

CCP-PETMR 5th Working Group Meeting UCL 15th June 2017

First version of minutes: Ben Thomas

Minutes to be read together with the slides as not all information is repeated here.

Attendance (15)

Andrew Reader (KCL)
Ben Thomas (UCL)
Brian Hutton (UCL)
Casper da Costa-Luis (KCL)
David Atkinson (UCL)
Harry Tsoumpas (Leeds)
Julian Matthews (Manchester)
Kris Thielemans (ULC)
Nikos Dikaïos (Surrey)
Nikos Efthimiou (Hull)
Simon Arridge (UCL)
Steven Sourbron (Leeds),
Will Hallett (Imanova)

Online:

Martin Turner (Manchester),
Christoph Kolbitch (PTB)

Introduction and status - KT

- Brief overview of CCP
- Description of STFC time allocation for next year
- Planned software releases at outset:
 - First release at Q2 2016. In reality, a ~12-month delay.
- V 0.9.0 now released.
 - Described status. More support for Siemens than GE so far.
- Example of applications (Christoph and Palak).
- Improvements in software development process e.g. CMake, GitHub.
- Additionally, we are making some small contributions to gadgetron and ismrmrd.
- UCL-internal code for data transfer and file format. Still pending Siemens approval.
- Demonstration using VM
 - MR fully-sampled demo
 - PET display and projection demo
- 2 x exchanges: Ottavia Bertolli (UCL-Orsay) and Yu-Jung Tsai (UCL-KULeuven)
- PSMR 2017 training school
 - ~25 participants
 - Hands-on session
 - Went reasonably well and well received. Allocated time probably a bit too short
- Some presence in other networks:
 - DPUK (Julian et al.)

Commented [TK1]: Present?

Commented [TK2]: Anyone else? Giorgos from Edinburgh?

- ISMRM (David, Steven)
- CCP PETMR awards were described
 - Christoph Kolbitsch - £400
 - Ben Thomas - £200
 - Casper da Costa-Luis- £100
- Overview of Mid-term goals as written in the grant proposals. Generally we're on target. 2 comments: It is too early for a hackathon. Cross-modality use of information is still tricky but is planned for V2 (mid 2018)
- Towards SIRF v1.0
 - Target release was mid-October. It was decided to aim for end of Nov.
 - Main features:
 - Reconstruct PET from non-TOF data
 - More testing including Continuous Integration testing via Jenkins

CK: Asks about proprietary information

KT: Have all the information at UCL. We are still waiting for Siemens re. hardware mu-maps and MRAC. GE has supplied Matlab files but we cannot distribute those. We will ask if this can be changed. Turku is pushing for PET file format disclosure from Phillips.

(Note added after meeting: Floris Jansen (GE) has agreed to distribute Matlab files to other sites with GE NDA under certain conditions).

??: Does an MR developer have to use Gadgetron?

KT: Can use SIRF directly but will be slower than Gadgetron.

??: Can a user wrap their own code in MATLAB and bypass Gadgetron?

DA: Yes, you can manipulate objects with your own code. Reason for Gadgetron was because it is open-source and handles real-world scale data.

Update on Gadgetron – DA

- ISMRM has raw data format going from v1 to v2. Funding provided to Alexandra Institute in Denmark. 'Cabal of people to provide oversight.
- Recently added BART interface to Gadgetron.
- Test data now on Azure.
- Hui Xue (NIH), David Hansen (Arhaus) Kelvin Chow (Siemens) involved
- Michael Hansen (NIH) leaving for Microsoft.
- No immediate impact on SIRF as Gadgetron will remain going. Also SIRF build on top of other packages rather than integrating.
- ISMRMRD converters – Philips and GE converters lagging behind Siemens.

Scanner update – JM

- Manchester is likely to start scanning next month. Most studies starting the beginning of next year. Imanova did first patient recently
- There is currently a problem on GE scanner with specific MR sequences interfering with the PET. New cables will be installed. Imanova might have additional problem.

Acquiring real data –JM

- Database to ensure accuracy of CCP software through testing.
- Budget of £25K. We have letters of support committing data at fraction of cost.
- Database purpose:
 - Test novel reconstructions.
 - Software testing
 - Education
- ???: Maintaining algorithm performance metrics.
- JM: What do we want?
 - Phantom or patient?
 - Which scanners?
 - Concurrent PET/MR or PET and MR?
 - Good to have variability?
 - Data hosting?
 - DPUK?
 - What about non-dementia and phantom studies
- It was discussed if we should host the data, e.g. by using the DPUK-developed software for hosting with XNAT. However, this requires serious effort and infrastructure, which is outside of our capabilities. We will therefore resume our discussions with DPUK about how they can assist. BT worries if XNAT will support the raw data which we will need (**Actions JM**). DA noted that we want to keep the data in original file format as well as ISMRMRD.
- It was noted that there will be a need for QC of incoming data. Workflow exists in XNAT (approval)
- Issues with patient data:
 - Anonymization: essential. JM noted that current advice is that is not necessary to mask faces in MRI data (would be impossible in raw data anyway)
 - ethics. We need to make use of ongoing and planned clinical studies. For instance DPUK is developing a multi-centre florbetapir trial (ethics aspects lead by Paul Matthews). This would be useful as a template for future applications.
 - It is very likely that a registration form will be needed to access the data
- Phantom data
 - Difficulty with water in phantoms. oil and PET tracer don't mix. However, lots of work on this has been done at various centres (Geoff Charles Edwards (KCL), Anna Barnes (UCLH)), including some National lab efforts at standardisation for MR (and maybe PET/MR?)
 - Our needs are a bit different from others as we specifically need simultaneity, not really QC.
Action JM+KT: set-up meeting on PET-MR phantoms.
- Simulated data
 - BT asked we should include this. KT says currently no resources. UCL et al. are part of a EU-grant proposal that would make this possible.

Commented [TK3]: Do we need to do anything here? Do I need to communicate need for raw data?

Grant proposals - KT

- KT gave an overview of our Flagship proposal : concentrating on dynamic PET-MR data. 32 months duration. Start end of September. Currently recruiting. Intention to run in parallel with CCP PET-MR.
- KT gave overview of ERAMMIT European infrastructure grant submitted with UCL 1/23 partners. 5-year grant including a software pillar. ~ €5 million budget.
- BT: Update on RSE fellowship application (5 year) Translation of imaging techniques across modalities with simulation framework. Currently informally supported by CCP PETMR and CCPi. Will need to have formal support for final application.
- We had a discussing on EPSRC panels. SA advised that Healthcare Engineering is still the best place. Imaging downgraded but not likely to have huge impact.
- We should consider a programme grant.

CCPi overview- MT

- MT gave a brief overview of CCPi activites, e.g. 4 exchanges, various seminars (mainly on post-processing), exhibitions/workshops/ conferences.
- Collaboration with NPL on standardisation for XCT.
- CCPi Flagship approved: Reconstruction Toolkit for multichannel CT (RT-MCT). This has started and should be fully up and running in September or October

Dissemination – AR

- Website important for outreach.
- conference presentations
 - PSMR poster 2016 Cologne
 - ISMRM British Chapter meeting
 - PSMR poster 2017 – Lisbon
 - Submitted: IEEE MIC – Atlanta 2017
- Future conference presence discussion:
 - Fully3D 2019
 - ISMRM had a PET-MR session and an open-source software special session. Could go in either
- Acknowledgements in papers:
 - Christoph – Journal paper
 - Conference - PSMR
 - 2 x submissions to MIC
- SIRF paper: target end of year (release of v1.0)

Future meetings -KT

- Our grant proposal says we will have 2-day workshops but it was generally felt there is enough activity in the field. Better to have targeted meetings.
- Possibilities of joint workshop with CCPi were (again) discussed. Possible topics:
 - Bayesian methods – Bill Lionheart
 - Synergistic/multi-spectral reconstruction

- Deep Learning
 - Action JM+KT:** take this up with CCPi (Bill, Daniil or Jakob)
- PET/MR phantoms (see above)
- SIRF Training day
 - Target MIC 2019 – Manchester: **Action CT:** contact Paul Marsden
 - KT notes that CT+KT will use STIR at MIC 2017 – PET/SPECT MR short course. (Cannot be SIRF as SPECT)

Actions

JM: contact DPUK for data storage/distribution

JM/KT: Phantom taskforce

JM/KT: Talk to Bill et al on 1 or 2 joint workshops

CT: MIC 2019 SIRF training