



PROGRAMME

UK AvH Association's Annual Research Symposium 2021

17 September 2021

Held online

[Due to the continuing COVID-19 situation, this is a virtual meeting using Zoom video-conferencing]

- 10:20-10:30 Dr James Wilton-Ely (Imperial College London)
President, UK AvH Association
Welcome
- 10.30-11.30 *Fourth Brian Ketterer Lecture*
Prof. Nicole Boivin (Director, Max Planck Institute for the Science of Human History)
How can the past help us to shape a better future?
- 11.30-12.00 **Dr Stefano Albrecht** (University of Edinburgh)
Self-driving cars and R&D work with UK-based company Five AI
- 12.00-12.30 **Prof. Thorsten Fögen** (Durham University)
*Portrayals of doctors and patients in ancient literature:
The example of the Latin epigrammatist Martial*
- 12.30-14.00 Lunch Break
(& ECM for Executive Committee)
- 14.00-14.30 Annual General Meeting (AGM)
- 14.30-15.00 **Dr Sohail Ahmad** (University of Glasgow)
The efficiency of cities in using land: A comparison of Africa and Asia
- 15.00-15.30 **Dr Shannon Bonke** (University of Cambridge)
Renewable energy storage through the synthesis of fuels
- 15.30 Formal close

ABSTRACTS:

Ahmad: Inclusive and sustainable urbanisation is crucial for achieving sustainable development, particularly in Asian and African cities that will accommodate 90% of all growth of the world's urban population in the next three decades. The SDG 11.3. indicator, 'the ratio of land consumption rate to population growth rate', intention to capture inclusive and sustainable urbanisation has a limitation. Density growth rate as an alternative indicator, this study investigates the patterns across Asian and African cities. The empirical analyses are based on the European Commission's Global Human Settlement Layer data, relying on 1203 cities (1011 Asia and 192 Africa) with a population over 100,000 and an area over 20km. Findings reveal

that Eastern Asian cities have sprawled whereas large cities and cities located in Africa, particularly in the Middle and East, have densified over time, after controlling GDP and other factors. Complemented by a case study of eleven cities across the regions, this study reveals a limitation of an indicator to represent inclusive and sustainable urbanisation. Interventions based on contextual understanding is crucial for a transition towards inclusive and sustainable urbanisation. Current de/re-densification occurs because of ill-conceived land policy and the proliferation of unplanned human settlements. These should be addressed through promoting economic density – where cities should opt for vertical growth with appropriate space for infrastructures and economic activities – to reap the benefits of compact development.

Albrecht: The development of autonomous vehicles, one of the great technological challenges of our century, promises safer, greener, and more efficient travel. Yet many questions remain unsolved: How should a vehicle make sense of its surroundings? How to predict the intentions and driving behaviours of other vehicles? What if other vehicles see things that you can't see? How can we "guarantee" safe driving? In my role as Royal Society Industry Fellow, I work with UK-based company Five AI to develop answers to such questions. I will explain why solving these questions poses some very difficult technical problems, and how we can use artificial intelligence and machine learning approaches to tackle them.

Bonke: Eliminating the use of fossil fuels requires strong investment in wind farms and solar panels for renewable energy harvesting. However, this needs to be complemented with energy storage systems to compensate for the natural intermittency of solar and wind. This is challenging on a national scale where days to weeks of energy buffer will be required for stable power and energy security, but it is possible by storing the energy within chemical bonds, i.e. the synthesis of fuels. This approach can eliminate global dependence on fossil fuels, along with their accompanying environmental problems and geopolitical tensions. Fuel synthesis allows solar and wind harvesting in productive locations with the fuel transported for use where and as required, thus creating export opportunities. This approach would redistribute energy resources between nations and help alleviate tensions over resources in oil rich regions while simultaneously addressing climate change. Combustion of a fuel releases energy and by-products, whereas fuel synthesis is the opposite, and puts energy into those by-products to reassemble the fuel. For example, hydrogen produces water when it is burnt, while putting energy into water can split it back into hydrogen and oxygen. This effectively stores the energy within the chemical bonds of hydrogen, ready for use on demand. Alternatively, carbon can be used as a recyclable energy carrier, with renewable energy used to covert carbon dioxide into liquid fuels. Mastering this chemistry would facilitate recycling of carbon dioxide emitted from industry and vehicles to prepare liquid fuels that are compatible with existing infrastructure, and can be stored to provide on-demand power. Such a collection of the carbon dioxide to reuse it makes this process net carbon-neutral, while the UK's 2020 Energy White Paper includes a £1B investment in carbon-capture utilisation and storage initiatives, which provide suitable carbon dioxide reservoirs for the cyclic use of carbon. The concepts of renewable energy storage will be discussed in this talk, and the basis for the chemical questions and research approaches will be introduced

Fögen: The humorous or satirical treatment of medical practitioners and their various interactions with others, especially with their patients, has a long tradition in ancient literature. As far as we can reconstruct, it starts in Greek comedy and is then further elaborated in Menippean satire, the mime and other types of satirical writings. Another genre in which doctors and their patients are caricatured or even ridiculed is epigram. The *Anthologia Palatina* contains a wide range of good examples, which seem to have inspired the Latin epigrammatist Martial (* between A.D. 38 and 41, † no later than A.D. 104), who repeatedly makes fun of bad medical practitioners, but also of the behaviour of patients. In this paper, I will consider the evidence in Martial's corpus and discuss his approach to medicine, the representatives of this discipline and the individuals affected by an illness under different rubrics which are, however, somewhat connected with each other: (1) the doctor as the bringer of death, (2) the doctor in a sexual context, (3) other dubious doctors and a few exceptions, and (4) medical discourse combined with other themes. Material from other authors, especially those collected in the *Anthologia Palatina*, Pliny the Elder and several medical writers, will also be taken into account in order to not only appraise Martial's special take on the theme, but also to scrutinise to what extent his epigrams may reflect certain aspects of real life in the ancient Roman world.

Boivin: How can the past help us to shape a better future? The Anthropocene era is upon us, with humans now the dominant force shaping Earth systems. Yet, as archaeologists and others have discovered, the roots of the Anthropocene extend deep into human history. This talk will explore how humans have altered the Earth over the long term, and what this means moving forward. How can archaeological knowledge of humanity's long engagement with Earth systems help us to shape a better future?