



UNIVERSITY OF
CAMBRIDGE
Department of Radiology

Monthly Newsletter

Department of Radiology

Newsletter - Summer 2017

Message from Professor Gilbert

Welcome to the Summer edition of the departmental newsletter. The weather in Cambridge has been stunning with gloriously hot summer days punctuated by rain storms – a typical British summer! We have had excellent external speakers at the Forum this term - Professor Savvas Andronikou who spoke about Paediatric Radiology, Dr Gianni Morana, from Treviso, who gave a beautifully illustrated lecture on ‘Pancreatic Cancer & Mimics’ & ‘Difficult Liver Lesions in Oncologic Patients’, Professor van Dongen, VUMC Amsterdam speaking on ‘PET imaging and drug development’ and Duncan Ettles as the visiting Interventional professor giving us an inspirational lecture on Frontiers in Interventional Radiology. The superb quality of lectures was more than matched by our home team and we were educated by Penny Moyle, excellent case based gynae imaging, Helen Taylor on how radiologists can improve anatomy teaching, Miltos Krokidis on novel interventional techniques, Pat Set on how to reduce an intussusception, Jamie MacKay on Osteoarthritis imaging and Mathew Gaskarth celebrating 10 years of MR guided breast biopsies, service he introduced ... yes 10 years ago.



We are delighted that Jianmin was awarded his PhD and we wish him well in his new post at Stanford and to collaborating with him in breast imaging. As you can see from the newsletter we have had other success in terms of new grants being awarded, publications and abstract presentations. The department is going from strength to strength and the new term will bring more new faces. I was lucky enough to watch the first races of the Americas Cup in Bermuda.

Speaking to the sponsors of Ben Ainslies boat and visiting the boat shed to watch the boat being repaired overnight after she was holed was fascinating and brought home to me yet again the importance of team work. This is something which I hope all of you recognise – the excellent multidisciplinary team we have in the department.

In the meantime I hope you all get some well earned time off over the summer.

Researcher Feature: Dr Nasim Sheikh-Bahaei



PET qualification of MRI sequences in Alzheimer's disease (PEMA)

Alzheimer's disease is the most common type of dementia, responsible for 60% - 80% of all dementia cases. The latest report from "Dementia: UK update" estimated that 850,000 people with dementia were living in the UK in 2015 and it cost the UK around £26 billion. The cost of care for dementia is equal to combined cost of cancer, heart disease and stroke together.

Diagnosis of Alzheimer at an early stage particularly in clinical setting is challenging and requires different ancillary diagnostic methods. Several studies have shown clinical diagnosis is not sensitive or specific at early stages and structural imaging with MRI and CT do not improve the accuracy of clinical diagnosis. Functional imaging with different PET ligands on the other hand, are very accurate but they are expensive with risk of radiation. In addition, widespread adoption of PET clinically is hampered by limited availability of PET scanners and technical expertise. The main goal of my research, as a neuroradiologist with interest in degenerative brain disease, was to identify new imaging techniques to improve diagnosis of Alzheimer's disease at early stages in day to day clinical practice.

During my PhD (under co-supervision of Prof Gillard (radiology) and Prof O'Brien (Psychiatry)), I investigated the correlation between different MRI techniques and both Amyloid PET (^{11}C -Pittsburg Compound B (PiB)) and ^{18}F -FDG-PET, the current gold standards of imaging in degenerative brain diseases.

My research project comprises different subprojects. I summarise the two main studies for this report:

1 - PET-guided MR Spectroscopy in early Alzheimer's disease:

In this project, we hypothesized that level of brain metabolites in MRS are representative of underlying pathological changes identified in PET. Therefore, MRS can improve the accuracy of early Alzheimer's disease diagnosis in clinical practice. To our knowledge this study is **the first PET-guided MRS in AD**. We measured the level of brain metabolites in regions of abnormality depicted by PiB- and FDG-PET in cases with Alzheimer's disease and mild cognitive impairment and compared them with corresponding areas in healthy controls. Our results showed there was significant temporal and spatial association between Myoinositol (mI) in MRS and amyloid load. This indicates mI can be considered as a marker for Amyloid deposition in day to day practice. On the other hand, we found total N-acetyl group (tNA) was significantly associated with both amyloid load and neurodegeneration with a stepwise decline in different stages of the disease, implying tNA, might be used as a disease stage biomarker and also as a valuable surrogate biomarker for assessing response to treatment.

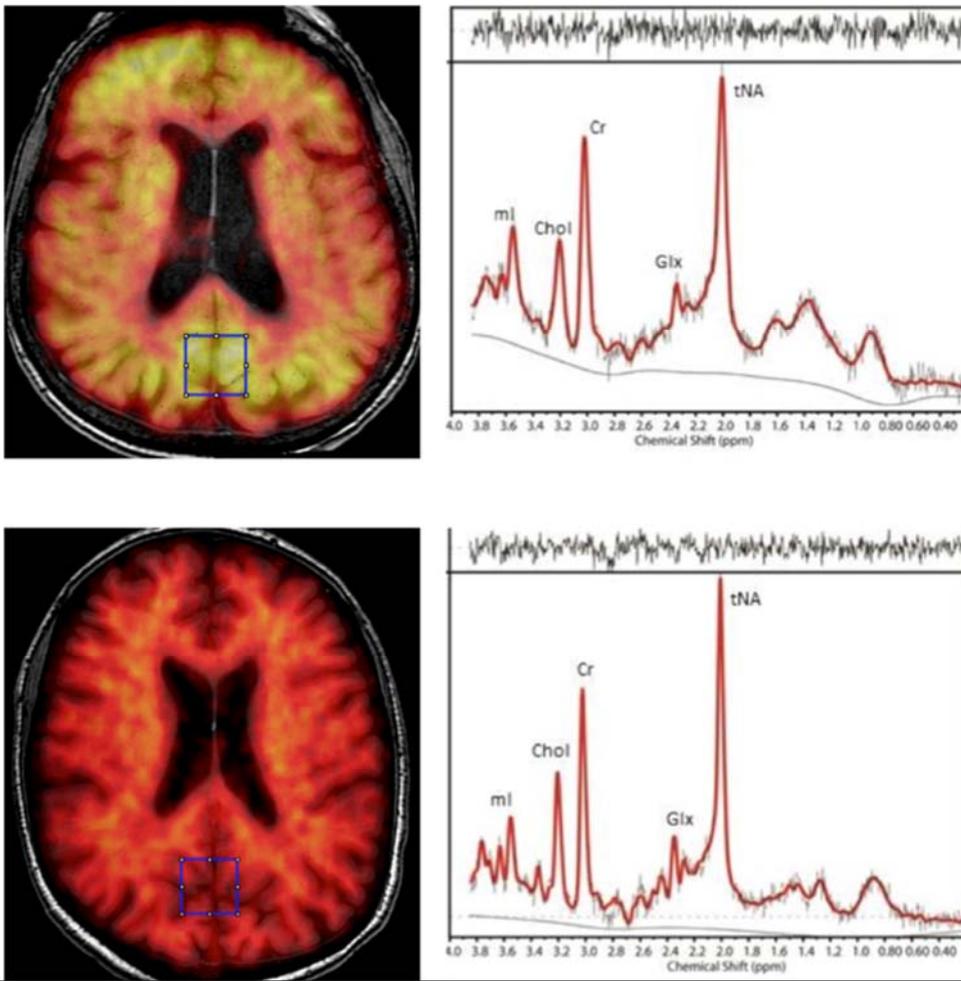


Fig.1: PiB-PET image on the left showing MRS voxels in Posterior Cingulate Gyrus with representative MRS spectra on the right. The top row is an Alzheimer case with high amyloid uptake and the bottom row is a healthy control with no amyloid. The metabolite peaks in spectra show differences between two cases.

2 - The correlation between Cerebral Microbleeds, amyloid load and hypometabolism:

For this project, we hypothesized that lobar cerebral microbleeds (CMB) seen in Susceptibility Weighted Imaging (SWI) in Alzheimer's disease are associated with amyloid load and neurodegeneration in each anatomical region. Therefore, CMB can be used as an imaging biomarker to improve the accuracy of diagnosis at early stages of AD in clinical practice.

Our data showed that presence of CMB is highly associated with both total cortical and more importantly, lobar amyloid uptake. It means identifying CMB in SWI in clinical practice might be a good indicator of amyloid load in cases with probable Alzheimer's disease. We have also found associations between CMB and hypometabolism and neurodegeneration in temporal lobe. This indicates that independent of the amyloid burden, CMB might contribute to the neurodegenerative process in Alzheimer's disease.

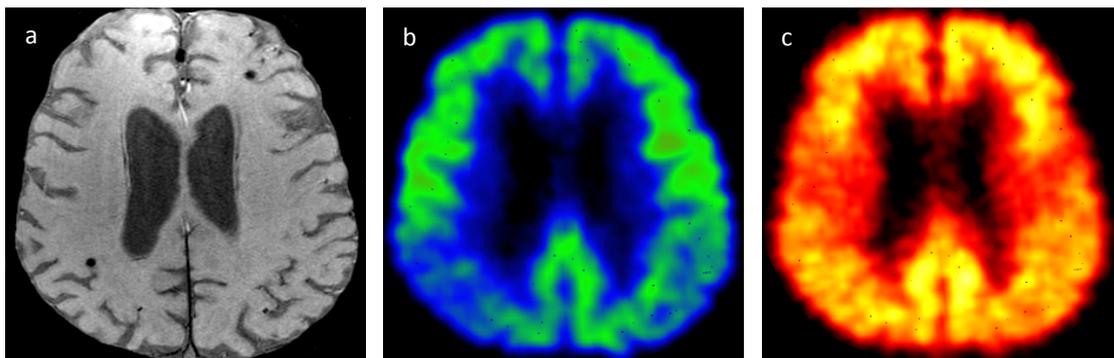


Fig 2: Case with Alzheimer's disease showing lobar CMB in frontal and parietal lobes in SWI (a) ; hypometabolism in parietal lobes in FDG-PET (b) and extensive cortical amyloid uptake in PiB-PET (c)

Department News



We would like to congratulate **Dr Ferdia Gallagher** on his appointment to a Readership in Molecular Imaging. Congratulations, Ferdia!



At the end of May the department of Radiology said a sad farewell to our IT and Admin Assistant, **Anna Rygielska**, who has left us to pursue to a role focused on programming. We will miss her but we wish her all the best in her new career.

Royal College of Radiologists and British Society of Breast Radiology Travelling Professor 2017 - 2018

We share in congratulating **Dr Ruchi Sinnatamby** her new professorship.

From the Clinical School Newsletter:

Dr Sinnatamby, the Clinical School's CUH Clinical Sub-Dean and consultant in the CUH Breast Unit, who has been appointed to the annual RCR BSBR visiting Professorship for 2017 – 2018.



This prestigious appointment involves a series of visits to UK radiology post-graduate training schemes for the purpose of teaching, stimulating interest in breast radiology and fostering high quality breast imaging throughout the UK. The visiting professor will be expected to undertake 6-8 visits to training programmes over 12 months to deliver lectures and workshops and culminates in a named plenary lecture at the BSBR Annual Scientific Meeting. A highly experienced educator, Ruchi Sinnatamby has previously been awarded a university Pilkington Prize and plans to develop teaching material in breast radiology that can be modified subsequently for the use of our clinical students.



The department would like you to join us in congratulating our Research Nurse, **Sarah Hilbome**, on completing a 1st Leadership and Management level 3 course, developing skills for management and communications.

Congratulations Sarah!

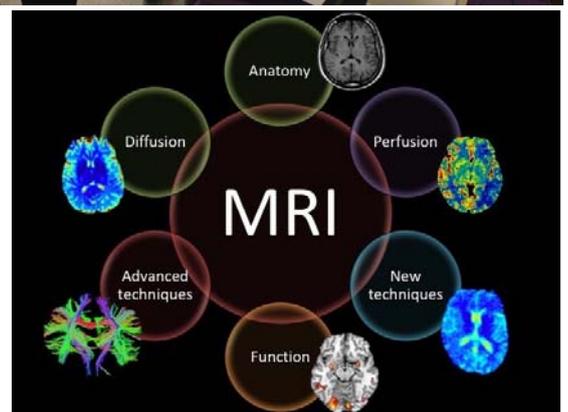
Research Updates

On the 5th of June, Dr Frank Riemer and Dr Fulvio Zaccagna attended the Cancer Imaging Centres Annual Cancer Conference at the Institute of Child Health in London.

There they presented work entitled “**High-resolution diffusional kurtosis imaging (DKI) in normal brain: A comparison with histology**” and “ **^{23}Na -MRI demonstrates a sodium gradient within gliomas as a biomarker of tumour heterogeneity**” respectively.

On Friday the 23rd of June, Dr Riemer will be going to the Cancer Imaging Centres National Training Event on Contrast Agents to present a poster titled “**Do gadolinium-based contrast agents alter ^{23}Na T_1 relaxivity in glioma?**” at King’s College London.

On the public engagement side, we have a few photos from Dr Riemer and Dr Zaccagna’s presentations at the science festival in March:



Recent Publications

- Caglic, I., Hansen, N.L., Slough, R.A., Patterson, A.J., Barrett, T., 2017. **Evaluating the effect of rectal distension on prostate multiparametric MRI image quality.** *European Journal of Radiology* 90, 174–180. [doi:10.1016/j.ejrad.2017.02.029](https://doi.org/10.1016/j.ejrad.2017.02.029)
- Gill, A.B., Hilliard, N.J., Hilliard, S.T., Graves, M., Lomas, D.J., Shaw, A., 2017. **A semi-automatic method for the extraction of the portal venous input function in quantitative dynamic contrast-enhanced CT of the liver.** *BJR* 20160875. [doi:10.1259/bjr.20160875](https://doi.org/10.1259/bjr.20160875)
- Hilliard, N., See, T.C., Shaida, N., 2017. **Ultrasound-assisted thrombolysis of an occluded transjugular portosystemic shunt.** *Diagnostic and Interventional Radiology.* [doi:10.5152/dir.2017.16238](https://doi.org/10.5152/dir.2017.16238)
- MacKay, J.W., Murray, P.J., Kasmai, B., Johnson, G., Donell, S.T., Toms, A.P., 2017. **Subchondral bone in osteoarthritis: association between MRI texture analysis and histomorphometry.** *Osteoarthritis Cartilage* 25, 700–707. [doi:10.1016/j.joca.2016.12.011](https://doi.org/10.1016/j.joca.2016.12.011)
- Noorani, A., Bornschein, J., Lynch, A.G., Secrier, M., Achilleos, A., Eldridge, M., Bower, L., Weaver, J.M.J., Crawte, J., Ong, C.-A., Shannon, N., MacRae, S., Grehan, N., Nutzinger, B., O'Donovan, M., Hardwick, R., Tavaré, S., Fitzgerald, R.C., Consortium, on behalf of the O.C.C. and M.S. (OCCAMS), Elliott, R.F., Edwards, P.A.W., Li, X., Chettouh, H., Contini, G., Gregson, E., Zeki, S., Smith, L., Abdullahi, Z., Rue, R. de la, Miremadi, A., Malhotra, S., Smith, M.L., Davies, J., Crichton, C., Carroll, N., Safranek, P., Hindmarsh, A., Sujendran, V., Turkington, R., Hayes, S.J., Ang, Y., Preston, S.R., Oakes, S., Bagwan, I., Save, V., Skipworth, R.J.E., Hupp, T.R., O'Neill, J.R., Tucker, O., Beggs, A., Taniere, P., Puig, S., Underwood, T.J., Noble, F., Owsley, J., Barr, H., Shepherd, N., Old, O., Lagergren, J., Gossage, J., Davies, A., Chang, F., Zylstra, J., Sanders, G., Berrisford, R., Harden, C., Bunting, D., Lewis, M., Cheong, E., Kumar, B., Parsons, S.L., Saunders, J., Soomro, I., Kaye, P., Lovat, L., Haidry, R., Eneh, V., Igali, L., Welch, I.M., Scott, M., Sothi, S., Suortamo, S., Lishman, S., Grabowska, A., Peters, C.J., Hanna, G.B., Khoo, D., Beardsmore, D., 2017. **A comparative analysis of whole genome sequencing of esophageal adenocarcinoma pre- and post-chemotherapy.** *Genome Res.* 27, 902–912. [doi:10.1101/gr.214296.116](https://doi.org/10.1101/gr.214296.116)
- Rossi, S.H., Koo, B., Riddick, A., Shah, N., Stewart, G.D., 2017. **Different Successful Management Strategies for Obstructing Renal Parapelvic Cysts.** *UIN.* [doi:10.1159/000475886](https://doi.org/10.1159/000475886)
- Ruggiero, A., Screatton, N.J., 2017. **Imaging of acute and chronic thromboembolic disease: state of the art.** *Clinical Radiology* 72, 375–388. [doi:10.1016/j.crad.2017.02.011](https://doi.org/10.1016/j.crad.2017.02.011)
- Shaida, N., Priest, A.N., See, T.C., Winterbottom, A.P., Graves, M.J., Lomas, D.J., 2017. **Evaluation of velocity-sensitized and acceleration-sensitized NCE-MRA for below-knee peripheral arterial disease.** *J Magn Reson Imaging* 45, 1846–1853. [doi:10.1002/jmri.25533](https://doi.org/10.1002/jmri.25533)
- Turco, M.Y., Gardner, L., Hughes, J., Cindrova-Davies, T., Gomez, M.J., Farrell, L., Hollinshead, M., Marsh, S.G.E., Brosens, J.J., Critchley, H.O., Simons, B.D., Hemberger, M., Koo, B.-K., Moffett, A., **Burton, G.J., 2017. Long-term, hormone-responsive organoid cultures of human endometrium in a chemically defined medium.** *Nat. Cell Biol.* 19, 568–577. [doi:10.1038/ncb3516](https://doi.org/10.1038/ncb3516)
- Vennart, N.J., Bird, N., Buscombe, J., Cheow, H.K., Nowosinska, E., Heard, S., 2017. **Optimization of PET/CT image quality using the GE “Sharp IR” point-spread function reconstruction algorithm.** *Nucl Med Commun* 38, 471–479. [doi:10.1097/MNM.0000000000000669](https://doi.org/10.1097/MNM.0000000000000669)

Student Research Update: Jianmin Yuan

PRESENT FOUR ABSTRACTS IN THE ISMRM MEETING 2017

No.3118. Three-dimensional black-blood multi-contrast protocol for carotid imaging using compressed sensing: a repeatability study

No.3119. 3D black blood T2 mapping of the carotid artery wall with compressed sensing and data-driven parallel imaging

No.2786. Comparison of black-blood T2 mapping sequences in carotid artery at 3T

No.2787. Optimization of 3D black-blood multi-echo T2* weighted sequence in carotid artery

RECENTLY ACCEPTED PAPERS:

Yuan J, Makris G, Patterson AJ, Usman A, Das T, Priest AN, Teng Z, Hilborne S, Prudencio D, Gillard JH and Graves MJ. "Relationship between carotid plaque surface morphology and perfusion: a 3D DCE-MRI study". Magnetic Resonance Materials in Physics, Biology and Medicine 2017, 1-9.

Yuan J, Usman A, Reid SA, King KF, Patterson AJ, Gillard JH and Graves MJ. "Three-dimensional black-blood T2 mapping with compressed sensing and data-driven parallel imaging in the carotid artery". Magnetic Resonance Imaging 2017, 37:62-69.

New Arrivals

Callie Deng is a visiting student from The Johns Hopkins University who has joined the department for a summer research project from 29th May 2017 until 28th July 2017, supervised by Dr Ferdia Gallagher.

Nikita Sushentsev is a visiting Summer Student who arrived on the 28th of June for a 7-week assignment. Nikita's assignment will mainly involve work on research projects involving retrospective data and observing clinical lists.

Recent Awards

Dr Ferdia Gallagher has been awarded GSK funding for the project "Development of Zirconium-89 immuno-PET for cellular imaging" This will fund a PhD Studentship for current MPhil student Laura Lechermann

Dr Jamie MacKay has been awarded GSK funding for his study: "Advanced magnetic resonance imaging of osteoarthritis (AMROA)"

Dr Josh Kaggie, **Dr Martin Graves** and **Professor Fiona Gilbert** were awarded GSK Varsity funding for their project: "Functional Cartilage MRI Response of Early Osteoarthritis". This will fund a PhD student starting in October/2017.

Prof Fiona Gilbert has been awarded GE Educational Grant for the project "Functional PET/MR in triple-negative or BRCA mutation breast cancer". This will fund PhD student Gabrielle Baxter, who will start her PhD programme in October/2017, supervised by Prof. Gilbert.

Prof Fiona Gilbert has also been awarded Research Capability Funding for 2017/2018.

Upcoming Events

Wednesday Forums

**Wednesday forums are breaking for the summer -
Next issue we'll include the schedule for Michaelmas Term**

Radiology Research Seminars

**These monthly Radiology Seminars will continue throughout the summer,
keep an eye on your inbox for updates.**

Data Storage Update!

We have now obtained Dropbox for Business accounts through the University for students in the department. This is to be used for storing your working data, and can be set up to automatically backup. **We strongly recommend all students use Dropbox to backup all of their work.**

Please keep in mind Dropbox is NOT suitable for PID.

Funding Opportunities Page

We've added a large number of funding opportunities to the web page here:

<http://radiology.medschl.cam.ac.uk/research/funding-opportunities/>

This is a great resource for finding potential grants and other forms of funding for your research.

Department Website

In every newsletter, we will be requesting that all department members – **including students** - do three things for us:

1 – Please ensure that your Symplectic account is up to date. We pull publication data for the website using this database, so to make sure your publications are up to date on the website, this account must be up to date.

2 – Please send us any news or information about the projects you're working on! We want to publicise the department's achievements as much as possible, and get your names out there.

It goes without saying that it is essential in the current academic market to promote your work, and we want to help you do that!

3 – We will be updated the website staff profiles to new versions soon. Let us know if there is anything you'd like to have included in the new format!

We are also still looking for basic outlines of people's projects, along with images if possible, to make our Research Themes section look fantastic, and show off that this is a world class department for prospective students and researchers.

OPEN ACCESS UPDATE

As you all know, since HEFCE's policy change, in order for any publications to be eligible for the REF they must be made Open Access. We want to make sure that as a department we are 100% compliant.

The university has a team in place dedicated to making sure this process is as simple as possible and has now linked Open Access with Symplectic Elements so that publication data will be filled automatically from databases.

When a journal accepts your paper for publication, upload it through [Symplectic](#) before you sign any copyright or Open Access agreements.

See this page for more information on how to submit accepted publications: <http://osc.cam.ac.uk/open-research/symplectic-elements-deposit-pilot/depositing-articles-symplectic-elements>

Open Access FAQs

- **If I am not the first or last author do I still need to submit?**

If the first author is in our department → ask them to submit.

If they are in another Cambridge department and you have access to the accepted manuscript → please submit it anyway.

If you are the only Cambridge author → please submit if possible.

The bottom line is to have as many of our publications be eligible for the REF as possible. The Clinical School evaluates us on our compliance levels, and this reflects on both the department and the University.

- **When do I submit to/contact the Open Access Team?**

As soon as the paper is **ACCEPTED**. This is because the Open Access Team will want to support you in making sure the publication is published under the correct Open Access license, and this needs to happen during the initial negotiations, before you have signed the publisher agreement.

The acceptance date is also how compliance with the HEFCE policy is determined.

Feedback

We are currently working hard to improve communication and development within the department, and a big part of that work requires feedback from you. We are open to hearing any feedback or suggestions you have. If you'd like to provide feedback on anything department related, in addition to coming to see us, you can now provide it through a feedback form located on the Internal website via this link:

<http://radiology.medschl.cam.ac.uk/internal/feedback/>

We want to hear from all of you in relation to achievements, updates, news and any information you would like to share with the Department.