

Physics in the spotlight

22 – 25 October 2019

Forum programme



IOP Institute of Physics

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Physics in the spotlight

A four-day physics forum for physicists from the UK and Ireland

The Institute of Physics (IOP) is convening a new type of forum – four days of discussion, debate and knowledge sharing at our flagship King’s Cross building.

Members of IOP special interest groups, including leading thinkers in the physics community in the UK and Ireland, will host discussions, talks, meetings and panels to foster debate and exploration of key topics such as oceans and the climate, optics in quantum technologies and machine learning.

The IOP’s member-led special interest groups are at the heart of the physics community. They enable you to take part in activities in your particular areas of interest, share and receive expert advice on developments in your sector, grow your network across disciplines, and attend topical and inter-disciplinary sessions.

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Welcome

I’d like to extend a very warm welcome to all our delegates.

Over 350 physicists are taking part in Physics in the spotlight’s talks, meetings and panels. We welcome attendees from the UK and Ireland, as well as further afield. We hope that you’ll all value this opportunity to expand your networks and advance our collective knowledge.

Our eventual ambition is to expand this forum into a larger-scale, wider-ranging gathering in future years, which could become a powerful platform to address current global challenges.

For guests who are unfamiliar with the IOP’s work, you can find out more at the membership information desk in the gallery, and about the IOP special interest groups that created this forum.

Over 10,000 IOP members are signed up to at least one of our 51 groups, forging connections, engaging in thought-provoking discussions and making their voices heard. Members can take part in activities in their particular areas of interest, share and receive expert advice on relevant developments, expand their cross-discipline networks, and attend topical and inter-disciplinary sessions.

Finally, our thanks go out to all the volunteers who gave their time and expertise to develop this initiative.

Professor Brian Fulton, CPhys FInstP
Honorary Secretary, Institute of Physics

Programme

Tuesday 22 October

12:00 Welcome, registration and refreshments	
12:30	Lunch Gallery
Physics aspects of the UK nuclear innovation Organised by the IOP Nuclear Industry Group and Energy Group	
14:00	Introduction: Dan Wolff , NIRO, UK Theatres 1&2
14:15	Digital reactor design: Albrecht Kyrieleis , Wood Nuclear, UK Theatres 1&2
14:45	Thermal hydraulics: Richard Underhill , Frazer-Nash Consultancy, UK Theatres 1&2
15:15	Coffee break
15:40	Reactor physics: Beth Slingsby and Allan Simpson , National Nuclear Laboratory, UK Theatres 1&2
16:10	Fuels: James Gath and Joel Lucas , National Nuclear Laboratory, UK Theatres 1&2
16:40	Panel discussion: all speakers: Chaired by Paul Nevitt , National Nuclear Laboratory, UK Theatres 1&2
17:00	Drinks reception Gallery

Wednesday 23 October

09:00 Welcome, registration and refreshments	
Talking about the physics of our climate change world: what is happening and what can we do? Organised by the IOP Physics Communicators Group	
9:30	Discussants share their perspective Audrey Alejandro: LSE, UK; John Bruun: University of Exeter, UK; Spiros Evangelou: University of Ioannina, Greece; Guillaume Wright: IOP Publishing, UK; and Peter Young: Lancaster University, UK Theatres 1&2
11:00	Focus group discussion Theatres 1&2
12:00	Focus groups report back and summary Theatres 1&2
12:30	Lunch Gallery

Wednesday 23 October (continued)

Environmental physics day: oceans Organised by the IOP Environmental Physics Group	
13:30	The ocean: brake, accelerator and warning lights of the climate system: Dr Richard Wood , UK Met Office, UK Theatres 1&2
14:15	The role of the ocean in climate variability: Dr Jon Robson , University of Reading, UK Theatres 1&2
15:00	Break
15:10	Oceans apart... then back together again: the role of the oceans on climate from centennial to tectonic timescales Dr Paul Halloran , University of Exeter, UK Theatres 1&2
15:55	Investigating the role of the ocean in past climate events: the day after tomorrow, yesterday Dr David Thornalley , University College London, UK Theatres 1&2
16:40	Q&A and discussion Theatres 1&2
Chadwick and Meitner: discoveries that changed the world Organised by the IOP History of Physics Group	
17:30	Chadwick and Meitner: discoveries that changed the world Professor Gerry Lander , Institut Laue Langevin, Grenoble, France Seminar rooms
18:30	Drinks reception Gallery

Thursday 24 October

09:00 Welcome, registration and refreshments	
Introduction to machine learning in physics, with applications Organised by the following IOP special interest groups: Computational Physics, Polymer Physics, Particle Accelerators & Beams and Plasma Physics	
09:30	Session opening by the Computational Physics Group Theatres 1&2
09:40	Training neural networks for physics applications: an overview and application to RBS automation Armando Vieira: Hazy, UK Theatres 1&2
10:10	A fourth paradigm? The challenges of using machine learning in physics: Keith Butler: STFC, UK Theatres 1&2
10:40	Darren Price: Alan Turing Institute, UK Theatres 1&2
11:10	Break

Thursday 24 October (continued)

11:30	Data-driven discovery of functional materials: Jacqui Cole: University of Cambridge/Rutherford, UK Theatres 1&2
12:00	Bayesian inference in condensed matter physics: learning force fields and wave functions Aldo Glielmo: International School for Advanced Studies (SISSA), Italy Theatres 1&2
12:30	Lunch Gallery

Machine learning in soft and biological matter

Organised by the IOP Computational Physics Group and Polymer Physics Group

14:00	Session opening by the Polymer Physics Group Seminar rooms
14:05	Interpolation of intermolecular potentials via machine learning Richard Graham: University of Nottingham, UK Seminar rooms
14:35	Inferring the hidden rules of cellular behaviour through computer vision and deep learning Alan Lowe: University College London, UK Seminar rooms
14:35	Inferring the hidden rules of cellular behaviour through computer vision and deep learning Alan Lowe: University College London, UK Seminar rooms
15:05	Adventures with Gaussian process emulators for uncertainty and sensitivity analysis for cardiac models Richard Clayton: University of Sheffield, UK Seminar rooms
15:35	Break Gallery
15:50	Dimitris Pinotsis: University of London, UK Seminar rooms

Machine learning in plasma and accelerator physics

Organised by the IOP Computational Physics Group, Plasma Physics Group and Particle Accelerators & Beams Group

14:00	Session opening by the Particle Accelerators and Beams Group & Plasma Physics Group Theatres 1&2
14:05	Tom Holmes: University of Sheffield, UK Theatres 1&2
14:35	Data Driven Modelling of Plasma in Tokamaks Vignesh Gopakumar: United Kingdom Atomic Energy Authority, UK Theatres 1&2
15:05	CLARA-Net: a framework for integrating accelerator experiments, simulations and machine learning: Matthew King, followed by Neural networks for RF-breakdown detection: Hannah Kockelbergh, STFC, UK Theatres 1&2
15:35	Break Gallery
15:50	Discussion and close Theatres 1&2

Thursday 24 October (continued)

16:20	Assessment of low dose-rate intraprostatic brachytherapy with automated segmentation and registration between clinical imaging Rollo Moore and Ladislav Urban: The Royal Marsden NHS Foundation Trust, UK Seminar rooms	15:50	Discussion and close Theatres 1&2
16:50	Discussion and close Seminar rooms		
17:00	Drinks reception Gallery		

Friday 25 October

09:30 Registration, breakfast and networking

The late breakfast: access to funding & finance,

Hosted by **Ian Tracey:** Knowledge Transfer Network, UK and **Nicola Musgrove:** Oxinet, UK

Organised by the IOP Business Innovation and Growth Group

10:00	A three-minute introduction on how to do a 30 second pitch Theatres 1&2
10:30	Networking hour: an opportunity to make connections with investors, companies and funding advisers Theatres 1&2
11:30	Open mic: companies pitch to the room - 30 seconds each and fast paced Theatres 1&2
11:45	Workshop: UK grant applications Theatres 1&2
12:30	Lunch Gallery

Become a member of the IOP

The IOP is the professional body and learned society for physics in the UK and Ireland. Membership puts you at the heart of a vibrant community, including peers from academia, industry, education, training and beyond, coming together to shape the future of physics.

Through our special interest groups, events, and volunteering, our members work together to increase their own and society's knowledge, understanding and enjoyment of physics.

You'll have access to tailored career development support at every stage of your career. And IOP professional registrations are a way to show you're committed to lifelong learning, with the latest knowledge and skills in your sector: find out more at iop.org/professional-registration. We also provide a clear pathway to help you progress through the three categories of membership: Associate Members, Members and Fellows.

The IOP is your platform to engage and network with fellow physicists, at a pivotal point in our history; our ambitious new strategy reflects our discipline's exceptional potential to benefit society. We continue to press government and policy-makers to secure the strongest possible outcome for physics and for our society.

You can find out more, or join the IOP, at iop.org/join, or contact us via membership@iop.org or [020 7470 4800](tel:02074704800).

IOP special interest groups

The IOP has 51 member-led special interest groups, covering a wide range of subjects. These communities are an excellent way to make connections and engage in thought-provoking discussion. Members disseminate knowledge of their field through conferences, workshops and publications, as well as awarding student bursaries and responding to policy consultations.

To join a special interest group, you must be a member of the IOP: for more details visit iop.org/groups, email groups@iop.org or call us on [020 7470 4860](tel:02074704860).

IOP for Business

IOP Business Briefings

Our Business Briefings are designed to provide practical business support and connect entrepreneurs and start-ups with their peers across industry. Events include talks from experts in their fields and one to one sessions.

Our Business Briefings programme for 2019 covers essential business and leadership topics. If you have a physics-based innovation but don't know how to bring it to market, we can help with information and contacts. If you're a start-up in need of practical advice and guidance to grow your business, we can offer support.

To sign up to hear about IOP Business Briefings or to find out about other business-related activities, email business@iop.org or follow us on Twitter and LinkedIn at [#IOPBusiness](https://twitter.com/IOPBusiness).

The IOP Accelerator Centre

IOP Business Briefings are held at the new IOP Accelerator Centre, in our flagship building in London's Kings Cross. This is our affordable, fully-serviced workspace for entrepreneurs, micro- and small businesses bringing physics-based innovation to market in any sector.

The Accelerator Centre offers affordable workspace in the heart of London's Knowledge Quarter, a partnership of over 100 organisations devoted to advancing and disseminating knowledge.

To find out more, email accelerator@iop.org.



IOP events for 2020

For information about all IOP conferences and events, visit iop.org/conferences

Anglo-French Physical Acoustics Conference (AFPAC) 2020

15 – 17 January 2020
Selsdon Park Hotel, UK
Organised by the IOP Physical Acoustics Group

2020 Physics in Food manufacturing conference

15 – 17 January 2020
Weetwood Hall Estate, UK
Organised by the IOP Physics in Food Manufacturing Group

Joint Astroparticle Physics (APP), High Energy Particle Physics (HEPP) and Nuclear Physics (NP) conference

6 – 9 April 2020
University of Edinburgh, UK
Organised by the IOP APP Group, HEPP Group and NP Group

Magnetism 2020

20 – 21 April 2020,
Cutlers Hall Sheffield, UK
Organised by the IOP Magnetism Group

47th Plasma Physics Conference

21 – 24 April 2020
Institute of Physics, UK
Organised by the IOP Plasma Physics Group

Training course on vacuum systems design and maintenance

2 – 5 June 2020
Institute of Physics, UK
Organised by the IOP Vacuum Group

Fourth international conference on the history of physics

17 – 19 June 2020
Trinity College, Ireland
Organised by the IOP History of Physics Group

Photon 2020

1 – 4 September 2020
East Midlands Conference Centre, UK

26th international conference on DNA computing and molecular programming

13 – 18 September 2020
University of Oxford, UK
Organised by the IOP Biological Physics Group

Polymer physics meeting: a retirement conference for Dame Athene Donald

21 – 22 September 2020
Churchill College, Cambridge, UK
Organised by the IOP Polymer Physics Group

Nuclear Forensics (NuFor)

14 – 15 October 2020
Institute of Physics, UK
Organised by the IOP Materials and Characterisation Group

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