

## 6<sup>th</sup> CCP PET-MR Working Group Meeting 17 Nov 2017

### Attendance:

David Atkinson  
Richard Brown  
Casper da Costa-Luis  
Elise Emond  
Kjell Erlandsson  
Ashley Gillman  
Christoph Kolbitsch  
Marcus Mattus  
Abolfazl Mehranian  
Evgueni Ovtchinnikov  
Edoardo Pasca  
Andrew Reader  
Dee Tarday  
Kris Thielemans  
Ben Thomas  
Richard Laforest  
Charalampos Tsoumpas  
Martin Turner  
Palak Wadhwa  
Pawel Markiewicz  
Parisa Khateri  
Nikos Efthimiou

### Agenda:

- Introduction
- Overview of progress
  - Software status
  - Networking Activities
- Construction of phantom database
  - PET-MR Synergistic Phantom group
  - Phantom data distribution
  - License
- Brief overview of CCP PET-MR Software Flagship project
- Software plan
  - Future release plan
  - Are there new applications that our software needs to target?
  - Strategies for integrating of external packages
- Future Networking Activities.
- A.O.B.

## Overview of progress

New in SIRF 0.9.2:

- PET data algebra
- Storage scheme (file/memory) management for acquisition data
- Single precision float Matlab and Python arrays
- Argument validity checks
- Matlab test scripts
- Consistent naming scheme for libraries and modules
- User Guide Appendix on advanced features
- Specific versions of dependencies (ISMRMRD, Gadgetron, STIR, SIRF) in SuperBuild
- SuperBuild update for Virtual Machine

Progress since 0.9.2:

- Access to all MR images and acquisitions parameters
- More Python test scripts
- Tests for C++ and C interface to STIR
- All 8 file IO available (PET: Interfile, MR: HDF5)

## Networking activities

- Software Meetings
  - 15/06/2017, UCL, London 13 att.
  - 16/09/2017, Manchester 12 att.
  - 17/11/2017, UCL, London ~20 att.
- ~2 weekly developer t-cons ~5 att.
- Exchanges
  - Palak Wadhwa (Leeds) to UCL, October 2017
  - Niccolo Fuin (CEA, Orsay, France) to UCL, Nov 2017  
1 day visit + seminar
  - 3 informal requests for the future

## Construction of phantom database

Kickstarting phantom group discussed.

Data distribution options: DPUK-II vs Zenodo discussed.

Phantom data license discussed.

## Brief overview of CCP PET-MR Software Flagship project

CCP PETMR Flagship: A framework for efficient synergistic spatiotemporal reconstruction of PET-MR dynamic data EP/P022200/1 presented.

Aims:

- expanding the CCP PET-MR software platform to handle data and reconstructions with high spatiotemporal resolution, providing researchers with a flexible Open Source research toolkit;
- improving and implementing state-of-the-art techniques for estimation of relevant parameters from multi-modality dynamic data by exploiting spatial and temporal correlations;
- optimising core functionality for multi-core and GPGPU systems;
- deepening the use of sustainable software engineering practice by the community.
- provide proof-of-concept and to engage the community: develop and implement novel methods for dynamic PET-MR imaging in two key applications, and test the performance on data acquired on the latest generation PET-MR systems

### Software plan

- Software releases  
[https://1drv.ms/w/s!Aj8GcHAEH3\\_8gcN0mlqVm5T9MCPhrw](https://1drv.ms/w/s!Aj8GcHAEH3_8gcN0mlqVm5T9MCPhrw)
- Are there new applications that our software needs to target?
- Difficulties encountered
  - Supporting different OSs
  - MATLAB and Python
  - Managing of external dependencies
- Integration with other packages

### Future Networking Activities

- Phantom group
- Joint Workshop with CCPi
- Publication on SIRF 1.0  
*Computer Programs in Physics (CPIP)*  
50 YEARS of Computer Physics Communications: a special issue focused on computational science software
- Dedicated SIRF Training day 2018
- PSMR 2018?
- IEEE MIC 2019 Manchester. Short course 2 day
- ISMRM 2019 PETMR study group (or reproducible research). 20 min “demo”
- Workshop March 2020, combining scientific aspects and educational software

### Decisions:

- Interface to PET-MR harmonisation effort (Richard Laforest/Thomas Hope)

- Use Zenodo to store phantom data (everyone can upload their own datasets, will get their own DOI. Can then be added to a group). Data license to be confirmed (will likely need to be flexible for different use case), but encourage referencing via DOI.
- Make publication on SIRF after Release 1.0
- Software:
  - o Long term plan approved
  - o Keep supporting MATLAB to increase user-base. Can be staged (MATLAB a bit later than Python), as long as clear what is supported.
  - o Keep supporting Windows, as in previous point.
  - o Suggested way to interface to major other packages such as ITK (via conversion of objects, while not wrapping all of ITK) and optional dependency on the whole of ITK was accepted.

**Actions:**

- KT make phantom data license suggestions
- Richard Laforest to send details on PET-MR harmonisation effort and meeting at RSNA