

# 3D X-ray Histology for biomedical applications at the University of Southampton: Get involved, Get in touch!

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**X-ray micro-computed tomography ( $\mu$ CT)** allows **non-destructive 3D (volume) imaging** of specimens' microstructure. We have demonstrated that  $\mu$ CT can successfully resolve microstructural detail<sup>1</sup> of routinely prepared tissue specimens, to a degree that can challenge current understanding of disease pathogenesis<sup>2,3</sup>. We recently introduced **3D X-ray histology**<sup>[1]</sup> and demonstrated how combining  $\mu$ CT with conventional 2D histological techniques adds value to both<sup>4</sup>.

**3D X-ray Histology (XRH)** is **non-destructive and non-disruptive imaging technology** based on soft tissue-optimised  $\mu$ CT, capable of **complementing conventional histology with truly 3D micro-structural data** of standard unstained, formalin-fixed and paraffin-embedded (FFPE) soft tissue biopsies.

## Benefits of X-ray Histology

- **High-resolution** imaging of FFPE soft tissues down to  $\sim 5 \mu\text{m}$  spatial resolution
- **Non-destructive, distortion-free 3D (volume) imaging**
- **Correlative 2D histology / immunohistochemistry and 3D visualisation**
- **Whole block imaging**

Find out more



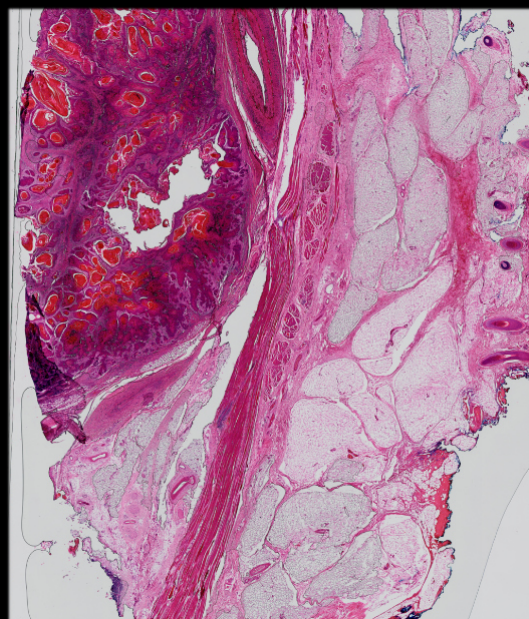
XrayHistology.org

## Matching XRH and histology of a head and neck tumour specimen

- Specimen was scanned on the cassette at  $10 \mu\text{m}$  voxel (3D pixel) size without staining
- Serial sections were taken after  $\mu$ CT and stained with H&E

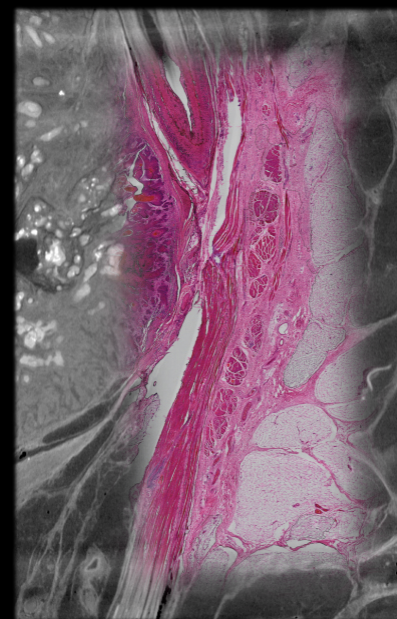


Sample courtesy of Prof. Gareth Thomas & Elaine Ho

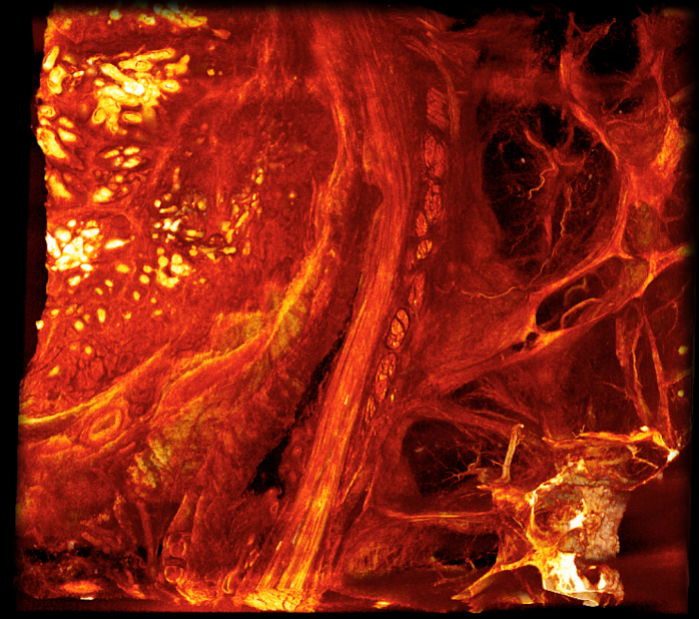


## XRH + Conventional Histology

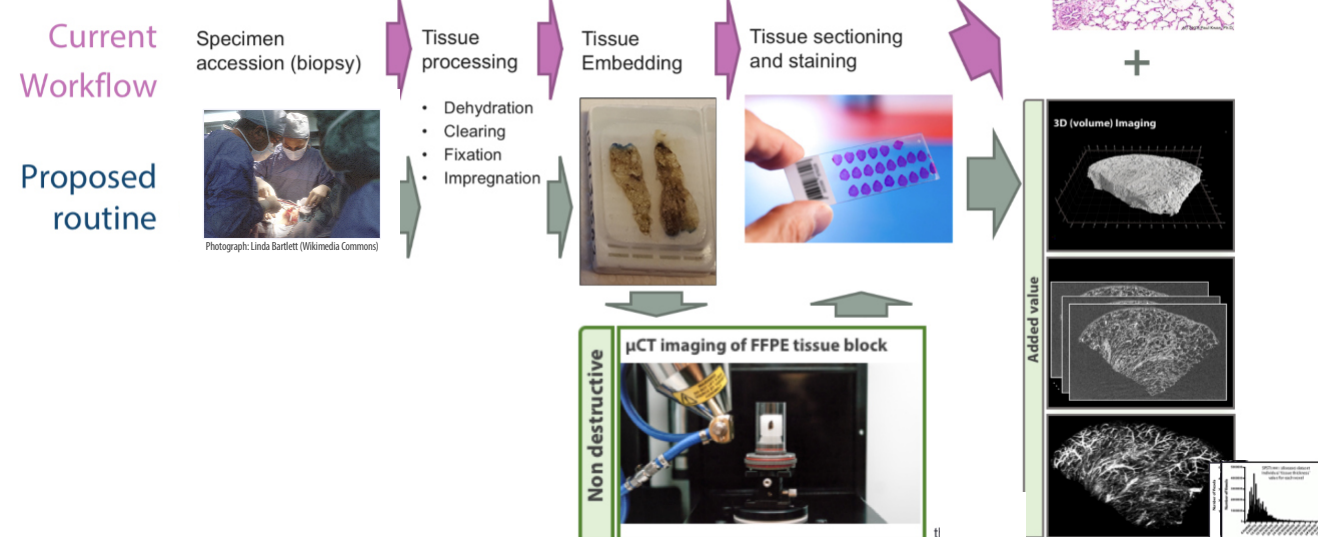
Augmented tomography for enhanced "specificity"



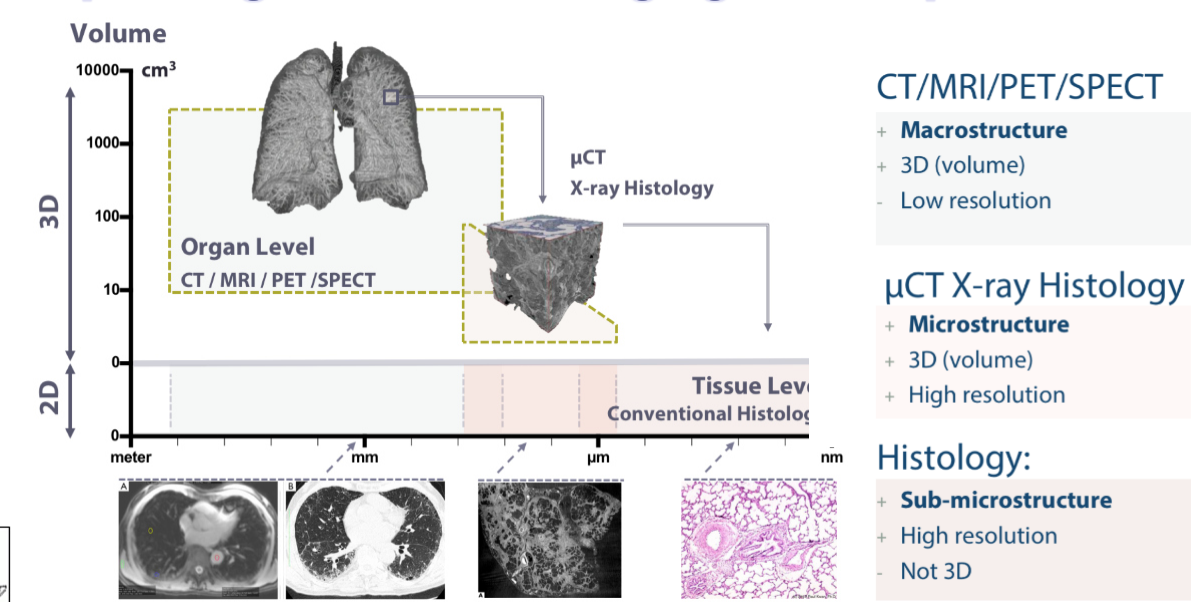
## 3D (volume) Visualisation enabling Quantification and Classification



## Direct integration into existing histology workflows



## Expanding the clinical imaging landscape



$\mu$ -VIS: Multidisciplinary, Multiscale, Microtomographic Volume Imaging

3D X-ray Histology

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## 3D X-ray Histology

Setting the foundations for X-ray micro-computed tomography workflow for non-destructive 3D X-ray histology (XRH)

$\mu$ -VIS X-Ray Imaging Centre | Biomedical Imaging Unit  
Funded by Wellcome Trust

www.xrayhistology.org

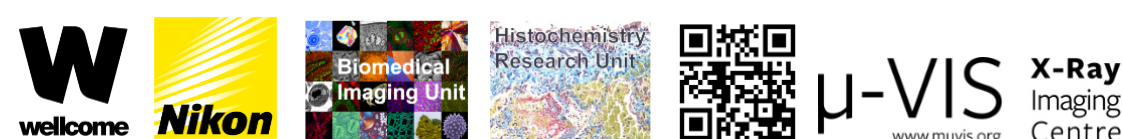
## Get involved, Get in touch with the XRH-team !

We are always **looking for collaborations** to explore the full potential of the technology, and **can provide open access to the technique for proof-of-concept studies** with qualitative inspection and quantitative image-based characterisation of the tissue.

We are particularly interested in stimulating and supporting novel and exploratory projects, introducing 3D X-ray Histology to the wider biomedical research and clinical pathology community and identifying application-specific imaging needs

• visit: [www.XrayHistology.org](http://www.XrayHistology.org) • contact us at [info@xrayhistology.org](mailto:info@xrayhistology.org)

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