

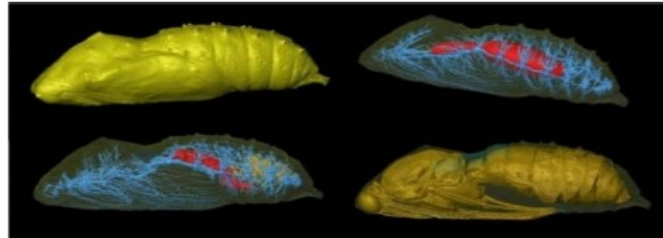
Xray-CT: Image Reconstruction Frameworks

Software Working Together

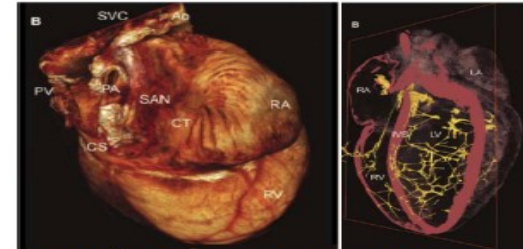
M. Turner, E. Pasca, J. Jorgensen, D. Kazantsev, M. Hanwell, P. Withers, B. Lionheart, E. Ovtchinnikov, R. Fowler, S. Nagella
(Science and Technology Facilities Council (UKRI); University of Manchester; Kitware, Inc.) On behalf of CCPi and Tomviz



Quantifying plant root systems in Soil 3: runner-up in the CCPi sponsored ToScA ©Stefan Mairhofer: CCPi Working Group



Science image runner-up ©Tristan Lowe et al. CCPi member; temporal study of chrysalis development at HMXIF.



Poster 1st prize winner at ToScA Robert Stephenson using 3D imaging for modelling of hearts using CCPi software at HMXIF was supported by CCPi

Collaborative Computational Project in Tomographic Imaging has been funded for the next phase 2015-2020 and.... aims to provide a toolbox of algorithms that increases the quality and level of information that can be extracted by computer tomography.

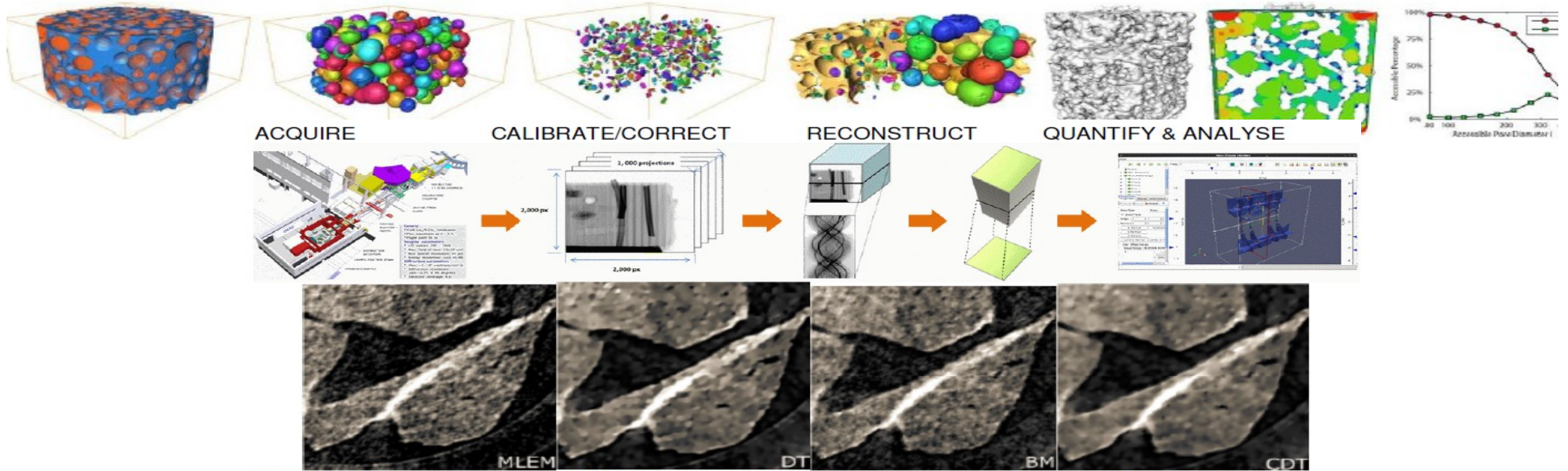
Prof Phil Withers (Manchester)



CCPi: UK Software Aims



- Pre-processing
 - Reconstruction
 - Quantification
- } Framework

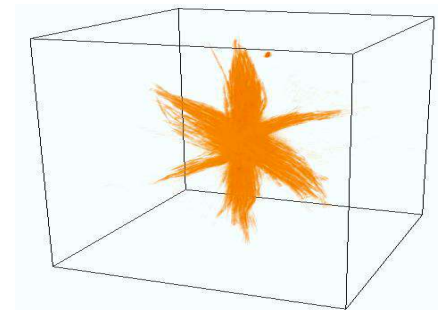
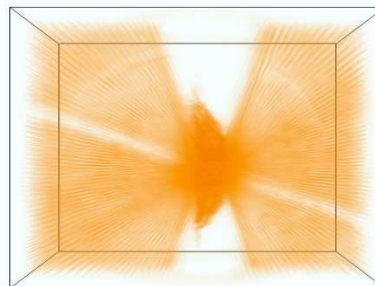
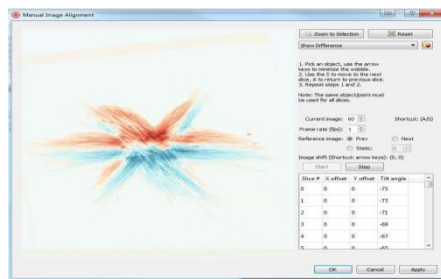


IMAT dataflow schematic showing capture of initial test data from neutron tomography (top). Images below show data from (PSI SLS) bringing together neutron (sensitive to water) and synchrotron imaging (better spatial resolution) utilising CCPi code comparing various hybrid reconstruction algorithms for water ingress into gravel.

Kitware Inc. Tomviz: USA Software Aims

Framework carries out three-dimensional characterization of materials at the nano- and meso-scale using transmission and scanning transmission electron microscopes (S/TEM) data.

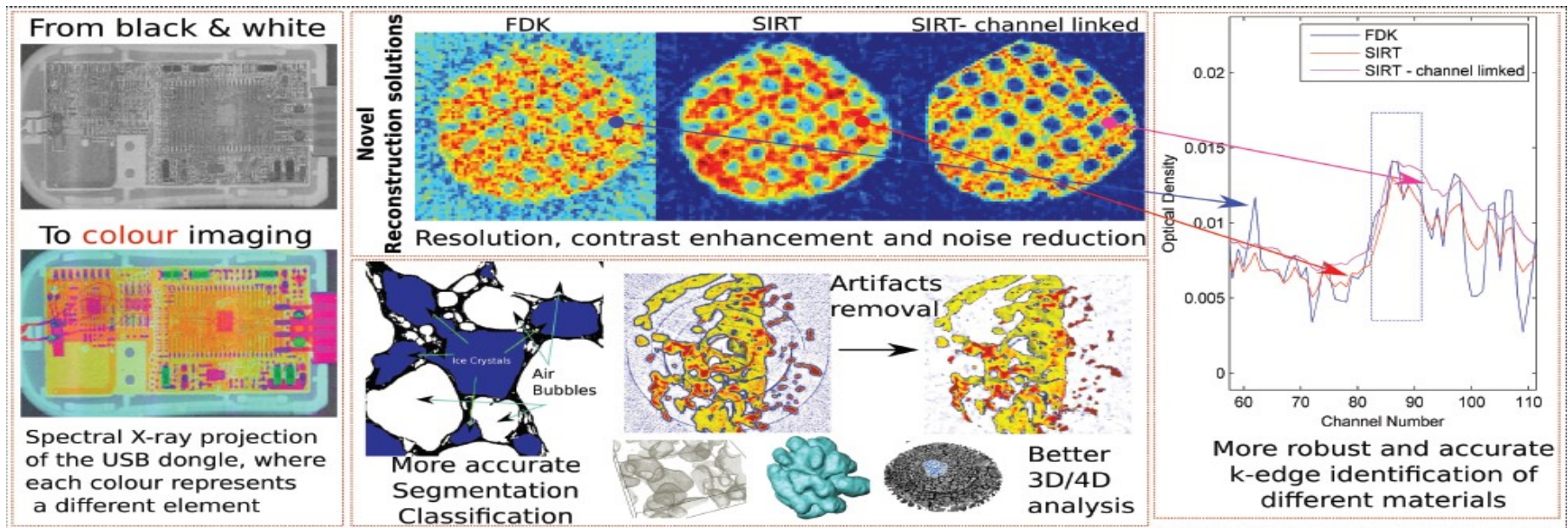
<https://tomviz.org/>



Proposal for Tomviz is to incorporate Xray CT data set within the framework so a potential to merge the UK / USA Research Software Engineering experience, best-practice, code and examples.

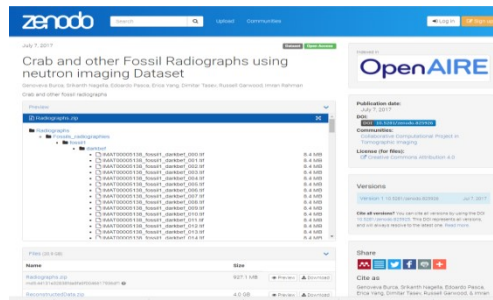


CCPi Flagship (EP/P02226X/1): A Reconstruction Toolkit for Multichannel CT



Exchanges

- Paleo Meeting

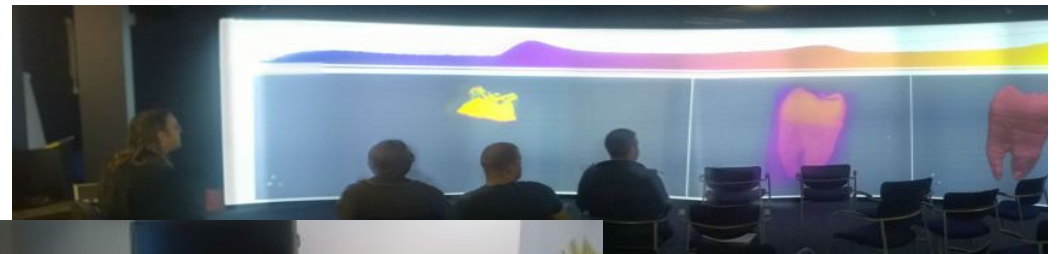


IMAT

Paleontology meeti
21/07/2017



- RSE UK-USA Exchange;
Marcus Hanwell
4-13/09/2017



Exchanges

RSE UK-USA Exchange; Marcus Hanwell from Kitware has been awarded an EPSRC grant to exchange information across related RSE groups in 3D tomographic visualisation and processing.

Press release at: <https://www.software.ac.uk/news/rse-uk-usa-travel-fund-first-awardees-and-future-deadlines>

The schedule so far is:

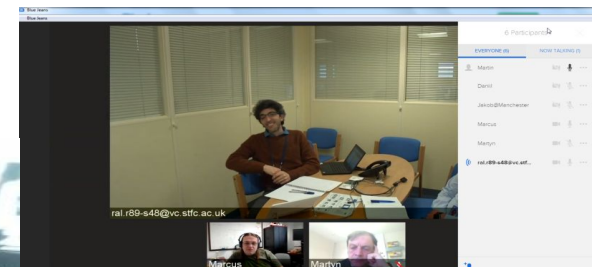
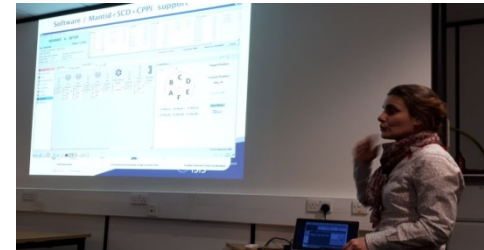
- Monday 4 September 2017; 3pm RSE activities from both sides of the pond - including Rob Haines
- Tuesday 5 September 2017: University of Manchester 'software show-and-tell'
 - Seminar at 2pm:
 - Cakes and discussion at 3:15pm
- Wednesday-Friday 6-8 September 2017: ToScA @ University of Portsmouth
- Monday-Tuesday 11-12 September 2017: RAL (Harwell Campus), STFC
 - SCD Seminar at 2pm, 11 Sep
 - CIL (core Imaging Library_ and Flagship code at 10am and 11am, 12 Sep
- Wednesday 13 September 2017: Daresbury Labs, STFC
 - Hartree Seminar at 10am

Exchanges

- 28 September 2017 Royal Geographical Society - collected recognition at the UK-USA network event for RSEs sponsored by SSI
- 10 April 2018, ISIS exchange to Manchester “lunch and learn”
- 3 April 2018, Weekly CCPi techy meetings – with initial links to USA
- 18 April 2018 – two proposals for Neutron beamtime submitted.

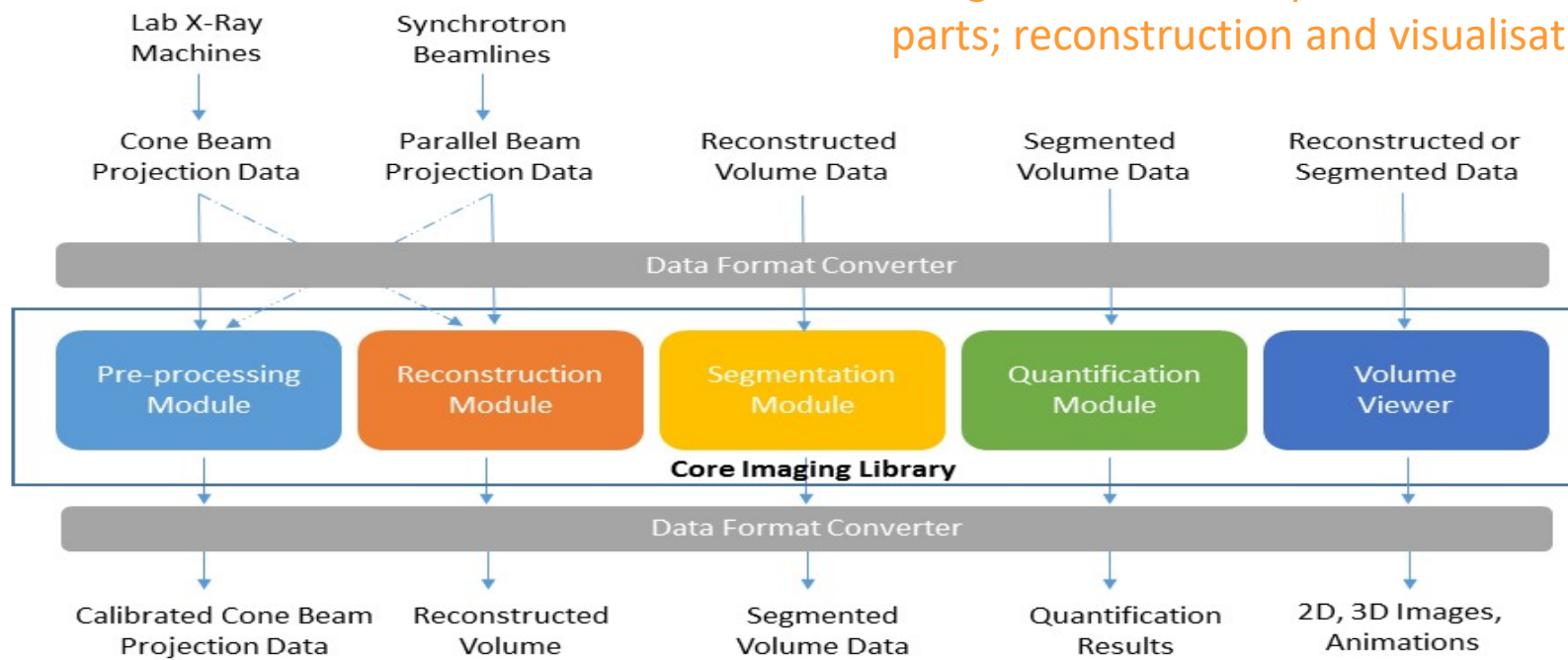
Future links to other tomography modes:

- 20 April 2018 – link with PET-MR
- 14 June 2018 “Fringe” meeting at RAL (Harwell Campus)



- Open Source 3-clause BSD and Apache 2.0 License – to be accepted / combined
- Easy installation via scripts, handholding,... – to be automated
- Python framework – to be rewritten for CIL and cross-linked across libraries
<http://cil.readthedocs.io/en/latest/> <https://www.ccp.ac.uk/CIL>
- Link to Flagship RSE code: Multichannel Iterative Reconstruction – to be included
Daniil Kazantsev et al. "Joint image reconstruction method with correlative multi-channel prior for X-ray spectral computed tomography" Inverse Problems
<http://iopscience.iop.org/10.1088/1361-6420/aaba86> 2018
- Share datasets

Integrate across complete network or just parts; reconstruction and visualisation.



Contacts

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<http://www.ccpit.ac.uk/>
<https://tomviz.org/>

