PathLAKE
Computational Pathology Excellence

**Professor
Clare Verrill**

" The PathLAKE programme is now at a very exciting stage. The datalake is growing in volume day by day and we recently held a very popular AI Masterclass for pathologists – you can read more about it in this newsletter.

Our AI exemplar algorithms are starting to be published in high impact factor journals and as next steps we look to real world usage in the NHS. We are working with the other AI Centres of Excellence and one of our initiatives involves the ethical landscape for AI in imaging. We have held three cross-centre ethics workshops to date, and look forward to more!

This edition of the newsletter focuses on the wide range of engagement activities we run, and features our very active and enthusiastic Patient and Public Involvement (PPI) panel. "

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NHS
**University Hospitals
Coventry and Warwickshire**
NHS Trust

WARWICK
THE UNIVERSITY OF WARWICK

PPI Involvement & Opportunities

"Involving patients and the public in how we shape and deliver PathLAKE has always been important to us. Some of our lay advisors have been working with us since the very beginnings of PathLAKE in 2018. Lay members make a valuable contribution to our committees, and ensure the patient is at the heart of what we do."

Professor David Snead
Director PathLAKE, Consultant Pathologist

Here are some of our PPI representatives discussing the importance of including PPI opinions & ideas within PathLAKE: **Janet Frost OBE, Sophia Turner & Ed Macalister-Smith**

What is your perspective on the use of AI in healthcare and how this affects individuals?

Janet: *I hadn't really had my eyes opened to the real benefit of AI in healthcare until I joined PathLAKE, and learnt about the application of AI in pathology. My awareness was limited to 'smart apps' that support individuals in managing their own lifestyle and healthcare; and technologies that have brought system type improvements within the health sector. I am learning through PathLAKE more about the scale of the challenges within pathology and the extent to which AI can provide solutions and opportunities.*

Ed: *The potential for using artificial intelligence in health care services is immense and has been growing behind the scenes over a number of years, but probably for most members of the public, this will have been invisible. Specifically in relation to AI, the ability to analyse enormous amounts of data from large groups of individuals and to draw out improvement/specific outcome trends has a huge benefit to the public. And the cleverest AI programmes can undertake routine cross-checking of samples or images (from laboratories and diagnostic clinics) at a scale that the available current human workforce simply can't manage. Personally, my firm belief is that the NHS (as a nearly unique national population-wide healthcare system) has a duty to local people to carefully control how their anonymised records can benefit the development of better care for all - but I think it is vital that the NHS (on our behalf) never lets go of the ultimate ownership of that data.*

Sophia: *It seems to me that AI is going to provide us with another precious data point for tailoring treatment for individuals. Patients are already familiar with having a combination of different data points determine how their cancer is going to be treated (e.g. genetics, imaging, risk profiling, molecular biology). AI in pathology will provide a step-change in precision and speed; computers can quantify precisely how many pixels are a particular shade in a way that humans can't.*

In addition, there's a hope that pathology AI will contribute to the cancer conundrum. Tumours and the beds in which they grow are complex ecosystems of different cells. Pathology AI will provide greater insight on the interactions between cells in tumour beds. Combining this data with survival and treatment could help improve prognosis and even help identify new treatment targets.

How do you think patients will benefit from PathLAKE?

Janet: *PathLAKE is a resource and tool; which holds the valuable resource of images and clinical information. More importantly it does that in a way as to make it available so the value of that resource is realised. That will translate into benefit for patients: improved diagnostic pathology service in terms of throughput, timelines and quality if we use AI to support the pathologists and their expertise. It will also lead to improved treatment and care if the images in PathLAKE are used in research which ultimately leads to improvement of treatment options.*

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Ed: *PathLAKE is a collaborative project within the NHS to join together data on tests and images from many different populations across the country, and to use that bank of data in responsible and controlled ways to improve care. So, patient care is at the heart of the purpose of the project. But so is staff welfare and benefit - AI has the capacity to enable our scarce and highly trained staff to concentrate on their highest levels of skill, and leave routine analysis of routine work to machines. In practical terms for patients, these improvements are likely to lead to a whole range of benefits - from faster and more accurate routine test results, to better complex diagnosis, to quicker development of new medicines (and vaccines). And as taxpayers, we'll all know that our NHS continues to be amongst the most efficient in the world.*

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Sophia: *As part of the PathLAKE project, hospitals have received their very first digital pathology scanners for creating the store of digital pathology images for use (under strict ethical watch) in research. However, these scanners can be used to benefit patients immediately by forming part of the patient's digital data record. As digital images, they can be shared on-screen for discussion during MDTs, immediately shared with other Trusts that are involved in the patient's care, shown to patients to illustrate their disease, and also directly compare pathology to that taken at earlier dates. Researchers and clinicians in hospitals that are involved in PathLAKE become connected with a global network that is endeavouring to improve healthcare through AI. The relationships created through this international network will raise the profile of Trusts and bring more opportunities to the patients in the form of clinical trials and access to cutting-edge research.*

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What is your role in PathLAKE?

Janet: *I am part of the access committee within the governance structure that reviews & approves any requests to access the images within PathLAKE.I bring an independent perspective and draw on my previous roles in health research as well as my experiences as a patient and carer. I would like to see the success of PathLAKE, because of the benefits it will bring. As a volunteer on the committee I seek to effectively bring the views of patients and the public to PathLAKE as part of the overall governance structure for the project..*

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Why did you join PathLAKE?

I am a former Chief Executive of the Health Research Authority (HRA) stepping down several years ago for health reasons. The HRA is responsible for the Research Ethics Committees in England that review Health and Social Care research from an independent and patient perspective. The committee membership is entirely voluntary to which the HRA, the broader NHS and patients are indebted. In my retirement it seemed only right I should look to do my own volunteering and I wanted to maintain my interest in health research. I also sit on DATA-CAN (the Cancer Hub of Health Data Research UK).

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Ed: *As a member of the public, I sit on a panel which meets occasionally to review applications from hospital and university researchers, and from private businesses, to use the anonymised data held within PathLAKE. We look for organisations which have an understanding of our approach to research, that can demonstrate that they have safeguards in place to hold data securely, and that if they make commercial returns from the work will be able to make a financial contribution to our collaboration. So I, and my other public member colleagues, act as a public check on the work of PathLAKE and its relations with the wider research community. When we receive an application, one of us will read that particular application closely and introduce it to our Panel which then prompts a discussion and in the end a recommendation to partner with the applicant, or not.*

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Sophia: *I am an unpaid patient expert on the PathLAKE steering committee. I can ask basic technical questions without fear of looking silly, and political questions without fear of losing my job! I contribute to all considerations that are brought to the group (e.g. procurement, consortium membership). I also bring to the forum ideas and needs from the patient community (e.g. information dissemination, taking PathLAKE into schools). In addition I'm invited to attend things like AI symposiums, lab tours, patient ethics consultations. To be honest not all the project management is particularly exciting (e.g. finances) but listening to the scientists and being amongst the first to understand the benefits of PathLAKE more than compensates.*

We are dedicated to learning more about incorporating PPI representation here at PathLAKE and are looking to inspire others to get involved and make an impact!

Would you like to get involved with research and find out more about how PathLAKE can shape the future and have a huge impact on the lives on individuals?

Follow the link **here** for more information and instructions to join the PPI team.

Ongoing Engagement Activities

Digital Pathology Tutor Platform Helping Pathologists Transition to Digital Reporting

A key aim of the PathLAKE project is to educate the next generation of pathologists and support the transition of current pathologists to digital.

As part of this, PathLAKE has developed three online modules in breast, prostate and PDL1. All are hosted on the Cirdan PathXL platform and each is accredited by the Royal College of Pathologists. They can be accessed by anyone looking to train and develop their skills in digital pathology.

Over 200 users are registered already. Feedback has been overwhelmingly positive, with comments including: "it's a valuable resource and a great help to trainees and pathologists getting to grips with digital pathology" and "excellent case mix and easy to follow module."

Professor David Snead, Director of PathLAKE, said, *"We believe this will be a vital resource as laboratories across the UK and the world transition to digital pathology".*

The platform is free to access. To register simply email: **pathlake@uchw.nhs.uk** or complete the form **here**

Oxford University and Partners Win Government Funding to Evaluate Paige Prostate Cancer Detection System

A prostate cancer detection software system to help pathologists quickly identify suspicious areas of tissue, developed by Paige, will be investigated in a multicentre clinical study led by Oxford University as part of a successful NHSx Artificial Intelligence Health and Care Award application.

Please read more about this award **here**

In developing the Oxford-led Paige study, we made sure that patients and the public were at the heart of the study design and included patient representatives in the team which was successfully awarded funding. We held 2 webinars on the use of AI in pathology to help develop the study, including one dedicated specifically to the use of AI in prostate cancer pathology diagnosis.
Prof Clare Verrill University of Oxford

Sonrai Analytics Wins Government Funding to Deliver AI Cancer Screenings Across the NHS

Professor Manuel Salto-Tellez, Co-Director of PathLAKE and the Precision Medicine Centre and Chair of Molecular Pathology at Queen's University Belfast said: *"Artificial Intelligence needs to fulfil its medical promise. The partnership between the PMC at Queen's University Belfast and Sonrai Analytics will deliver a framework for AI tissue-based diagnostics across the NHS, providing more timely, accurate and affordable laboratory results."*

Please find the link **here** for further information regarding this funding success.

Publications

In every edition we shine a spotlight on a recent publication. This time we look at the importance of considering ethics in computational pathology.

Professor Tom Sorell is Professor of Politics and Philosophy and Head of the Interdisciplinary Ethics Research Group at Warwick University. He is author of "Ethical issues in computational pathology."

What has caused you to further research this area of ethical issues in computational pathology?

There is an emerging area of ethics research to do with applications of artificial intelligence. Computational pathology is one of the medical applications of AI; another is in radiology. The medical applications of AI, especially for cancer diagnosis, are potentially among the most beneficial. By contrast, many non-medical applications of AI are to do with commercial marketing of consumer goods and services, even quite unnecessary ones, where the gains to the general population are not necessarily very great. Administrative applications of AI –such as its use in the identification and the prioritisation of various kinds of risk are also problematic and, in some cases, invite or permit discriminatory profiling.

What would you suggest are the three most important ethical issues to consider when researching and creating digital pathology resources?

Both digital and computational pathology involve large amounts of data that would otherwise belong to highly protected medical records.

Although they both concern the use of big data, and de-identified big data at that, the data in question is probably not anonymised in the strict sense of data protection law. This means that there are at least theoretical data protection issues. A second issue is over the repurposing of the data as when whole slide images made originally for diagnostics purposes are added to other large data sets in biobanks for the AI-assisted identification of biomarkers. Although this repurposing is often harmless or even beneficial, the appropriate consent regime is not obvious. Finally, what happens if AI-assisted diagnosis is (occasionally) mistaken, with the result that there are delays in treatment? Should this be a matter for compensation, and if so, by whom?

What are some of the suggestions that are highlighted in this paper to combat these potential ethical issues?

The paper suggests that some of the problems are created by the thinking behind data protection rather than by the application of AI. Some data are anonymised for all practical purposes even when there is the possibility of inferring the identity of a data subject. The paper suggests that for biobanking purposes, constantly renewed consents may be unnecessary.

What advice would you give to researchers advancing in digital pathology/AI technologies when considering ethical issues?

One piece of advice would be to read our paper! Another would be to read reports of citizens juries conducted with the UK public about medical uses of AI.

PLease follow the link here to find a list of our most recent PathLAKE publications

Previous & Upcoming Events

18th & 20th May - University of Warwick Masterclasses: AI for Pathologists

The Warwick PathLAKE masterclasses series took place successfully online during 18th & 20th May around the theme of 'AI for pathologists' with researchers, practitioners and industry specialists who gave professional insight into AI for pathologists and how to further this exciting theme in research. Over the two days, more than 240 pathologists, professionals, researchers and suppliers met together virtually to take part in a series of exciting sessions including opening talks, flash talks, exhibitors and hands-on demos by eminent researchers and practitioners working in the areas of digital and computational pathology.

The recordings will be made available in the near future but keep up to date and in touch by checking our dedicated masterclass page

Feedback has been hugely positive including:

"All talks from the series were excellent!"

"Introduction to deep AI learning was excellent. Made the underlying concepts easy to understand."

May 27 Nottingham - Breast Pathology Online Masterclass: Addressing Challenges in Diagnostic Breast Pathology

Over 250 delegates from across the world joined the Nottingham Breast Pathology Online Masterclass on Thursday 27 May which was sponsored by PathLAKE. Course Director, Prof Emad Rakha, was joined by leading breast pathologists Prof Cecily Quinn, Prof Ian Ellis, Prof Abeer Shabban and Dr Elena Provenzano. Focusing on challenges in diagnostic breast pathology, the day also included three slide seminars.

Delegate feedback has been overwhelmingly positive, including: *"Congratulations on the excellent masterclass- great topics, super presentation and very well run!"*

Ethics in Imaging: AI Centres of Excellence webinar series

As part of the AI Centres of Excellence **Ethics in Imaging** webinar series, **PathLAKE** will be hosting a webinar on on Thursday 22nd July 2021 from 13:00 – 14:30.

The theme is: **Research Ethics Committee Review of AI projects: what REC members need to know and training needs. For more detail please visit PathLAKE** here

July 16 - Nottingham Breast Pathology Online Masterclass: Addressing Challenges in Diagnostic Breast Pathology

Join us online for the second event in the 2021 series of Breast Pathology masterclasses. Hear from experts from across the world to update your knowledge and skills in breast pathology.

The next masterclass takes place on Friday 16 July. Places are still available, book online here

University of Warwick TIA lab Seminar Series

From September 2021 we will be starting an exciting seminar series that will take place each month at the TIA Lab Warwick University. The seminar series will feature a variety of topics focused on the application of image analysis and machine learning algorithms in order to further our understanding of the biology and entangled histological patterns of complex diseases such as cancer.

We will be joined by trained professionals from around the world and look forwards to enabling more discussions exploring these exciting topics.

Save the date - PathLAKE Conference 9th September. This will run alongside Cirdan's Pathology Horizons event.

More details will be announced soon but visit the link here for updates.