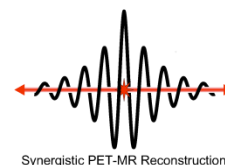


EPSRC Collaborative Computational Project in Synergistic PET-MR reconstruction: Meeting Record of 2nd Working Group Meeting



Time: Monday 7 December 2015, 13.30-15.30

Location: UCL, Rockefeller Building Room 339, 21 University Street, London, WC1E 6DE

Documents distributed ahead of the meeting:

Present: (17 physically and 2 virtual attendance)

- Kris Thielemans (UCL) – Chair [KT]
- David Atkinson (UCL) – [DA]
- Andrew Reader(KCL) – [RA]
- Julian Matthews(UoM) – [JM]
- Claudia Prieto (KCL) – [CP]
- Martin Turner(STFC/UoM) – [MT]
- Ron Fowler (STFC) – [RF]
- Evgueni Ovtchinnikov (STFC) – [EO]
- Sri Nagella (STFC via WebEx) – [SN]
- Ross Maxwell (Newcastle) – [RM]
- Harry Tsoumpas (Leeds) – [HT]
- Steven Sourbron (Leeds) –[SS]
- Paul Marsden (KCL) – [PM]
- Tim Fryer (Cambridge) – [TF]
- Roie Manavaki (Cambridge)
- Nikos Dikaios (UCL)
- Will Hallett (Imanova)
- Nikos Efthimiou (Leeds)
- Ciprian Catana (Harvard)

Minute	Item	Action
7.12.0	The meeting began at 13:30 and the attendees introduced themselves	
7.12.01	Agenda Item 1 - Recap of Aims and Structure KT gave a review of the aims and objectives of CCP PET-MR project and the roles of the Executive committee, the Working Group and the External Advisors. Activities for the last 6 months were summarised. These included the establishment of mailing lists, OneDrive account (for Exec Committee and STFC only), website and research exchange programme. A range of meetings and courses were held along with four Software Framework meetings.	
7.12.02	Agenda Item 2 – Overview of activities since last meeting <ul style="list-style-type: none"> • Mailing list establishment and website 	

	<ul style="list-style-type: none"> ○ KT reported that 3 email lists have been established: Announcements (68 subscribers), Users (55) and Developers (9). ○ The web site (www.ccpetmr.ac.uk) is now hosted on a Drupal CMS system which will make updates easier. RF gave a summary of the new features. ○ JM described the CCP PET-MR Research Exchange Programme which has been announced on the website and email lists. This can fund visits to further the aims of the CCP. ○ HT gave a report on the CCP PET-MR sponsored workshop on Open Source Software for Image Reconstruction held at IEEE MIC 2015. ○ KT and HT reported on the CT/SPECT/PET image reconstruction course given at the IEEE Nuclear Science Symposium & Medical Imaging Conference. The use of STiR in a virtual machine worked well and could be used for the initial version of a CCP PET-MR distribution. ○ KT described the STiR User's and Developer's meeting at MIC 2015 which had about 40 attendees. ○ An overview of the four Software Framework Meetings was given. These have had good attendance (16-24 people) and aim to define the requirements for the project software. 	
7.12.03	<p>Agenda Item 3 – Updates on related projects</p> <ul style="list-style-type: none"> ● MT gave a report on the activities of the CCPi project (Tomographic imaging – related CCP www.ccp.ac.uk). <ul style="list-style-type: none"> ○ Outreach activities included a new sub-group addressing the use of interactive touch tables for presentation of results. ○ The three software frameworks that are being developed to address different user group's needs: <ul style="list-style-type: none"> ▪ Savu, a python framework, for high performance cluster based analysis. ▪ IMAT framework for neutron imaging ▪ Avizo (commercial sci vis tool) based framework aimed at lab based CT users. ○ A special journal issue of Philosophical Transactions A devoted to X-ray reconstruction has been published with articles from CCPi members. ○ Large test data sets are being stored on Zenodo (CERN) which provides a stable platform. DOI references can be obtained for well-defined data sets. ○ Various visiting fellows have been sponsored and flagship grants applied for. ○ A joint workshop on joint/synergistic reconstruction is being planned with CCP PET-MR. ● DPUK – JM and TF gave an update on this project. Of the five new PET-MR scanners four are going to be GE machines with one site choosing a Siemens system. Hence there will soon be a total of 7 (clinical) PET-MR machines available to UK researchers. An image repository (XNAT) for the project may be funded at Swansea. 	
7.12.04	<p>Agenda Item 4 – Status of Data Formats</p> <ul style="list-style-type: none"> ● DA gave an update on the standardisation of the ISMRMRD format used 	

	<p>for MRI data.</p> <ul style="list-style-type: none"> ○ A paper on ISMRM Raw Data format 1.0 is now in press defining the standard. ○ converter software for Siemens, Brucker and Philips is provided on github. GE provides a converter on request. ○ Interfaces exist for Matlab, C++ and Python ○ Version 2 of the standard is being worked on and will address other data e.g. gradients. It will also address more general data, e.g. ECG, breathing. ○ Streaming data (as in Gadgetron) may also be addressed in version 2.0. <ul style="list-style-type: none"> ● KT reported on data formats for PET data. Discussions are continuing with GE and Siemens over getting access to the data from their machines. Not all data will be made available, e.g. the translation between PET and MRI coordinates will not be accessible for Siemens. 	
<p>7.12.05</p>	<p>Agenda Item 5 – Software Framework Progress</p> <ul style="list-style-type: none"> ● JM presented an overview of the User Specification Document which had been distributed before the meeting. He highlighted the choice of license, the proposal to support Matlab and Python interfaces and the initial aim for a Linux release with Windows and MacOS support added later. EO noted that the current STiR demo runs on Windows and Linux; the Gadgetron package is easier to run on Linux. The current version of the User Specification was accepted by the working group on a show of hands. ● KT presented the software design document which was also provided before the meeting. This document is still under development (V0.2). ● EO showed a demonstration of the STiR interface running in Python. The same example can also run in Matlab with minimal changes. ● KT gave details of the dates for the initial software release: <ul style="list-style-type: none"> ○ A Developers release of the code will be provided in Jan 2016. ○ A release available to users will be provided (as a Virtual box image) in Feb 2016. 	
<p>7.12.06</p>	<p>Agenda Item 6 – Future Activities</p> <ul style="list-style-type: none"> ● KT+CP said that CCP PET-MR would try to provide access to future seminars via both “live” video conferencing and online recordings. CP should be contacted if you have a suitable seminar coming up. ● AR and JM had had a meeting with Bill Lionheart about arranging a workshop synergistic reconstruction methods with CCPi. The possible format of a joint meeting was discussed with possible break-out sessions on specific topics. It was agreed that this workshop would be useful and should go ahead. ● Another training school on PET/MR engineering, along the lines of the previous Leeds one, was discussed. Programme could be similar to previous years but excluding hardware. It was unclear when would be the best date to run such a course, giving the timing of new PhD students. Also some 	

	<p>question about available funding. See also next bullet point.</p> <ul style="list-style-type: none"> • SS and HT described a potential pre-meeting workshop at the September 2016 Meeting of the British Chapter of ISMRM in Leeds. KT suggested combining with training in using the CCP software. An issue was raised about other meetings occurring in September (e.g. CRUK CIC). To be discussed further. • The project aim of establishing a database of phantom data was discussed. PM and SS had agreed to coordinate this activity. Zenodo is one possibility for storage. Need to define the data to make available. 	<p>HT/SS + exec committee</p> <p>SS/PM/KT</p>
7.12.07	<p>Agenda Item 7 – Close</p> <ul style="list-style-type: none"> • Approval of Report to CCPi Chair meeting: KT had distributed the report before the meeting. The report was accepted. • AOB <ul style="list-style-type: none"> ○ MT mentioned the internal reports the STFC has to make on the CCP. • Next working group meeting date: This will be May or June 2016. Exact date still to be decided. 	
Minute	Action	Date due to be completed by
7.12.06	Investigate PET-MR workshop at ISMRM meeting in Leeds	Feb 2016
7.12.06	Gather ideas for data for phantoms database	Mar 2016