



AI Technologies for Health and Wellbeing – Friday 14th June 2024

9.00-9.30	Arrival and refreshments		
9.30-9.45	Introduction to the day		Long Tran-Thanh – University of Warwick
Session 1 – Industrial			
9.45-10.00	Artificial Intelligence and Machine Learning in Drug Development	Our vision at AstraZeneca is for a future of individualised healthcare, driven and informed by science and data, and aimed at substantially improving outcomes for patients and healthcare systems worldwide. All our work in BioPharmaceuticals is empowered by digital technologies, data and AI. By harnessing these technologies, we are making extraordinary advances. In this talk I will show how these can impact across the drug development pipeline.	Tom Diethe – AstraZeneca (Head of AI)
10.00-10.15	W8Buddy: the NHS UHCW co-developed Weight Management Technology	Dr Petra Hanson (UHCW; University of Warwick) and Arjun Panesar (DDM Health; University of Warwick) discuss the design and development of the only NHS co-developed specialist weight management service,	Petra Hanson / Arjun Panesar

		<p>W8Buddy. Within just 24 months, the technology has achieved NHS DTAC status, NICE recommendation for specialist weight management and is the #1-rated health app used in the NHS (97%; Orcha). Learn how the solution was designed with patients, developed to solve a clinical need, embedded within existing services and used as a platform to empower patients with AI.</p>	
10.15-10.30	Funding Opportunities	A brief talk on what funding opportunities are available.	Rob Hollingworth – Research & Impact Services, University of Warwick (Impact Manager)
10.30-10.45	AI opportunities in proton beam therapy	Proton beam therapy is a recent technology in the UK used for treating difficult cancers. There are currently two facilities in the UK, The Christie Manchester and UCL Hospital London. Research teams around these facilities are still learning how to optimally work with this new technology and there are many open questions as to how to improve its use. I will introduce some basic facts and recent modelling behind proton beam and how this opens the door to the use of AI in this domain.	Andreas Kyprianou – University of Warwick (Director of CAMaCS)
10.45-11.00	Boosting Work Performance: Enhancing Human-Technology Interaction with Machine Learning	In this talk, we will explore cutting-edge advancements in non-contact biometric monitoring technologies and their transformative impact on work performance. We will delve into how machine learning is revolutionizing human-technology interactions by enabling more accurate and insightful health and environmental assessments. Key topics will include remote photoplethysmography (rPPG), thermography, facial expression analysis, and their applications in workplace wellness and productivity. Join us to discover how integrating	Enrique Munoz de Cote – CellClar (VP of AI)

		AI-driven biometric monitoring can lead to healthier, more productive work environments.	
11.00-11.30	Break	Refreshments in the Lounge	
Session 2 – Healthcare			
11.30-11.45	Digital Linguistic Biomarkers in Neurodegeneration	Digital Linguistic Biomarkers are powerful, low-cost and completely non-invasive biomarkers that can tell us a lot about a person, from their wellbeing status to their cognitive state. I will highlight how useful they can be in the case of patients with neurodegeneration.	Melanie Jouaiti – University of Birmingham
11.45-12.00	Machine Learning based Health Assessment using wearables	This talk presents ML-based automated health assessment using wearable sensors, which can provide objective measurement for continuous monitoring. Depending on resources like annotation, interpretability, clinicians' input, and expected outcomes, the best strategy to model a health assessment task varies. Considering accuracy and interpretability, I will outline a general processing pipeline and briefly introduce our recent sensor-based health assessment works, including Perinatal Stroke Screening for infants, Parkinson's disease classification, Remote Stroke Rehabilitation Monitoring, and fatigue assessment.	Yu Guan – University of Warwick
12.00-12.15	AI for Clinical Impact and Discovery: Computational Biology and Pathology at Warwick	Explore the transformative potential of AI and machine learning in computational biology and pathology at Warwick. This talk presents cutting-edge research demonstrating how advanced algorithms drive clinical impact and discoveries, enhancing diagnostic precision, and uncovering new biological insights.	Fayyaz Minhas – University of Warwick

12.15-12.30	Revolutionizing Endovascular Intervention: The Role of AI and Robotics	In recent years, artificial intelligence (AI) has emerged as a transformative force across various medical disciplines, including endovascular intervention. This talk explores the intersection of AI, robotics, and endovascular procedures, highlighting how AI-driven technologies are enhancing diagnostic accuracy, procedural planning, and post-operative care. We will delve into the applications of machine learning algorithms in imaging analysis, real-time decision support systems, and predictive analytics for patient outcomes. Case studies will illustrate successful implementations, showcasing improved efficiency and reduced complication rates. Attendees will gain insights into current advancements and the future potential of AI and robotics in revolutionizing endovascular interventions, ultimately leading to more personalized and effective patient care.	Anh Nguyen – University of Liverpool
12.30-14.00	Lunch and networking	Private Dining Room	
Session 3 – Explainability			
14.00-14.15	Few-shot learning for NLP	In this talk I will address the challenge of learning from limited data for a range of NLP tasks and languages using parameter efficient approaches. I will present our work on few-shot learning from scratch without any language model pretraining, and show its effectiveness against strong baselines, using only a fraction of the parameter count of LLMs. I will furthermore present our recent research on few-shot learning via soft-label prototypes that can capture the simultaneous membership of data points into several classes, and show how	Helen Yannakoudakis – Kings College London

		they can learn previously unseen NLP tasks from very few examples.	
14.15-14.30	Decoding Biomedical Data: NLP Strategies for Enhanced Drug Monitoring	Natural Language Processing (NLP) can significantly advance pharmacovigilance and similar healthcare fields. In this talk, I will begin by exploring the role of Large Language Models (LLMs) in extracting information from unstructured clinical notes. Next, I discuss how reversing this process -converting structured information from the FDA's FAERS database into narrative text- enhances our understanding of causal relations in drug safety. Lastly, I will conclude by highlighting how automatically simplifying complex medical documents can improve accessibility for medical professionals, patients, and machines alike. This talk will serve as a starting point to showcase the potential of the recent NLP methodologies in analysing biomedical texts and tables, extending well beyond pharmacovigilance.	Gabriele Pergola – University of Warwick
14.30-14.45	Transparent AI for Healthcare – explainable models or trustworthy decisions?	In this talk, we present transparent AI in healthcare through two distinct approaches – that of explainable models (with the example of hybridisation of data driven deep learning with interpretable mechanistic models) and trustworthy decisions (with the example of uncertainty quantification of individualised predictions by conformal analysis) and ask the question which is better for responsible and safe AI for personalised healthcare and precision medicine?	Rohan Chakraborty – Alan Turing Institute
14.45-15.00	Automatic sleep staging, a solved and unsolved problem?	In this presentation, I will talk about the state-of-the-art AI approaches for automatic sleep staging and discuss why (and why not) it is a solved problem. I also share my view on how	Huy Phan - Amazon

		the next generation of sleep staging AI should offer and what research problems need to be addressed.	
15.00-15.15	Capturing cancer screening journeys on a population-wide scale	The construction and quality assessment of a dataset comprising over 50 million screening episodes from over 13 million women forms the first milestone in the long term NIHR funded study ATHENA-M about how eligibility, screening interval and recall threshold affect the benefits and harms of breast cancer screening. Routine screening records (invitation, attendance, test results) from all 79 English NHS breast screening centres between 1988 and 2018 were linked to cancer registry (cancer characteristics and treatment) and national mortality data. Data quality was assessed using comparability, validity, timeliness, and completeness.	Julia Brettschneider – University of Warwick
15.15-15.30	Using AI/ML to identify cancer patients who are at-risk of developing serious adverse events	The analysis focuses on the use of standard clinical trial measurements and also considers the severity of the adverse event. The latter is crucial as serious adverse events can range from grade 3 which requires hospitalisation to grade 5 which is death due to the adverse event. In the talk I will also be explaining how the AI algorithm works and how to interpret results effectively from ROC curves, AUC scores and Shapley additive explanation plots etc, in order for there to be more transparency between AI experts and healthcare specialists.	Linda Wanika - University of Warwick
15.30-15.45	Closing remarks		