

SCIENCE &
ENGINEERING
SOUTH

Leading the UK in
thought-provoking,
innovative science

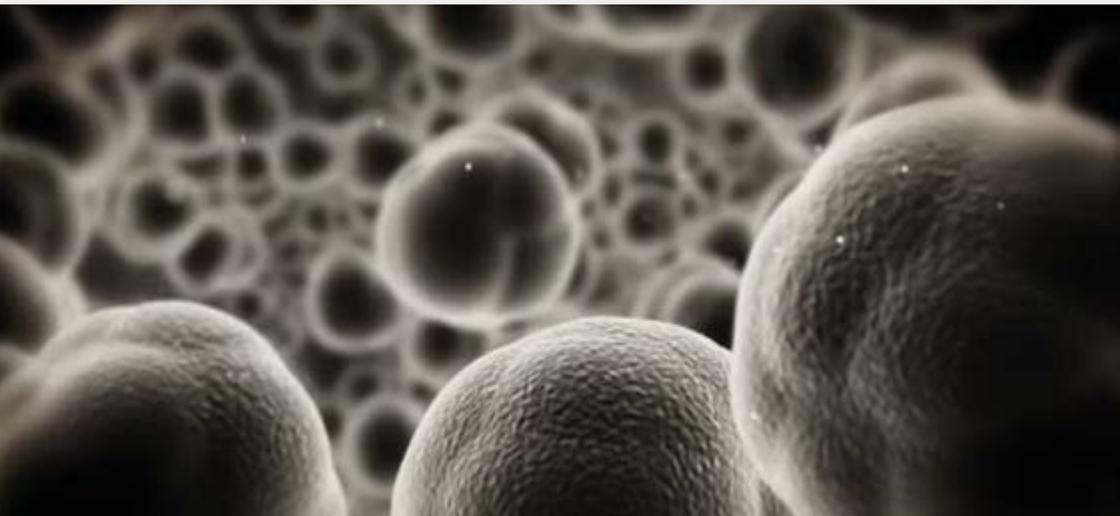
Who are we?

The Science and Engineering South Consortium brings together the universities of Oxford, Southampton, University College London (UCL), King's College London, Queen Mary University of London and Imperial College London, creating the most powerful hub of research-intensive universities in the UK. As Russell Group members with expertise in Science, Technology, Engineering and Mathematics (STEM), our partners invest in high quality research, essential for the sustained development of world-leading research that makes a positive difference to our health, our wellbeing, and to the world around us.

Generating benefit for the UK

SES is a collaborative alliance, harnessing our collective insights and resources to innovate and explore new ideas whilst increasing the return on existing and future public investment. By working together we are able to deliver successes that may otherwise be difficult to achieve or afford if acting alone.

In addition to traditional academic settings, SES partners provide innovative environments for 'blue sky' research, feeding the UK economy. Companies like the Southampton based Symetrica (providing radiation detection for the security industry) and Oxford Nanopore (selling sequencing products for the direct analysis of single molecules) were established through investment in infrastructure and support provided by SES partners, in order to further their curiosity driven science.



Our Presence



“Our successes demonstrate how coordination of efforts and resources can leverage our collective expertise to deliver cutting-edge research”

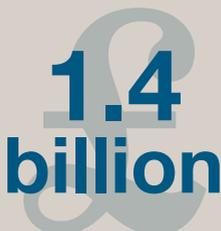
Prof. Nick Jennings
Vice-Provost (Research),
Imperial College London

“The SES consortium brings together an extraordinary range of world-leading research, sharing resources and expertise to accelerate research progress and applications, for the benefit of society”

Prof. William J. Spence
Vice Principal (Research),
Queen Mary University of London



**ALL OUR PARTNERS
ARE MEMBERS OF THE
RUSSELL GROUP, 24
RESEARCH-INTENSIVE,
WORLD-CLASS
UNIVERSITIES**



**AMOUNT OF
EPSRC FUNDING,
REPRESENTING
30% OF NATIONAL
ALLOCATION**

(correct on 7th Feb 2017)



**SES PARTNER MACHINES
ARE RANKED ON BOTH
TOP500 AND GREEN500
LISTS FOR WORLD-
LEADING HPC**

(Nov 2016)

Enhancing the skills of our researchers

The on-going development of researchers is fostered through sharing their understanding and experiences in Research Data Management (RDM); from managing complex sets of data, and educating staff in dealing with RDM inquiries, to offering a realm for researchers to network and debrief together, raising questions for the future of their scientific study.

We continue to provide accessible resources for researchers and staff across the consortium, maintaining a dialogue between academics and university-based service providers. Our events encourage guests to collaborate in a cross-disciplinary environment and analyse the field of RDM (from data intensive research or analytics) to better understand research needs, challenges, and available resources.

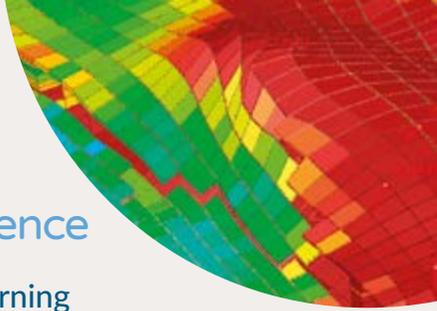
To find out more about our previous events and work in RDM go to:
www.ses.ac.uk/rdm.

The Data Dialogue

Held at The University of Cambridge, The University of Oxford (with UCL), and King's College London, our Data Dialogue series brought together researchers and staff from wide ranging backgrounds to share knowledge, experience, and skills on managing research data. A plethora of current and crucial areas in RDM were covered, from data sensitivity (Time to Share: Navigating Boundaries and Benefits), to sharing and transferring data internationally (When Research Crosses Borders) and confidentiality and data intelligence (At War with Data).

Watch our event video at:
www.ses.ac.uk/data-dialogue.





Partners in Computational Science

From Molecular Modelling to Machine Learning

High Performance Computing (HPC) continues to be an essential tool for academic, industrial and blue-sky research, maximising and facilitating scientific output. Two recent EPSRC funded systems now make up the SES HPC landscape:

- The MM Hub, a new centre in materials and molecular modelling at UCL, developed in partnership with the Thomas Young Centre.
- The Joint Academic Data science Endeavour (JADE), a national GPU facility for machine learning, molecular dynamics and other applications at The University of Oxford.

HPC for Tsunami Modelling

Since 2012, Prof. Serge Guillas from Statistical Science at UCL and GPU specialists from Oxford University led by Prof. Mike Giles, have been harnessing the power of the SES machine Emerald to enable the acceleration of VOLNA, a modeling software used to simulate travelling ocean waves in tsunami research developed at University College Dublin by Prof. Frédéric Dias.

Thanks to supercomputers like Emerald, it is now possible to simulate how tsunamis begin, grow and impact at a significantly faster rate. The new JADE facility at Oxford is projected to deliver an additional 10x acceleration to VOLNA, thus allowing researchers to produce more realistic tsunami simulations at an even quicker speed.

Following recent natural disasters in the Indian Ocean and Japan, this could enable civil authorities to greatly improve early warnings, reduce long-term impact/damage to property and limit loss of life through better disaster planning. These advances are also of major interest to the insurance industry for processing risk analyses; a tsunami hazard model developed by Prof. Guillas for the US/Canadian pacific NW coast is now commercially available for the insurance sector. A new project on tsunami risk for the Western Indian Ocean is also being led by Prof. Guillas with colleagues in the UK and India.

To read more about Professor Guillas' work visit: www.ses.ac.uk/tsunami-pub

“All these projects have been taking advantage of the accelerations of VOLNA on Emerald and will exploit the leap in computational power that JADE will provide”

**Prof. Serge Guillas
Professor of Statistics, UCL**

Energising Equipment Sharing

Institutional infrastructure provides essential space and technology, though setting up, accessing, and promoting equipment costs both time and money, raising the desire to share equipment across the partners. To encourage this, we're providing transparent information on available facilities, charges and application methods.

Spotlight On – R.J. Mitchell Wind Tunnel

The National Wind Tunnel Facility hosts 9 of its 17 facilities at SES partner institutions (Imperial College London, The University of Southampton, and The University of Oxford), with the R.J. Mitchell tunnel in Southampton providing a low-speed facility capable of testing the aerodynamic performance of tools such as trains and aircraft. Currently it's being harnessed to deliver on two key projects; an academic, Airbus backed venture on aerodynamic 'drag', and an improved performance bike frame from company Boardman Bikes. Visit www.ses.ac.uk/equipment for more information.

Spotlight On – Nikon Imaging Centre

Developed in partnership with Nikon Instruments UK, the Nikon Imaging Centre at King's College London is one of nine such facilities worldwide providing access to the most cutting edge light microscopy instrumentation and methodologies for wide variety of research backgrounds (e.g. immunology, neuroscience, cancer studies etc.). Collaborating on infrastructure and sharing expertise is key to cross-consortium ventures. Go to www.ses.ac.uk/kcl-image to discover:

- the UCL-KCL Comprehensive Cancer Imaging Centre – identifying imaging techniques to better treat cancer, and
- the iFind initiative (King's College London, Imperial College London and Philips Healthcare clinicians) – improving fetal imaging and diagnosis.

“Research must never be a closed shop or a one-way street – it's vital to look outwards and recognise that dialogue, interaction and teamwork are the lifeblood of the process”

**Prof. Reza Razavi,
Professor of Paediatric Cardiovascular Science,
King's College London**



Impact: SEAHA

The Science and Engineering in Arts, Heritage and Archaeology (SEAHA) Centre is an EPSRC funded joint initiative by UCL, the University of Oxford and the University of Brighton. From cutting-edge techniques that locate, date and analyse ancient artefacts to digital technologies that deliver new possibilities for 3D and interactive displays, SEAHA is aiming to aid conservation and build skills that illuminate our heritage and advance the arts. The Centre is already demonstrating how science and engineering can make a material difference to this sector, while directly benefiting industry too and training the next generation of Heritage Scientists.

Impact: Abzena

Successful university spinout companies are a key feature of the UK's economic landscape – but not many can match the remarkable rise of Abzena, a thriving life sciences business at the arrow tip of medical innovation. From its origins in cross-institutional research at the London School of Pharmacy (UCL) and Imperial College London, to the launch of spinout PolyTherics and its evolution into Abzena, the mission of the company has been to translate leading-edge research from lab bench to clinical use. Abzena has led the way in developing better antibody-drug conjugates (ADCs) for cancer treatment. ADCs are 'seek and destroy' weapons combining the tumour-targeting capabilities of antibodies with the tumour-killing power of cytotoxic drugs.

“The Abzena story shows how scientific collaboration can lead to the emergence of a successful global business while helping scientific institutions. The net result, in terms of the potential for better healthcare outcomes for millions of people worldwide is almost too huge to comprehend”

**John Burt,
CEO, Abzena**





Contact details & links

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Shared and National Facilities

The University of Southampton

National Crystallography Service
National Centre for Research Methods
National Oceanographic Centre
Administrative Research Data Centre for England

University College London

Centre for Longitudinal Studies
National Dark Fibre Infrastructure Service

Imperial College London

National Service for Computational Chemistry Software
National Wind Tunnel Facility

Queen Mary University of London

Genomics England

King's College London

The Nikon Imaging Centre
Centre for Ultrastructural Imaging

**Imperial College
London**

UNIVERSITY OF
Southampton

 **Queen Mary**
University of London

