
**LOOKING FORWARD TO
THE NEXT 20 YEARS OF
MULTIDISCIPLINARY AND
INTERNATIONAL
COLLABORATIVE SLEEP
RESEARCH**

WORKSHOP PROGRAMME

19-20 April 2023

OUR SPONSOR



The Institute of Advanced Studies (IAS) at the University of Surrey sponsors workshops and Fellowships at the 'cutting edge' of science, engineering, social science and the humanities. Through this scheme the Institute fosters interdisciplinary collaborations and encourages a flow of international scholars to visit, enjoy their stay at Surrey and leave behind excellent ideas and innovations.

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INTRODUCTION

Sleep is recognised as an important determinant of mental and physical health, quality of life, and a worthy research topic for neuroscientists, molecular biologists, psychologists, sociologists and even mathematicians. Twenty years ago, the Surrey Sleep Research Centre (SSRC) was created with the aim to deliver multidisciplinary research of leading international quality. The SSRC now consists of 8 Faculty members researching sleep from humans to zebrafish, and from genes to dementia. During the first 20 years of its life, SSRC fostered many national and international collaborations, in part through IAS sponsored workshops, contributed to progress in the field and, through multiple media activities, professional societies, industry contacts, and publications in high impact journals, to the visibility of the University. The questions now are: What to do next? What are the main research questions, challenges and opportunities for sleep research for the future? How can sleep research deliver impact and innovation? How can we maintain and expand our network of collaborators, and attract new investigators? The overall aim of this 1.5-day workshop is to address these questions by convening a group of current and future national and international collaborators.

Organising committee:

Professor Derk-Jan Dijk, Surrey Sleep Research Centre
Professor Simon Archer, Surrey Sleep Research Centre
Professor Steven Lockley, Surrey Sleep Research Centre/Harvard Medical School
Professor Anne Skeldon, Department of Mathematics, University of Surrey
Professor Rob Meadows, Department of Sociology, University of Surrey
Dr Julie Seibt, Surrey Sleep Research Centre
Dr Vikki Revell, Surrey Sleep Research Centre
Dr Ines Violante, School of Psychology, University of Surrey

Administrative support:

Institute of Advanced Studies, University of Surrey

PROGRAMME

DAY 1 – WEDNESDAY 19 APRIL

Venue – Innovation for Health Building

(GMT)

13.00 - 13.30 Registration and Refreshments

13.30 – 15.00 **Theme 1 'Bedroom of the future'**
Key Speakers

15.00 - 15.30 Refreshments

15.30 - 17.00 **Theme 1 'Bedroom of the future'**
Flash Speakers

From 18.00 Drinks reception - Treetops, Wates House. Followed by dinner and social event

DAY 2 – THURSDAY 20 APRIL

Venue – Innovation for Health Building

(GMT)

09.00 – 09.15 Refreshments

09.15 – 10.30 **Theme 2 'Dynamics of multimodal data analysis'**
Key Speakers

10.30 – 11.00 Refreshments

11.00 – 12.30 **Theme 2 'Dynamics of multimodal data analysis'**
Flash Speakers

12.30 – 13.00 Lunch

13.00 – 14.30 **Theme 3 'Translation of sleep and circadian research'**
Key Speakers

14.30 – 15.00 Refreshments

15.00 – 16.30 **Theme 3 'Translation of sleep and circadian research'**
Flash Speakers

From 16:30 Farewell drinks and canapes

THEMES AND PARTICIPANTS

Workshop Theme 1

Bedroom of the future

Chairs – Prof Rob Meadows, Dr Ulli Bartsch

Sleep research will no doubt remain multidisciplinary and will make use of novel digital, and machine learning approaches. Sleep research will increasingly move from the sleep lab to the homes of people of all segments of society and be conducted at scale. The questions to be addressed are: What is needed to harness the potential and facilitate the implementations of these new tools? What does the bedroom of the future look like?

Main questions

Within this session, participants will be asked to draw on their varied experiences - across different 'bedroom' sites – to reflect on one or both of the following:

- How will we monitor/ analyse/ optimise sleep in the bedroom in 5, 10 and 50 years?
- What are the clinical/ methodological/ social/ ethical implications of extended sleep monitoring at home?

We will use a group discussion to then collectively build responses to additional detailed questions, such as:

- Who should design the bedroom of the future?
- Do we need to validate every new device?
- Who should own sleep data?
- Is sleep monitoring ethically feasible in people living with psychiatric disorders?
- Can/should we optimise/ rejuvenate/ normalise sleep in ageing and neurodegeneration?
- Do we need to monitor brain activity to understand sleep?
- Should the NHS sponsor a sleep monitoring device for every person in the UK?

Continued ►

Key Speakers – suggested topics/titles (20mins + 10mins questions)

Hans-Peter Landolt: *My dream bedroom of the future*

Gilles Vandewalle: *Can digital sleep metrics be used as an indicator of brain health?*

Ciro della Monica/Kiran Kumar: *Overview of current monitoring technologies*

Flash Speakers – suggested topics/titles (10mins)

John Groeger: *Sleep and behaviour*

June Lo: *Sleep and vigilance in adolescents*

Malcolm von Schantz: *Circadian health in low-income countries*

Haomiao Jin: *Health technology and ML*

Podium discussion all speakers (30mins)

1. Socio-cultural framework and ethical implications.
2. Digital sleep medicine at scale: digital phenotyping, living cohort studies, large-scale sleep data acquisition.
3. Participant involvement, PPI, citizen science, quantified self.

Workshop Theme 2

Dynamics of multimodal data analysis

Chairs – Prof Anne Skeldon, Dr Ines Violante, Dr Julie Seibt

Sleep research will focus increasingly on simultaneous assessment of multiple levels, from multi-omics via neurons and synapses to EEG, behaviour and cognition and their dynamics across the sleep-wake cycle. Which analytical approaches are most suitable to summarise these data in an informative manner?

What do we mean by dynamics? Time dependence!

Suggested guidance for speakers

Frame your talk around the following points:

- i) Describe your favourite dynamics example from your research.
- ii) What do you like about this example?
- iii) What are the challenges?
- iv) What are the dynamical opportunities for the future?

Session 1 Key Speakers – suggested topics/titles (20mins + 10mins questions)

Pierre Maquet: *Dynamics of the brain – challenges and opportunities*

Paul Franken: *Dynamics across scales – omics to behaviour; challenges and opportunities*

Emma Laing: *Dynamic time series analyses – challenges and opportunities*

Session 2 Flash Speakers – suggested topics/titles (5mins)

Dynamics of the brain

Nick Franks: *Dynamics of glymphatics*

Alpar Lazar: *Dynamics of spatio-temporal patterns in the EEG*

Ines Violante: *Dynamics of neuromodulation (with closed loop auditory stimulation)*

Dynamics of the genome

Colin Smith: *Dynamics of the genome*

Brian Cade: *Dynamics of the genome and disease*

Mathieu Nollet: *Dynamics of stress and sleep*

Dynamics of behaviour

Daan van der Veen: *Dynamics of the metabolome*

Jon Johnston: *Dynamics of glucose*

Anne Skeldon: *Dynamics of behaviour: a mathematical approach*

Dynamic time series analysis

Carla Moller-Levet: *Dynamical analysis of the transcriptome*

Samaneh Kouchaki: *Dynamics using machine learning*

Workshop Theme 3

Translation of sleep & circadian research

Chairs – Prof Steve Lockley, Dr Vikki Revell

Sleep research will remain intertwined with circadian biology and the impact of environmental factors such as light, temperature and air quality, which are all altered in our built-up, and increasingly warmer world, on sleep and circadian processes will be modelled just as climate change is. The effects of work and school schedules on sleep and circadian biology and outcomes such as fatigue, accidents and health will need to be modelled and evaluated. How can we best make progress in this area? What kind of data sets do we need? How can we influence policy and medical education?

Session objectives for speakers to consider:

- i) To understand the barriers to translation of research to widespread policy, commercial and clinical use.
- ii) To understand strategies that have failed or have been shown to overcome these barriers, and develop new strategies.
- iii) Develop new strategies and define a plan for how to apply these strategies in actual examples.
- iv) Define academia policy changes, leadership and training that are needed to facilitate expert-led translation of research (starting with the SSRC).

Session 1 Key Speakers – suggested topics/titles (20mins + 10mins questions)

Introduction: Steve Lockley

Shantha Rajaratnam: *Translating academia to government and policy*

Luc Schlangen: *Translating academia to industry*

Nick Meyer: *Translating academia to the clinic*

Session 2 Flash Speakers – suggested topics/titles (5mins)

Introduction: Vikki Revell

Translation from pre-clinical models

Bill Wisden

Sibah Hasan

Keith Wafford

Matt Parker

Translation in real-world clinical and working populations

Sara Balouch

Shuchita Patel

Katharina Wulff

Karen Robertson

Rachel Firth

Valeria Jaramillo

Simon Archer

Vikki Revell



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