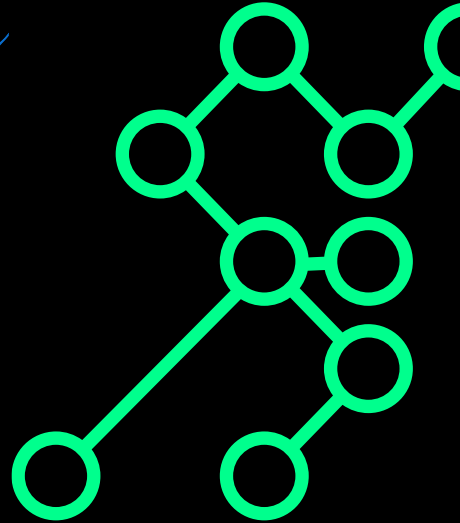


Orthopaedic  
Research UK



# AI in orthopaedics



**Date:** 6–7 November 2023

**Venue:** Day 1: The Medical Society of London  
Day 2: The Royal Society of Medicine

**CPD:** 11 CPD hours



**#Alinortho**

In association with



British Orthopaedic  
Association

# Workshop programme

## Day 1: Monday 6 November

### Venue: The Medical Society of London

**\*\*All participants must bring along a fully charged laptop\*\***

#### 14:30 Registration, refreshments and meet the faculty

#### 15:00 Welcome and introduction

Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre  
Mr Keith Tucker, Trustee, Orthopaedic Research UK

#### SESSION 1: BACKGROUND

Chairs: Ms Antonella Maia Perini and Professor Mike Reed

#### 15:05 Introduction and history of AI

Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre

#### 15:10 What happens inside the black box?

Mr Peter Harris, Research Science Manager, NielsenIQ

#### 15:15 Worked examples of AI in the clinical environment

Dr Christopher Spence, Clinical Fellow in Orthopaedics, Cleveland Clinic London

#### 15:20 Generative AI for MSK

Mr Mustafa Alnaib, Orthopaedic Surgeon, Maidstone and Tunbridge Wells NHS Trust

#### 15:25 Different types of AI: From linear regression to deep learning

Professor Kia Nazarpour, Professor of Digital Health, The University of Edinburgh

#### 15:32 Optimisation and machine learning

Professor Ferrante Neri, Professor of Machine Learning and Artificial Intelligence, University of Surrey

#### 15:40 Computer vision: past, present and future

Professor Yi-Zhe Song, Professor of Computer Vision and Machine Learning, University of Surrey

#### 15:52 Natural language processing

Dr Diptesh Kanojia, Lecturer in Artificial Intelligence for Natural Language Processing, University of Surrey

#### 16:00 Q&A

#### SESSION 2: PRINCIPLES

Chairs: Professor Visakan Kadirkamanathan, Professor Rob Nelissen & Professor J Mark Wilkinson

#### 16:05 Ethics and safety

Ms Antonella Maia Perini, Research Associate, The Alan Turing Institute

#### 16:12 Data collection and preparation

Dr Justin Green, Orthopaedic Registrar, Northumbria Healthcare NHS Foundation Trust and ORUK / BHS Research Fellow

#### 16:17 PROBAST and CHARMS

Dr Justin Green, Orthopaedic Registrar, Northumbria Healthcare NHS Foundation Trust and ORUK / BHS Research Fellow

#### 16:22 Model selection and evaluation

Dr Diptesh Kanojia, Lecturer in Artificial Intelligence for Natural Language Processing, University of Surrey

#### 16:29 Introduction to deep learning

Mr Peter Harris, Research Science Manager, NielsenIQ

#### 16:37 Deployment and Monitoring

Dr Justin Green, Orthopaedic Registrar, Northumbria Healthcare NHS Foundation Trust and ORUK / BHS Research Fellow

#### 16:45 Q&A

#### 16:55 Refreshments

#### SESSION 3: PRACTICAL CONSIDERATIONS FOR SETTING UP AI IN AN NHS HOSPITAL

Chairs: Professor Deairy Kader & Dr Catherine Kelly

#### 17:05 How to set up AI in an NHS hospital

Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre

#### 17:13 Appropriate hardware

Professor Philip Breedon, Professor of Smart Technologies, Nottingham Trent University, School of Science and Technology

#### 17:21 Virtualisation or on-premises?

Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre

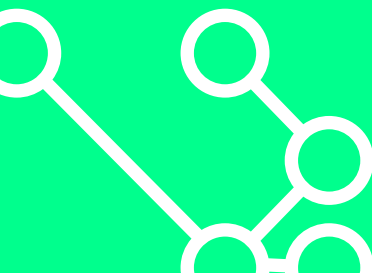
#### 17:28 Data security and federated technology

Ms Irrum Afzal, Research and Outcomes Manager - Clinical Researcher, South West London Elective Orthopaedic Centre (SWLEOC)

#### 17:35 Digital technology deployment – one size does not fit all

Professor Philip Breedon, Professor of Smart Technologies, Nottingham Trent University, School of Science and Technology

#### 17:40 Q&A



#### SESSION 4: CODING

Chairs: Professor Richie Gill & Mr Richard Hewitt

17:52 **What is meant by coding?**  
Mr Peter Harris, Research Science Manager, NielsenIQ

18:02 **Basic principles of python coding for AI**  
Mr Peter Harris, Research Science Manager, NielsenIQ

18:10 **Q&A**

#### SESSION 5: PRACTICAL

Leaders: Mr Vipin Asopa, Mr Peter Harris & Mr Daniel Jones

18:20 **Setting up the environment for AI**  
Dr Suparna De, Lecturer in Computer Science, University of Surrey

18:28 **Worked examples of image analysis using deep learning**  
Mr Peter Harris, Research Science Manager, NielsenIQ  
Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre

19:28 **How to interpret the results?**  
Mr Peter Harris, Research Science Manager, NielsenIQ  
Professor Kia Nazarpour, Professor of Digital Health, The University of Edinburgh

#### SESSION 6: ROUND UP

Chairs: Professor Deairy Kader & Professor Kia Nazarpour

19:35 **Round up...Best practices for the implementation of an AI programme**  
Professor Philip Breedon, Professor of Smart Technologies, Nottingham Trent University, School of Science and Technology

19:45 **Discussion**

20:00 **Refreshments and opportunity to chat with faculty**

20:20 **Close of workshop**



## Conference programme, Day 2: Tuesday 7 November

Venue: The Royal Society of Medicine, London

09:00 Registration and refreshments

09:30 Welcome and introduction  
Mr Keith Tucker, Trustee, Orthopaedic Research UK

### SYMPOSIUM 1: AI AND HOW IT WORKED FOR ME (OR DID NOT WORK!)

Chairs: Professor Kia Nazarpour & Professor Mike Reed

09:35 Zero to one in medical AI  
Dr Will Briggs, CEO, Naitive Technologies

09:43 Clinical evaluation of an AI-based 2D-to-3D knee bone reconstruction for patient-specific plan in total knee arthroplasty  
Dr Hassan Nemat, Head of Technical Research, Ortoma AB

09:51 Deep learning in the osteoarthritis arthroplasty clinical pathway: a systematic review and meta-analysis evaluating performance in image interpretation  
Ms Amal Ahmed, Medical Student, MSk Lab, Imperial College London

09:59 You've built the device, so what next? Insights from an AI technology on the journey to US clinical adoption  
Dr Catherine Kelly, Chief Operating Officer, Naitive Technologies

10:07 Use of artificial intelligence and saliency mapping to identify novel radiographic markers in failing total hip arthroplasties  
Mr Sai Pendyala, Junior Orthopaedic Clinical Research Fellow, South West London Elective Orthopaedic Centre (SWLEOC)

10:15 Panel discussion

### SYMPOSIUM 2: WHERE WE ARE WITH OUR GOVERNMENT AND THE NHS

Chairs: Professor John Skinner & Mr Keith Tucker

10:30 Communication from the Minister of State for Science, Innovation and Technology  
Mr George Freeman, MP

10:45 Developing an operational AI product  
Mr Achuf Manandhar, Senior Data Scientist, NHS England

10:55 Update from the NHS AI Lab  
Mr Dominic Cushnan, Director of AI, Imaging and Deployment, NHS Transformation Directorate

11:03 Panel discussion

11:15 Refreshments and exhibition

### SYMPOSIUM 3: AI AND HOW IT WORKED FOR ME (OR DID NOT WORK!)

Chairs: Professor Richie Gill & Professor J Mark Wilkinson

11:30 Use of natural language processing techniques to predict patient selection for total hip arthroplasty: results from the Ai to Revolutionise the patient Care pathway in Hip and knEe aRthroplastY (ARCHERY) project  
Mr Luke Farrow, Clinical Research Fellow, University of Aberdeen

11:38 A general-purpose natural language processing tool (ChatGPT) can make complex surgical decisions with confidence similar to experienced surgeons: a comparative analysis  
Mr Kyriacos Pouris, Medical Student, MSk Lab, Imperial College London

11:46 Comparative analysis of generative artificial intelligence (AI) versus manual data analysis in orthopaedic patient data  
Mr Mustafa Alnaib, Orthopaedic Surgeon, Maidstone and Tunbridge Wells NHS Trust

11:54 Guidelines Genius: A start-up in orthopaedic health education using generative pretrained transformer architecture  
Dr Salah Hammouche, Senior Trauma and Orthopaedic Registrar ST8, Imperial College London and Founder & Director, Guidelines Genius  
Dr Adam Julius, ST4 Anaesthetist, London School of Anaesthesia  
HEE Clinical Fellow in Artificial Intelligence, UCLH

12:02 The application of large language models to orthopaedic practice  
Dr Arwel Poacher, Academic Core Trainee (WCAT), University Hospital Wales

12:10 Panel discussion

### SYMPOSIUM 4: EXPERIENCES FROM OTHER DISCIPLINES

Chairs: Professor Alan Fraser, Professor Rob Nelissen & Professor J Mark Wilkinson

12:20 CORE MD AI from a cardiologist  
Professor Frank Rademakers, Emeritus Professor of Cardiology, KU Leuven, Belgium

12:28 The path and the challenges in developing ML for retinal screening  
Mr Richard Hewitt, Principal Consultant, Government, Health and Housing, NEC Software Solutions

12:35 The use of AI for survival modelling of hip and knee implants  
Professor Visakan Kadirkamanathan, Professor of Signal and Information Processing, Department of Automatic Control and Systems Engineering, University of Sheffield

12:45 Panel discussion

13:00 Lunch and exhibition



## SYMPOSIUM 5: GOVERNANCE

Chairs: Ms Christine Glover, Professor Caroline Hing & Professor John Skinner

- 13:45** **The important data protection and ethical issues before you implement AI**  
Mr Taj Sallamuddin, Information Lawyer, Information Governance Services Limited
- 13:53** **MHRA, the rules, the UKCA**  
Ms Lucy Spain, Benefit Risk Evaluation Assessor, Musculoskeletal, Trauma and Cosmetic Team, MHRA
- 14:00** **Health Research Authority / Research Ethics Service**  
Ms Charlotte Allen, Quality and Performance Manager, Health Research Authority
- 14:08** **Caldicott Guardians**  
Mr Vipin Asopa, Consultant Orthopaedic Surgeon (Academic Surgical Unit), South West London Elective Orthopaedic Centre
- 14:15** **Big data and building patient-powered platforms in orthopaedics**  
Mr Manoj Ramachandran, Consultant Paediatric Orthopaedic and Trauma Surgeon/Professor and Director of Innovation, Barts Health NHS Trust
- 14:23** **The rules which we need to observe**  
Dr Justin Green, Orthopaedic Registrar, Northumbria Healthcare NHS Foundation Trust and ORUK / BHS Research Fellow
- 14:30** **Panel discussion**

## SYMPOSIUM 6: AI AND HOW IT WORKED FOR ME (OR DID NOT WORK!)

Chairs: Professor Deiry Kader & Mr Daniel Jones

- 14:50** **Integration of gait function data into an orthopaedic AI algorithm**  
Dr Matt Thornton, Technical Lead, Motor Learning Lab, Royal National Orthopaedic Hospital
- 14:58** **Artificial intelligence in orthopaedics: Can chat generative pre-trained transformer (ChatGPT) pass section 1 of the fellowship of the Royal College of Surgeons (trauma & orthopaedics) examination?**  
Mr Ekemini Ekpo, Trauma & Orthopaedic Registrar (ST4), Guy's and St Thomas' NHS Foundation Trust
- 15:06** **Transfer learning with convolutional neural network ResNet50 model for radiographic prediction of one-year patient reported outcome post uni-compartmental knee arthroplasty**  
Dr Jack Tu, ORUK Early Career Research Fellow, Oxford Orthopaedic Engineering Centre

- 15:14** **A transfer learning model with CNN ResNet50v2 for patella and femur detection from ultrasound images**  
Mr Karthik Saravanan, Medical Student, University of Oxford
- 15:22** **Operating theatre list scheduling of elective joint replacement surgery can be improved by machine learning: A systematic review**  
Dr Christopher Spence, Clinical Fellow in Orthopaedics, Cleveland Clinic London

### 15:30 Panel discussion

#### Access to data

Chairs: Mr Vipin Asopa, Mr Will Briggs & Mr Peter Harris

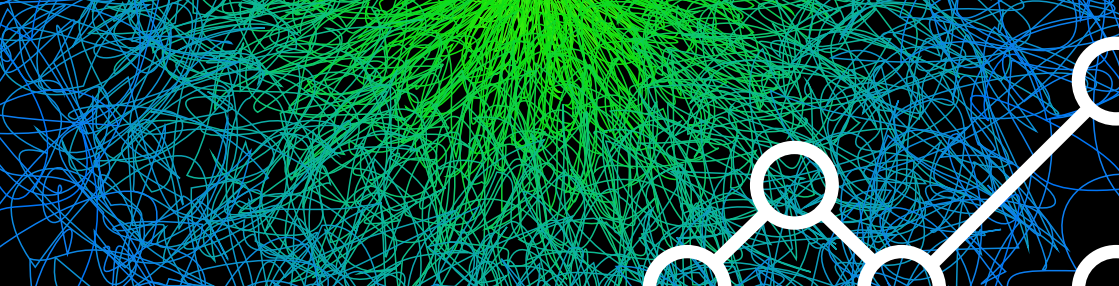
- 15:40** **Obtaining data for M/L AI from PACS**  
Mr Daniel Jones, Business Director UKI, Gleamer AI
- 15:48** **Microsoft and data provision**  
Dr Umang Patel, Chief Clinical Information Officer, Microsoft
- 15:56** **Panel discussion**

### 16:05 Refreshments and exhibition

## SYMPOSIUM 7: FUNDING

Chairs: Professor Ferrante Neri & Ms Ines Reichert

- 16:25** **ORUK investment in AI in MSK: what have we learnt so far?**  
Dr Arash Angadji, CEO, Orthopaedic Research UK
- 16:30** **NIHR-ORUK funding collaboration update**  
Dr Helen Compton, Stakeholder Engagement Manager, Innovations, NIHR coordinating centre
- 16:38** **Maximising the success of your innovation!**  
Mr Tom Underwood, Delivery Manager, NHS Horizons
- 16:46** **Building a successful funding application**  
Mr Sasha Karakusevic, Project Director, NHS Horizons
- 16:54** **Building and funding a global healthcare AI company from scratch**  
Mr Manoj Ramachandran, Consultant Paediatric Orthopaedic and Trauma Surgeon/Professor and Director of Innovation, Barts Health NHS Trust
- 17:05** **Panel discussion**



**SYMPOSIUM 8: WRAP UP**  
Chairs: Mr Vipin Asopa & Mr Keith Tucker

- 17:10 The importance of AI and ML in the future of orthopaedics**  
Professor Fares Haddad, Professor of Orthopaedic and Sports Surgery and Consultant Orthopaedic Surgeon, University College Hospital  
Professor John Skinner, Past President, British Orthopaedic Association
- 17:18 Prizes** (Vote on Slido for your favourite poster and proffered paper)
- 17:21 Presentation by the winner of the essay competition**  
Dr Nimra Akram, Junior Clinical Research Fellow, SWLEOC / Epsom and St Helier University Hospitals NHS Trust
- 17:25 Closing remarks**  
Dr Arash Angadji, CEO, Orthopaedic Research UK  
Mr Keith Tucker, Trustee, Orthopaedic Research UK

**17:30 The Furlong networking drinks reception and exhibition**

**19:00 Close**



**Day 1 is an educational workshop for non-specialist AI users**

- Monday 6 November 2023, 14:30 - 20:00**  
The Medical Society of London  
Lettsom House, Chandos Street  
London W1G 9EB  
Attendees at the workshop will be limited to 40 in-person attendees (first come, first served)

**Day 2 is the AI conference where all clinicians, scientists, engineers and industry experts are welcome to attend**

- Tuesday 7 November 2023, 09:00 - 19:00**  
Royal Society of Medicine  
1 Wimpole Street  
London, W1G 0AE

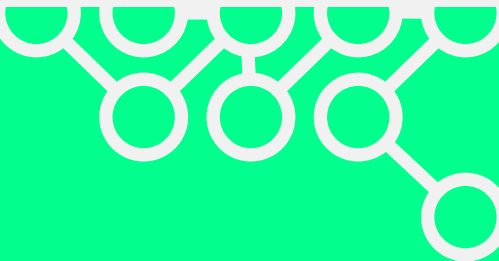
Day 1 & 2's venue are around the corner from each other.

**Travelling by tube**

- Oxford Circus station (Victoria, Bakerloo, Central lines) & 4 minute walk
- Bond street (Central, Jubilee lines) & 5 minutes walk
- Great Portland Street (Hammersmith & City, Circle lines) & 15 minutes walk

**Travelling by train**

- London Victoria Station** (Gatwick Express) & 2 stops on the Victoria line to Oxford Circus or 10 minutes by taxi
- London Charing Cross station** & 2 stops on the Bakerloo line to Oxford Circus or 10 minutes by taxi
- London Euston Station** & 2 stops on the Victoria line to Oxford Circus or 10 minutes by taxi
- London King's Cross & St Pancras Station** (Eurostar) & 3 stops on the Victoria line to Oxford Circus



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