Data Science for Climate and Health Event 5th March 2025, SS Great Britain

Abstracts and Speaker Biographies

Keynote Talk – Aline Villavicencio

Developing Artificial Intelligence and Data Science for Modelling Health and the Climate

Abstract: In this talk I will discuss how some of the advances on AI and data science have contributed towards modelling health and climate. In particular, I'll talk about how data about our interactions can reflect important information about clinical conditions, and how advances in natural language and speech processing can help in developing technology for early detection of clinical conditions, like Dementia and Alzheimer's disease, and can assist in providing support for clinical decision making. Women have made significant contributions to these research fields, and I will use this opportunity to highlight several recent projects. My own research and career have touched on applications of Natural Language Processing and time will be spent sharing the challenges and opportunities along the way as a woman in Computer Science in different countries.

Biography: Aline Villavicencio is the Director of the Institute of Data Science and Artificial Intelligence, University of Exeter, affiliated to the Department of Computer Science, University of Sheffield (UK), has a Fellowship at the Alan Turing Institute and is a Visiting Professor at the Federal University of Rio Grande do Norte (Brazil). Before these, she held academic positions in the Institute of Informatics, Federal University of Rio Grande do Sul, Brazil (between 2005 and 2021) and in the School of Computer Science and Electronic Engineering, University of Essex, UK.

Nicola Wiseman

Ensemble-based machine learning for ocean biogeochemistry

Abstract: The global oceans cover >70% of the Earth's surface and absorb almost 30% of carbon dioxide (CO₂) emissions from human activities. CO2 gas dissolves in the surface waters of the oceans and is transported away from the atmosphere by physical processes like currents as well through the marine food web via microscopic algae called "phytoplankton." Because the oceans are so inherently large and diverse, it can

be very difficult to take physical measurements that fully represent the true variability between different ocean regions.

Ensemble-based machine learning provides a valuable tool for taking sparse observations from around the world and producing global-resolved maps of important oceanographic data, such as species distributions, methane gas production, and other biogeochemical variables. Here I will present three such projects and discuss how these studies improve our understanding of the modern oceans as well as their use in helping us predict the effects of climate change.

Biography: Dr. Nicola A. Wiseman is a Research Associate in the Bristol Research Initiative for the Dynamic Global Environment in the School of Geographical Sciences at the University of Bristol. They received their Bachelor's of Science in Environmental Science with high honours in research from the University of Rochester in New York, USA before completing their Ph.D. in Earth System Science at the University of California, Irvine. Their research focuses on using computational methods to understand the ocean's role in carbon dioxide uptake, particularly the role of microscopic algae known as "phytoplankton." They have co-authored research articles in Science and Nature Communications and have presented at international conferences for the American Geophysical Union, European Geophysical Union, and Challenger Society. Dr. Wiseman is currently working on a project funded by the Jean Goulding Institute called "C-GAPS: Cellular to Global Assessment of Phytoplankton Stoichiometry" which aims to compile laboratory data from universities around the globe that measure the carbon and nutrient usage of marine phytoplankton and use statistical models to understand what drives variations in carbon uptake by these phytoplankton.

Laura Tan

Using data and AI to activate proactive health action: Avid's healthtech journey

Abstract: In this talk, Dr Laura, a clinician turned clinical academic and co-founder of digital health company Avid, shares her experience in developing Avid's AI and datadriven approach to activating proactive health care. Avid's mission is to engage patients further upstream through targeted care programs that combine clinical health coaching, content, and data insights to reduce risk. The talk will explore Avid's use of behaviour science, clinical rigour and novel technologies, including their work using data science to further target care and AI initiatives such as AI avatars to scale. Dr Laura will also discuss the opportunities and challenges of implementing AI within the healthcare system, including navigating the regulatory landscape and balancing the power of AI to scale and engage, whilst preserving human empathy and expertise where it's needed most. Finally, Laura will offer practical advice for those looking to get involved in healthtech, data science, and AI.

Biography: Dr. Laura Tan is a Medical Doctor (MBBS BSc), NHS Clinical Entrepreneur and Co-founder of Avid, where she combines her clinical, technical and academic expertise to build and scale impactful care solutions to shift healthcare to be more preventative, predictive and personalised. Graduating from Imperial College Medical School, she worked across a wide variety of specialties, also securing an Academic Clinical Program at NHS Wales with research interests across data science, data analytics and AI in the clinical setting. She also completed an intercalated Cardiovascular Science BSc, building software to automate analysis of echocardiographic images. After building further programming skills in app and web development, she co-founded Avid - a VC backed digital health start up for proactive health action, through coaching, data and AI. She is driven by a mission to redefine preventative healthcare at scale - blending human expertise with AI to supercharge, in a product that combines consumer-grade engagement with clinical rigour and meaningful outcomes.

Beatriz Costa Gomes

Computer vision across fields: neurons, neural networks and everything in between

Abstract: My work with computer vision has taken me across multiple disciplines, from neurobiology to cryo-electron microscopy and environmental science. I have applied image analysis techniques to analyse neuronal cells, find molecular structures, and even analyse biological data, gaining insight into how computational tools can be adapted to different scientific challenges. This talk will reflect on the experience of working across fields, the challenges of interdisciplinary research, and the practical aspects of transitioning between domains. I will also discuss the role of collaboration and how skills in computer vision can be leveraged in a variety of scientific contexts.

Biography: Bea is currently a Turing Research Fellow at the Alan Turing Institute. Previously, Bea worked as a Post Doctoral Research Associate in the molecular biology group at the Turing, bridging between sciences. During her PhD, she developed tools to fast-track the analysis of diseased neurons in culture, with different neurodegenerative diseases. As a science communicator, Bea is one of the hosts of the Turing Podcast and often speaks at events for all ages to talk about science and scientific careers. In her free time, she also does amateur stand-up comedy.

Penny Holborn

Empowering Progress: Advancing Data Science Careers and Driving Transformation at Ofgem through Data and AI

Abstract: This presentation explores my career journey in leading Data Science learning and development programs across academia and government. Drawing from my experiences, I will share practical tips for career progression in data science, focusing on essential professional skills and strategies for advancing within the field. Additionally, I will discuss my current role at Ofgem, where I lead initiatives to enhance data and AI literacy across the organisation. Through case studies, I will highlight how data and AI are transforming Ofgem's operations, improving decision making processes and driving innovation. By linking these advancements to the urgent challenges posed by climate change, I will demonstrate how data-driven solutions play a critical role in achieving sustainability goals and shaping the future of energy regulation.

Biography: Penny has recently joined Ofgem as the Head of Data & Al Literacy. Prior to that she joined the Data Science Campus at the ONS in September 2021 as Head of Faculty to design and deliver the Government Data Science Graduate Programme and then moved on to lead Data Science Capability building Internationally. Before joining the Civil Service, she was a Senior Lecturer in Mathematics and Data Science at the University of South Wales and was the academic lead for the award-winning Welsh Data Science Graduate programmes. She has a wealth of experience in course development, curriculum design and stakeholder management. Penny has a PhD in Mathematics and a BSc in Mathematics, Operational Research and Statistics from Cardiff University. She is a Fellow of The Higher Education Academy and holds a Post Graduate Certificate in Developing Professional Practice in Higher Education.