Department of Radiology

Message from Professor Gilbert

This spring the world has been gripped by the rapid spread of Coronavirus or COVID-19 as it is now being named. What started as a few cases in a wet market in Wuhan, China before New Year is now turning into a large-scale pandemic across most countries. The Chinese have been taking dramatic steps to try to contain this spread with many sectors of their population self isolating to minimize contact. It is important to consider this virus in relation to previous pandemics. The H1N1 virus (Swine flu) affected 11-21% of the population (700-1400 million) originating in the USA, which resulted in the 2009 ISMRM conference in Toronto being cancelled. It was reported to have caused 284,000 deaths. The Spanish flu of 1918 was the same virus H1N1, and was thought to affect 500 million people (27% of the world’s population) and remains the biggest killer of the last century with between 20-50M deaths. The good news about Covid-19 is that death rate is relatively low at 2% and is related to excessive viral load and pre-existing disease.

I am a member of the REF 2021 panel which had their first meeting in London the day after the disruptive Storm Ciara. I had been up in Edinburgh at the Scotland England rugby match but managed to get one of the early trains back to London making it to the meeting just in time unlike several other members. The REF is not a “just in time” exercise and is resulting in huge amount of planning and consideration for the Cambridge submission. The REF is a very important metric as the University is judged by the external peer review process, never mind the financial loss if we do not perform well. It is important to ensure that all publications are published before the census date and that our web site is up to date.

Our administrative team are in a period of reorganisation. The perfect storm of several senior vacancies in the five smaller departments in the Clinical School allowed consideration of a more effective, efficient delivery of our administrative services. Change invariably causes distress and anxiety (as a Taurean I am the worst!) and we need to be mindful of quite a disruptive period for our administrative team. Over the next few months we will have a new structure in place. Initially it will not feel very efficient but we are hoping that this more collaborative approach will result in a more informed team who can better serve the departments. Please welcome our new faces and be sympathetic to their situation. We want to try and make this new structure work – there will be a review in 6 months when we will be able to look at what adjustments would improve the service.

Great news for the department is the promotion of Josh Kaggie to SRA, a successful defense of PhD’s for Pascal Ruetten and Dr Jamie MacKay. We welcome Jaimie Taylor as study coordinator for MyPEBS/BRAID and breast trials, Judith Hopkin as Research & Data Administrative Assistant (BRAID & MyPeBS research trials), Evis Carcani as Projects Coordinator.

Hopefully the Coronavirus will not impact on us in too great a way, but it is better to prepare for the worst and hope for the best. Please ensure you can work effectively from home in case this is imposed on us.

Spring is in the air so keep well, enjoy working and focus on your work life balance!

Open Access Reminder

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 must make sure our department is 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:

You can also contact the open access team directly at: info@openaccess.cam.ac.uk
Department News

Professor Fiona Gilbert Receives An Honorary Membership Of The Radiological Society Of North America

Professor Fiona Gilbert, MD, MBChB, FRCP, FRCR is Head of the Department of Radiology, University of Cambridge. She is an expert on oncological and musculoskeletal imaging and has been recognised for her expertise in this field. Professor Gilbert was invited to be an Honorary Member of the Radiological Society of North America (RSNA) in recognition of her outstanding achievements in radiology.

The RSNA is a non-profit international society of radiologists, medical physicists and other medical professionals and has more than 54,000 members from around the world. The Committee awarded Fiona the Honorary membership in recognition of exceptional service and achievements in the field of radiology. Professor Gilbert joins a distinguished list of Honorary Members.

RSNA President Valerie P. Jackson, MD was quoted as saying “Professor Gilbert is an internationally known expert in breast imaging, musculoskeletal radiology, and quality assurance. I am most aware of her many contributions to breast cancer imaging and possible treatments, where we have the potential to significantly decrease breast cancer mortality. Dr Jackson also highlighted Professor Gilbert’s leading role as a mentor and researcher underpinned by nearly 200 peer-reviewed publications and her appointment as an NIHR Senior Investigator 2016-2020.

Prof Gilbert’s current research interests focus on screening for breast cancer, using risk adapted imaging to use appropriate techniques with women most likely to benefit from them. She is also investigating predictive and surrogate response in breast cancer, using 3T MR imaging with diffusion-weighted imaging and spectroscopy to identify biomarkers that will help guide personalized treatment.

After receiving her medical degree from the University of Glasgow in 1978 and her radiology training in Aberdeen, Prof Gilbert quickly established herself as an authority on quality improvement. She has contributed to numerous focus groups and advisory boards to establish national standards for medical imaging. From 2004 to 2008, she served on the National Cancer Research Institute’s breast cancer clinical focus group as a radiology representative. The group prioritized the research projects to be supported by the National Cancer Research Network. Professor Gilbert also set up the Scottish Interval Cancer Database for the Scottish Breast Screening Programme and was responsible for auditing the program, serving as Deputy Chair for Radiology for Quality Assurance. She is currently President elect of the European Society of Breast Imaging and is an NIH Senior Investigator.

Professor Gilbert said of her award, “It’s very moving to be recognised by my international colleagues in this way. I have a deep respect for Radiology in North America and I am thrilled to be honoured by the largest radiological society in the world”
Dr Umar Sadat Receives the Hunterian Professorship and Hunterian medal

Dr Umar Sadat, Lecturer in Vascular Surgery at Addenbrooke’s Hospital, and alumni of Department of Radiology, receives the Hunterian Professorship and Hunterian medal 2019 at the Annual Scientific Meeting 2019 of the Vascular Society of Great Britain and Ireland.

Hunterian Professor Dr Umar Sadat delivered the official 2019 Hunterian lecture on “Morphological, biomechanical and functional assessment of atherosclerosis with magnetic resonance imaging” on 29th November 2019 at the Annual Scientific Meeting 2019 of the Vascular Society of Great Britain and Ireland, in Manchester. Vice-president of the Royal College of Surgeons of England, Professor Cliff Shearman awarded the Hunterian medal to Professor Sadat in a special ceremony.

The ceremony was attended by members of the council of the Royal College of Surgeons of England and of the Vascular Society of Great Britain and Ireland which included eminent scientists and vascular surgeons.

Dr Sadat has been awarded Hunterian Professorship 2019 for his long standing contributions to developing special techniques using MR imaging that can identify atherosclerotic plaque in great detail and can help risk stratify patient cohorts and guide treatment with known and novel anti-atherosclerotic therapies.

His award is rather unique in the long history of awards of Hunterian Professorships spanning over 200 years since 1810, as his research elegantly brings together diverse fields of cardiovascular medicine, MR physics, bio-engineering, radiology and vascular surgery to developing this technique with a team of collaborators, including Professor Jonathan H Gillard, Dr Zhongzhao Teng and Dr Martin J Graves, at the Cambridge Biomedical Campus.

Hunterian Professorships have a long history dating back to 1810, and have been awarded to some of the world’s most famous scientists and surgeons, including Sir Alexander Fleming for his discovery of penicillin, former Addenbrooke’s surgeon, Sir Roy Calne, for his pioneering transplant procedures and Lord Ara Darzi for his health reforms and contributions to scientific innovations.

His Hunterian lecture will be made available on Royal College of Surgeons of England youtube channel in due course.

Additional information:

- [https://www.wntv.uk/dr-umar-sadat-receives-the-prestigious-hunterian-medal/](https://www.wntv.uk/dr-umar-sadat-receives-the-prestigious-hunterian-medal/)
International evaluation of an AI system for breast cancer screening

Screening mammography aims to identify breast cancer at earlier stages of the disease, when treatment can be more successful. Despite the existence of screening programmes worldwide, the interpretation of mammograms is affected by high rates of false positives and false negatives. Here we present an artificial intelligence (AI) system that is capable of surpassing human experts in breast cancer prediction. To assess its performance in the clinical setting, we curated a large representative dataset from the UK and a large enriched dataset from the USA. We show an absolute reduction of 5.7% and 1.2% (USA and UK) in false positives and 9.4% and 2.7% in false negatives. We provide evidence of the ability of the system to generalize from the UK to the USA. In an independent study of six radiologists, the AI system outperformed all of the human readers: the area under the receiver operating characteristic curve (AUC-ROC) for the AI system was greater than the AUC-ROC for the average radiologist by an absolute margin of 11.5%. We ran a simulation in which the AI system participated in the double-reading process that is used in the UK, and found that the AI system maintained non-inferior performance and reduced the workload of the second reader by 88%. This robust assessment of the AI system paves the way for clinical trials to improve the accuracy and efficiency of breast cancer screening.

- “AI shows promise for breast cancer screening” (Nature 577, 35-36 (2020))

Imaging breast cancer using hyperpolarized carbon-13 MRI

Our recently published paper “Imaging breast cancer using hyperpolarized carbon-13 MRI”, published in the Proceedings of the National Academy of Sciences (PNAS), has shown for the first time how a new MRI technique named hyperpolarised 13C-MRI can be applied to studying breast cancer. Patients were injected with a breakdown product of glucose, termed pyruvate: more aggressive tumours converted this molecule into lactate, unlike their less aggressive counterparts. In the future, this could be used to better characterise breast cancer and allow doctors to determine at an earlier timepoint whether patients are responding successfully to chemotherapy.

The team based at the Cancer Research UK Cambridge Institute and the Department of Radiology, University of Cambridge, tested the technique in seven patients with various types and grades of breast cancer before they had received any treatment. They used the scan to measure how fast the patients’ tumours were metabolising a naturally occurring molecule called pyruvate, and were able to detect differences in the size, type and grade of tumours – a measure of how fast growing, or aggressive the cancer is.

The scan also revealed in more detail the ‘topography’ of the tumour, detecting variations in metabolism between different regions of the same tumour. The researchers showed that monitoring this conversion in real-time could be used to infer the size, type and aggressiveness of the breast cancer.

The team now hopes to trial this scan in larger groups of patients, to see if it can be reliably used to inform treatment decisions in hospitals.

Cambridge Imaging Festival

Get ready for the next Cambridge Imaging Festival in May 19th 2020! You can already have a look at the programme and register at: http://www.mrc-cbu.cam.ac.uk/conferences/cif2020/

Interested in submitting a poster abstract? Get in contact with Leonardo (lr495@cam.ac.uk) and Lorena (les44@cam.ac.uk) as soon as possible!
Department News

New Department of Radiology Twitter account @Radiology_UOC
You can now find us on our new Twitter account @Radiology_UOC, where we will be publishing our latest news and upcoming events and any last minute changes that might occur.

If you have any news you would like highlighting or tweets you think would be appropriate please send them to radiology-it@medschl.cam.ac.uk. If you would like to volunteer to help with the administration, tweeting etc, please let IT know at radiology-it@medschl.cam.ac.uk.

Cambridge Science Festival: Imaging Of Atoms And Anatomy With MRI

Sun March 22nd - 1:15-2:00 pm at Cancer Research UK Cambridge Institute, Li Ka Shing Centre, Robinson Way, CB2 0RE

Dr Martin Graves, Dr Joshua Kaggie and Dr Ferdia Gallagher will discuss the physics behind magnetic resonance imaging. They will show how these principles are used to image human anatomy and detect disease, and how specific atoms can be used to improve disease characterisation.

Further details on the whole festival can be found at https://www.sciencefestival.cam.ac.uk

Radiological Society Of North America December Meeting

Several members of the department gave excellent presentations at the December meeting of the RSNA

- Professor Fiona Gilbert gave a lecture on risk adapted breast cancer screening and presented personalised breast care within the UK BRAID Trial together with GE Healthcare. In this randomised controlled trial, supplemental whole breast ultrasound, contrast enhanced mammography and abbreviated MRI will be compared regarding their ability to detect cancer in patients with dense breasts.
- Dr Ferdia Gallagher gave a lecture on hyperpolarised MRI as a metabolic imaging technique and its current and future application
- Professor Evis Sala presented and discussed the work she undertook together with Lucian Beer in the emerging field of radio-proteogenomics on Ovarian Cancer using public data from the TCIA
- Dr Tristan Barrett gave a lecture on prostate MRI for the assessment of genitourinary anatomy and treatment planning in an interactive session and a presentation on genitourinary imaging case challenge during an extremely popular audience participatory session
- Dr Luigi Aloj presented PET/CT cases and examples of combined radiopharmaceuticals to improve diagnosis as well as the assessment of tumour heterogeneity during an interactive game session
- Dr Ramona Woitek gave a lecture on the power of integrating molecular multiomics with radiomics using machine learning and the future perspectives of this field

Professor Evis Sala Appointed Senior Consulting Editor for Radiology: Artificial Intelligence

Professor Evis Sala has joined the Editorial board for the journal “Radiology: Artificial Intelligence” as senior consulting editor. The journal, which launched in early 2019, highlights the emerging applications of machine learning and artificial intelligence in the field of imaging across multiple disciplines. The journal will focus on the impact of AI to diagnose and manage patients, extract information, streamline radiology workflow, or improve healthcare outcomes as well as looking at articles that demonstrate novel applications and methodologies of AI in radiology

Plenary Lecture at the American Association for Cancer Research (AACR)

Professor Evis Sala attended the Plenary Lecture at the American Association for Cancer Research (AACR), Advancing Precision Medicine Drug Development: Incorporation of Real World Data and Other Strategies Symposium, where she gave a lecture “Clinical challenges in oncological imaging: AI support from image analysis to integrated diagnostics”. 

Dr Zhongzhao Teng appointments

Congratulations to Dr Zhongzhao Teng on his recent appointments:

- Senior Editorial Member of Scientific Reports, a nature research journal.
- Committee member of Society of Cerebral Blood Flow and Metabolism, Chinese Stroke Association. As committee member, Dr Teng will work together with other members to direct the research direction of the society and advise local policy makers with evidence-based approaches in stroke prevention in China. Dr Teng will also act as a bridge for researchers and clinicians between UK and China to exchange opinions and ideas for stroke prevention.
- Elected Chairman of Chinese Life Scientists Society in the UK (CLSS-UK). Chinese Life Scientists Society in UK (CLSS-UK) was founded in 1992 and since then on members have been devoting themselves to build a link for life and bio-medical scientists between UK and China. CLSS-UK is the only organisation in the United Kingdom that represents all the Chinese scientists in life and bio-medical fields from mainland China and it also has become one of the most important professional organisations within Chinese community. CLSS-UK has over 5000 members, consisting of academics, scientists, clinicians, and students from all over the UK, as well as from China and the member number is still increasing.

ISMRM abstracts accepted from Radiology Staff

Hao Li, Gabrielle Baxter and James MacKay have been accepted to give oral presentation at this years event.

- Gabrielle’s presentation is “Predicting complete pathological response (pCR) to neoadjuvant chemotherapy in breast cancer: machine learning-based comparison of radiomics features derived from pre-treatment DCE-MRI”.
- Hao Li’s presentation is “Highly Accelerated Subtractive NCE-MRA using Advanced k-space Subtraction and Magnitude Subtraction Reconstruction Methods”
- James MacKay’s presentation is forthcoming.

A further six posters have been accepted (Links will appear on our website):

- Characterization and elimination of X-nuclear eddy current artifacts on clinical MR systems
- A new open-source quality assurance protocol for unbiased C coil comparison across sites
- SVD-Based Multi-Channel-Receive-Coil Combination for C Metabolic Imaging
- Providing a clinical pipeline for using the sodium-23 resonance to calibrate for in vivo hyperpolarized carbon-13 experiments.
- ROKET: a Robust Keto Enol Tautomerisation phantom for multi-site, multi-vendor hyperpolarized C studies
- Optimisation of Poisson-disk Sampling Pattern for Highly Accelerated Femoral NCE-MRA

Cambridge NCITA Repository by Lorena Escudero

As part of the CRUK funded National Cancer Imaging Translational Accelerator (NCITA) award (Cambridge PI, Evis Sala), we are building a repository of radiological images for cancer research, based on the XNAT software, that will be connected with other institutions in the UK (Institute of Cancer Research, Imperial College London, UCL, Kings College London, Oxford and Manchester).

Our Cambridge repository is now available using the Cloud Services of the High Performance Computing department of our University. [https://ncita.xnat.radiology.medschl.cam.ac.uk/](https://ncita.xnat.radiology.medschl.cam.ac.uk/)

If you would like to learn more and/or use this repository for storing and sharing your anonymised research data, avoiding the nightmares of hard-drives and USB sticks, get in contact with us (les44@cam.ac.uk)!

Department News

Highlights from the Radiogenomics and Quantitative Imaging Group:

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Christmas Lunch

A great Christmas meal was enjoyed by the Department at Browns Restaurant in Cambridge just before the Christmas break, organised brilliantly by Candice and Sarah.

Brian Hargreaves

Brian Hargreaves has ended his sabbatical with a lunch out with colleagues.

Isadora Mira De Groot

Marius and Meike are delighted to announce the birth of their daughter Isa (Isadora Mira de Groot) on January 4th. “She is very sweet and doing well - we are a pair of very happy parents :-)”

Welcome new PhD students and visitors!

New Radiology Research Associate

Hao Li submitted his thesis in January, and had his viva in early March. We’re really pleased that Hao Li will be continuing to work in the Department as a Research Associate.

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

We want to hear from all of you in relation to all achievements, updates, news and any information you would like to share with the Department.
Our Equality and Diversity representatives are Leonardo Rundo (staff) and Laura Lechermann (students)

Wednesday Lunchtime Board Game Sessions

We now have a Wednesday board game session in the Berridge room (1pm – 2pm) and as part of the department’s wellbeing initiative the department has provided the budget for the purchase of some small box games that in the future we are planning to put in the Berridge room so anyone can have a quick play in a coffee break and mingle with people from other groups.

Upcoming Training Opportunities

**Respect at Work**
Date: 25th March 2020 Time: 10am-12noon Location: Seminar Room 10, Clinical School Building

Training which considers the role of staff in creating a positive culture with a zero tolerance approach to unacceptable behaviour. [https://tinyurl.com/r4lsxxe](https://tinyurl.com/r4lsxxe)

Upcoming Events

**Women’s Leadership Conference**
Date: 14th March 2020 Time: 8.30am-6pm Location: Judge Business School

Held jointly with their sponsor, Goldman Sachs, the theme for this year’s conference is Reimagining Diversity and it will be provide invaluable insight for both women and men wanting a deeper understanding of what makes successful leaders in business.

This year the keynote speakers are:

- Alison Loehnis, President of Net-a-Porter, In Conversation with Ruth Kennedy, Managing Director at Kennedy Dundas
- Tilly Franklin, Chief Investment Officer at the University of Cambridge

[https://tinyurl.com/sf7hndn](https://tinyurl.com/sf7hndn)

**Monthly Wellbeing Massages**
Date: 12th & 26th March 2020 Time: Varies (see booking links) Location: Seminar room 4, Clinical School Building

[https://tinyurl.com/s8f979z](https://tinyurl.com/s8f979z) for 12th March

[https://tinyurl.com/srchxbv](https://tinyurl.com/srchxbv) for 26th March

Please note sessions are limited to one per person per month and multiple bookings by the same individual will be reallocated.

**Nutrition and Hydration Week**
Date: 16th-22nd March 2020

- Giles Yeo will be doing a talk on Nutrition – The Truth about Diets (1-2pm, 16th March) [https://tinyurl.com/qltrjco](https://tinyurl.com/qltrjco)
- The Clinical School Restaurant will be getting involved in Nutrition and Hydration week
- We will also be offering Fruit Boxes again to promote Nutrition and Hydration week
Update your Information

In every newsletter, we will be requesting that all department members – including students - update three specific tasks for us:

- 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.
- The website pages on research teams and projects are out of date. Any material available for public consumption would be a great help!
- 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. The following are points of contact for research groups:

<table>
<thead>
<tr>
<th>Ramona Woitek</th>
<th><a href="mailto:rw585@cam.ac.uk">rw585@cam.ac.uk</a></th>
<th>Breast imaging and oncologic imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelly Holmes</td>
<td><a href="mailto:Kelly.Holmes@cruk.cam.ac.uk">Kelly.Holmes@cruk.cam.ac.uk</a></td>
<td>Advanced Cancer Imaging Programme Manager CRUK</td>
</tr>
<tr>
<td>Tristan Barrett</td>
<td><a href="mailto:tb507@medschl.cam.ac.uk">tb507@medschl.cam.ac.uk</a></td>
<td>Multi-parametric MRI techniques for identifying and characterising prostate tumours</td>
</tr>
<tr>
<td>Joshua Kaggie</td>
<td><a href="mailto:jk636@cam.ac.uk">jk636@cam.ac.uk</a></td>
<td>Stem cell research for joint repair</td>
</tr>
<tr>
<td>Zhongzhao Teng</td>
<td><a href="mailto:zt215@cam.ac.uk">zt215@cam.ac.uk</a></td>
<td>The translational application of combination of in vivo medical imaging and mechanical analysis to assess the vulnerability of atherosclerotic lesions.</td>
</tr>
<tr>
<td>Tomasz Matys</td>
<td><a href="mailto:tm418@cam.ac.uk">tm418@cam.ac.uk</a></td>
<td>MRI and PET for characterization of the extent of primary and secondary brain tumours.</td>
</tr>
<tr>
<td>Yuan Huang</td>
<td><a href="mailto:yh288@cam.ac.uk">yh288@cam.ac.uk</a></td>
<td>Clinical-oriented risk assessment of CVD</td>
</tr>
<tr>
<td>Miranda Townsend</td>
<td><a href="mailto:mjtt205@medschl.cam.ac.uk">mjtt205@medschl.cam.ac.uk</a></td>
<td>Oncology and haematology trials</td>
</tr>
</tbody>
</table>

Upcoming Events

Wednesday Forums—1 CPD credit

To receive your CPD certificate, please remember to sign the attendance register.

You can now find us on our new Twitter account @Radiology_UOC, where we will be publishing our latest news and upcoming events and any last minute changes that might occur.

<table>
<thead>
<tr>
<th>DATE</th>
<th>CHAIR</th>
<th>SPEAKER</th>
<th>HOT SEAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th March</td>
<td>Dr Jonathan Weir-McCall</td>
<td>Professor Richard Coulden: Cardiac imaging in sarcoidosis: PET or MRI?</td>
<td>None</td>
</tr>
<tr>
<td>18th March</td>
<td>Dr Luigi Ajoj</td>
<td>Professor Arabinda Choudhary: TBA</td>
<td>None</td>
</tr>
<tr>
<td>25th March</td>
<td>Professor Fiona Gilbert</td>
<td>EARS Meeting</td>
<td>None</td>
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