Fellowship in Clinical Artificial Intelligence

Fellow: Robert Miller

Supervisor: Prof J. Teo

AI CENTRE for Value Based Healthcare
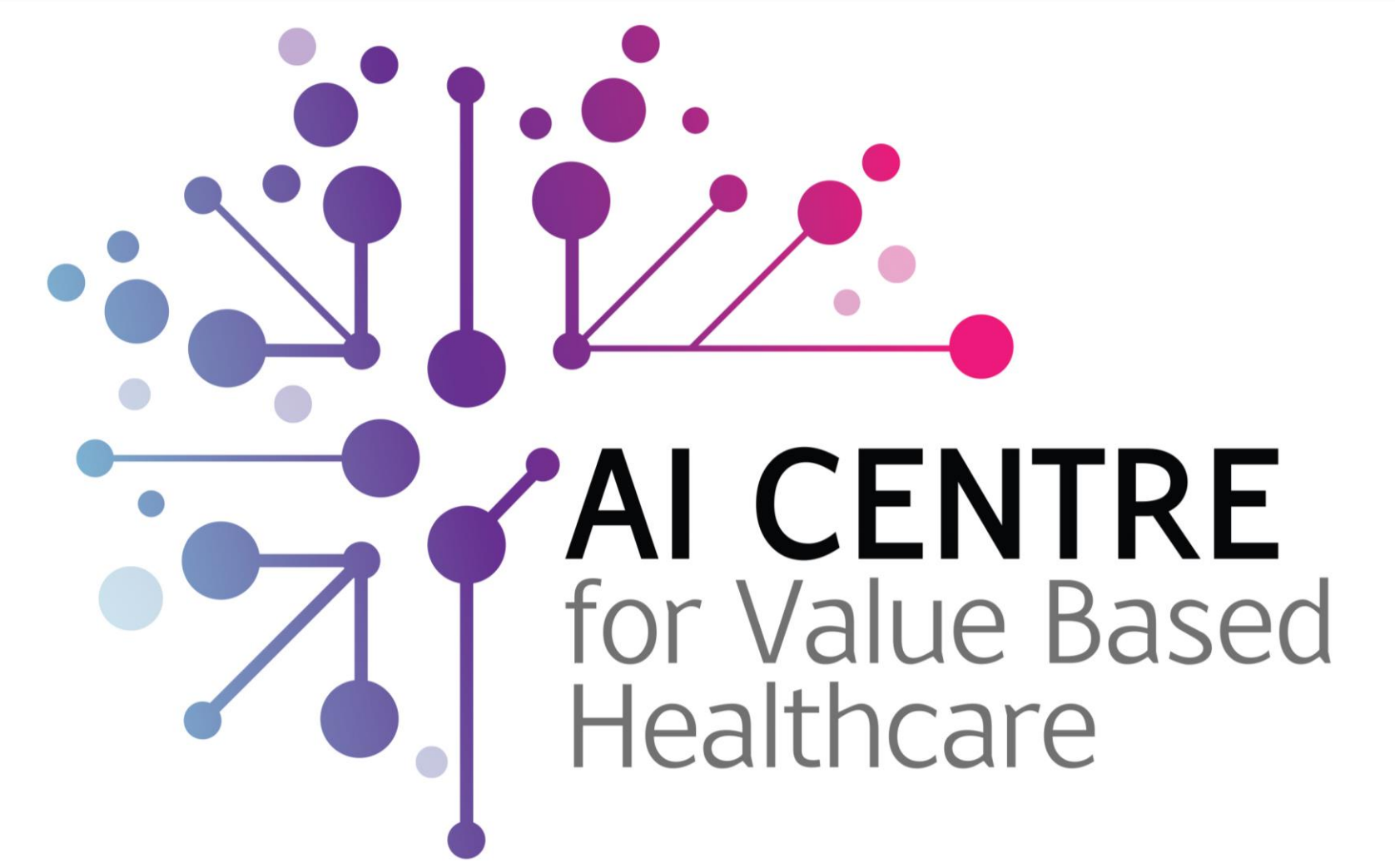
Inter-cranial haemorrhage program (IHP)

Overall aim
Improve the currently available IHP model

Project aim
Employ and evaluate the use of active learning AI (MONAI label) to improve intra-cranial haemorrhage segmentations

Steps
1) Train MONAI label
2) Evaluate performance
3) Use MONAI label to increase IHP training

Novice clinician vs. MONAI label segmentation			
DICE scores	Novice	MONAI	P-value
Haemorrhage			
Overall	0.91	0.99	**<0.05**
Easy scans	0.98	1.00	>0.05
Hard scans	0.85	0.99	>0.05
Calcium			
Overall	1.0	0.99	0.52
Easy scans	1.0	0.98	-
Hard scans	0.99	1	-
Intra-ventricular haemorrhage			
Overall	0.99	1.00	**0.08**
Easy scans	1.00	1.00	>0.05
Hard scans	0.99	1.00	>0.05
Ventricular blood ('hard scans only')			
Overall	0.42	0.82	**0.02**

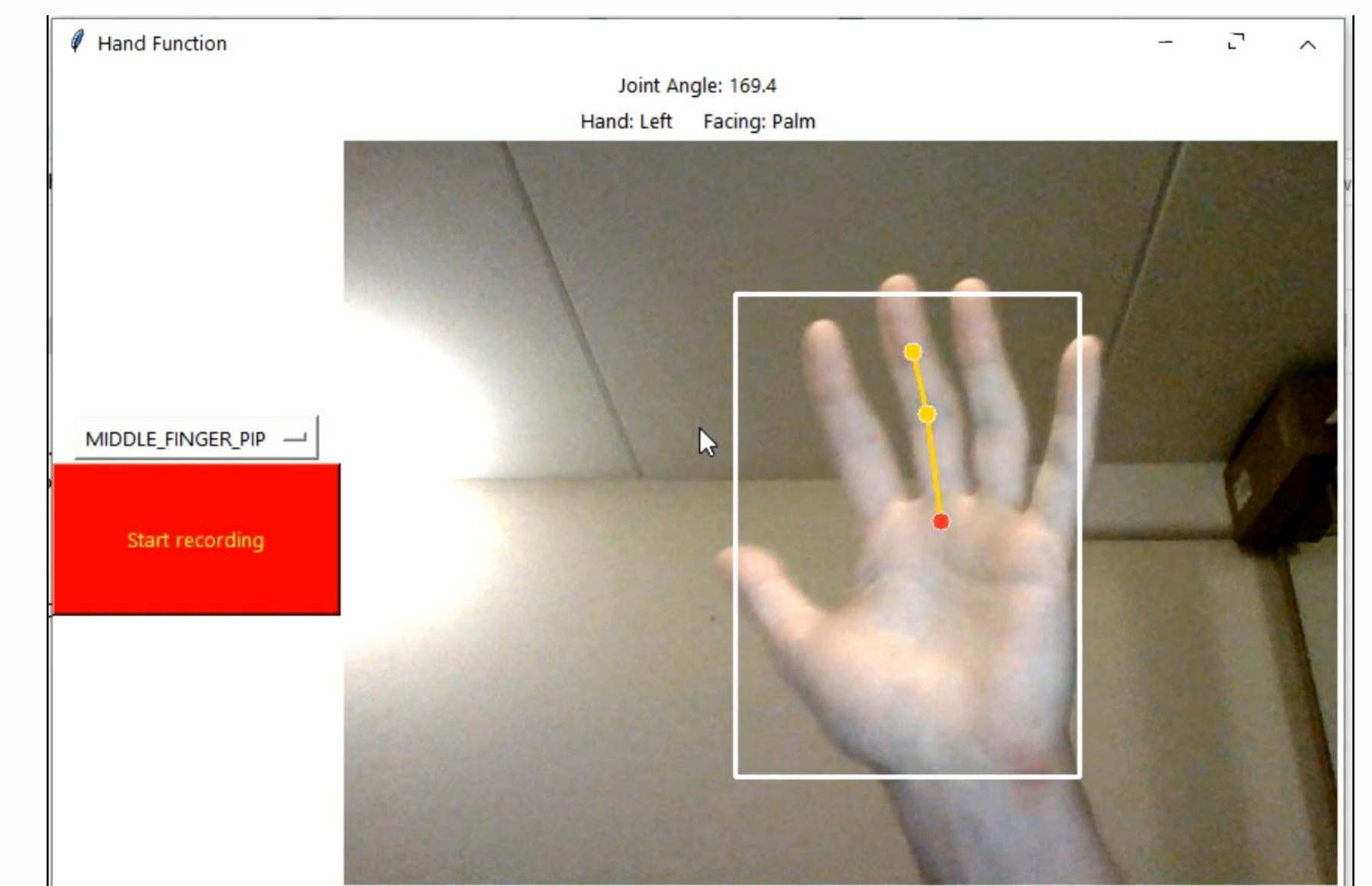### Computer vision and machine learning to automate hand function analysis

Overall aim
Produce a model using computer vision to automate hand function analysis
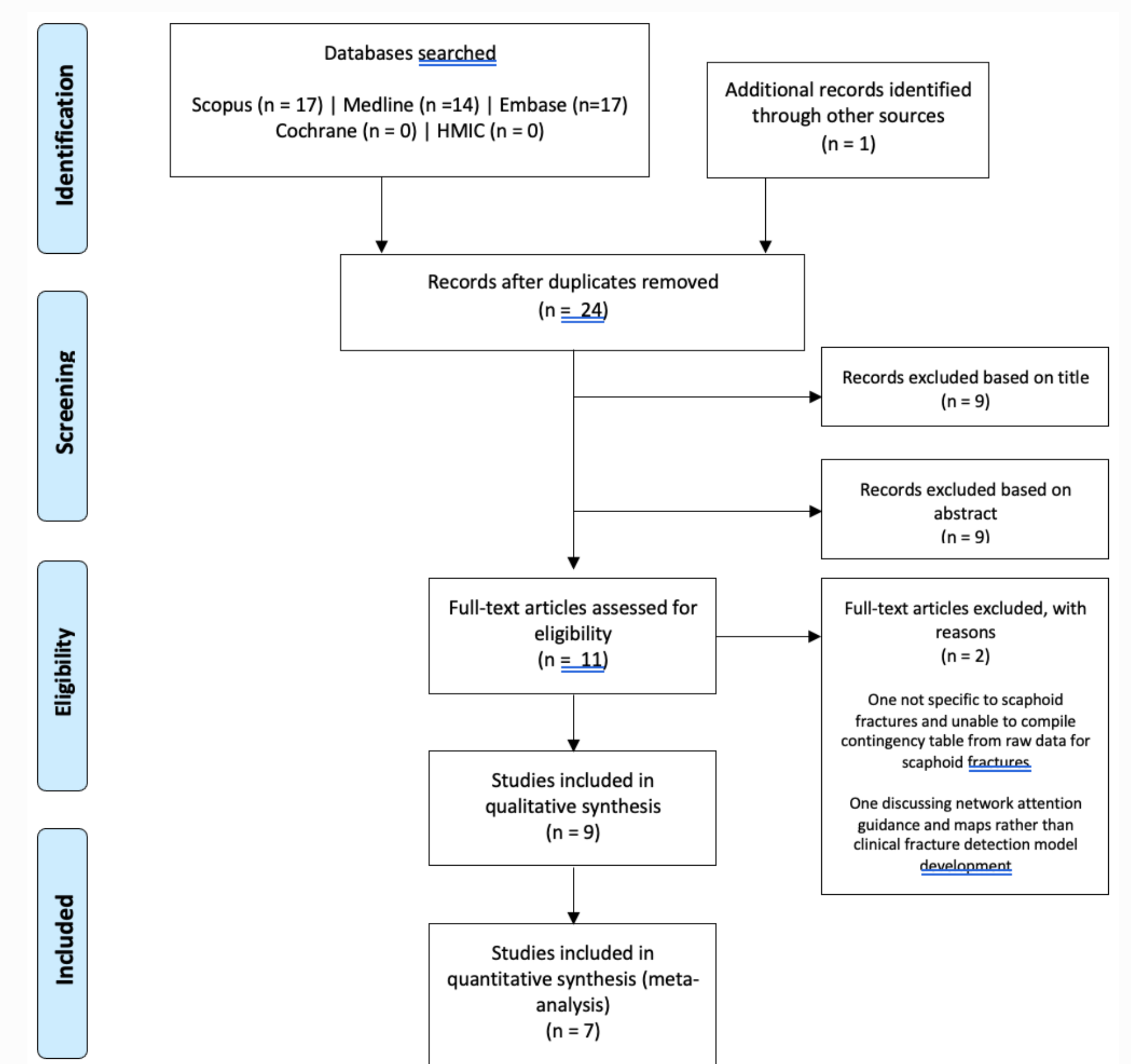
Project aim
Harness Google Mediapipe to track each hand joint and estimate min/ max/ range of joint movement (in degrees)

A systematic review and meta-analysis of scaphoid fracture detection models

Steps:
- Systematic literature review
- Qualitative analysis
- Quantitative analysis (meta-analysis)
- Model design interrogation
- Quality and risk assessment (CLAIM and PROBAST tools)
- Model development recommendations

The future & output

Publications in progress:

R. Miller et al., **A systematic review and meta-analysis of scaphoid fracture detection models**

Topol Digital Fellowship

Health Education England

- Segmentation model and pipeline development for automated hand x-rays interpretation
- Scaphoid fracture detection
- Patient/ public / clinician engagement

Guy's and St Thomas' NHS Foundation Trust | NHS **Digital Academy** | **King's College Hospital** NHS Foundation Trust | NHS **Imperial College Healthcare** NHS Trust | King's College LONDON