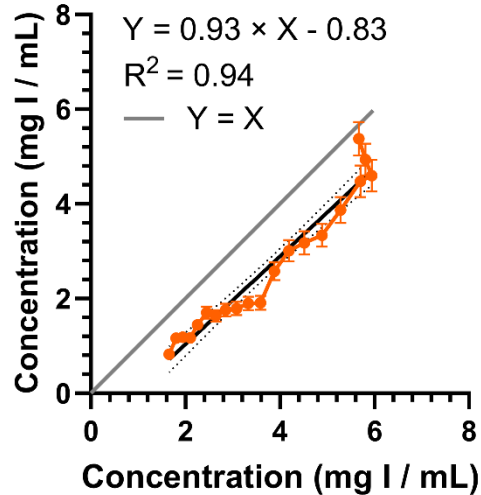




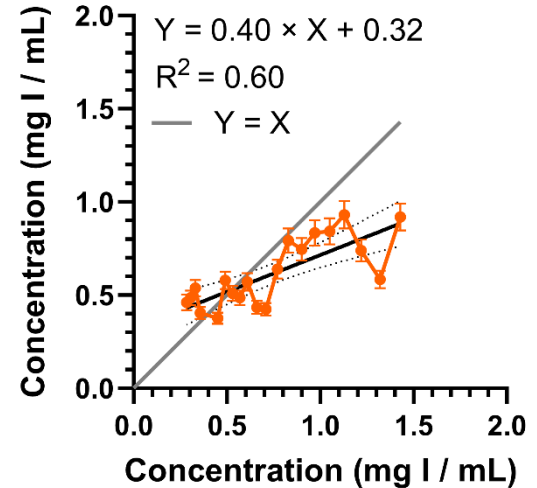
Post-contrast analysis (100-second Intervals)



Post-contrast 1

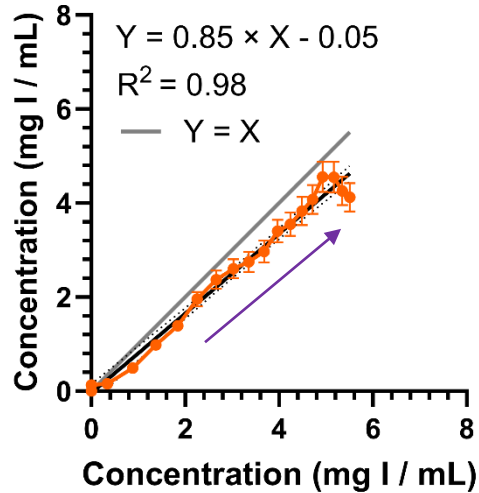


Post-contrast 2

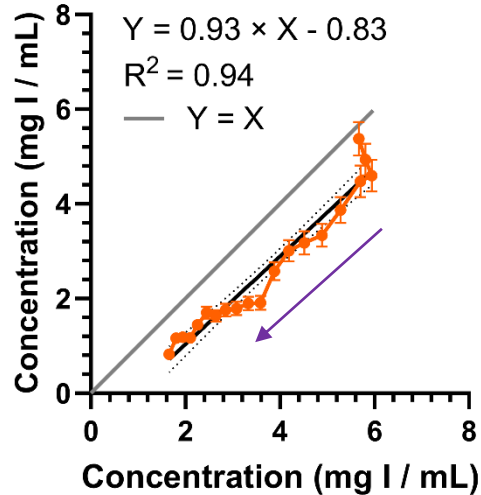


Post-contrast 3

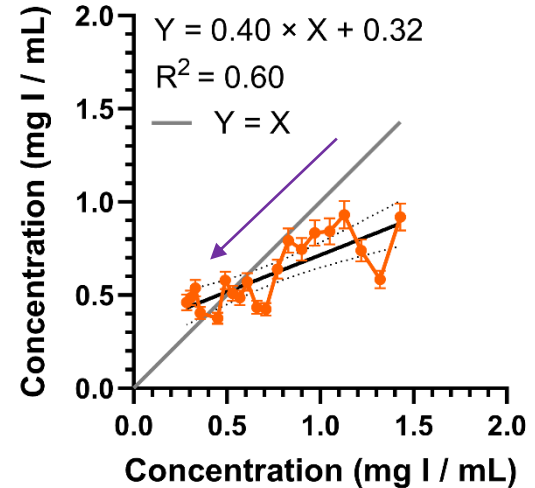
Post-contrast analysis (100-second Intervals)



Post-contrast 1

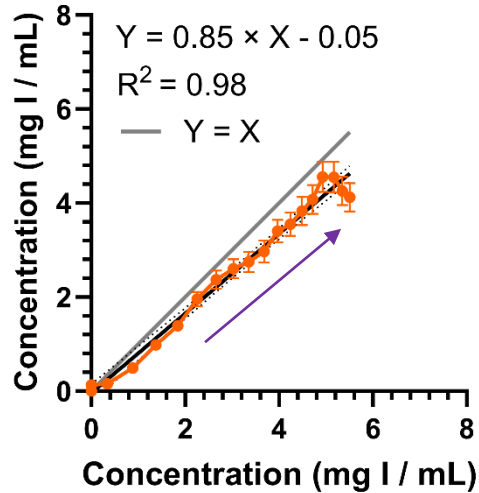


Post-contrast 2

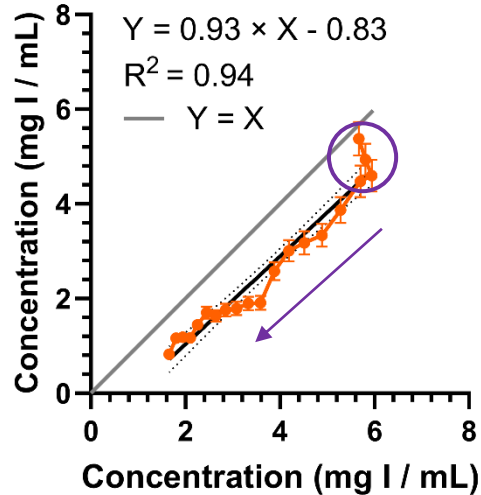


Post-contrast 3

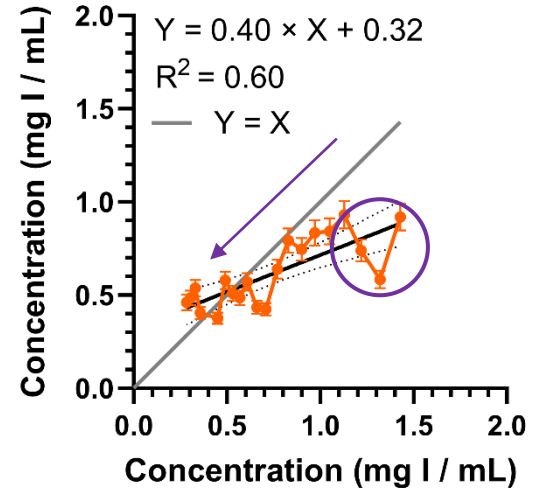
Post-contrast analysis (100-second Intervals)



Post-contrast 1



Post-contrast 2

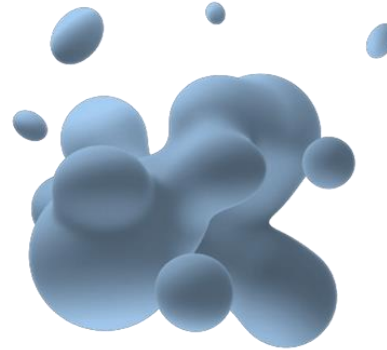


Post-contrast 3

Limitations

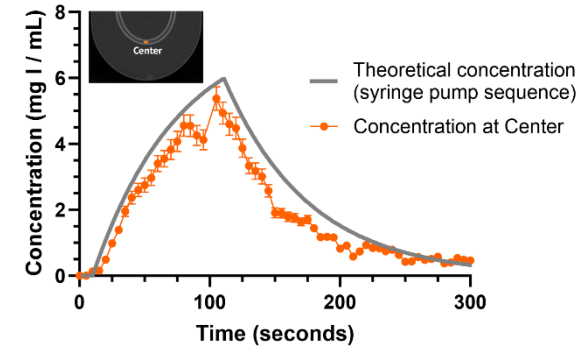


**Timing of peak
capture**



Fluid bolus behavior

Conclusion



4D DCE-bCT has the potential to provide quantitatively accurate estimates of iodine concentration