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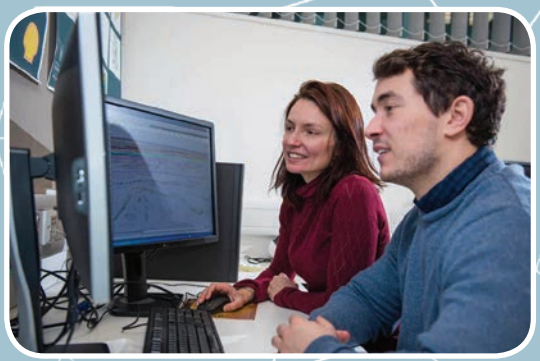
UNIVERSITY OF OXFORD

Accelerating Impact:

How Your Research Can Make a Difference

Mathematical Institute, University of Oxford
Thursday 30 May 2019



This event is supported by University of Oxford's
EPSRC Impact Acceleration Account award - EP/R511742/1

“The University has been the recipient of an Engineering and Physical Sciences Research Council Impact Acceleration Account (EPSRC IAA) for over six years, and we are delighted to have the opportunity today to share with you some of the projects that have been supported by Oxford’s EPSRC IAA over that period.

The EPSRC IAA provides an opportunity for researchers to think differently about their research, its purpose, and how it can have impact on society and the economy. The IAA is instrumental in supporting researchers at all career stages, and helps the development of a research impact mind-set, and provides opportunities to work with partners in external organisations who could use your research outputs, and fundamentally shape the direction of your research and your careers in new and exciting ways.

I hope this event will enhance your understanding of what it means to generate impact from your research, and inspire you to reflect on how your research, and you can make a difference.”

Prof Alison Noble, OBE FRS FREng
Chair of the Oxford EPSRC IAA Steering Group
Associate Head of Division (Industrial Liaison and Innovation),
Mathematical, Physical and Life Sciences Division

Programme

Time	Session
12:30	**Registration and Poster session**
	Poster session with networking over lunch
13:30	**Presentations**
	Semi-automated Image Analysis for Histology Helen Byrne and Joshua Bull, Mathematical Institute
	From light microscopy to mass photometry Philipp Kukura, Chemistry
	KOALA: Kids Online Anonymity & Lifelong Autonomy Sir Nigel Shadbolt and Jun Zhao, Computer Science
14:30	**Panel session / Open forum**
	Patrick Grant (Chair) Pro-Vice-Chancellor (Research), and Vesuvius Chair of Materials
	Alison Noble Chair – EPSRC IAA Steering Group, and Technikos Professor of Biomedical Engineering
	Charlotte Deane Head – Department of Statistics, and Deputy Head of Mathematical, Physical and Life Sciences Division
	Philipp Kukura Professor, Department of Chemistry
	Matthew Scott Engineering and Physical Sciences Research Council – Senior Manager – Impact
	Christopher Jones Head of Industrial Research Partnerships, Mathematical, Physical and Life Sciences Division
15:30-16:30	**Poster session, networking and refreshments**

Poster Session - Abstracts

Smart Mouthguard
Leonardo de Almeida e Bueno, Man Ting Kwong and Jeroen Bergmann - Engineering Science

Sport activities play an essential role in keeping the population healthy. Interestingly, some of the biggest and fastest growing sports globally are contact sports. However, there is great need to ensure that the contact-sport community can safely participate in physical activity. The objective of this project is to develop novel technologies that facilitate behavioral changes to achieve healthier sport participation by developing unobtrusive solutions that are applicable for on-field use. A newly developed smart mouthguard will be tested with Oxford University Rugby Football Club to improve athletic management through continuous monitoring of fatigue.

Decision-making tool for better use of lime mortar on traditional and historic buildings
Lucie Fusade and Heather Viles - School of Geography and the Environment

Lime mortar has been used in traditional masonry for centuries. For repair interventions, because of its authenticity, breathabilitiy, permeability and low energy consumption to produce, lime should be used. However, repairs are often done using inappropriate materials, such as cement, which damage the masonry.

The project proposes to develop a pilot decision-making tool to encourage practitioners and conservation specialists working on historic and traditional masonry to use lime mortar better and more efficiently and will improve knowledge sharing between scientific researchers and practitioners.

Pitch-In: Connecting Capability in the Internet of Things (IoT)
Andy Gilchrist - Industrial Research Partnerships, MPLS

Pitch-In aims to collaboratively identify and address barriers to the successful development, introduction and further exploitation of Internet of Things (IoT).

It is particularly targeting IoT knowledge exchange in manufacturing, energy/transport systems, health and cities: and cross-sector issues including ethics and management. It is a Connecting Capability Fund (CCF) programme led by Sheffield, with partner Universities of Oxford, Cambridge and Newcastle.

It aims to develop partnerships between the Universities, with industry and within local IoT eco-systems. It supports Proof of Concept projects, so if of interest do come and discuss.

A miniature device to expand the functionality of low-cost light microscopes
Robert R. Ishmukhametov and Richard M. Berry - Physics

We have developed a novel technology for light microscopy (patent pending) which can significantly expand the functionality of optical microscopes. Our technology is based on a simple optical design and consists of a small, low-cost miniature epi-illumination attachment, which can be used with standard commercial microscopes.

The attachment enables various imaging techniques, which have limited availability to non-specialist users due to their high costs and expertise required.
Of those techniques two (backscattering dark-field and epi-fluorescence) can detect malaria and tuberculosis, respectively, and could be potentially implemented on primitive low-cost microscopes in primary medical facilities of the developing world.

The Public Engagement Lab
Michaela Livingstone-Banks - MPLS

The Public Engagement Lab is a strategic programme that aims to build capacity for public engagement with research by connecting researchers with the University's Gardens, Libraries and Museums, by collaboratively developing high quality, innovative public engagement with research projects.

Phase one involved a series of training and collaborative ideation workshops with the opportunity for participants to pitch for funding. Phase 2 is now underway. Four funded projects are developing and delivering their ideas. The projects and programme are being robustly evaluated to understand and demonstrate the value of collaborative working, as well as the outcomes and impacts on all involved.

RisingWISE: being the change you want to see

Anne Miller[1], Daisy J Hung[1] and Leah Thompson[2] - MPLS[1]; KEIT[2]

Women are being urged to pursue careers in STEM subjects, where they often excel, but face a huge disparity in achieving success and leadership roles. RisingWISE has been developed to address this challenge, bringing together women early career researchers from Oxford and Cambridge over three winter weekends, to meet with women working in industry and commerce, who face similar challenges.

Together they develop skills, knowledge and confidence to catalyse and energise the enterprising behaviour of women in a variety of contexts.

The success of the programme demonstrates that there is both demand for and access to a network of support and mentoring and great benefit to be had by sharing experiences

Agile Lab at Begbroke Science Park: Space to commercialise scientific research

Claire Morgan and Alistair Cory - Begbroke Science Park

The Agile Lab at the University's Begbroke Science Park is a shared equipped laboratory with bookable bench space and adjoining office. It is designed for:

- Pre-start up science entrepreneurs performing proof of concept experiments for funding applications
- University researchers undertaking experiments to confirm research impact prior to company incorporation
- Newly formed SME's developing their pipeline before expansion.

As well as low rental rates, Agile Lab users get one-to-one business support, networking opportunities on site and access to seminars and workshops.

This is an initiative of the Oxfordshire Innovation Support for Business programme (ISfB) funded by the European Regional Development Fund (ERDF).

Feasibility study for the scale-up and automation of the manufacture of a surgical patch

P-A Mouthuy, H Morris, A Lach, J Martin and A Carr - Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences

Pain and loss of function arising from disease or injury of the tendons at the shoulder joint can cause significant long-term disability. Currently 17,000 patients annually in England require surgical repair of torn tendons and this number is increasing each year, while around 40% of these surgical repairs fail to heal.

We have recently developed a novel degradable patch that mimics a normal tendon and is capable of promoting much better healing. But while our current manufacturing process is able to produce sufficient numbers of patches for clinical trials scheduled to start in 2020, it would be unsuitable for their commercialisation. The aim of this project is to investigate the feasibility of scaling up our capability to produce patches to a level suitable for initial commercialisation.

3D-printed breathing-powered prosthetic arm for children

Vikrant Nagaraja & Jeroen Bergmann - Engineering Science

Prosthetic arms are not available to all children and young adults due to financial or support constraints. 3D printing technology provides opportunity for personalisation and improving device accessibility in low- and middle-income countries.

A body- powered (BP) prosthesis severely limits the movement possibilities of the user and a radical new BP prosthetic is proposed here that relies on the lungs to power and control the prosthesis. This ambitious research project wants to push the boundaries, and provide a step-change in affordable, BP prosthetic designs for children, through the development of a personalised 3D-printed prosthetic that uses a new type of control.

Multiple Window Length Forecasting for Univariate Time Series
Ningzhi Tang, Jaroslav Fowkes and Raphael Hauser - Mathematical Institute

We propose a new time series forecasting method called Multiple Window Length Forecasting. The main idea of Multiple Window Length Forecasting is that instead of restricting ourselves to a univariate time series, we make a forecast based on a multivariate time series which combines different length subsamples with the same endpoint from the univariate data. Numerical comparisons between Multiple Window Length Forecasting and existing univariate time series methods (SSA and SARIMA) show that Multiple Window Length Forecasting provides improved forecasts on both strongly-seasonal and weakly-seasonal econometric data for different forecast horizons.

Using our proposed method, multivariate SSA (MSSA) provides a more accurate forecast than SSA and moreover MSSA-ARIMA (a new combination of forecast methods) is the most accurate forecasting method compared to MSSA, SSA and SARIMA.

Presentations - Abstracts

Semi-automated Image Analysis for Histology
Helen Byrne and Joshua Bull – Mathematical Institute

Modern imaging techniques generate detailed images of tissue biopsies, each containing hundreds of millions of pixels. Manual analysis of such images is timeconsuming and diagnoses, even by experienced pathologists, may not be consistent. Our project aims to accelerate routine analysis of specimens.

By combining image compression techniques with machine learning, our software enables rapid extraction from large images of quantitative data that are accurate, robust and reproducible.We aim also to use advanced spatial statistics to develop novel, quantitative biomarkers for cancer classification and patient stratification, and to integrate predictive computational models with histology data to compare different treatment protocols.

From Light Microscopy to Mass Photometry
Philipp Kukura – Chemistry

I will present the evolution of a rather obscure light microscopy technique towards a potentially transformative new technology with broad applications in the life and material sciences, as well as diagnostics and drug discovery. Instrumental in enabling maximal impact was a relatively early EPSRC IAA award that enabled the construction of a prototype, which ultimately catalysed external investment and the launch of Refeyn Ltd, a spin-out that has grown to almost 20 FTE employees within 9 months of launch and installed products in the US and Europe.

KOALA: Kids Online Anonymity & Lifelong Autonomy
Nigel Shadbolt and Jun Zhao – Computer Science

Mobile devices are widely used by young children. While these technologies provide great education opportunities, they also expose children to increasing privacy risks, with their personal information being exploited for identity theft and targeted advertisements. The goal of the KOALA project is to raise awareness about the risks associated with the use of mobile devices, and investigate the impact of personal data collection practices of mobile apps upon the well-being of young children. Our project findings have been fed into national data regulation development and research into children's digital well-being.

Oxford University's EPSRC Impact Acceleration Account (IAA)

The EPSRC awarded the University of Oxford an Impact Acceleration Account (IAA), to the value of £5.2m, for activities that will accelerate the impact beyond academia of research outputs within the EPSRC remit. In addition to strategic initiatives, between 1 April 2017 and 31 March 2020, Oxford's IAA provides small grant support to Oxford researchers to:

- Stimulate and strengthen relationships between Oxford researchers and external non-academic organisations
- Develop new technologies to the point where they are suitable for follow on support from other sources (e.g.Oxford University Innovation translational funding) or for commercial exploitation (e.g. capital investment for spinning out, licensing deals etc.)
- Transfer knowledge, whose take-up will provide benefits to users but may not necessarily be of commercial value (e.g. applications for NHS and other public bodies, NGO's, etc.)
- Support and encourage new DPhil graduates to maximise the impact of their research through engagement with external non-academic partners.

Find out more at **www.mpls.ox.ac.uk/epsrc-iaa**

University support for impact activities - Questions & Answers

Where can I find information about translational funding and how can I get help with the application?

Translational funding is used to advance fundamental discoveries closer to exploitation or implementation. There is a variety of funding opportunities depending on the scientific topic and readiness of the technology.

To find out more about internal funding opportunities, including from Oxford University Innovation, please visit **https://researchsupport.admin.ox.ac.uk/funding/internal**

For information about external funding opportunities please use Research Professional at **www.researchprofessional.com**

Research Professional is an online research funding database and news service which is free to use for Oxford University staff. The database holds information on thousands of research funding opportunities, from small travel grants to early career fellowships and research project funding. The Research Professional website also provides a wealth of interviews, in-depth articles and tips to help you apply for funding and develop your career, alongside research policy news coverage. To find out more about how to use the service please visit **researchsupport.admin.ox.ac.uk/funding/rp**

Research Services grants and major bids teams and departmental support staff specialise in providing advice and support for all types of grant applications with any kind of funder. They will provide you with all the information and guidance you need in order to apply for funding calls, as well as reviewing the application before submission to make sure it is in line with the funder's instructions and University policy. The earlier you can let Research Services and your departmental support staff know that you will be applying for a specific call, the more they will be able to help you.

Please consult **researchsupport.admin.ox.ac.uk/applying** for further information.

What do I need to write in the Pathways to Impact section and who can help me?

The objective of the Pathways to Impact section in grant applications is to highlight the activities that will increase the likelihood of potential economic and societal impacts being achieved from the research outputs of the proposed project. The activities can be broadranging and should reflect the best path(s) to achieve impact. These can include –

i. application and exploitation, both commercially and non-commercially;

ii. collaboration and co-production with external academic and non-academic partners;

iii. communications and engagement with the end users of the research outputs;

iv. capacity and involvement.

The resources for the activities proposed can and should be costed as part of the application through the normal FEC costing method. This will remove or reduce the need to apply for translational funding to carry out activities directly related to the proposed project. The types of costs covered include employment of specialist knowledge transfer staff, consultancy fees, publication and marketing costs, public engagement activity, engagement events, networking activities and people exchange, among others.

Please get in touch with your Research Services grants contact, and/or Oxford University Innovation if you intend to exploit the outputs commercially or non-commercially, or if you need support for your Pathways to Impact section.

Please visit **researchsupport.admin.ox.ac.uk/applying/guidance/impact** for further information.

Can Public Engagement with Research (PER) be a route to research impact?

Public engagement with research describes the many ways that members of the public can be involved in the design, conduct and dissemination of your research. High-quality engagement is a two-way process with the goal of generating mutual benefit between the public and researchers and ultimately enhancing the quality or impact of research. There are many benefits to engaging the public with your research and engagement activities can take many different forms. Public engagement with research can result in economic, health, environmental, policy, academic, cultural and societal impacts. Direct impacts on the public participating in the engagement activities, which are all valid routes to research impact, include:

- Increase in knowledge and understanding
- Changes in perceptions or attitudes and values

- Changes in behaviour
- Empowerment
- Enjoyment, inspiration and aspiration
- Gaining new skills

For further information on the PER training, support, funding schemes and opportunities available at Oxford see: **www.ox.ac.uk/research/public-engagement**

What is the Research Excellence Framework (REF)?

The REF is the system used by our national funders for assessing the quality of research in UK higher education institutions (HEIs). Submissions to the REF are assessed via three distinct elements: outputs of research, the impact of research beyond academia, and the research environment. Submissions are made by universities into subject-based units of assessment, which are then reviewed by experts in subject-based panels. Staff employed on research contracts by HEIs on 31 July 2020 who both have a significant responsibility for research and are independent researchers will be submitted.

To find out more, including points of contact both centrally and locally, please look at the Oxford REF website: **researchsupport.admin.ox.ac.uk/ref**

I want to generate impact by working with external non-academic partners but am unsure how to – who can help me?

There are several routes to generate impact by working with external non-academic partners including research collaborations, sponsored research, and providing consultancy services, among others. The best route for impact will depend on what your research outputs and objectives are.

If you would like to collaborate or seek funding from a non-academic partner, the business development and industrial research partnerships teams can work with you to identify the ideal partner for your research, through the University's growing network of external contacts. These teams can offer a wide range of support for your collaborative projects, from simply facilitating the right introductions through to ongoing project development and post-agreement support to ensure longevity and efficiency in your partnership. They will also be able to connect you to other support services that may be required along the way, for example Research Services contracts teams or Oxford University Innovation. Please use the contact information provided on the back cover of this booklet for general advice or to discuss a specific opportunity.

How can I use my expertise to benefit external organisations?

Consulting activity is one of the easiest ways to make your knowledge and expertise available to external organisations. Through consulting, your research can make an early impact on the wider world. Such interactions will in turn benefit you as you will bring back the insights, experiences and contacts you have gained as a consultant to your University teaching and research.

The University has established a specialist group within Oxford University Innovation to support academic staff wishing to provide advice and expertise to external organisations. Consulting Services manages all the contractual and administrative aspects of consultancy, minimising the administrative burden while protecting your interests and those of the University. Consulting Services also supports departments to undertake departmental consulting and technical services work. Please use the contact information provided on the back cover of this booklet for general advice or to discuss a specific opportunity.

How can I talk to external non-academic partners without giving away any of my results and ideas?

There are ways to protect results and ideas when discussing or collaborating with external partners so this should not be perceived as a barrier to generating impact. A simple and quick confidentiality agreement can be put in place if you are having initial discussions with an external partner or, if you intend to carry out work, then other types of agreements will be better suited. It is advisable to make contact with the research contracts team in Research Services before engaging in discussions with an external partner, so they can advise you on how best to protect your interests, and support you through the process. The research contracts team is specialised in all research-related contractual matters, including confidentiality, publication, intellectual property, and many others. They negotiate and finalise thousands of contracts a year with many different organisations across the world, from small charities to large multinationals. This huge pool of knowledge is used to protect your and the University's interests when contracting with other parties (to fulfil the University's charitable aims of advancing knowledge through research and teaching).

Who can help me to commercialise the results of my research?

Oxford University Innovation is there to help you if you wish to protect your ideas and commercialise the results of your research. Whether it involves licensing intellectual property to external parties, creating a new spin-out company or setting up a social enterprise, commercialisation also provides important opportunities to create impact. Not only you, but also your department and the University itself can all benefit from successful commercialisation of research outcomes within the University's framework. Please use the contact information provided on the back cover of this booklet for general advice or to discuss a specific opportunity.

Useful contacts

Oxford EPSRC IAA Support

E: epsrciaa@mpls.ox.ac.uk
W: **www.mpls.ox.ac.uk/epsrc-iaa**

Research Services

- Contracts teams
- Grants teams
- Public Engagement with Research
- Knowledge Exchange & Impact Team
- Research Excellence Framework Team

To find who your dedicated support staff members are please visit **researchsupport.admin.ox.ac.uk/contacts** and use the filter system

Oxford University Innovation (OUI)

T: 01865 (2)80830
E: enquiries@innovation.ox.ac.uk
W: **innovation.ox.ac.uk/university-members/**

Oxford University Consultancy Services

T: 01865 (2)80829
E: consulting@innovation.ox.ac.uk

Business development and research partnering teams

W: **www.mpls.ox.ac.uk/our-team/industry-links**
W: **www.torch.ox.ac.uk/business-engagement-partnerships**
W: **www.medsci.ox.ac.uk/support-services/teams/business-development**