



IAS | Institute
of Advanced
Studies

ADVANCING KNOWLEDGE

Annual review

2021



UNIVERSITY OF
SURREY



Front cover image: 'Choreoluminosity' project by PhD student Michelle Man – see pages 22-23.

About the Institute

Established in 2004, 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. Over the years our events and Fellowships have resulted in many research grants, new collaborations, journal articles and books, as well as much goodwill from all over the world. The Institute's Advisory Board advises on the strategy of the Institute and reviews and recommends which bids should be funded in the annual competition. The Institute is a member of the UK Consortium of Institutes of Advanced Studies and the international Consortium of Humanities Centers and Institutes.

ias.surrey.ac.uk



INSTITUTE DIRECTOR
Nigel Gilbert

Nigel Gilbert has a Distinguished Chair in Computational Social Science at the University of Surrey. He read for a first degree in Engineering and obtained his doctorate on the sociology of scientific knowledge from the University of Cambridge. His main research interests are processual theories of social phenomena, the development of computational sociology, and the methodology of computer simulation, especially agent-based modelling. As Director of the IAS, he is responsible for its development as a centre for international intellectual interchange.

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INSTITUTE COORDINATOR
Mirela Dumić

Mirela is responsible for the overall management of the Institute, including its annual grant competition and the Fellowship scheme. She supports the IAS Director in strategic activities and liaises with the Institute's Advisory Board, the University's academic community, external Fellows and similar institutes in the UK and abroad. She is also responsible for the Institute's publicity and dissemination of outcomes from events and Fellowships.

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INSTITUTE ADMINISTRATOR
Vicki Blamey

Vicki provides general administrative support to the Institute with a particular focus on the workshops that run each year following the Annual Competition. She is the main point of contact for workshop organisers and their administrators, providing support and assistance as required. In addition to her role for the IAS, Vicki is also the Department Administrator and Assistant to the Head of Department of Politics.

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Welcome

Welcome to the Institute of Advanced Studies' Annual Review

The last year has been a very busy and productive one for the Institute of Advanced Studies (IAS). While the pandemic has continued, we have succeeded in working with restrictions to deliver a wide range of workshops and Fellowships which have enriched Surrey's research environment and opened up new avenues for future collaborations.

Earlier this year, IAS Artist-in-Residence Dorita Hannah brought her wealth of experience as an award-winning performance designer to Surrey, conducting a series of inspirational virtual sessions with PhD students in Surrey's Guildford School of Acting. Under our Fellowship scheme we were also lucky enough to welcome Dr Ciaran Lahive to Surrey in person. Dr Lahive, a postdoctoral researcher from the University of Groningen in the Netherlands, spent three months with host Dr Bussemaker within the Department of Chemical and Process Engineering exploring the potential of ultrasound to overcome challenges in processing biomass.

In terms of events, I'm delighted to report that the 2020-21 year has been our

most prolific year ever, with a total of 12 workshops held in the past 12 months. At these events, researchers, practitioners and other stakeholders from across the disciplines have discussed topics as varied as cancer during pregnancy, the secret life of binary stars, online harms in digital youth culture, and enhancing the voices of older people with complex care needs.

Holding these events online has enabled high numbers of delegates from around the world to attend. The 'Feedback Literacy' event, for example, attracted 290 participants from 20 different countries, while at the 'Use and Governance of Plastics' workshop, delegates heard from speakers located in Kenya, Ethiopia, Malawi and Brazil. While there are obviously advantages to meeting in person, conducting events virtually has undoubtedly enabled us to hear voices we would not normally have been able to benefit from. The online format has also allowed events to be held at times to suit different time zones or work patterns, or provided the luxury of a longer event, as in the case of the week-long workshop on pulsation stars.

Our 2021 workshops have already produced some exciting outcomes. These include the publication of a policy brief on international student mobility within Europe which will help to inform decisions

by policymakers and higher education institutions, and three soon-to-be-published special issues produced by the University's Governing Plastics Network. There are also plans to develop a MOOC (Massive Open Online Course) on providing supportive care for women diagnosed with cancer in pregnancy. Following Dr Irene Zorzan's Fellowship at Surrey in 2020, hosted by Dr Matteo Barberis (School of Biosciences and Medicine), the two have undertaken a study which has furthered understanding on the behaviour of certain types of cells, the results of which were published in *Current Opinion in Systems Biology* in March 2021.

As we look forward, we anticipate another exciting year for the IAS, during which we hope to host 10 new Fellowships and a series of multidisciplinary workshops. The work of our Advisory Board plays a vital role in supporting and guiding our activities, and I'd like to take the opportunity to welcome the newest members of our Board, Professor Rachel Brooks (Faculty of Arts and Social Sciences) and Dr Dan Horton (Faculty of Health and Medical Sciences).

We are proud of what has been achieved over the past year, and the positive impact the Institute is bringing both internally and externally. I hope that you enjoy reading this snapshot of our work in 2020-21. .

Nigel Gilbert
IAS Director

Advisory Board

The members of the Advisory Board are drawn from those who hold Distinguished Chairs at the University of Surrey and, ex officio, the Associate Deans of Research and Innovation from the three Faculties. The Distinguished Chairs are recognised as leading figures in their

fields, and have demonstrated academic excellence at an international level as well as in professional organisations and committees in their discipline. They have also made major contributions to the leadership of the University.

The Institute's Advisory Board advises on the strategy of the Institute and reviews and recommends which bids should be funded in the annual competition.

Faculty representatives



Rachel Brooks
Professor of Sociology and Associate Dean, Research and Innovation Faculty of Arts and Social Sciences



Dan Horton
Reader In Veterinary Virology and Associate Dean, Research and Innovation Faculty of Health and Medical Sciences



Julie Yeomans
Professor of Ceramic Materials and Associate Dean, Research and Innovation Faculty of Engineering and Physical Sciences

Distinguished chairs



Jim Al-Khalili
Professor of Physics and Public Engagement in Science



Derk-Jan Dijk
Professor of Sleep and Physiology



Greville Corbett
Professor of Linguistics



Nigel Gilbert
Professor of Sociology



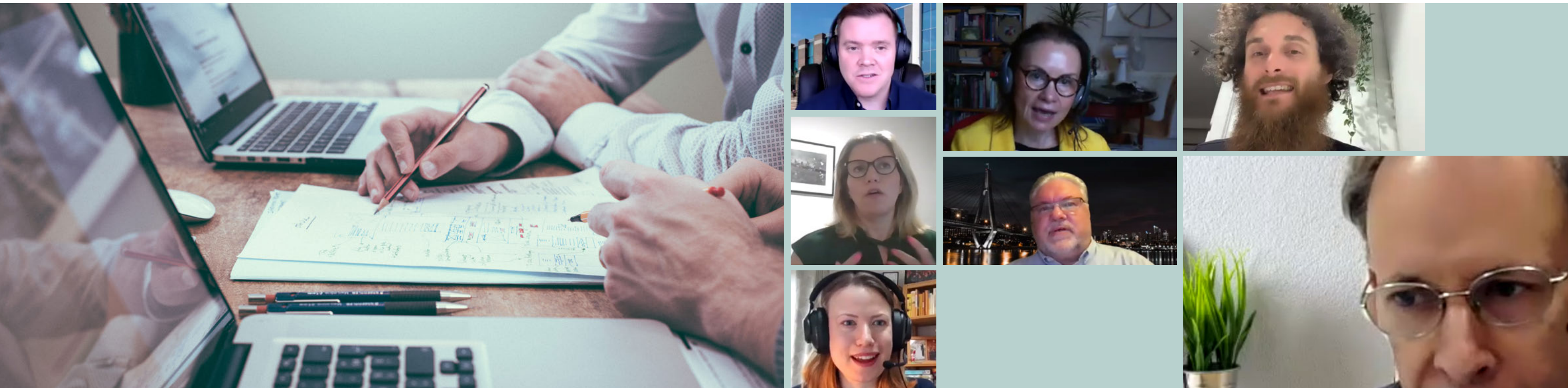
Josef Kittler
Professor of Machine Intelligence



Margaret Rayman
Professor of Nutritional Medicine



Debra Skene
Professor of Neuroendocrinology



Reflecting on feedback

Feedback literacy: From education to professional practice

January 2021

A workshop on feedback literacy in January 2021 was the largest ever run by the IAS, attracting 290 participants from 20 different countries.

There is a growing awareness that the true impact of feedback is not the comments given, but rather how students or employees engage with and use this information. Understanding the impact of feedback literacy is important for teachers, healthcare professionals and supervisors in other workplace settings because it can directly affect future development of students and employees.

On 12 to 13 January, this was the subject of a virtual symposium which brought together nearly 300 delegates from education, the NHS, the police and other organisations. The event, which was co-sponsored by the European Association for Research in Learning and Instruction, was organised by Dr Naomi Winstone (Director of the Surrey Institute of Education) and Dr Edd Pitt (Senior Lecturer in Higher Education and Academic Practice, University of Kent).

On the first day of the symposium, three keynote speeches reflected the breadth of

sectors where feedback literacy matters. Professor David Carless (University of Hong Kong) spoke on teacher feedback literacy, Associate Professor Rola Ajjawi (Deakin University, Australia) on the latest developments in feedback research in the health professions, and Professor Almuth McDowall (Birkbeck, University of London) on feedback and development in the workplace.

The second day of the symposium included 23 individual research presentations and a panel discussion by eminent researchers including the three keynote speakers and Professor David Boud and Professor Phil Dawson from the Centre for Research in Assessment and Digital Learning (CRADLE) at Deakin University, Australia.

Some of the interesting points of discussion to emerge throughout the symposium were the impact of the terminology we use to describe feedback, and the importance of seeing feedback as a two-way 'learning conversation', where the student or

employee and their teacher or manager form a 'coaching alliance'. Other topics were the need to set up spaces for effective feedback processes to take place, and the significance of the longer term effects of feedback, which could happen over months or even years.

A different kind of symposium

Originally planned for summer 2020, the symposium was postponed and moved online due to the Covid pandemic. While this obviously created challenges, it also opened up a number of opportunities – the obvious one being that the event was able to accommodate a far higher number of attendees. With the symposium arranged over two mornings, delegates from all over the world were able to attend, including those in Australia during their evenings.

For the organisers, it was crucial that the symposium opened up conversations across disciplinary boundaries and provided a space for delegates to build

new connections – an objective that was achieved despite not meeting face-to-face.

Dr Winstone explains: "We created lots of opportunities for discussion throughout the event, with optional open networking spaces at the end of each morning – one focusing on research and the other on practice. Our research sessions were particularly effective in providing an informal space for PhD students and early career researchers to share their current work."

Young researchers also benefited from the presence of three 'giants' of feedback research globally – David Boud, David Carless and David Nicol – who were very generous in sharing their advice and ideas.

Some feedback from delegates:

"As a new person in the field and this being my first symposium, I loved how strong the community of feedback researchers is and how welcoming as well. It generated a lot of new ideas while making me question some of my previous thoughts and beliefs."

The organisers endeavoured to make the event as interactive as possible, with delegates able to use the Zoom chat function to ask questions, make comments and share resources, and PollEverywhere to give input during and after the panel discussion. This meant that instead of interaction happening in pockets – as is often the case at a face-to-face event – the organisers were able to download valuable ideas and information and share it with all attendees after the event.

One clear outcome from the symposium will be the publication of papers in a special issue of Assessment and Evaluation in Higher Education in late 2021/early 2022. However the effects of the event go much further in terms of enriching the feedback

"Attending the symposium made me feel enthusiastic about teaching again in a way that has slightly been beaten out of me by the trials of moving teaching and assessment online."

literacy research community and sparking new directions for future research.

Dr Winstone says: "More than anything, we wanted to create an environment where early career researchers could make connections and feel part of the community, and from the feedback we received, I think we achieved this."

"While Covid obviously altered our plans, the pandemic has actually brought a new relevance to the subject because of our reliance on remote learning and hybrid education. Relationships and feedback are more important than ever."

"I really enjoyed the symposium yesterday and today! Wow, your community is really fantastic. People are so enthusiastic, open, positive, critical and self-reflective."

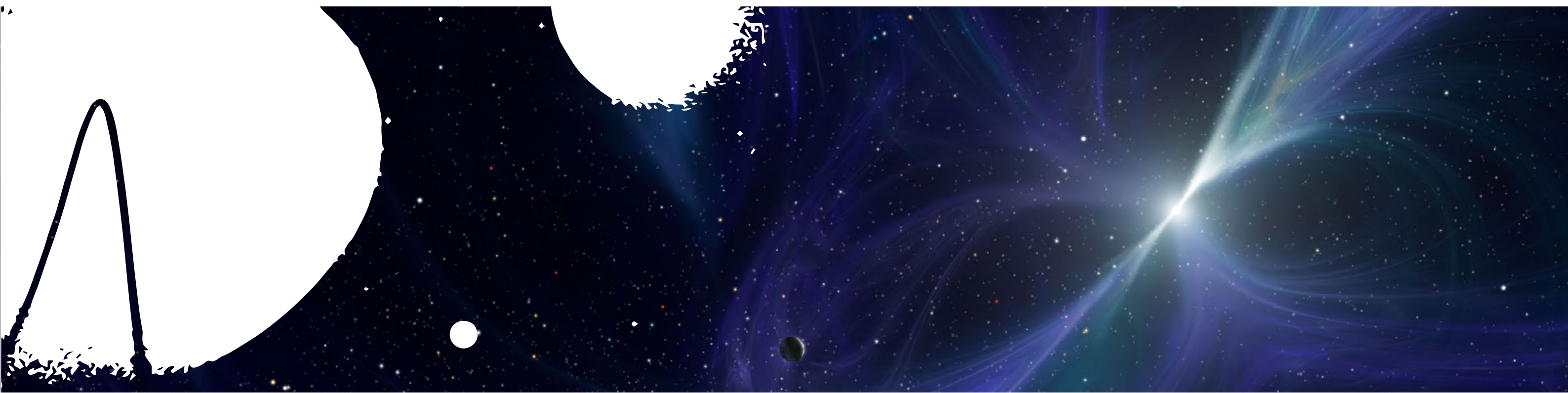


Image: NASA/JPL-Caltech/R. Hurt / wiki commons

The secret life of twin stars

Pulsations in intermediate-mass, massive and/or multiple stars

January 2021

A week-long workshop run by IAS from 18 to 22 January 2021 brought together experts from two distinct communities within the field of astronomy, providing an opportunity to explore stars as never before.

Binary systems (where two or more stars are formed at the same time and orbit each other) represent half of all stars, but until now, asteroseismology – the measurement of oscillation in stars to reveal important information – has rarely investigated them because they are difficult to interpret.

The virtual workshop, organised by Dr Giovanni Mirouh, Research Fellow in Stellar Astrophysics, offered a forum for experts in binary stars to connect with those in the asteroseismology community. The objective was to capitalise on the potential of asteroseismology in the analysis of binary stars, and enable researchers to forge new approaches and techniques that will build on the wealth of data delivered by 21st century astronomical missions.

Dr Mirouh explains why the time was right for this event. “Asteroseismology has become a

hot topic recently, with the recent Kepler and TESS space missions, and the forthcoming PLATO mission in 2024-6,” he says. “Binary stars have also become more and more interesting because we have realised that some things we don’t understand from single star evolution are strongly linked to binaries.”

Postponed from March 2020, the event was rescheduled as a week of online sessions for 32 participants located in the UK, Europe and Japan.

Dr Mirouh and his fellow organisers Dr Robert Izzard and Mr David Hendriks from Surrey’s Astrophysics Research Group, and Dr Andrea Miglio from the University of Birmingham, were particularly keen to give delegates the opportunity for networking and collaboration. They therefore scheduled 90 minutes of discussion time at the end of each day, using Zoom’s breakout room function and Slack to

facilitate conversations, as well as a half-hour catch-up session first thing each morning.

A virtual dinner held one evening provided a great opportunity for participants to get to know each other less formally, with each person doing a ‘show and tell’ of their chosen food and drink, and recipes swapped the following day on Slack.

Delegates heard from many eminent speakers over the five days, including Professor Hiromoto Shibahashi (University of Tokyo) who talked about the search for quiet stellar-mass black holes lurking in binary systems, Professor Gerald Handler (Nicolaus Copernicus Astronomical Center, Poland) who spoke on single-sided pulsators (a new type of oscillating star found in closed binary systems), and Professor Gordon Ogilvie (University of Cambridge, UK) on the effects of tidal forcing in binary stars.

Broadening the discussion, Dr Gavin Lotay (Surrey) presented on experimental advances in explosive nuclear astrophysics, and Dr Gregor Traven (Lund Observatory, Sweden) gave an insight into machine learning in stellar physics.

The workshop provided a valuable opportunity for young researchers to raise their profiles. Postdoctoral researcher Dr Charlotte Gehan (Universidade do Porto, Portugal) opened the first day of the workshop with a review of seismology of solar-type pulsators, and Mr Amadeusz Miszuda, a PhD student from University of Wroclaw, Poland, presented his research into the fascinating properties of a particular post-mass transfer binary system.

Three clear topics for future collaboration came out of the workshop discussions – distorted stars, core rotation in ‘red giant’ stars, and how we can model convection in stars – and a number of research projects are now being pursued towards publication.

Dr Mirouh explains: “One of the big open questions is why, in red giant stars, the core does not spin as fast as it should according to

physical first principles. Some of the rotation is being extracted, and one of the possible explanations is that binary interactions are causing this phenomenon. This is something we are interested in exploring further.

“There was also a lot of discussion on research into the change in shape binary stars undergo when they are close, and the impact this distortion has on the stars’ structure and pulsations, with participants contributing ideas of how to push this idea further.”

With overwhelmingly positive feedback after the meeting, Dr Mirouh and his colleagues hope to organise a follow-up meeting at Surrey or elsewhere in Europe in a few years’ time.

“Above all, I hope that the workshop has inspired young researchers and helped them in their careers,” says Dr Mirouh. “This is really important because they are the people who will be able to take these ideas into the future and foster long-lasting collaborations.”

Some feedback from delegates:

“This was an extremely well-organised workshop with conference-level talks from both experts and up-and-coming researchers across a variety of fields. It was informative, scientifically excellent and, with a clear discussion stream on Slack, allowed for a real exchange of information.”

“I wholeheartedly congratulate the organisers – they did a wonderful job! The online social event was a fine addition. Should we be limited to online meetings in the future, this event set the gold standard!”



July 2021

The right support for pregnant women with cancer

Cancer during pregnancy: developing consensus and priorities for supportive care research and educational initiatives through an international community of practice

Women diagnosed with cancer during pregnancy, and their families, face complex challenges which go far beyond clinical care. An IAS workshop took a creative approach to building a shared understanding of the subject and mapping future research priorities.

Two pregnant women a day in the UK are told the devastating news that they have cancer but, while medical guidelines exist, very little is known about the best ways of providing supportive care to these women. This lack of data and understanding led three academics from Surrey's School of Health Sciences – Professor Faith Gibson, Dr Karen Poole and Dr Jenny Harris – to run a workshop in collaboration with IAS on 7 to 8 July.

The event brought together midwives, cancer and chemotherapy nurses and other clinicians with psychologists, educators, academics and, crucially, women and family members with personal experience of the issue. It also welcomed representatives from Mummy's Star, a national charity dedicated to providing support for affected women and their families.

A cancer diagnosis during pregnancy often means facing challenging and complex decisions, balancing the safety of the unborn child with the delivery of effective cancer treatment alongside maternity care for the mother and her family. Some may also face the heart breaking decision of whether to terminate or continue with the pregnancy.

Dr Poole explains: "A pregnant women with cancer may have other children to care for which will be difficult in practical terms. She will also be worried about being there to care for her children as they grow up. There is a ripple effect as these issues affect not just the woman but also her partner if she has one, and her family and friends."

Dr Harris adds: "Pregnancy is a time when women get close to other women through antenatal support groups, particularly

with their first baby. Women with cancer don't feel they fit in with other new mums, so many feel isolated. They also feel out-of-place among cancer patients."

The workshop, conducted as a Zoom webinar, was opened with a presentation by Professor Frédéric Armand, Chair of the International Network of Cancer, Infertility and Pregnancy in Belgium, who spoke about treatment choices women have once they are diagnosed with cancer. An important message from this talk was that chemotherapy is possible and safe after the first trimester and up until 37 weeks.

With few midwives having experienced the issue before, pregnant women are classed as a high risk pregnancy and their care taken over by a cancer team. With the right care, he said, women can maintain some degree

of choice and near 'normal' pregnancy experiences – for example making the decision to delay chemotherapy for a few weeks in order to still be able to breast feed.

The workshop was fortunate to welcome the world's only specialist cancer midwife, Katrien Von Tornout (University Hospitals Leuven, Belgium), who talked about her role in empowering women and their families, and supporting other clinicians to provide women-centred care. Delegates also heard from clinical psychologist Maria Teresa Miletta (Centro Informazione Maternita e Nascita, Roma, Italy) who presented the findings of the POSMAT initiative, which aims to promote a positive maternity experience for women with cancer across Europe.

Laura Pearson, an author, shared her valuable lived experience of being diagnosed with cancer during pregnancy five years ago. Peter Wallroth, CEO and founder of Mummy's Star, talked about the aspects of care which made a positive difference when his partner was diagnosed with cancer, and described how Mummy's Star provides educational support across the UK and Ireland to women, their families and midwives.

One of the undoubted highlights of the workshop was the involvement of artist Katie Chappell, who captured recommendations from each discussion group visually in real-time.

"Watching Katie create the illustrations live on screen really helped to engage people," says Dr Poole, "and this was particularly useful for the many delegates whose first language isn't English. She succeeded in pulling out the key points in a very accessible way."

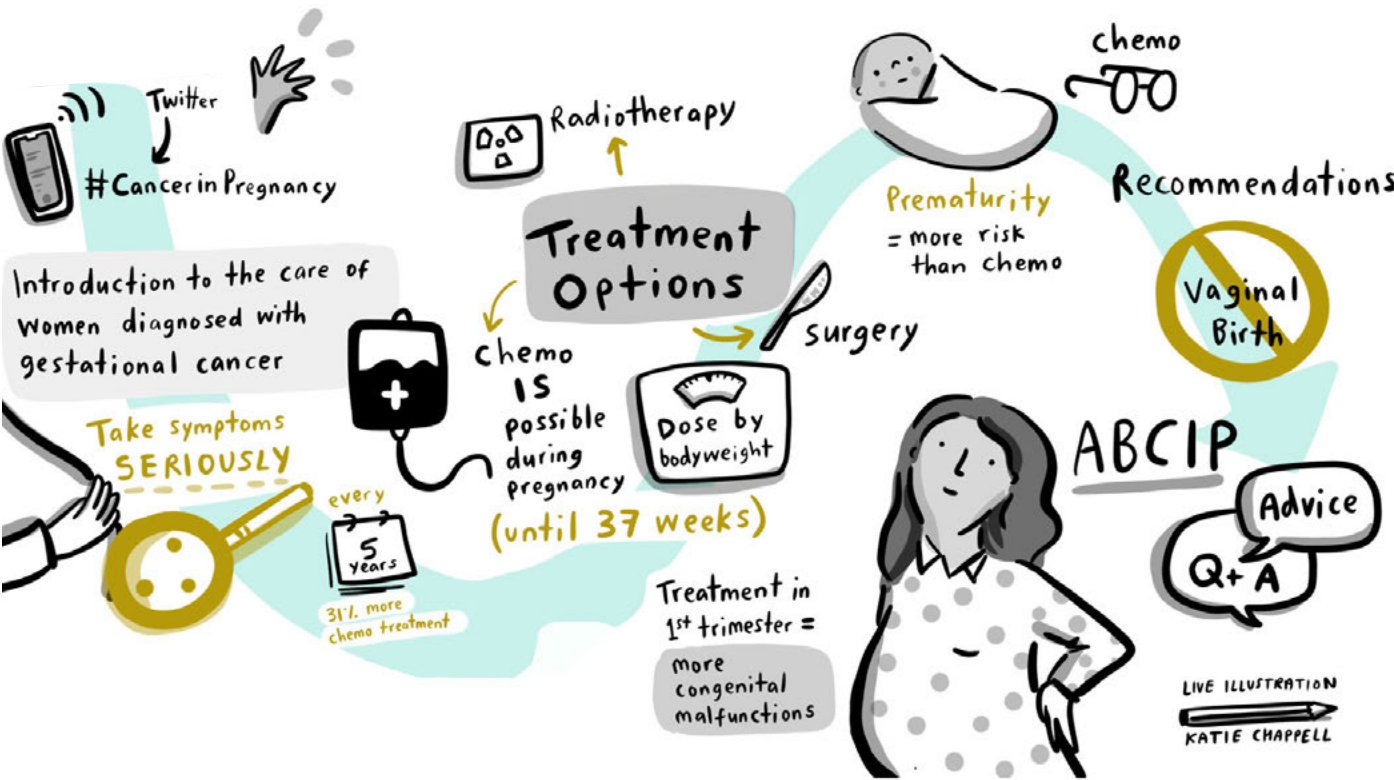
Following the workshop, the Surrey team is now clarifying the key priorities for research and working with partners to apply for funding. Plans are also in place to develop a MOOC (Massive Open Online Course) which will be designed for use by women diagnosed with cancer, their families, social workers and clinicians.

Professor Gibson says: "The workshop has reinforced that there's a lack of data and services in this area, and this absence of supportive care can make a difficult situation worse for pregnant women with cancer. With a growing number of older first-time mothers, it's important that we improve the experiences of women facing this issue."

Some feedback from delegates:

"I just wanted to say thank you for an excellent workshop this week. It was so interesting and well organised I really enjoyed it." (Volunteer support worker)

"Thanks so much for delivering such an insightful workshop. I have learnt a huge amount." (Charity director)





A meeting of minds on plastics

Use and governance of plastics

A workshop on plastics has helped to build a global network of academics with the aim of reducing pollution and the public health impact of plastic waste through regulation and governance.

June 2021

“Plastics are ubiquitous and very useful,” says Professor Rosalind Malcolm of the School of Law, “for example they are great for keeping food hygienic and fresh, but they are also problematic. ‘Zero plastics’ is not the right objective: what we need to talk about is how to manage plastics.”

Surrey is home to the Governing Plastics Network – a collaboration with the University of Nairobi in Kenya – which is currently conducting four UKRI-funded projects in the field of plastics use and governance. The time was therefore right to stage a workshop, sponsored by the IAS, to look at plastics from a regulatory and governance perspective, with a particular focus on developing nations.

Held online on 28 to 29 June, the online workshop welcomed around 30 academics with an interest in plastics from legal and business backgrounds, and as far afield as Scotland, Kenya and Brazil. The event was organised by Professor Malcolm in

collaboration with Professor Chanaka Jayawardhena of Surrey Business School.

The workshop began with a presentation by Michael Hennessy Picard (University of Edinburgh) on the shortcomings of the Basel Amendments on the regulation of the transboundary movements of plastic waste. The Basel Amendments were aimed at curbing shipments of plastic waste from developed to developing countries, which are deemed to have inadequate recycling and treatment facilities. However, since the amendments only concern hazardous waste and focus on the control procedure rather than being an outright ban, they have in effect merely provided a regulatory platform for the ‘right to pollute’.

Throughout the workshop, experts spoke on the communication, public policy and legal frameworks for governing single-use plastics in different countries around the world – including Ethiopia, Malawi and Brazil – and

how effective or otherwise these are proving.

Malawi became the first African country to impose a ban on thin plastics in 2015, in response to the choking of its ecosystems due to poor waste management, but this policy was met with hostility by many plastic manufacturers who took the government to court and won. Academics from the African Legal Studies team at University of Bayreuth, Germany and the Catholic University Malawi argued that rather than piecemeal attacks on single-use plastics, the only effective way forward is to put in place a comprehensive framework that removes them from circulation, coupled with clean-up obligations for manufacturers.

A key focus of the workshop was the impact which interventions – such as bans and the imposition of taxes on plastics products – is having on youth communities. Dr Andrea Clayton (Caribbean Maritime University, Jamaica) spoke on building collective

ownership of single-use plastics waste in youth communities, and academics from University of Nairobi, Kenya, presented the results of a study into knowledge and information gaps in single-use plastics among young people. Researchers found that there is a ‘disconnect’ within youth communities: while there may be a collective understanding of the problem, individuals are neglectful of managing their own waste.

The workshop provided an excellent platform for networking, enabling global experts to share knowledge and ideas, and proving an effective way of expanding the University’s Governing Plastics Network. It is also set to result in publications in three special issues in the near future: ‘The Governance of Plastics’ in *Social Sciences*, ‘Retailing and Sustainable Marketing’ in *Sustainability*, and ‘Stakeholder engagement: opening up participation, inclusion and democracy’ in *Business & Society*.

Professor Jayawardhena says: “We are very grateful to the IAS for sponsoring the

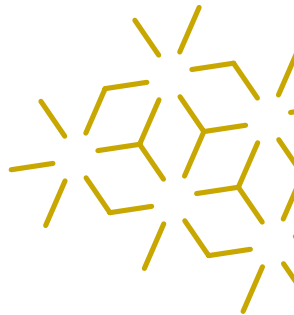
event; the processes it has in place are very helpful and it ran very smoothly. The online format enabled us to include speakers from a wide cross section of countries.

“The workshop showed that while there are some differences in terms of use and governance in different countries, there are a lot of similarities. The overall message that plastics are not desirable resonates across all societies – rich and poor – and among young people in particular.”

Some feedback from delegates:

“As a PhD student, the workshop was invaluable because it provided great insights about governing plastics from different corners of the world. It was interesting to note that even with our differences in socio-economic as well as political issues, we do have common problems that require common solutions.”

“Using Zoom worked well because most of the presenters were from different time zones.”





May/June 2021

Giving older people a voice

Enhancing the voices of older people with complex care needs

A two-part IAS workshop investigated how creative approaches can be used to involve older people with complex care needs in evidence-building and research within health and social care.

With an increasingly ageing population, older people with complex care needs are the main users of health and social care services. Yet when it comes to research, they are under-represented, which shapes the type of care they receive. Academics in Surrey’s School of Health Sciences believe that to improve the experience, quality of life and services provided to people in the last phase of their lives, evidence-building for research needs to move beyond traditional research methods, which are often a barrier to participation.

Two half-day IAS workshops were run in May and June to explore research practices which focus on creativity – such as arts-based activities, poetry, videos or simply involving people in design processes. Around 60 delegates attended over the two workshops including healthcare professionals, community-based practitioners and researchers from the UK, across Europe and New Zealand.

In the first workshop, a panel of experts from three different fields discussed their use of creativity, and the challenges and opportunities this presents, followed by breakout discussions. Taking part were Dr Sarah Russell (Admiral Nurse Professional and Practice Development Facilitator for Dementia UK), Dr Aileen Collier (a palliative care specialist and academic in Australia and New Zealand) and Professor David Frohlich (Director of Surrey’s Digital World Research Centre).

The second workshop aimed to put ideas discussed at the first workshop into practice. After an ‘in conversation’ session with Wendy Parkin (co-author of *Age at Work*, now aged 84), who told Professor Caroline Nicholson about her own experiences as an older person, delegates took part in two hands-on activity sessions.

Dr Richard Green, who organised the workshop with Professor Nicholson, explains:

“For one, we asked participants to bring a hat to wear and challenged them with a virtual board game. In the other we each found a stone from outside and, through drawing and talking, we found new ways to relate to and understand the stone and our feelings towards it. These turned out to be excellent tools to engage with each other, to push us out of our comfort zone and help us to see things from a different perspective.”

The workshop concluded with a ‘Now what?’ session, which encouraged participants to carry the ideas discussed forward into their practice by writing an email to themselves which they will receive in six months’ time.

One of the main outcomes of the workshop has been the formation of an engaged network of people with a shared interest in the topic, with all delegates given access to an online repository where they can share creative resources and ideas. The workshop learnings will contribute to a

Some feedback from delegates:

“Excellent speakers; very interesting and informative workshop. I really enjoyed and benefited from attending.”

“Well organised and a nice variety of research methods presented.”

“The use of the chat facility was good – especially in terms of sharing resources.”

‘living and dying well’ stream of research within the School of Health Sciences and, the organisers hope, will also build momentum towards collaborations with other disciplines at Surrey involved in ageing research such as psychology, tourism and electronic engineering.

Dr Green says: “Getting older people with complex care needs more involved in evidence-building is easier said than done for many reasons. This group can often struggle with technology, have less energy to pay attention and contribute to evidence-building, be less or unable to travel, or may find it hard to vocalise what they mean. Using creativity can be an invaluable tool to tap into their passions, interests and memories.

“The workshop has clearly shown that there’s an appetite to do things differently but there are also challenges because creative approaches can seem opposed to the quantitative, measurable research practices we are used to. As researchers we need to relinquish some control and think less in terms of ‘I need this data’ and more about creating an equal relationship with older people that benefits them.”



More highlights from our workshops

USER-FRIENDLY CYBER SECURITY

Behavioural science for usable security
18 May 2021

Workshop chair: Professor Steve Schneider, Department of Computer Science

Designing effective cyber security mechanisms relies on understanding how users behave in practice. With this in mind, computer and behavioural scientists joined forces for a half-day workshop to tackle the challenges of developing usable security. Taking electronic voting as an example – but widening the discussion to other applications such as payment systems – delegates considered questions such as what determines users’ security decisions and behaviour, and how users can

be encouraged to engage with important but inconvenient security procedures. Particularly useful were multidisciplinary discussions in which small groups of delegates decided on a specific security challenge and looked at this from both a behavioural and a security point of view before considering potential solutions.

OUTCOMES
Valuable insights in behavioural science from the workshop will form the basis of a special issue in a leading business and psychology journal. There are also plans to bid for funding to continue building the network established by the event, and to hold a follow-up workshop.



MAKING SENSE OF LANGUAGE

Mutual Intelligibility: Language, Culture, Cognition
24-25 June 2021

Workshop chair: Dr Nadezda Christopher, School of Literature and Languages

This two-day workshop explored the under-researched concept of mutual intelligibility – where a speaker of one language can use their native tongue to communicate with a speaker of another language. Organised by academics from Surrey Morphology Group and the School of Psychology, the event enabled interdisciplinary researchers and practitioners from eight different countries to share the latest research findings – such as the first exploration of mutual intelligibility in Kurdish languages. One highlight was an interview with

artist, poet and translator Andreea Birsanu (Spain) who shared her views of working within a linguistic continuum of several mutually intelligible Romance languages.

OUTCOMES
The workshop identified some key future research directions and has already served as a foundation for collaborative projects between participants. Areas currently being explored include the expansion of research to previously unstudied linguistic families, the development of research methodology, and how deeper insights could be gained by combining research methods from different disciplines.

WHEN TRAVEL BROADENS THE MIND

International student mobility within Europe: responding to national, regional and global challenges
1-2 July 2021

Workshop chair: Professor Rachel Brooks, Department of Sociology

International student mobility (ISM) has a positive effect not only on individuals but far more broadly in terms of cultural diversity, increased competition and societal change. This workshop set out to investigate the current challenges to ISM within three themes – political, health and environmental, and socio-economic.

As well as looking at the impact of Brexit and the Covid pandemic, the workshop examined topics such as the ‘othering’ of international students, which impacts on their sense of belonging during their studies, and the prevalence of racial discrimination and

low reporting of hate crimes within universities. An important insight was that while the socio-economic profile of mobile students is diversifying, there is evidence that international education is becoming more stratified, with those from more privileged backgrounds having greater access to the most prestigious opportunities.

OUTCOMES
The workshop has already resulted in a policy brief which presents a series of recommendations for policymakers and higher education institutions. Recordings of the workshop talks are being disseminated widely and are available online.



PUTTING THE YOUTH VOICE FRONT AND CENTRE

Conceptualizing and responding to online harms in youth digital culture
7 July 2021

Workshop chair: Dr Emily Setty, Department of Sociology

Policies to combat online harms to young people are often based on simplistic assumptions and fail to take into account the complexities of online life for this group, and the opportunities, pleasures and rewards digital culture brings them.

In this half-day virtual workshop, over 100 academics, researchers, practitioners and policy-makers came together to explore institutional and regulatory responses to young people’s experience of online harms, using evidence and best practice based on direct research with young

people. Discussion focused on how we can support (rather than blame and re-victimise) young people who report harm, what training practitioners need to respond to these situations more effectively, and the diversity of young people’s lived experiences.

OUTCOMES
The organisers are in the process of establishing a network of research, policy and practice stakeholders which will share knowledge and identify collaboration opportunities. There are also plans to publish workshop contributions in one of the leading journals in the field, as well as an edited collection in book format.



“It is so important that young people’s voices are heard on all this – I am already thinking differently after today.”

THE COMPLEXITIES OF SLEEP

Making sleep: new agendas for a new public health?
7-8 July 2021

Workshop chairs: Professor Rob Meadows, Professor Christine Hine, Department of Sociology

The quality of our sleep is linked to many factors such as socioeconomic status, ethnicity and employment. This means that achieving a ‘national sleep strategy’ requires an innovative approach and a radical departure from traditional thinking. This workshop brought together nearly 100 delegates from neuroscience, pharmacy, healthcare, clinical psychology and other disciplines to discuss the complexities of sleep, and how we can most effectively respond to these complexities. Discussion focused on topics such as the potentially problematic

terminology currently used (such as ‘sleep crisis’), how a focus on sleep can be a driver for poor sleep, and the nuanced relationship between technology and sleep.

OUTCOMES

Recommendations from the workshop include re-framing the language used around sleep health, and developing local strategies rather than a single public health strategy. A video version of the event is currently being produced, and the organisers are also in the process of setting up an online network to facilitate continued discussions, a collective report and future grant applications.



“Loving the variety of perspectives #makesleep is providing. Such an array of interesting, insightful and challenging topics/questions being highlighted and discussed!” (Dr Georgia Cook on Twitter)

WHEN MATHS MEETS SLEEP

Multilevel dynamics of human and animal sleep: mathematical models meet data
12 to 21 July 2021

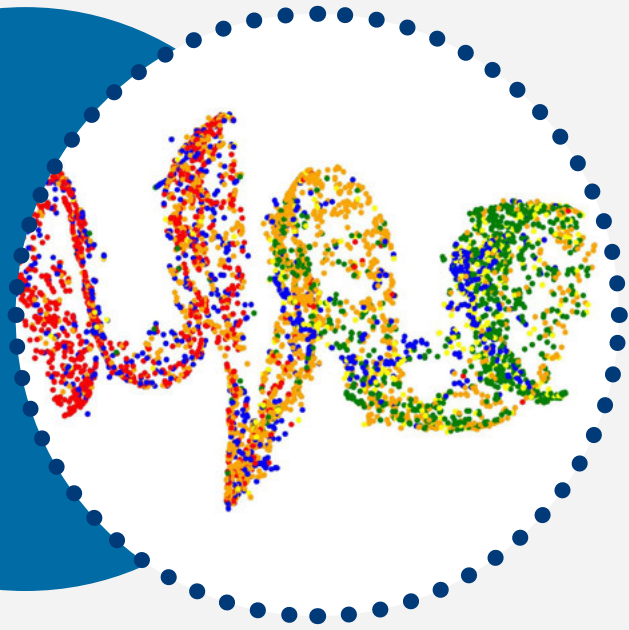
Workshop chairs: Professor Anne Skeldon, Department of Mathematics; Professor Derk-Jan Dijk, School of Biosciences and Medicine

This workshop was an opportunity for biologists and mathematicians from across Europe, the USA and Australia to explore the opportunities and challenges of using data and mathematical/statistical modelling to understand human and animal sleep and circadian rhythms. Five hour-long online sessions were each led by two speakers – one from the angle of mathematical modelling and the other from the perspective of biology and data – facilitating a truly interdisciplinary dialogue. Among the topics discussed

were the difficulties of capturing individual differences using models, the insights that combining data and modelling are bringing to our understanding of REM sleep, and whether it is possible to identify sleep deprivation from a single blood sample.

OUTCOMES

Building on a previous meeting in 2015, the workshop reinforced links between a growing network of experts in the field, with the online format enabling the participation of those who are at the forefront of data collection globally. Future events are planned to facilitate further interdisciplinary discussion and research collaborations.



THE BAYESIAN CONUNDRUM

Towards a cross-research platform for hosting Bayesian data-fitting tools
14 July 2021

Chair: Dr Payel Das, Department of Physics

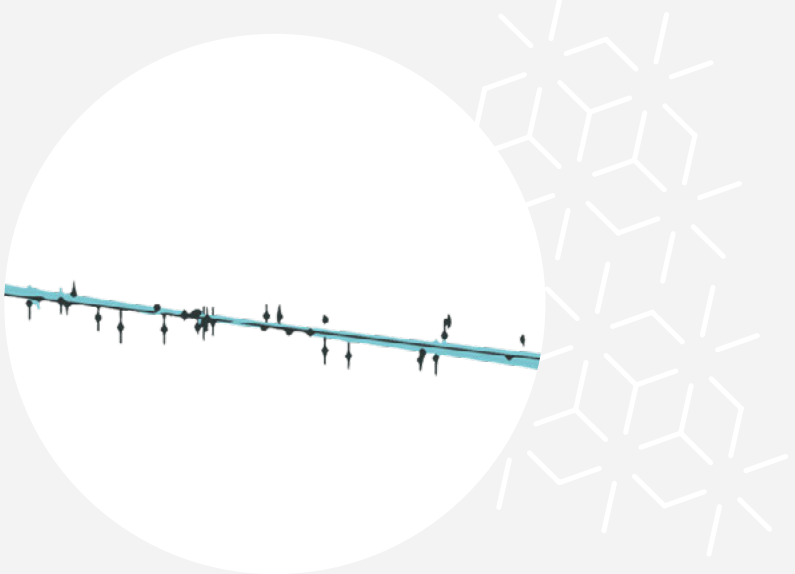
Using Bayesian sampling methods to quantify model parameters is useful but becomes unworkable when applied to real systems such as interacting galaxies, the weather or flu epidemics. In this workshop, 46 delegates from industry and a wide range of different research disciplines came together to explore the issue and work towards solutions.

Two sessions – one focused on establishing the diversity of complex data-fitting problems encountered by researchers, the other on the various Bayesian sampling procedures available

– were interspersed with three pedagogical talks which helped to set the scene for the broad interdisciplinary audience.

OUTCOMES

A conference proceedings of full short papers or abstracts from the workshop has been compiled. The next steps are aimed at removing the key barriers to applying Bayesian methods across research disciplines. These will include building a new lexicon that enables mathematicians, engineers, physicists and those from industry to communicate; setting up a Wikipedia page on Bayesian sampling methods; and organising future events to continue the knowledge exchange.



“What struck me about this workshop is how so many of us across a number of research disciplines are tackling complex data-fitting problems of a similar nature. Researchers however tend to group together in terms of disciplines when designing their approaches to search problems. The IAS funding has really helped us to establish this new network to ensure that we can continue to exchange research approaches in the coming years.” – Dr Payel Das

Unlocking the potential of biomass with ultrasound

A major challenge in producing high-value chemicals from biomass is the complexity of one of its components, lignin. Dr Ciaran Lahive, a postdoctoral researcher from the University of Groningen (The Netherlands) visited Surrey's Department of Chemical and Process Engineering to explore the potential of ultrasound in solving this puzzle.



The ability to efficiently process biomass in order to produce high-value chemicals for use in polymers and pharmaceuticals is crucial to reducing our dependence on fossil-derived chemicals. However, while the extraction of two components of biomass – cellulose and hemicellulose – is well studied and practised, lignin remains a trickier challenge. An abundant but very complex molecule, lignin's chemical formula varies between different plants, and even changes in structure during the extraction process.

Dr Lahive's research in the Green Chemical Reaction Engineering Research Group within the Engineering and Technology Institute Groningen (ENTEG) focuses on using mild extraction techniques to extract lignin in order to preserve the molecule's structure. When he met Dr Madeleine Bussemaker, Lead of the Sonochemistry Ultrasonics Research Group at Surrey, at a conference

in the US in 2019, he began to consider how ultrasound might be used in this context.

He says: "This meeting sowed the seed for the Fellowship. I was excited about exploring the use of ultrasound on lignin, and I also realised that the skillset I had could enhance what was being done at Surrey.

In her research, Dr Bussemaker exploits the ability of ultrasound to create unusual physical and chemical properties, and applies this technique not only in biomass processing, but also in fields such as waste water treatment and sustainable hair dyes.

Originally planned as three short visits in the summer of 2020, the IAS Fellowship was postponed until early 2021 due to the pandemic. Dr Lahive arrived in January and, because of travel restrictions, remained at the University for three months. The starting point of his work was to learn

how to use ultrasound, which he first practised by analysing pitted starch. He then applied that practical knowledge to extracting lignin from biomass.

Dr Bussemaker explains that – as often in science – the work on lignin did not show what the team wanted, but these experiments were nevertheless useful. "We didn't see too much of a benefit in terms of lignin extraction," she says. "However the second aim was oxidation of lignin. This area is showing real promise, and we're now exploring it in more chemical detail."

As a result of these early results, Dr Lahive and Dr Bussemaker have successfully applied for a second grant from the Biomass Biorefinery Network, which will fund proof of concept of the oxidation research.

Dr Bussemaker says: "Following the Fellowship we are also collaborating in

the longer term with Dr Peter Deuss, who is part of Groningen's Green Chemical Reaction Engineering Research Group, merging his group's expertise in analysing lignin with our skills in ultrasound."

For Dr Lahive, the Fellowship has been hugely beneficial. As a postdoctoral researcher he is earlier in his career than many IAS Fellows, and has valued the autonomy and opportunities it has brought.

"With a background in pharmaceutical chemistry, I became interested in 'green' chemistry – a field which is younger than I am – because of its role in solving major sustainability challenges," he says. "During the Fellowship I've gained a somewhat unique skillset and established my ability to work with ultrasound, which has given me the confidence to take the next step and apply for a larger follow-up grant."



"For the first time in my career, I've had the opportunity to explore one of my own ideas and design a research project around it. Eventually, my dream is to establish myself in an independent research career, and this Fellowship has allowed me to take a baby step in that direction."

Dr Ciaran Lahive



A leap of faith

Award-winning performance designer Dorita Hannah has made a hugely valuable contribution to the work of six PhD students in Surrey's Guildford School of Acting through a series of workshops during her artist-in-residency.

When Dorita Hannah, Adjunct Professor at the University of Auckland, was named as IAS artist-in-residence, the plan was for her to travel to the UK from New Zealand for three separate visits. However, in 2020 the world became a very different place, and the residency was swiftly adapted to leverage Dorita's experience in the most effective way.

A world-leading specialist in intersecting art forms and spatial and event dramaturgy, Dorita has expanded the definition of what scenography (the elements that contribute to a theatrical presentation) can mean. At the Prague Quadrennial 2019, she was selected for the 'Living Legends' exhibition in recognition of her leadership in promoting a global change in thinking and practice around performing arts design and design performativity.

Bringing her valuable creative expertise to Surrey, Dorita held four collaborative online workshops with six PhD students who are each in the process of developing

practice-led research projects. For the students, who were based far apart geographically, this provided a true lifeline not only in enabling them to access Dorita's unique perspective, but also in bringing them together into a close-knit group.

After an introductory session, the students each presented their abstract as a mini-conference paper with accompanying images. Following feedback and discussions with Dorita and their fellow students, they then re-presented their work in the final session.

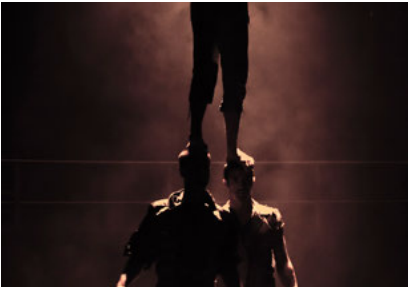
Dorita explains: "When the students first presented their work it was clear that the theory was leading the process, so I encouraged them to embrace the fact that they are amazing artists and make the 'leap' to let the creative work lead the process."

She adds: "The highlight of my residency was definitely seeing the students' work. They are researching an amazing range of

projects in a rich, extraordinary way. There was a great sense of collegiality between the students, who were all at different stages of their journey. They have a new way of seeing scenography in the world and, by learning how to master the discourse, they can make a real contribution."

The residency was hosted by Professor Robert Shaughnessy, who says: "One of the few benefits of the pandemic is that it has helped groups to meet online and fostered a community spirit, and this is a fantastic example.

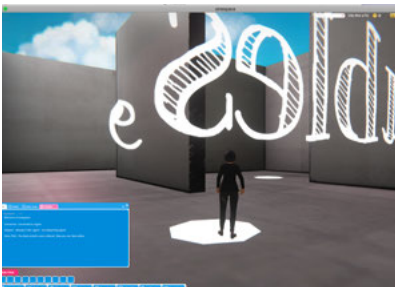
"In the future there is the potential to build on the momentum by engaging in collaborative projects with other disciplines at Surrey – across shared interests such as sustainability – and extend the body of knowledge these students are building through further funding bids."



'Choreoluminosity', Michelle Man



'Interspecies performance', Flo Fitzgerald-Allsopp



Reimagining design and construction, Ele Slade



"The highlight of my residency was definitely seeing the students' work. They are researching an amazing range of projects in a rich, extraordinary way. There was a great sense of collegiality between the students, who were all at different stages of their journey. They have a new way of seeing scenography in the world and, by learning how to master the discourse, they can make a real contribution."

Dorita Hannah



Michelle Man

Choreographer Michelle Man has examined a concept she calls 'choreoluminosity' – the reciprocal relationship between light and the dancer – through a series of artistic laboratories and large-scale performances in different light environments.

"Working with Dorita got me to the heart of the project very quickly and helped me reinstate the significance of my practice and acknowledge how it can shift and shape theoretical thinking. It was also incredibly exciting to get the chance to hear about each other's projects in-depth."



Flo Fitzgerald-Allsopp

Flo's PhD focuses on 'interspecies performance' in which contemporary artists explore human-animal entanglements through embodied performance practice, with a focus on their contribution to feminist politics.

"At the pre-confirmation stages of my PhD, Dorita's sessions gave me the time and space to creatively explore the scope of my research, while simultaneously reminding me to stay attentive to the 'nub' of the project. It was an absolute joy to be able to draw on her exceptionally broad knowledge, experience, and keen critical and creative mind."



Ele Slade

Originally a set and costume designer, Ele is researching the processes of how we design and construct environments – arguing that the relationships we generate with things are social, and that the 'things' we welcome into our world also perform.

"Even though my PhD springs from my practice, there's a tendency to get bogged down when it comes to writing. Having someone totally outside the process asking: 'what are you really saying?' helped me to understand how my practice elements – and the narrative I write – work as one journey."

IAS Fellowships for 2021-22

External academics



Dr Jason Bramburger,
University of Washington (USA)

Surrey host: Dr Naratip Santitissadeekorn, Department of Mathematics

A specialist in the analysis of dynamical systems, Dr Jason Bramburger will spend three weeks in the Department of Mathematics, working with Dr Santitissadeekorn to develop a data-driven tool which enables real-time prediction of disease spread, using Covid-19 data from the Royal College of GPs. The Fellowship will also benefit researchers from the Vet School and other research groups by providing an insight into how to apply machine learning techniques developed by Dr Bramburger to their research.

Professor Gary Tse,
The Second Hospital of Tianjin Medical University (China)

Surrey host: Dr Kamalan Jeevaratnam, School of Veterinary Medicine

This Fellowship will take the form of three visits to explore the links between clinical and ECG data in order to achieve better risk prediction for cardiac abnormalities. Building on an existing collaboration between Professor Tse and Dr Jeevaratnam, the aim is to undertake machine learning analysis on the use of ECG variables to predict adverse outcomes in heart attacks, and further develop knowledge on Brugada syndrome (a pathological cardiac electrical abnormality).



Dr Daniel Avdic
Centre of Health Economics, Monash University (Australia)

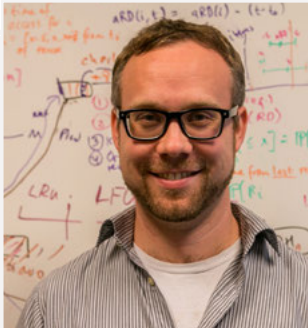
Surrey host: Dr Giuseppe Moscelli, School of Economics

Dr Avdic, whose research centres on health and labour economics, will collaborate with Dr Moscelli to conduct an empirical analysis of the causes and consequences of nursing staff shortages on the efficiency and quality of healthcare provision. Using rich data on in-patient spells and hospital resources in Sweden, they will apply sophisticated econometric techniques to identify the impact of factors such as wage levels in different countries on staffing levels and healthcare quality.

Professor Ymir Vigfusson
Department of Computer Science, Emory University (USA)

Surrey host: Professor Gregory Chockler, Department of Computer Science

An expert in distributed systems, Professor Vigfusson will work with Professor Chockler to investigate the best way of combining Remote Direct Memory Access hardware (developed at Surrey) with Software Guard Extension technology (which protects computer memory) in order to provide both security and scalability. A dynamic speaker, Dr Vigfusson will also deliver a TEDx-style talk about his background as a hacker who now works on making the world safer, and a technical talk on his research.



Dr Yuesuo Yang
Jilin University (China)

Surrey host: Dr Bing Guo, Department of Civil and Environmental Engineering

A Professor in Contaminant Hydrogeology, Dr Yuesuo Yang will collaborate with academics in Surrey's Department of Civil and Environmental Engineering to exchange knowledge on technologies which can be used to treat heavy metal and hydrocarbon (eg. petroleum leakage) contaminations in groundwater and soil. As well as devising a sampling strategy using microbial techniques and developing a roadmap for achieving an effective investigation toolbox, the Fellowship aims to broaden knowledge through a seminar for researchers and a UK-China workshop.

Yevheniya Sharhorodska MD
Institute of Hereditary Pathology, National Academy of Medical Sciences (Ukraine)

Surrey host: Dr Marika Kaakinen, School of Biosciences and Medicine

This Fellowship brings together knowledge of women's reproductive health with expertise in advanced data analysis. Yevheniya Sharhorodska will collaborate with Dr Kaakinen and her group, the Surrey Section of Statistical Multi-Omics, to investigate the relationship between recurrent pregnancy loss (RPL) and metabolic syndromes which are associated with pre-eclampsia and other complications. Building on a previous study, a statistical analysis will be conducted, the results of which will be presented at two important upcoming human genetics conferences.



Entrepreneur



Mr Miklos Orban,
Orban & Perlaki Law Firm (Hungary)

Surrey host: Dr Marton Ribary, School of Law

An IT lawyer and founder of Jumpstart, the first legal tech incubator in central and eastern Europe, Mr Orban will bring an industry perspective to the School of Law's expertise in pioneering legal fields. During three visits to Surrey he will contribute to innovative new modules and deliver lectures on the way data and evidence-based analysis is transforming the legal profession. He will also work with researchers to develop a Surrey-led research bid around algorithmic modelling of law, and present two proposed research seminar papers.

Public servant

Dr Florence Gaub
European Union Institute for Security Studies (France)

Surrey host: Professor Amelia Hadfield, Department of Politics

Over three visits to Surrey, Dr Gaub will broaden the horizons of staff, early career researchers and PhD students within the School of Politics by providing professional mentorship, masterclasses, teaching and support from an EU-specific perspective. A high-ranking, hugely prolific European civil servant, Dr Gaub will contribute directly to work on EU-UK issues currently being undertaken by the Centre for Britain and Europe (CBE) through events, analysis and publishable outputs, and facilitate cross-Faculty work on Europe and security.



Artists in residence



Ms Anna Dumitriu,
Award-winning British artist (UK)

Surrey host: Professor Mark Chambers, Department of Microbial Sciences

Ms Dumitriu, an internationally renowned artist who focuses on 'bio-art', will visit Surrey's School of Biosciences and Medicine with the aim of enriching research in infection and immunity – focusing particularly on zoonotic viruses, parasitology and the ethical implications of infectious disease control on animals. Ms Dumitriu will develop a new body of artworks that will increase public awareness of Surrey's 'One Health' research, which will be shown widely during her exhibition programme and used as a teaching resource for students and public engagement activities.



Mr J R Yancher,
Bike City Theatre Company (USA)

Surrey host: Dr Zoe M Harris, Centre for Environment and Sustainability

Mr Yancher and colleagues from the Bike City Theatre Company (California, USA) will lead a two-week workshop at Surrey as the culmination of a year-long remote R&D project. Central to the Fellowship will be the creation of a sustainability-themed musical developed by experts in sustainability research, creative communications and performance, including students from the Guildford School of Acting. This original piece of science communication will be aimed at raising awareness of the impact of climate change, with Surrey able to use the script and score to put the performance on again in the future.

Fellowship outcome
Understanding designs of cell fate

"Since multi-functionality is an important property of biological systems, network designs that can exhibit both switch-like and oscillatory behaviours are encountered in diverse biological contexts such as cell division, immunology, memory formation and neuronal activity."

Dr Irene Zorzan



Dr Irene Zorzan, a researcher in Information Engineering at the University of Padova, spent six months at Surrey with host Dr Matteo Barberis (School of Biosciences and Medicine) investigating biological circuits that allow a cell to select which state to reach among multiple possibilities.

Following the Fellowship, Dr Zorzan and Dr Barberis have undertaken a comprehensive study of network designs which exhibit switch-like and oscillatory behaviours, the results of which were published in *Current Opinion in Systems Biology* in March 2021. Based on this research, they have identified mathematical descriptions of networks exhibiting both behaviours, and are currently conducting a thorough review of available literature.

Dr Zorzan is now on a two-year Research Fellowship at Surrey, supervised by Dr Barberis, enabling a long-term collaboration which is contributing to understanding about the relevance of timing on molecular mechanisms of cell fate.

IAS Annual Workshop and Fellowship Grant Competition

Academic year 2022–23

Deadline: Friday 21 October 2022
See full application details: ias.surrey.ac.uk



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