

Report from CCPi for the Period 08/12/15 to 06/06/16

Prof Philip Withers – 15 June 2016 <http://www.ccpi.ac.uk/>

1. Background

The CCP in Tomographic Imaging has now transitioned to Phase Two within the new five-year EPSRC network; this has built on the previous activities to deliver new versions of the core codes, as well as support defined dataflow frameworks. Core team staffing within STFC includes; **Srikanth Nagella, Ron Fowler, Evgueni Ovtchinnikov and Martin Turner**. The core team is funded (1.16 FTE) where Martin Turner (0.08 FTE) has a secretariat position. The focus is on improving tomographic data exploitation at four stages; pre-processing, reconstruction, quantification and framework integration.

Items of note over the whole year:-

- **Extra Core Staffing for the past year:** We were awarded extra funding over this year (**0.475 FTE**); **1. Erica Yang** (0.10 FTE) developed further collaborations with the new IMAT tomographic beamline on the ISIS neutron spallation source; **2.** Handover for iterative reconstruction methods, **Barry Searle** (0.125 FTE); **3. (0.25 FTE)** allocated for IMAT/ISIS tomographic dataflow framework integration within the Mantid system.
- **Extra Fellowship roles for the past year:** The Flagship project, with **Daniil Kazentsez**, was continued to complete a further set of example use cases for iterative reconstruction methods, and we funded a short term fellowship, **Nicola Wadeson**, to create reconstruction code specifically for the Rapiscan Helical scanner (originally for baggage handling and now for experimental research).
- **Formal links to other CCPs** have been made with the CCP PET/MR that employs similar iterative solutions for positron emission tomography (PET) and magnetic resonance (MR) imaging. Shared resources; include a new Drupal CMS (Content Management System) website setup to promote the coding and network activities; joint advertised training and software deposits.

2. Highlights for the Current Reporting Period

Success has built upon many items but two areas are of note: the actions from our annual ToScA conference (September 2016; att 120) and our involvement in the international network EU COST (MP1207 EXTREMA <http://extrema.ua.ac.be/>) run by Professor Kees Joost Batenburg where flagship code from Daniil Kazantsev is being integrated (time varying phantoms for the assessment of time lapse reconstructions).

Core software highlights in the last six months, within the CCPForge software repository:-

1. **Reconstruction Core algorithms:** supporting and providing some embedded development effort for code within three frameworks; one in the Diamond Light Source (Savu); one linking the new IMAT beamline in ISIS and an integrated system as a plug-in within the commercial Avizo scientific visualisation software suite.

2. **Quantitative visualisation algorithms:** updated Avizo algorithms (contributions by Erwan Plougonven, Bordeaux University) and new code to correct for beam hardening (being tested on a second location, RAL/RCaH – first at Queen Mary, University of London).

National Facilities have appointed contacts with the CCP;

1. **IMAT/ISIS** is now a formal partner in the CCPi Working Group and joint funding developers for their new beamline: contact Winfried Kockelmann.
2. **CLF** have also now just joined the CCPi Working Group after carrying out a demonstration visualisation event with their datasets: contact Ceri Brenner.
3. Also **DLS (Diamond Light Source)** is now creating a new python based framework: contact Nicola Wadson.

Funded Short Term Fellowships and Grants;

1. Setup and installed new equipment for visualisation facilities within ICAL (Interdisciplinary Centre for Ancient Life, Russell Garwood) at Manchester Museum (transferred in Mar 2015);
2. Matt Pankhurst (University of Leeds) becoming an SCD Visiting Scientist (Feb 2016) to link to software project.

Workshops / Training; we continue to support training courses within the network, from minor software license management to full training provision:

1. Two courses occurred: a series of Avizo courses was run from 8-15 December at Manchester (att 20); followed by an Avizo Advanced course, on 30 March 2016 (att 12)
2. The series of social meetings at RAL (coffee-and-tomography) continues and there have been 27 monthly meetings (total attendance is now at 407).
3. Only one developer workshops was held; on 10 December 2015 at Warwick Manufacturing Group, Coventry (att 9).
4. Supported BSI Workshops on proposed XCT standards; Thursday, January 14, 2016 (att 12), follow up at 16 March 2016, Lunch Seminar, Michael McCarthy (NPL), University of Manchester HMXIF, "Industrial XCT: Current develops of a dimensional verification standard for XCT (ISO 10360)" (att 23) and on 10 May 2016, held a XCT Conference "Dimensional X-ray Computed Tomography Conference" at National Physical Laboratory Teddington (att 95).

EU involvement: There has been staff exchanges with the EU e-COST programme (EXTREME) with collaborating through workshops and conferences (links through Bill Lionheart, Mark Basham and Daniil Kazantsev).

CCP, industry and other Network Cross-collaborations:

1. The SLA EPSRC funded survey on visualisation user needs is continuing for a second year with new survey announced at: <https://www.surveymonkey.com/r/VLFM7XH>
2. The TSB (UK Innovate) project (code 37972-241197) for Towards Zero Prototyping programme continues integrating tomography with CFD simulation.
3. License agreement for multi-site use of Avizo (FEI) involving RCaH (Research Complex at Harwell), DLS (Diamond Light Source), CLF (Central Laser Facilities) and ISIS. Multi-token

license for three years from March 2016; allowing for multiple developers and a permanent virtual reality setup, as well as an AvizoToGo license free facility.

3. Workshops and New Opportunities

Future networking and sustainability opportunities include stronger links with industrial and laboratory based resources. This includes;

1. September 2016 ToScA Symposium (Number 4, University of Bath) will include further CCPi activities. Partnership Status for CCP has been awarded.
2. July 4-10, 2016 Daresbury Labs., Open Days including Tomography vis tools from CCPi will be demonstrated.
3. Synergistic workshop planned by Bill Lionheart and Julian Matthews to link the developers' of the two CCP_PET-MR and CCPi together.
4. Invitation to host a quantitative tomography across multiple scales workshop, has been proposed from other CCPs notable; CCP5 and CCP_EM.
5. Links with the tomography standards panel (NPL/BSI cttee membership) are to be continued – next conference in March 2017.
6. Training and developer's days are to continue as normal. The next "away-day" developers' day is to Southampton in June 2016 and future planned session in Birmingham is planned for 2016 to link with the SESC.
7. A touchable volume visualisation content discussion mini workshop is to continue with links to the NHM (Natural History Museum) – includes Brainbox on Manchester Day in June 2016.
8. A ParaView training day and software show-and-tell Kitware Inc (Marcus Hanwell) in September 2016.
9. Expand the new data archive community space <https://zenodo.org/collection/user-ccpi?ln=en> and incorporate interactive visualisation within the Drupal website (ongoing).

4. Issues and Problems

- There is a still need to foster inter- and intra-networking between the developers group and the user community but this has started.
- We have drastically increased levels of outreach via the Interactive Visualisation subGroup (IVG) over the last year and this will continue. Causing extra loading.
- Applications for 'good' new fellowships and exchange visits are difficult and needed.
- Applications for summer students are being looked at to act as short term fellowship collaborations.
- There has been an overload of extra work from ISIS that has meant that there has been an underspend (of 0.4 FTE) and a new recruit is planned and has been actioned (by STFC/CSD) for the next three years of the project.

The next CCPi Working Group meeting is planned to be held in December 2016 (date TBC).