**Manchester Metropolitan University**

**Manchester, United Kingdom**

presents

# The 28th UK Conference on Medical Image Understanding and Analysis

## (MIUA 2024)

## July 24-26, 2024

**MIUA 2024**
*Manchester*

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# The 28th UK Conference on Medical Image Understanding and Analysis (MIUA-2024)

## Date: 24-26 July 2024

## Venue:

Manchester Metropolitan University

Business School

Oxford Road

Manchester

M15 6BH

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# About the Conference

MIUA is a UK-based international conference for the communication of image processing and analysis research and its application to medical imaging and biomedicine. This is a rapidly growing subject with ever increasing real-world applicability.

MIUA welcomes all researchers in medical imaging including mathematicians, computer scientists, bioinformaticians, clinicians, engineers and bioscientists.

MIUA is the principal UK forum for communicating research progress within the community interested in image analysis applied to medicine and related biological science. The meeting is designed for the dissemination and discussion of research in medical image understanding and analysis, and aims to encourage the growth and raise the profile of this multi-disciplinary field by bringing together the various communities. MIUA covers many topics in medical imaging including:

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|---|---|---|---|
| Biomarker Discovery | Brain Imaging | Cancer | Cardiac Imaging |
| Circulation and Microcirculation | Computational anatomy and physiology | Computed Tomography | Deep Learning |
| Dermatology | Image Interpretation | Image Guided Intervention | Image Physics |
| In-Vivo Intravital Imaging | Inflammation | Machine Learning | Magnetic Resonance Imaging |
| Microscopy | Multi Modal Image Analysis | Neurology | Novel Imaging Methods |
| Perception Modelling and Simulation | Positron Emission Imaging | Ophthalmology | Optical Imaging |
| Radiology | Texture Analysis | Tissue Perfusion | Ultrasound |

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# Welcome Note

Welcome to MIUA 2024 and Manchester Metropolitan University. MIUA 2024 will feature presentations from the authors of all accepted papers and conference abstracts. MIUA is a UK-based international conference for the communication of image processing and analysis research and its application to biomedical imaging and biomedicine. The conference also celebrates the establishment of MIUA Doctoral Community.

The diverse range of topics covered in MIUA 2024 reflects the growth in the development and application of biomedical imaging. The conference proceedings and conference abstracts feature the most recent work in the fields of (1) Advancement in Brain Imaging; (2) Medical Images and Computational Models; (3) Digital Pathology, Histology and Microscopic Imaging; (4) Dental and Bone Imaging; (5) Enhancing Low-Quality Medical Images; (6) Domain Adaptation and Generalisation; and (7) Dermatology, Cardiac Imaging and Other Medical Imaging.

There were almost twice as many submissions to MIUA 2024 as to MIUA 2023. Focused on in person only conference mode, this year's edition of MIUA attracted high-quality submissions making the review process particularly competitive. In total, 93 full papers were submitted to the Conference Management Toolkit (CMT), and after an initial quality check, the papers were sent out for the peer-review to the Program Committee, which consisted of 91 reviewers. Submissions were received from authors at different institutes from 25 countries, and papers were accepted from a total of 254 authors. All submissions were subject to double-blind review by at least three members of the Program Committee and meta-reviewed by at least one of the Program Chairs, with 28 oral full papers (30%) and 31 poster full papers (33%) accepted. In addition, there were 42 conference abstracts submitted, of which 34 were accepted for presentation.

We thank all members of the MIUA 2024 Organizing, Steering, Program, Publicity, Social Media, Special Session, Sponsorship, Keynote Speakers, panel members and Doctoral Community Committees. We sincerely thank all who contributed greatly to the success of MIUA 2024: the authors for submitting their work, the reviewers for insightful comments improving the quality of the proceedings, the sponsors for financial support, and all participants in this year's in-person MIUA conference.

As we embark on this journey over the next few days, we encourage you to fully immerse in the conference experience. We hope you will find the sessions inspiring and value the time in networking to establish new collaborations. Once again, welcome to MIUA 2024. May this conference bring us closer to each other and celebrate the success of medical image understanding and analysis.

**Conference Chairs**

Moi Hoon Yap, Timothy Cootes, Reyer Zwiggelaar, and Neil Reeves

# Committee

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NEIL REEVES, *Lancaster University*

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INDRANATH CHATTERJEE, *Manchester Metropolitan University*

RAJA EBSIM, *University of Manchester*

# Programme Overview

## DAY 1 July 24th

| | |
|---|---|
| **8:30 - 9:00am** | **Arrival (*tea, coffee, and Danish pastry*)** |
| **9:00 - 9:30am** | Welcome Speech (G.27) |
| **9:30 - 10:30am** | Keynote Speaker: Prof. Alejandro Frangi (G.27)<br>Title: On Trials and Tribulations - Safer, Faster, and More Sustainable Medical Devices for Better and More Equitable Care<br>Session chair: *Adrian Davison* |
| **10:30 - 11:00am** | Tea break and networking (*Exhibition Atrium*) |
| **11:00 - 12:30pm** | **Oral Session 1: Advancement in Brain Imaging** (G.27)<br>Session chairs: *Xujiong Ye* and *Ewa Niewiadomska-Szynkiewicz*<br><br>**Paper ID 27**: Robust Multi-Modal Registration of Cerebral Vasculature<br>*Bertram Sabrowsky-Hirsch (RISC Software GmbH)\*; Ahmed Alshenoudy (RISC Software GmbH); Josef Scharinger (JKU); Matthias Gmeiner (Kepler University Hospital); Stefan Thumfart (RISC Software GmbH); Michael Giretzlehner (RISC Software GmbH)*<br>**Paper ID 43**: Towards Segmenting Cerebral Arteries from Structural MRI<br>*Ahmed Alshenoudy (RISC Software GmbH)\*; Bertram Sabrowsky-Hirsch (RISC Software GmbH); Josef Scharinger (JKU); Stefan Thumfart (RISC Software GmbH); Michael Giretzlehner (RISC Software GmbH)*<br>**Paper ID 52**: Stochastic Uncertainty Quantification techniques fail to account for Inter-Analyst Variability in White Matter Hyperintensity segmentation<br>*Ben R Philps (University Of Edinburgh, School of Informatics, Biomedical AI CDT)\*; María del C. Valdés Hernández (University of Edinburgh); Susana Munoz Maniega (University of Edinburgh); Mark Bastin (University of Edinburgh); Eleni Sakka (University of Edinburgh); Una Clancy (University of Edinburgh); Joanna Wardlaw (University of Edinburgh); Miguel Bernabeu (University of Edinburgh)*<br>**Paper ID 54**: Learning-based MRI Response Predictions from OCT Microvascular Models to Replace Simulation-based Frameworks<br>*Jaloliddin Rustamov (United Arab Emirates University); Zahiriddin Rustamov (United Arab Emirates University); Nadia Badawi (UAEU); Frederic Lesage (Polytechnique Montreal ); Nazar M Zaki (UAEU); Rafat Damseh (UAEU)\**<br>**Paper ID 97**: Multimodal 3D Brain Tumor Segmentation with Adversarial Training and Conditional Random Field<br>*Lan Jiang (University of Dundee); Yuchao Zheng (University of Dundee); Miao Yu (University of Dundee); Haiqing Zhang (University of Dundee); Fatemah Aladwani (University of Dundee); Alessandro Perelli (University of Dundee)\**<br>**Paper ID 56**: DeepDSMRI: Deep Domain Shift analyzer for MRI<br>*Rafsanjany Kushol (University of Alberta)\*; Sanjay Kalra (University of Alberta); Herbert Yang (University of Alberta)* |
| **12:30 - 1:30pm** | Lunch and Networking (*Dining Atrium*) |
| **1:30 - 3:00pm** | **Poster Session I: Brain Imaging, Medical Images and Computational Models** (*Exhibition Atrium*)<br>(*Full Paper ID: 81, 34, 91, 30, 42, 99, 38*) |

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| | *(Abstract ID:100, 109, 112, 117, 121, 133,135, 138, 139, 58, 102, 104, 111, 114, 125)*<br>List of Posters: refer to page 18 |
| **3:00 - 3:30pm** | Tea break and networking (*Exhibition Atrium*) |
| **3:30 - 5:00pm** | **Oral Session 2: Medical Images and Computational Models** (G.27)<br>Session chairs: *Jiling Feng* and *Baihua Li*<br>**Paper ID 26**: Micro-CT Imaging Techniques for Visualizing Pinniped Mystacial Pad Musculature<br>*Elizabeth Evans (University of Manchester); Alyx Elder (Manchester Metropolitan University)\**<br>**Paper ID 35**: SCorP: Statistics-Informed Dense Correspondence Prediction Directly from Unsegmented Medical Images<br>*Krithika Iyer (Scientific Computing and Imaging Institute, University of Utah)\*; Jadie R Adams (Scientific Computing and Imaging Institute, University of Utah ); Shireen Y. Elhabian (Scientific Computing and Imaging Institute, University of Utah)*<br>**Paper ID 2**: JointViT: Modeling Oxygen Saturation Levels with Joint Supervision on Long-Tailed OCTA<br>*Zeyu Zhang (The Australian National University)\*; Xuyin Qi (The University of Adelaide); Mingxi Chen (Guangdong Technion Institute Of Technology); Guangxi Li (The University of Sydney); Ryan Pham (University of Adelaide); Ayub Qassim (Flinders University); Ella C Berry (Flinders University ); Zhibin Liao (University of Adelaide); Owen Siggs (Garvan Institute of Medical Research); Robert A McLaughlin (University of Adelaide); Jamie Craig (Flinders University); Minh-Son To (Flinders University)*<br>**Paper ID 98**: Identification of skin diseases based on blind chromophore separation and artificial intelligence<br>*Mustapha Zokay (Laboratory of materials, signals and systems and physical modeling, Faculty of Sciences, Ibn Zohr University, Morocco)\*; Hicham Saylani (Laboratory of Electronics, Signal Processing and Physical Modeling, Faculty of Sciences, Ibn Zohr University, Morocco)*<br>**Paper ID 89**: Generating Chest Radiology Report Findings using a Multimodal Method<br>*Chenyu Wang (University of Dundee); Vladimir Janjic (University of Dundee); Stephen J. McKenna (University of Dundee)\**<br>**Paper ID 92**: Image processing and machine learning techniques for Chagas disease detection and identification<br>*Lavdie Rada (Bahcesehir University)\*; Inass Azzawi (Bahcesehir University); Preet Kumar (University of the West of England); Carlos Francisco Brito Loeza (University of Yukatan); Cefa Karabag (London Metropolitan University); Constantino Reyes-aldasoro (City, University of London)* |
| **6:00 - 7:00pm** | Visit to the Institute of Sport (MRI)<br>Coordinators: *Indranath Chatterjee* and *Aneurin Kennerley* |
| **7:00pm** | Conference Reception *(Dining Atrium)* |

# DAY 2 July 25th

| 8:30 - 9:00am | Arrival (*tea, coffee, and Danish pastry*) |
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| 9:00 – 10:30am | **Oral Session 3(a) Recent Advances in Computational Pathology and Microscopic Imaging** (G.27)<br>Session chairs: *Adam Shepherd* and *Simon Graham*<br>**Paper ID 136**: Streamlining Colon Biopsy Screening with Interpretable Machine Learning<br>*Quoc Dang Vu (Histofy Ltd); Navid Alemi (Histofy Ltd); Johnathan Pocock (Histofy Ltd); David Snead (Histofy Ltd); Nasir Rajpoot (Histofy Ltd); Simon Graham (Histofy Ltd)\**<br>**1st Power Pitch Session**<br>**Paper ID 62**: GRU-Net: Gaussian attention aided dense skip connection based multiResU-Net for Breast Histopathology Image Segmentation<br>*Ayush Roy (Jadavapur University); Payel Pramanik (Jadavpur University); Soham Ghosal (IIITNR); Daria Valenkova (Saint Petersburg Electrotechnical University "LETI"); Dmitrii Kaplun (Saint Petersburg Electrotechnical University "LETI")\*; Ram Sarkar (Jadavpur University)*<br>**2nd Power Pitch Session**<br>**Paper ID 75**: Bounding Box is all you need: Learning to Segment Cells in 2D Microscopic Images via Box Annotations<br>*Nabeel Khalid (DFKI)\*; Maria Caroprese (Sartorius, Digital Solutions, Royston); Gillian Lovell (Sartorius, BioAnalytics, Royston); Daniel A Porto (Sartorius, BioAnalytics, Ann Arbor); Johan Trygg (Sartorius Corporate Research); Andreas Dengel (DFKI GmbH); Sheraz Ahmed (DFKI)*<br>**3rd Power Pitch Session**<br>**Paper ID 17**: RoTIR: Rotation-Equivariant Network and Transformers for Zebrafish Scale Image Registration<br>*Ruixiong Wang (University of Bristol)\*; Alin Achim (University of Bristol); Renata Raele-Rolfe (University of Bristol); Qiao Tong (University of Bristol); Dylan Bergen (University of Bristol); Chrissy Hammond (University of Bristol); Stephen Cross (University of Bristol*<br>**4th Power Pitch Session**<br>For more details on the Power Pitch sessions, click here for details. |
| 9:45- 10:30am | **Oral Session 3(b) Dental and Bone Imaging** (G.35)<br>Session Chairs: *Haider Raza* and *Sean Maudsley-Barton*<br>**Paper ID 66**: Enhancing Cephalometric Landmark Detection with a Two-Stage Cascaded CNN on Multi-Resolution Multi-Modal Data<br>*Reeha Khan (National University of Sciences and Technology)\*; Muhammad Anwaar Khalid (Air University); Kanwal Zulfiqar (Riphah International University); Ulfat Bashir (Riphah International University); Muhammad Moazam Fraz (National University of Sciences and Technology)*<br>**Paper ID 48**: Enhancing Dental Diagnostics: Advanced Image Segmentation Models for Teeth Identification and Enumeration<br>*Mohsin Ali (School of Computer Science and Electronics Engineering, University of Essex)\*; Moin Hassan (School of Computer Science and Electronic Engineering, University of Essex); Esra Kosan (Department of Periodontology, Oral Medicine and Oral Surgery, Berlin); John Q. Gan (School of Computer Science and Electronic Engineering, University of Essex); Haider Raza (School of Computer Science and Electronics Engineering, University of Essex); Akhilanada Chaurasia (Department of Oral Medicine and Radiology,* |

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| | *King George's Medical University, Lucknow)*<br>**Paper ID 20**: 3D Bone Shape from CT-Scans Provides an Objective Measure of Osteoarthritis Severity: data from the IMI-APPROACH study<br>*James M Burlison (Imorphics)\*; Michael Bowes (Stryker); Philip Conaghan (University of Leeds); Alan Brett (Stryker)* |
| **10:30 - 11:00am** | Tea break and networking (*Exhibition Atrium*) |
| **11:00 - 12:00am** | Keynote Speaker: Prof. Carola-Bibiane Schönlieb (G.27)<br>Title: From variational modelling to deep learning for biomedical imaging<br>Session Chair: *Sean Maudsley-Barton* |
| **12:00 - 1:00pm** | **Poster Session II: Low-Quality Medical Images, Pathology, Microscopic, Dental and Bone Imaging** (*Exhibition Atrium*)<br>*(Full paper ID: 74, 85, 78, 96, 29, 70, 73, 80, 82, 76, 83)*<br>*(Abstract ID: 13, 105, 108, 118, 119, 129, 130, 134, 136)*<br>List of Posters: refer to page 20 |
| **1:00 - 2:00pm** | Lunch and Networking (*Dining Atrium*) |
| **2:00 - 3:30pm** | **Oral Session 4** (*Parallel Sessions*) |
| | **4(a) Enhancing Low-Quality Medical Images** (G.34)<br>Session Chair: *Haiyan Jin*<br>**Paper ID 7**: YOLO-TL Tiny Object Segmentation Framework for Low Quality Medical Images<br>*Yamin Li (Hubei University); Yu Duan (Hubei University)\*; Liu Duan (Hubei University); Wen Xiang (Hubei University); Qifeng Wu (Hubei University)*<br>**Paper ID 40**: Ultrasound Confidence Maps with Neural Implicit Representation<br>*Vahit Bugra Yesilkaynak (Technical University of Munich); Vanessa Gonzalez Duque (Ecole Centrale Nantes)\*; Magdalena Gawlinska (TU Munich); Yordanka Velikova (Technical University of Munich); Diana Mateus (Centrale Nantes); Nassir Navab (TU Munich, Germany)*<br>**Paper ID 36**: Blurry Boundary Segmentation with Semantic-Aware Feature Learning<br>*Qiuyu Xiao (University of North Carolina at Chapel Hill)\*; Dong Nie (UNC)*<br>**Paper ID 46**: SA-GCN: Scale Adaptive Graph Convolutional Network for ASD Identification<br>*Jinbei Zhang (Tianjin University of Technology); Chao Jiang (Tianjin University of Technology); Jing Li (Tianjin University of Technology)\*; Gaoxiang Ouyang (Beijing Normal University)*<br>**Paper ID 57**: Resolution-Invariant Medical Image Segmentation using Fourier Neural Operators<br>*Lu Liu (University)\*; Raymond Veldhuis (University of Twente); Christoph Brune (University of Twente)* |
| | **4(b) Machine Learning for Endoscopy (EndoML)** (G.35)<br>Session chairs: *Bogdan Matuszewski* and *Jorge Bernal del Nozal*<br>**Invited Talk**: Improving clinical decision making in gastrointestinal endoscopy: can machine learning help?<br>*James Turvill (York and Scarborough Teaching Hospitals NHS Foundation Trust)*<br>**Paper ID 132**: Polyp Segmentation Generalisability of Pretrained Backbones<br>*Edward Sanderson (University of Central Lancashire)\*; Bogdan J Matuszewski (University of Central Lancashire)*<br>**Paper ID 124**: Multi-Task SwinV2 Transformer for Polyp Classification and |

| | Segmentation<br>*Kerr F Fitzgerald (University of Central Lancashire)\*; Bogdan J Matuszewski (University of Central Lancashire); Jorge Bernal (Computer Vision Center and Computer Science Department, Universitat Autònoma de Barcelona); Yael Tudela Barroso (Computer Vision Center and Computer Science Department, Universitat Autònoma de Barcelona)*<br>**Paper ID 116**: Automatic assessment of the degree of cleanliness in esophagogastroduodenoscopy images using EfficientNet-V2 network<br>*Neil De La Fuente (Computer Vision Center, Universitat Autonoma de Barcelona)\*; Mireia Majó i Cornet (Computer Vision Center, Universitat Autonoma de Barcelona); Yael Tudela (Computer Vision Center, Universitat Autonoma de Barcelona); Irina Luzko (Endoscopy Unit, Gastroenterology Department, ICMDM, Hospital Clínic, Barcelona. Universitat de Barcelona. IDIBAPS. CIBEREHD); Henry Córdova (Endoscopy Unit, Gastroenterology Department, ICMDM, Hospital Clínic, Barcelona. Universitat de Barcelona. IDIBAPS. CIBEREHD); Gloria Fernández-Esparrach (Unidad Endoscopia Digestiva, Hospital Clinic, Barcelona); Jorge Bernal (Computer Vision Center and Computer Science Department, Universitat Autònoma de Barcelona)*<br>**Paper ID 106**: Counterfactuals: The impact of image properties on the quality of generated explanations in XAI<br>*Daniel Nguyen (Imperial College London)\*; Ahmed E Fetit (Imperial College London); Kanwal Bhatia (Aival)*<br>**Paper ID 101**: Toward Automated Small Bowel Capsule Endoscopy Reporting using a Summarizing Machine learning Algorithm: The SUM UP study<br>*Charles Houdeville (ENSEA)\*; Marc Souchaud (ETIS UMR 8051); Romain Leenhardt (Sorbonne University, Center for Digestive Endoscopy, Saint-Antoine Hospital, APHP,); Lia Golststein (Department of Gastroenterology and Hepatology, Radboud University Medical Center, Nijmegen); Guillaume Velut (Sorbonne University, Center for Digestive Endoscopy, Saint-Antoine Hospital, APHP); Hanneke Beaumont (Department of Gastroenterology and Hepatology, Amsterdam University Medical Center, Amsterdam); Xavier Dray (Sorbonne University, Center for Digestive Endoscopy, Saint-Antoine Hospital, APHP); Aymeric Histace (ETIS)* |
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| **3:30 - 4:00pm** | Tea break and Networking (*Exhibition Atrium*) |
| **4:00 - 6:00pm** | Plenary Discussion (G.27)<br>**Topic:** Translating Medical Imaging into Clinical Practice<br>Coordinator: *Nashid Alam* |
| **7:00pm** | Conference Dinner  (*Dining Atrium*) |

# DAY 3 July 26<sup>th</sup>

| 8:30 – 9:00am | Registration |
|---|---|
| 9:00 - 10:30am | **Oral Session 5 Domain Adaptation and Generalisation** (G.27)<br>Session chair: *Mohammad Yaqup* and *Michal Byra*<br><br>**Paper ID 45**: AdaptiveSAM: Towards Efficient Tuning of SAM for Surgical Scene Segmentation<br>*Jay N Paranjape (Johns Hopkins University)\*; Nithin Gopalakrishnan Nair (Johns Hopkins University); Shameema Sikder (Wilmer Eye Institute); Swaroop Vedula (The Johns Hopkins University); Vishal Patel (Johns Hopkins University)*<br>**Paper ID 68**: Analysing Variables for 90-Day Functional-Outcome Prediction of Endovascular Thrombectomy<br>*Dalia Rodríguez-Salas (Friedrich-Alexander-Universität Erlangen-Nürnberg)\*; Christian Riess (Friedrich-Alexander University Erlangen-Nuremberg); Celia Martin Vicario (Friedrich-Alexander-Universität Erlangen-Nürnberg); Oliver Taubmann (Siemens Healthineers); Hendrik Ditt (Siemens Healthineers); Stefan Schwab (FAU Erlangen-Nürnberg); Arnd Dörfler (Department of Neuroradiology, Friedrich-Alexander-Universität Erlangen- Nürnberg.*<br>**Paper ID 22**: Multimodal Deformable Image Registration for Long-COVID Analysis Based on Progressive Alignment and Multi-perspective Loss<br>*Jiahua Li (University of Oxford)\*; Bartlomiej W Papiez (University of Oxford); Fergus V. Gleeson (University of Oxford); James T. Grist (University of Oxford)*<br>**Paper ID 25**: Confounder-Aware Image Synthesis for Pathology Segmentation in New Magnetic Resonance Imaging Sequences<br>*Jesse Phitidis (University of Edinburgh)\*; Antanas Kascenas (Canon Medical Research Europe); María del C. Valdés Hernández (University of Edinburgh); William Whiteley (University of Edinburgh); Joanna Wardlaw (University of Edinburgh); Alison Q O'Neil (Canon Medical Research Europe)*<br>**Paper ID 55**: Prediction of total metabolic tumor volume from tissue-wise FDG-PET/CT projections, interpreted using cohort saliency analysis<br>*Sambit Tarai (Uppsala University)\*; Elin Lundström (Uppsala University); Johan Öfverstedt (Uppsala University); Hanna Jönsson (Uppsala University); Nouman Ahmad (Uppsala University); Håkan Ahlström (Uppsala University); Joel Kullberg (Uppsala University)* |
| 10:30 - 11:00am | Tea break and networking (*Exhibition Atrium*) |
| 11:00 - 12:00pm | Keynote Speaker: Prof. Emma MacPherson (G.27)<br>Talk: In vivo terahertz sensing of human skin: the largest study to date<br>Session Chair: *Moi Hoon Yap* |
| 12:00 - 1:00pm | **Poster Session III: Dermatology, Cardiac Imaging and Other Medical Imaging** (*Exhibition Atrium*)<br>*(Full paper ID: 21, 50, 51, 37, 18, 28, 93, 64,16, 15, 69, 71, 39)*<br>*(Abstract ID: 95, 107, 122, 127)*<br>List of Posters: refer to page 22 |
| 1:00 - 2:00pm | Lunch and MIUA Doctoral Community Event (G.27) |
| 2:00pm | Award Ceremony and Closing (G.27) |

# Keynote Speakers

## *Speaker for Day 1 (24th July 2024):*

**PROF. ALEJANDRO FRANGI**, FREng **Profile**
*Director of Christabel Pankhurst Institute*, Bicentennial Turing Chair in Computational Medicine, University of Manchester

**Talk:** On Trials and Tribulations - Safer, Faster, and More Sustainable Medical Devices for Better and More Equitable Care

**Abstract:** Novel medical technologies are being introduced at unparalleled rates, demanding scientific evidence of their safety and efficacy at an unprecedented pace to ensure patient safety and benefit. With success in both in-vitro/in-vivo studies, products are tested in clinical trials assessing use in humans. Predicting low-frequency side effects has been difficult because such side effects may not become apparent until many patients adopt the treatment. When medical devices fail at later stages, financial losses can be catastrophic. Testing on many people is costly, lengthy, and sometimes implausible (e.g., paediatric patients, rare diseases, underrepresented ethnic groups).

Computational Medicine underpins in-silico trials, i.e., computer-based trials of medical products performed on populations of virtual patients. Computer models/simulations are used to conceive, develop, and assess devices with the intended clinical outcome explicitly optimised from the outset (a-priori) instead of tested on humans (a-posteriori). This will include testing for potential risks to patients (side effects) and exhaustively exploring medical device failure modes before being tested in human clinical trials. In-silico evidence is still consolidating but is poised to transform how health and life sciences R&D and regulations are conducted. The UK can take a leadership position in in-silico trials, which would cement its position as a global leader in health and life sciences, help drive the UK economy, and provide UK citizens with early access to innovative health products.

In this talk, I will summarise progress made in this new paradigm among academia, industry, regulators, and policymakers, emphasising the UK's efforts to promote and adopt this paradigm shift through the InSilicoUK Pro-Innovation Regulations Network (www.insilicouk.org). A recent landscape report would be a helpful companion to this talk: Frangi, AF, et al. Unlocking the Power of Computational Modelling and Simulation Across the Product Lifecycle in Life Sciences: A UK Landscape Report. InSilicoUK Pro-Innovation Regulations Network, 2023.

## *Speaker for Day 2 (25ᵗʰ July 2024):*

**PROF. CAROLA-BIBIANE SCHÖNLIEB** **Profile**
*Professor* of Applied Mathematics, Head of the Cambridge Image Analysis group, University of Cambridge

**Talk:** From variational modelling to deep learning for biomedical imaging

**Abstract:** In the last couple of years the processing and analysis of biomedical imaging data has undergone a significant paradigm shift, from knowledge driven approaches that derive image analysis models from first principles to purely data driven approaches that derive models from data. In this talk I will discuss image analysis methods that operate at the interface of these paradigms and feature both a knowledge driven (mathematical modelling) and a data driven (machine learning) component. Mathematical modelling is useful in the presence of prior information about the imaging data and relevant biomarkers, for narrowing down the search space, for highly generalizable image analysis methods, and for image analysis solutions that come with theoretical solution guarantees. Machine learning on the other hand is a powerful tool for customising image analysis methods to individual data sets. Their combination is the topic of this talk, furnished with examples for image classification under minimal supervision with an application to chest x-rays, task adapted tomographic reconstruction and fast spatio-temporal imaging.

## *Speaker for Day 3 (26ᵗʰ July 2024):*
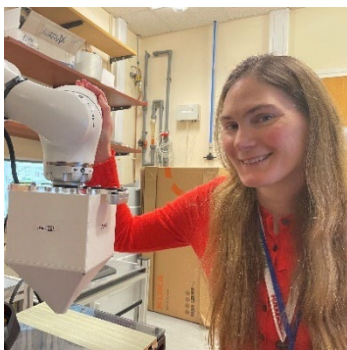
**PROF. EMMA MACPHERSON** **Profile**
*Professor*, Department of Physics, University of Warwick

**Talk:** In vivo terahertz sensing of human skin: the largest study to date

**Abstract:** We have recently reported on over 300 participant measurements in the largest in vivo terahertz (THz) study of human skin to date. The study was conducted in a non-laboratory environment at Warwick university. The forearm of volunteers was measured using a handheld THz scanner. The THz scanner was developed by 3D printing optics and mechanics to incorporate the Menlo TeraSmart emitter and detector. Human skin is comprised of several layers, the main ones being the epidermis and the dermis. The stratum corneum (SC) is the outer most layer of the epidermis and is dryer than the skin beneath it. We know from Raman studies that there is a water concentration across the SC. In our recent work we have used stratified medium theory to model the skin and extract the SC thickness and hydration and can even probe the skin beneath transdermal drug delivery patches.

# Plenary Discussion (DAY 2, 25<sup>th</sup> July 4-6pm)

**Topic:** Translating Medical Imaging into Clinical Practice

The primary aim of this plenary session is to foster networking, brainstorming, and developing working relationships, particularly between clinicians, industries and academia through a light-hearted panel discussion.

Our distinguished panel of experts:

- **PROF. CHRISTOPHER MILLER**, Professor of Cardiovascular Medicine, University of Manchester
- **DR ANTHONY WILSON**, Consultant in Anaesthesia and Critical Care, Manchester University NHS Foundation Trust
- **DR VISHNU CHANDRABALAN**, Honorary Clinical Professor, Lancaster University
- **DR NAVITA SOMAIAH**, Clinician Scientist and Group Leader at The Institute of Cancer Research, Clinical Oncologist at The Royal Marsden NHS Foundation Trust
- **DR ADAM LEWANDOSKI,** Deputy Chief Scientist, UK Biobank and Associate Professor of Cardiovascular Science, University of Oxford.

Co-chaired by **PROF. ALEJANDRO FRANGI** and **PROF. CAROLA-BIBIANE SCHÖNLIEB.**

# MIUA Doctoral Community (DAY 3 1-2pm)

The 2024 MIUA conference is excited to announce the inclusion of a Doctoral Community in Medical Image Understanding and AI, welcoming students from across the globe to join and share their ideas and experiences. This initiative offers two significant benefits:

Firstly, students will have the invaluable opportunity to learn about the work of their peers, facilitating collaboration and mutual assistance for those tackling similar research topics

Secondly, participants can leverage each other's experiences to navigate challenges and overcome obstacles encountered during their doctoral studies.

Additionally, master's students planning to pursue a PhD are encouraged to join, benefitting from mentorship and guidance from both peers and postdoctoral researchers. Moreover, postdoctoral researchers are invited to participate, providing valuable mentorship and enriching the collective knowledge base of the community. By fostering a supportive environment for knowledge exchange, this platform aims to enrich the academic journey of aspiring researchers in the field of medical image understanding and artificial intelligence.

Please join the community by filling in the questionnaire by scanning the QR code below or following this link: https://forms.gle/VV58P4YDEsvzxweP8

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## Best Student Paper Award (Special Session: Medical Images and Computational Models)

# Poster Session I (DAY 1)

## Brain Imaging, Medical Images and Computational Models *(Exhibition Atrium)*
**Full Papers** *(ID: 81, 34, 91, 30, 42, 99, 38)*

### Advancement in Brain Imaging

- **Paper ID 81**: Self-Supervised Pretraining for Cortial Surface Analysis
  *Dániel Unyi (Budapest University of Technology and Economics)\*; Bálint Gyires-Tóth (Budapest University of Technology and Economics)*

- **Paper ID 34**: Spike Detection in Deep Brain Stimulation Surgery with Convolutional Neural Networks
  *Ewa Niewiadomska-Szynkiewicz (Warsaw University of Technology)\*; Konrad Ciecierski (Warsaw University of Technology); Arkadiusz Marcin Nowacki (Warsaw University of Technology); Ewaelina Kolpa (Warsaw University of Technology); Mateusz Szychewicz (Warsaw University of Technology)*

### Medical Images and Computational Models

- **Paper ID 91**: Ensemble Deep Learning Models for Segmentation of Prostate Zonal Anatomy and Pathologically Suspicious Areas
  *Jakub Mitura (National Information Processing Institute); Rafał Jóźwiak (National Information Processing Institute)\**

- **Paper ID 30**: Image Reconstruction for Proton Therapy Range Verification via U-NETs
  *Lena M Setterdahl (Western Norway University of Applied Sciences)\*; Ilker Meric (Western Norway University of Applied Sciences); Kyrre Skjerdal (Western Norway University of Applied Sciences); Sean Holman (University of Manchester); William Lionheart (University of Manchester); Danny Lathouwers (Delft University of Technology); Hunter Ratliff (Western Norway University of Applied Sciences)*

- **Paper ID 42**: DynaMMo: Dynamic Model Merging for Efficient Class Incremental Learning for Medical Images
  *Mohammad Areeb Qazi (Mohamed bin Zayed University of Artificial Intelligence)\*; Ibrahim Almakky (Mohamed Bin Zayed University of Artificial Intelligence); Anees Ur Rehman Hashmi (Mohamed bin Zayed University of Artificial Intelligence); Santosh Sanjeev (Mohamed bin Zayed University of Artificial Intelligence); Mohammad Yaqub (Mohamed Bin Zayed University of Artificial Intelligence)*

- **Paper ID 99**: PDSE: A Multiple Lesion Detector for CT Images Using PANet and Deformable Squeeze-and-Excitation Block
  *Di Fan (USC)\*; Heng Yu (Carnegie Mellon University); Zhiyuan Xu (USC)*

- **Paper ID 38**: What is the Best Way to Fine-tune Self-supervised Medical Imaging Models?
  *Mohammad Osama Khan (New York University)\*; Yi Fang (New York University)*

### Conference Abstracts:

- **Paper ID 100**: Computational Fluid Dynamics Modelling of Blood Flow Performance for a Stented Patient Specified Peripheral Arteries
  *Jiling Feng (Manchester Metropolitan University)\**

- **Paper ID 109**: Specimen-to-tumor bed deformable registration to inform re-resection in otolaryngologic procedures
  *Morgan J Ringel (Vanderbilt University)\*; Ayberk Acar (Vanderbilt University); Qingyun Yang (Vanderbilt University); Marina Aweeda (Vanderbilt University Medical Center); Carly Fassler (Vanderbilt University Medical Center); Jon S Heiselman (Memorial Sloan Kettering Cancer Center); Jie Ying Wu (Vanderbilt University); Michael Topf (Vanderbilt University Medical Center); Michael Miga (Vanderbilt University)*

- **Paper ID 112**: Lateral Ventricle Shape Modeling using Peripheral Area Projection for Longitudinal Analysis
  *Wonjung Park (KAIST)\*; Suhyun Ahn (KAIST); Jinah Park (KAIST)*

- **Paper ID 117**: Exploring the potential of MRI variables for predicting conversion to mild cognitive impairment
  *Martina Billichová (Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava)\*; Davide Bruno (School of Psychology, Liverpool John Moores University); Fariba Sharifian (School of Computer Science and Mathematics, Liverpool John Moores University); Silvester Czanner (School of Computer and Engineering Sciences, University of Chester); Gabriela Czanner (Faculty of Informatics and Information Technologies, Slovak University of Technology in Bratislava)*

- **Paper ID 121**: Automatic Segmentation of Pediatric Brain Tumours using Diffusion-weighted MRI: Towards an Early, In-vivo Classification Pipeline
- *Daniel J Griffiths-King (Aston University)\*; Tim G Mulvany (Aston University); Andrew Peet (University of Birmingham); John Apps (University of Birmingham); Jan Novak (Aston University)*

- **Paper ID 133**: Generating Brain MRI with Subject-Specific and Generalised Learning using 3D GAN-based Models
  *Harikala Kandel (Birkbeck, University of London)\*; Carl Barton (Birkbeck)*

- **Paper ID 135**: Synthetic Cerebral Blood Vessel Generator for Training Anatomically Plausible Deep Learning Models
  *Georgia Kenyon (University of Adelaide)\*; Stephan Lau (University of Adelaide); Antonios Perperidis (University of Adelaide, Women's and Children's Hospital Network); Michael Chappell (University of Nottingham); Mark Jenkinson (University of Adelaide)*

- **Paper ID 138**: Post-processing of Perivascular Spaces segmentation using k-means
  *Roberto Duarte Coello (University of Edinburgh)\*; María del C. Valdés Hernández (University of Edinburgh); Jose Bernal (DZNE); Joanna Wardlaw (University of Edinburgh)*

- **Paper ID 139**: Multiple Sclerosis Diagnosis with Deep Learning and Explainable AI
  *Nighat Bibi (TU Dublin)\*; Jane Courtney (TU Dublin); Kathleen Curran (UCD)*

- **Paper ID 58**: Enhanced Segmentation via a Shared Encoder with Interpretable Classifier for Breast Tumor Analysis
  *Youngmin Kim (School of Computer Science and Engineering, Kyungpook National University); Hyejung Kim (Kyungpook National University Chilgok Hospital); Wonhwa Kim (Kyungpook National University Chilgok Hospital); Sungjoon Park (Kyungpook National University); Jaeil Kim (Kyungpook National University)\**

- **Paper ID 102**: Predictive Bayesian Active Learning in Stargardt disease diagnosis
  *Biraja P Ghoshal (UCL)\*; William Woof (UCL); Nikolas Pontikos (UCL)*

- **Paper ID 104**: Deep Learning with 3D Convolutional Neural Networks For Prediction of Germline BRCA Gene Mutation in High-Risk Breast Cancer Patients
  *Yongwon Cho (Department of Computer Science and Engineering, Soonchunhyang University)\*; Sung Eun Song (Department of Radiology, Korea University Anam Hospital); Kyu Ran Cho (Department of Radiology, Korea University Anam Hospital)*

- **Paper ID 111**: Implicit neural networks for breast ultrasound image segmentation
  *Michal Byra (Polish Academy of Sciences)\**

- **Paper ID 114**: Support classification system for glaucoma detection
  *Dmytro Furman (Slovak Technikal University)\*; Bryan M Williams (Lancaster University); Silvester Czanner (School of Computer and Engineering Sciences Faculty of Science, Business and Engineering University of Chester); Gabriela Czanner (Slovak Technikal University)*

- **Paper ID 125**: Analysis on Multi-Ethnic Retinal Fundus Image Datasets of Debiasing Techniques in Deep Learning for Diabetic Macular Edema Recognition
  Megha Hegde (Kingston University London)\*

# Poster Session II (DAY 2)

**Low-Quality Medical Images, Pathology, Microscopic, Dental and Bone Imaging**
**Full Papers** *(ID: 74, 85, 78, 96, 29, 70, 73, 80, 82, 76, 83)*

### <u>Enhancing Low-Quality Medical Images</u>
**Paper ID 74**: Superresolution of real-world multiscale bone CT verified with clinical bone measures
*Sophia W Bardenfleth (Technical University of Denmark)\*; Vedrana A Dahl (Technical University of Denmark); Chiara Villa (University of Copenhagen); Galateia Kazakia (UCSF); Anders B Dahl (Technical University of Denmark)*
**Paper ID 85**: Reconstructing MRI parameters using a noncentral chi noise model
*Klara A Baś (University College London)\*; Christian Lambert (University College London); John Ashburner (University College London)*

### <u>Digital Pathology, Histology and Microscopic Imaging</u>
**Paper ID 78**: Leveraging Foundation Models for Enhanced Detection of Colorectal Cancer Biomarkers in Small Datasets
*Craig GG Myles (University of St Andrews)\*; In Hwa Um (University of St Andrews); David Harrison (University of St Andrews); David Harris-Birtill (University of St Andrews)*
**Paper ID 96**: SPADESegResNet: Harnessing Spatially-adaptive Normalization for Breast Cancer Semantic Segmentation
*Srijay Deshpande (University of Warwick)\*; Durga Parkhi (University of Warwick)*
**Paper ID 29**: Unsupervised Anomaly Detection on Histopathology Images Using Adversarial Learning and Simulated Anomaly
*Wei-Ta Chu (National Cheng Kung University)\*; Yu-Chen Lai (NCKU)*
**Paper ID 70**: Nuclei-Location Based Point Set Registration of Multi-Stained Whole Slide Images
*Adith Jeyasangar (University of Warwick)\*; Abdullah Alsalemi (University of Warwick); Shan Raza (University of Warwick)*
**Paper ID 73**: CellGenie: An end-to-end Pipeline for Synthetic Cellular Data Generation and Segmentation: A Use Case for Cell Segmentation in Microscopic Images
*Nabeel Khalid (DFKI)\*; Mohammadmahdi Koochali (DFKI); Duway Nicolas Lesmes-Leon (DFKI); Maria Caroprese (Sartorius, Digital Solutions, Royston); Gillian Lovell (Sartorius, BioAnalytics, Royston); Daniel A Porto (Sartorius, BioAnalytics, Ann Arbor); Johan Trygg (Sartorius Corporate Research); Andreas Dengel (DFKI GmbH); Sheraz Ahmed (DFKI)*
**Paper ID 80**: A Line Is All You Need: Weak Supervision For 2.5D Cell Segmentation
*Fabian Schmeisser (DFKI GmbH)\*; Céline Thomann (3d.FAB, CNRS, INSA, CPE-Lyon, UMR5246, ICBMS, Université Claude Bernard Lyon 1); Emma Petiot (3d.FAB, CNRS, INSA, CPE-Lyon, UMR5246, ICBMS, Université Claude Bernard Lyon 1); Gillian Lovell (Sartorius AG); Maria Caroprese (Sartorius AG); Andreas Dengel (DFKI GmbH); Sheraz Ahmed (DFKI)*

### <u>Dental and Bone Imaging</u>
**Paper ID 82**: CNN-based osteoporotic vertebral fracture prediction and risk assessment on MrOS CT data: Impact of CNN model architecture
*Mohd Faraz Shaikh (Ostfalia University of Applied Sciences)\*; Eren Bora Yilmaz (Kiel University); Carsten Meyer (Ostfalia)*
**Paper ID 76**: Analysis of leg bones from whole body DXA in the UK Biobank
*Faten Alomar (University of Manchester)\*; Timothy Cootes (University of Manchester)*
**Paper ID 83**: H-FCBFormer: Hierarchical Fully Convolutional Branch Transformer for Occlusal Contact Segmentation with Articulating Paper
*Ryan Banks (University of Surrey)\*; Bernat Rovira-Lastra (University of Barcelona); Jordi Martinez-Gomis (University of Barcelona); Akhilanand Chaurasia (King George's Medical University); Yunpeng Li (University of Surrey)*

**Conference Abstracts** *(ID: 13, 105, 108, 118, 119, 129, 130, 134, 136)*

**Paper ID 13**: A Novel Method of Determining Bone Mineral Density from Pre-surgical CT scans to aid in Surgical Planning
*Niall Maguire (Stryker)\*; Alan Brett (Stryker)*

**Paper ID 105**: Enhancing Mitotic Figure Detection Using Attention Modules in Digital Pathology
*May Hlaing Kyi (University of West London)\*; Massoud Zolgharni (University of West London); Ali Khurram (University of Sheffield); Neda Azarmehr (University of West London)*

**Paper ID 108**: FLy-HEi Nuclear distribution clusters associate with clinical features in Follicular Lymphoma
*Volodymyr Chapman (University of Leeds)\*; Alireza Behzadnia (Leeds Teaching Hospitals NHS Trust); Cathy Burton (Leeds Teaching Hospitals NHS Trust); Dan Painter (University of York); Alex Smith (University of York); Reuben Tooze (Leeds Teaching Hospitals NHS Trust); Andrew Janowczyk (Emory University); David Westhead (University of Leeds)*

**Paper ID 118**: Whole Slide Image Classification of Salivary Gland Tumours
*John A Charlton (University of Sheffield)\*; Ali Khurram (University of Sheffield); Ibrahim Alsanie (King Saud University)*

**Paper ID 119**: Self-Supervised Pre-Training Improves the Prediction of Gene Mutations and Tumor mutational burden in Lung Adenocarcinoma
*Arwa AlRubaian (University of Warwick)\*; Nasir Rajpoot (University of Warwick); Shan Raza (University of Warwick)*

**Paper ID 129**: A Histology-Informed Network for White Blood Cell Recognition at Subpixel Level
*Qian Wang (School of Computer Science and Technology, Donghua University); Zhao Chen (School of Computer Science and Technology, Donghua University)\**

**Paper ID 130**: Applying Likelihood-Based Out-of-Distribution Detection to Malaria Microscopy using Deep Diffusion Models
*Joseph S Goodier (University of Bath)\*; Richard Bowman (University of Glasgow); Pietro Cicuta (University of Cambridge); Joe Knapper (University of Glasgow); Samuel McDermott (University of Cambridge); Joram Mduda (Ifakara Health Institute); Catherine Mkindi (Ifakara Health Institute); Joel Collins (University of Bath); Julian Stirling (Freelance); William Wadsworth (University of Bath); Boyko Vodenicharski (University of Bath); Jessica Nicholson (University of Bath); Neill Campbell (University of Bath)*

**Paper ID 134**: Let's Strike a Balance: Addressing Class Imbalance Issues in Haematological Images
*Thabang Fenge Isaka (Technological University Dublin)\*; Jane Courtney (TU Dublin)*

**Paper ID 136**: Streamlining Colon Biopsy Screening with Interpretable Machine Learning
*Quoc Dang Vu (Histofy Ltd); Navid Alemi (Histofy Ltd); Johnathan Pocock (Histofy Ltd); David Snead (Histofy Ltd); Nasir Rajpoot (Histofy Ltd); Simon Graham (Histofy Ltd)\**

# Poster Session III (DAY 3)

**Poster Session III: Dermatology, Cardiac Imaging and Other Medical Imaging**

**Full Papers** *(ID: 21, 50, 51, 37, 18, 28, 93, 64, 16, 15, 69, 71, 39)*

**Domain Adaptation and Generalisation**

**Paper ID 21**: Expert model prediction through feature matching
*Bishnu Paudel (Aberystwyth University)\*; Reyer Zwiggelaar (University of Aberystwyth); Otar Akanyeti (University of Aberystwyth)*

**Paper ID 50**: Enhancing Cross-Institute Generalisation of GNNs in Histopathology through Multiple Embedding Graph Augmentation (MEGA)
*Jonathan Campbell (University of Oxford)\*; Claudia Vanea (University of Oxford ); Liis Salumäe (Tartu University Hospital); Karen Meir (Hadassah Hebrew University Medical Center); Drorith Hochner-Celnikier (Hadassah Hebrew University Medical Center); Hagit Hochner (Hadassah Hebrew University Medical Center); Triin Laisk (University of Tartu); Linda Ernst (NorthShore University HealthSystem); Cecilia Lindgren (University of Oxford); Weidi Xie (Shanghai Jiao Tong University); Christoffer Nellaker (University of Oxford)*

**Paper ID 51**: PMT: Partial-Modality Translation Based on Diffusion Models for Prostate Magnetic Resonance and Ultrasound Image Registration
*Xudong Ma (University of Bristol)\*; Nantheera Anantrasirichai (University of Bristol); Stefanos Bolomytis (Southmead Hospital, North Bristol NHS Trust); Alin Achim (University of Bristol)*

**Paper ID 37**: Fine-grained Medical Image Synthesis with Dual-Attention Adversarial Learning
*Qiuyu Xiao (University of North Carolina at Chapel Hill)\*; Dong Nie (UNC)*

**Dermatology**

**Paper ID 18**: Enhancing Skin Lesion Classification: A Self-Attention Fusion Approach with Vision Transformer
*Rahmat Izwan Heroza (School of Computer Science and Electronic Engineering, University of Essex)\*; John Q. Gan (School of Computer Science and Electronic Engineering, University of Essex); Haider Raza (School of Computer Science and Electronics Engineering, University of Essex)*

**Paper ID 28**: Optimizing Melanoma Prognosis through Synergistic Preprocessing and Deep Learning Architecture for Dermoscopic Thickness Prediction
*Nikolaos Ntampakis (MetaMind Innovations)\*; Konstantinos Diamantaras (International Hellenic University); Konstantinos Goulianas (International Hellenic University); Ioanna Chouvarda (Aristotle University of Thessaloniki); Vasileios Argyriou (Kingston University London); Panagiotis Sarigiannidis (University of Western Macedonia, Department of Informatics and Telecommunications Engineering)*

**Paper ID 93**: The Effect of Image Preprocessing Algorithms on Diabetic Foot Ulcer Classification
*Njideka Chiamaka Okafor (Manchester Metropolitan University); Bill Cassidy (Manchester Metropolitan University)\*; Claire O'Shea (Te Whatu Ora Waikato: Hamilton); Pappachan Joseph (Lancashire Teaching Hospitals); Moi Hoon Yap (Manchester Metropolitan University)*

**Cardiac Imaging and Other Medical Imaging**

**Paper ID 64**: Radiomic Analysis of Transvaginal Ultrasound Cervical Images for Prediction of Preterm Birth
*William Cancino (Universidad Industrial de Santander)\*; Carlos Becerra (Universidad Industrial de Santander); Said Pertuz (Universidad Industrial de Santander)*

**Paper ID 16**: Deep learning models to automate the scoring of hand radiographs for Rheumatoid Arthritis
*Zhiyan Bo (University of Oxford)\*; Laura Coates (University of Oxford); Bartlomiej W Papiez (University of Oxford)*

**Paper ID 15**: Improving Automated Ultrasound Infant Hip Screening using an Integrated Clinical Classification Loss

*Allison Clement (University of Oxford)\*; Abhinav Singh (University of Oxford); Daniel Perry (University of Oxford); Irina D Voiculescu (University of Oxford)*

**Paper ID 69**: Synthetic Balancing of Cardiac MRI Datasets

*Carles Garcia-Cabrera (DCU)\*; Eric Arazo Sánchez (Insight Centre for Data Analytics); Enric Moreau (Insight Centre for Data Analytics, Dublin City University); Kathleen Curran (UCD); Noel O Connor (Home); Kevin McGuinness (DCU)*

**Paper ID 71**: EchoVisuAL: Efficient Segmentation of Echocardiograms using Deep Active Learning

*Isabella Galter (Helmholtz Munich)\*; Elida Schneltzer (Helmholtz Munich); Carsten Marr (Helmholtz Munich); Nadine Spielmann (Helmholtz Munich); Martin Hrabě de Angelis (Helmholtz Munich)*

**Paper ID 39**: Hierarchical multi-label learning for musculoskeletal phenotyping in mice

*Muhammad Jawaid (University of Lincoln)\*; Rasneer Sonia Bains (Mary Lyon Centre, MRC Harwell); Sara Wells (Mary Lyon Centre, MRC Harwell); James M Brown (University of Lincoln)*

## Conference Abstracts *(ID: 95, 107, 120, 122, 127)*

**Paper ID 95**: Detection of Extracardiac Findings in Cardiac Magnetic Resonance: a Comparative Study

*Edgar C Pinto (Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho)\*; Sandro Queirós (Life and Health Sciences Research Institute (ICVS), University of Minho)*

**Paper ID 107**: Parameter-Free Bio-Inspired Channel Attention for Enhanced Cardiac MRI Reconstruction

*ANAM HASHMI (DCU)\*; Julia Dietlmeier (Insight SFI Research Centre for Data Analytics); Kathleen Curran (UCD); Noel O'Connor (Dublin City University (DCU))*

**Paper ID 120**: Inter-site and inter-scanner reproducibility across four qMRI measurands using SI traceable references

*Ben Tatman (NPL); Robert Hanson (NPL); Amy McDowell (Lysholm Department of Neuroradiology, National Hospital for Neurology and Neurosurgery); Elizabeth Cooke (NPL); Cailean Clarkson (National Measurement Laboratory); Tugba Dispinar (Tubitak); Ilker Un (Tubitak); Sarah Hill (National Measurement Laboratory); Sumiksha Rai (National Measurement Laboratory); Ahmad Abukashabeh (National Measurement Laboratory); Aaron McCann (Belfast Health and Social Care Trust); Cormac McGrath (Belfast Health and Social Care Trust); Sian Curtis (University Hospitals Bristol and Weston NHS Foundation Trust (UHBW)); Holly Elbert (University Hospitals Bristol and Weston NHS Foundation Trust (UHBW)); Jonathon Delve (University Hospitals Bristol and Weston NHS Foundation Trust (UHBW)); Cameron Ingham (University Hospitals Bristol and Weston NHS Foundation Trust (UHBW)); Simone Busoni (AOU Careggi); Jack Clarke (NPL); John Thornton (Lysholm Department of Neuroradiology, National Hospital for Neurology and Neurosurgery); Nick Zafeiropoulos (UCL); Stephen Wastling (Lysholm Department of Neuroradiology, National Hospital for Neurology and Neurosurgery); Alessandra Manzin (INRIM); Riccardo Ferrero (INRIM); Adriano Troia (INRIM); Frederic Brochu (NPL); Asha Forde-Scille (NPL); Jessica Goldring (NPL); Asante Ntata (NPL)\*; Katie Obee (NPL); Susan Rhodes (NPL); Merima Smajlhodžić-Deljo (Verlab); Amar Deumić (Verlab); Alen Bosnjakovic (IMBIH); Paul Tofts (Brighton and Sussex Medical School); Richard Scott (University Hospitals Bristol and Weston NHS Foundation Trust (UHBW)); Matt Cashmore (National Physical Laboratory); Matt G Hall (National Physical Laboratory)*

**Paper ID 122**: How many spin echoes are enough? Sensitivity of T2 estimation to Image noise and B1 penetration effects

*Asante Ntata (NPL)\**

**Paper ID 127**: Deep Texture Analysis in Whole-Body PET Using Graph Neural Network Analysis of the Sub-Logit Layer

*Robert R John (University of Surrey)\*; Ian Ackerley (University of Surrey); Rhodri Smith (Cardiff and Vale University Health Board); Andrew Robinson (National Physical Laboratory); Vineet Prakash (Royal Surrey County Hospital); Manu Shastry (Royal Surrey County Hospital); Peter Strouhal (Alliance Medical Ltd); Kevin Wells (University of Surrey)*