

ESR Pop Up organized from Perth

EPU 01 - Imaging research in Australia: building bridges

March 3, 08:00 - 09:05 CET

EPU 01-1

Speaker

Paul Parizel, Perth/Australia

Affiliation

- *David Hartley Chair of Radiology, Royal Perth Hospital & University of Western Australia*
- *Chair, Clinical Radiology Research Committee, Royal Australian and New Zealand College of Radiologists*
- *Director, WA-NIF-Node*

Title

Acknowledgement of Traditional Owners and Welcome

Abstract

On behalf of the University of Western Australia and Royal Perth Hospital, I gratefully acknowledge the custodians and traditional owners of the land on which our campuses are located. We respectfully acknowledge the Whadjuk Noongar people as the traditional owners of the land on which we have the privilege of meeting. The Whadjuk Noongar remain the spiritual and cultural custodians of their land, and continue to practice their value, languages, beliefs and knowledge.

The growing complexity of specialised imaging studies, in research as well as in clinical practice, has led to regrettable failures in understanding and communication with patients, referring physicians, and colleagues from different professional backgrounds (e.g. oncology, nuclear medicine, medical physics, and pathology). The technology-driven nature of advanced imaging studies should encourage imaging professionals to reach out and interact with scientists and other healthcare providers, to the benefit of our patients.

These issues are addressed by the speakers in this session “Imaging research in Australia: building bridges”. This pop-up session contains contributions by experts across-the-board, hailing from fundamental imaging science, clinical oncology, nuclear medicine, medical physics, and pathology. The session concludes with a critical reflection on imaging research by the Deputy Vice Chancellor for Research of the University of Western Australia.

I would like to thank the speakers for their expert contributions, the audience for attending, and the ECR 2021 for the invitation to participate in this unique pop-up event.

EPU 01-2

Speaker

Graham Galloway, Brisbane/Australia

Affiliation

CEO, National Imaging Facility

Title

Introducing the (NIF) National Imaging Facility in Australia: infrastructure, expertise and vision

Abstract

The National Imaging Facility was established in 2007, as part of the National Collaborative Research Infrastructure Strategy (NCRIS) of the Australian government. The game changer for NIF is the recognition that infrastructure is more than equipment, but needs to include experienced researchers with the mandate and capacity to advise researchers who knew that using sophisticated imaging instrumentation would enhance their research, but were not sure where to start.

NIF's vision is to provide a national research infrastructure capability in advanced imaging that enables discovery and innovation, and its mission is to:

- Identify iconic investments in nationally and globally significant areas
- Provide Australian researchers with reliable and state-of-the-art technology, highly specialised expertise, and a world-leading capacity for creating and accessing high quality, reproducible data
- Ensure that Australia remains at the forefront of international developments and is able to contribute solutions to global challenges

Consistent with the principles of NCRIS, the National Imaging Facility is a network of internationally competitive imaging capability, committed to collaborative research. From the outset, NIF recognised the value of data, and the importance of systems to ensure well curated data, with rich meta data, and has committed to promoting and supporting F.A.I.R. data principles.

With a vision to be part of a global community, NIF entered into a MOU with EuroBioImaging in 2015, and is a foundation member of Global BioImaging.

This presentation will introduce the breadth of the structural, functional and molecular imaging infrastructure that comprise the NIF capability, and outline the structures in place to build and support the team which ensures optimal support for the user communities.

EPU 01-3

Speaker

Christobel Saunders, Perth/Australia

Affiliation

Professor of Oncology, Faculty of Health and Medical Sciences, Medical School, The University of Western Australia

Title

Building bridges between clinical medicine and imaging research in breast cancer

Abstract

EPU 01-4

Speaker

Roslyn Francis, Perth/Australia

Affiliation

Associate Professor of Molecular Imaging, University of Western Australia

Title

Nuclear medicine at the crossroads: building bridges from function to morphology and back again

Abstract

EPU 01-5

Speaker

Martin Ebert

Affiliation

- *President, Australian Centre for Quantitative Imaging*
- *Director of Physics Research, Radiation Oncology, Sir Charles Gairdner Hospital, Perth, Australia*
- *Co-Director, Australian Centre for Quantitative Imaging, University of Western Australia*

Title

Progressing imaging analytics in the antipodes: Resources and activities in quantitative imaging in Australia

Abstract

Australia has a relatively small population spread over a remote and geographically-broad area. Research involving the study of clinical sub-groups demands national cooperation and is greatly enhanced via international linkage.

In Perth, Western Australia, we have created the Australian Centre for Quantitative Imaging (ACQI) in response to the rapidly accelerating opportunities afforded through imaging analytics. ACQI is taking a leading role in developing national infrastructure for the collation and distribution of imaging study datasets. This includes, in collaboration with multiple institutions and government research agencies, the development of a national network of databases together with the security, governance and standardisation tools required for such a network to run efficiently and in compliance with international privacy standards. The infrastructure capitalises on national investment in high-performance computing resources, with the Perth node hosted on cloud resources of the Pawsey Supercomputing Centre, providing over 3,000 CPU cores at petaFLOP speeds, and 58 TB of RAM.

ACQI is a founding node of the Networks of Imaging Excellence (NIX) Alliance, an international effort to facilitate exchange of data and cross-dataset validation, enable access to analysis expertise, harmonise image acquisition and processing, and democratise quantitative imaging.

The above infrastructure will be described, together with some of the clinical questions ACQI is beginning to address.

EPU 01-6

Speaker

Jeremy Parry, Perth/Australia

Affiliation

Pathologist, Honorary Research Fellow, Murdoch University

Title

Pathology at the crossroads: introduction to quantitative analysis and artificial intelligence in digital pathology

Abstract

The integration of artificial intelligence and digital pathology creates unmatched opportunities for image-based diagnosis. Computer-aided analysis of whole slide images allows pathologists to recognise specific patterns and acquire underlying features, in a process very similar to what has been used to enhance radiology and cardiology diagnostic imaging workflows. Machine learning and deep learning algorithms (such as convolutional neural networks) assist pathologists to tackle the basic and fundamental tasks of image analysis, such as detection, classification, segmentation, and counting of objects. Computer-aided diagnostic techniques can integrate digital slide-based image diagnosis and at the same time incorporate information from radiology and nuclear medicine studies. There is great potential for cross-modality (multi-modal) training of neural networks with radiological and pathology data, which could yield exciting results, similar to molecular/pathology networks. Co-registering imaging and pathology data can guide the diagnostic pathway, facilitate concerted diagnostic decisions, and provide a unified interface to referring physicians.

EPU 01-7

Speaker

Tim Colmer, Perth / Australia

Affiliation

Deputy Vice-Chancellor (Research), The University of Western Australia

Title

CONCLUSION

Abstract

In a close partnership with the National Imaging Facility (NIF), the Western Australian Department of Health, several other partners and benefactors, the University of Western Australia (UWA) strongly supports fundamental and applied imaging research and promotes the use of modern imaging methods in a wide range of applications, from basic science and clinical investigations. UWA hosts the Western Australian NIF node, which serves as an interdisciplinary research laboratory to investigate the role of imaging applications in small animals, plants and materials, we are installing new facilities for human imaging. UWA offers a state of the art platform to investigators from research institutions across Western Australia and beyond as part of the National Network, thereby providing access to advanced imaging techniques and image post-processing methods. At UWA, it is our goal to build bridges of collaboration between individuals, disciplines and institutions, and to stimulate partnerships between basic science, translational, and clinical researchers. I thank our WA NIF Node Leaders Professor Paul Parizel and Associate Professor Roslyn Francis, and the NIF Team, for this important research and research training initiative.