



LONDON INTERNATIONAL
YOUTH SCIENCE FORUM
2022



63RD LONDON INTERNATIONAL YOUTH SCIENCE FORUM

27TH JULY – 10TH AUGUST 2022

'SCIENCE FOR SOCIETY'



Founded in 1959, LIYSF aims to give a deeper insight into science and its applications, for the benefit of humankind and to develop a greater understanding between young people of all nations.

LIYSF is an accredited not-for-profit social enterprise. We are part of a diverse international network of accredited social enterprises – the Social Enterprise Mark is an independent guarantee that we put the interests of people and the planet above financial gain.

President

Professor Clare Elwell: [2018 – Present]

Director

Richard Myhill: [2009 – Present]

Royal Patron

HRH The Princess Royal: [2020 – Present]

Science Patron

Professor Richard O’Kennedy [2018 – Present]

Sponsors

Peter Brewer, Steve Brosnan, Vanessa Smith

Founder Patron

HRH Prince Philip, Duke of Edinburgh [1959 – 1969], Past Patron: HRH The Duke of Kent [1983 – 1988]

Past Presidents

The Rt Hon Lord Nathan, **Sir John Cockcroft OM**, **Sir Lawrence Bragg CH FRS**, Dame Kathleen Lonsdale FRS, **Professor Sir Joseph Rotblat KCMG CBE FRS**, Professor Sir Hermann Bondi FRS FRAS, The Rt Hon Lord Ritchie Calder, The Rt Hon Lord Briggs, **The Rt Hon Lord Porter OM PRS**, Sir John Meurig Thomas FRS, Professor Brian FG Johnson FRS FRSE FAcad, Professor Richard O’Kennedy PhD FSB

***Nobel Prize winners**

Former Directors / Former Chair

George McGowan, John Needle, Mike Clark





HRH THE PRINCESS ROYAL



BUCKINGHAM PALACE

The importance of scientific and technological development and their relationship to the needs of humankind, has never been greater. As you attend this Forum, you will gain terrific insights into science and the role which it plays for positive progress within society.

All of you attending, whether here with us in London or connecting online, will have the opportunity to engage with some of the very best scientific minds and learn about a broad range of science topics. You will also, over the next 15 days, create your own international community. Young people coming together to talk about key issues and learn from each other, establishing a basis of international understanding, uniting around a common interest, such as science, is often the cement that binds together the strongest friendships and connections. You are making a personal contribution to the understanding between nations just by being here at LIYSF.

I welcome you to this 63rd edition and hope that you enjoy and make the most of your time at LIYSF over the coming two weeks. Seize every opportunity for science and cultural learning, immerse yourself and embrace each moment.

HRH The Princess Royal
Royal Patron of the London International Youth Science Forum

THROUGH TIME

1959 - PRESENT

LIYSF is an accredited not-for-profit social enterprise established in 1959. Since our beginning, the idea of LIYSF is about bringing young people from different nations together to learn about each other and our different cultures through a shared passion for science.

We strive to empower young people from all backgrounds to pursue their potential in STEM education (science, technology, engineering and mathematics). We believe that connecting with others from across the globe in person and exchanging ideas is vital to form and establish networks. We enable discussion about global issues and scientific advancements in our world today. LIYSF equips our students to take their place in the world as a global citizen.

KEY GOALS

Education, with a focus on the application of knowledge for economic & social benefit

Positive impact on individuals and through them on the world

Empowerment in STEM

Enabling students to explore and fulfil individual potential

Enabling students to acquire skills, confidence and knowledge

Facilitate and showcase international collaboration

Challenge students to think in new ways

Encourage and enable networking


Training in effective communication

Cultural interaction to ensure open and informed world citizens

LIYSF contributes to all 17 UN sustainable development goals, with proactive action and effect on the thinkers of the future.

LIYSF is an impartial, non-political, not for profit social enterprise. We are an inclusive organisation with a goal of promoting peace, friendship and understanding through science. We are pleased to be offering scholarships to enable Ukrainian refugees to attend this year's LIYSF.

LIYSF is a not-for-profit organisation. Across the world, such organisations have names like NGOs, foundations or similar. In the UK and in our case, LIYSF is a social enterprise in the form of a community interest company (CIC), limited by guarantee. LIYSF CIC does not have shareholders and profits are re-invested for our community purpose interest.

 We are part of a diverse international network of accredited social enterprises – the Social Enterprise Mark is an independent guarantee that we put the interests of people & the planet above financial gain. We have been externally assessed against sector-agreed criteria and have proved our commitment to using profits and income to create benefits for society and the environment.



LIYSF WELCOME MESSAGE

We are thrilled to welcome you to the 63rd London International Youth Science Forum, with so many of you traveling in person to attend with us in London.

As we gather together from across the world and reflect upon the scientific challenges facing humanity, we recognise that the need for responsible innovation, interdisciplinary collaboration and global partnerships has never been greater. With this in mind it is particularly fitting that the theme for this year's Forum in "Science for Society".

During your time at LIYSF you will have opportunity to engage with cutting-edge science. You will be encouraged to debate, communicate and challenge scientific ideas. And in the true spirit of the Forum, you will interact and share these experiences with other young scientists from across the globe. LIYSF provides a unique platform for you to embrace in spreading scientific knowledge and the promotion of understanding the impact of scientific research on society as a whole, as well as creating international friendships.

Make the most of every moment at the Forum, both scientifically and culturally. Make new connections as you surround yourself with the future of science and a network which will support and inspire you as forge your own futures and careers.

Everyone is welcome at LIYSF and we are thrilled to have you with us. You are now part of a special family. Let's change the world!

Professor Clare Elwell
President, LIYSF

Richard Myhill
Director, LIYSF

SCHEDULE

	<i>Morning</i>	<i>Afternoon</i>	<i>Evening</i>
Wednesday 27th July		Arrivals	Welcome Talk & Introductions
Thursday 28th July	Opening Ceremony & Keynote Address – Professor James Rothman & LIYSF President Welcome – Professor Clare Elwell	Principal Lecture Demonstration – Professor Ian Chapman	Welcome Event
Friday 29th July	Visit to Research & Scientific Establishments in London	Principal Lecture Demonstration – Professor Ijeoma Florence Uchegbu	Great Crossword Treasure Hunt
Saturday 30th July	Principal Lecture Demonstration – Professor Richard O’Kennedy	The Science Forum Bazaar – Student Project Poster Board Event	Optional Guided Coach Tour of London
Sunday 31st July	Optional Visit to Stonehenge	Optional Visit to Stonehenge	Debate Evening
Monday 1st August	Principal Lecture Demonstration – Steve McKechnie	Specialist Lectures	Student Topics & Science Communication
Tuesday 2nd August	Day Visit to Research & Scientific Establishments	Day Visit to Research & Scientific Establishments	Optional Theatre Night
Wednesday 3rd August	Specialist Study Day led by Dr Gemma Bale	Specialist Study Day	Principal Lecture Demonstration – Professor Sally Day
Thursday 4th August	Day Visits to Oxford Research and Scientific Establishments	Day Visits to Oxford Research and Scientific Establishments	Rehearsals
Friday 5th August	Alumni Specialist Lectures	Principal Lecture Demonstration – Professor Tolullah Oni	International Cabaret – Cultural Showcase Performance Evening
Saturday 6th August	Principal Lecture Demonstration – Dr Ollie Folan	Principal Lecture Demonstration – Professor Mark McCaughrean	LIYSF Olympics with Team Games
Sunday 7th August	Optional Visits: Day visit to Oxford, Cambridge or Tower of London	Optional Visits: Day visit to Oxford, Cambridge or Tower of London	Traditions of Home – Sharing World Customs and Fashion Evening
Monday 8th August	Specialist Lectures	Optional Visits to Buckingham Palace and the London Eye	Optional Theatre Night
Tuesday 9th August	Participants’ Forum	Closing Keynote Lecture – Professor Peter-Paul Verbeek & Ceremony	Farewell Party
Wednesday 10th August	Departures		

PRINCIPAL LECTURES & DEMONSTRATIONS



KEYNOTE ADDRESS A LIFE IN SCIENCE

Professor James Rothman *Yale University*

Tracing the history of the field of cell biology and his own personal history, Professor Rothman will describe his transition as a young scientist from physics to biology, and how this perspective enabled him to make the discoveries that led to a Nobel Prize in Physiology or Medicine. He will also draw from his experience to offer suggestions for today's young scientists.

James E. Rothman is the Sterling Professor of Cell Biology at Yale University and chairs Yale School of Medicine's Department of Cell Biology. His research has elucidated the molecular mechanisms and machinery governing vesicle traffic in the cell, explaining such diverse processes as the secretion of hormones like insulin, the action-potential controlled release of neurotransmitters in synaptic transmission, and the propagation of membrane compartments of the cytoplasm during cell growth and division. This work has been recognized by many awards, including the Albert Lasker Award for Basic Biomedical Research (2002), the Kavli Prize for Neuroscience (2010), and the Nobel Prize in Physiology or Medicine (2013).



28TH JULY

FUSION ENERGY – PUTTING THE SUN IN A BOTTLE

Professor Ian Chapman
UK Atomic Energy Authority

Fusion energy offers the potential of continuous, low-carbon, sustainable energy which could play a major role in tackling the spectre of climate change. However, it is fiendishly difficult to achieve and sustain here on earth as the fuel must be controlled at temperatures significantly hotter than the centre of the sun. This lecture will explain the challenges of achieving fusion energy and outline the latest developments in the field which offer increasing confidence that we can deliver fusion.

Ian Chapman became CEO of the UK Atomic Energy Authority and Director of the Culham Centre for Fusion Energy in October 2016. He has held a number of international roles in fusion, including membership of the Princeton Plasma Physics Advisory board, the Chinese Academy of Sciences Plasma Physics advisory board and chairing the IAEA International Fusion Research Committee. His research has been recognised with a number of international awards, including the Institute of Physics Paterson Medal in 2013, the European Physical Society Early Career Prize in 2014, the American Physical Society Stix Award in 2017, the Royal Society Kavli Medal in 2019 and the Institute of Physics Glazebrook Medal for leadership in 2021. He was made a Fellow of the Institute of Physics in 2013 and became a visiting Professor at Durham University in 2015.



29TH JULY

MAKING MEDICINES USING NANOTECHNOLOGY

Professor Ijeoma Florence Uchegbu
University College London

Medicines development involves the combination of an active pharmaceutical ingredient and various inactive ingredients, commonly known as excipients. Normally administering the medicine by mouth, injection or other means will result in the active pharmaceutical ingredient or drug substance going to various areas of the body. We have been able to use nanotechnology to control where the drug goes in the body. One of the net results of our scientific and technology efforts is that we have a medicine known as Envelta[®] being developed to treat pain, which should be as effective as the best pain killers known today, but with significantly reduced side effects. Envelta[™] is being developed to address the US opioid crisis. Opioids are highly addictive drugs such as morphine and fentanyl. 71,000 people died from opioid deaths in 2021 in the United States. Our work has also shown that we can use nanotechnology to deliver genes to the brain. There are no genetic brain therapies on the market at present. This ability to deliver genes to the brain may be useful for treating genetic brain diseases, such as Huntington's Disease and Alzheimer's Disease.

Ijeoma Uchegbu is UCL's Professor of Pharmaceutical Nanoscience, a fellow of the UK Academy of Medical Sciences, an honorary fellow of the Royal Society of Chemistry, a Wellcome governor and Chief Scientific Officer of Nanomerics Ltd. Her research was the first to show that peptides could be delivered across the blood brain barrier when presented as peptide drug nanofibers and the first to demonstrate, via pharmacology and pharmacokinetics evidence, peptide transport into the brain, using nanoparticles via the nose to brain route. These findings led to the enkephalin pain medicine candidate Envelta[™], which has been out-licensed to Virpax Pharmaceuticals (NASDAQ:VRPX). If successful, this will be the first neuropeptide medicine approval. Uchegbu has won numerous prizes, e.g. first place in the Royal Society of Chemistry's Emerging Technologies competition, 2017 and the Academy of Pharmaceutical Sciences Science Innovation Award, 2016.



30TH JULY
ENABLING PRECISION HEALTH
FOR EVERYONE-EXPLOITING
ANTIBODY-BASED

DIAGNOSTICS, SENSORS AND
Professor Richard O'Kennedy

Qatar Foundation

Richard O'Kennedy is Vice-President for Research at Hamad Bin Khalifa University, Qatar, Chair of the Board of Qatar Science and Technology Park and Member of the Royal Irish Academy. He is Science Patron of LIYSF. He has also been an LIYSF participant, staff member and President (2005-2017). He was Scientific Director of the Biomedical Diagnostics Institute, Head of the School of Biotechnology and Vice-President at Dublin City University, Ireland, and Past President of the London International Youth Science Forum and the Institute of Biology of Ireland. He has a H index of 60, ca 16,000 citations, has generated over 400 publications, 3 books and has supervised over 100 research students (incl 72 Ph.Ds.). He directs the Applied Biochemistry Research Group, internationally recognised for its expertise in assay development and is a Founder of AbYBiotech. He has a major interest in innovative approaches to Healthcare and has received many awards for Teaching, Research and Innovation.

In the past, healthcare was developed as a general approach for the population as a whole. This was shown to have a number of major limitations. Precision Health is tailored to the requirements of each individual and can generate much more targeted and successful impacts. This lecture will describe some of the methods that can be used to enhance disease diagnostics and significantly improve patient well-being.

31ST JULY
TRUTH, TRUST AND HARM
ONLINE: WHO IS
RESPONSIBLE?

Dr Jason Nurse
University of Kent

The online world is a beautiful place, full of opportunity and prospect. We use the internet for communication, learning, gaming, online business, and a range of other positive and uplifting activities. At the same time, however, online environments can be a place of great uncertainty, untruths, fear, and pain, most notably with the rise of fake information, misinformation, and online harms (e.g., cyber harassment, terrorism, and cyber-attacks). In this debate, we will reflect on truth, trust, and harms online, what they are, how do they relate to free speech, and who is best placed, or responsible for the safety of everyone in the online world.

Dr Jason R.C. Nurse is an Associate Professor in Cyber Security at the University of Kent and a Visiting Academic at the University of Oxford. Jason's research explores the interaction between people and aspects of cyber security, privacy and online trust. The impactful nature of Jason's work has resulted in regular keynotes and public lectures, and he has spoken at numerous conferences across the world, including in Singapore, North America Latin America and Europe. Dr Nurse has also had his research featured in various national and international media including Newsweek, BBC, Associated Press, Wall Street Journal, TRT World, ComputerWeekly, Wired, ZDNet, Infosecurity Magazine, and The Conversation.

1ST AUGUST SHAPING A BETTER WORLD

Steve McKechnie

Arup

The future of humankind is being forged now, through the myriad of decisions and actions that people take every day. We, as students of science, have the potential to shape that future. Our knowledge gives us understanding, and it gives us the power to make the sustainable future we want to see. This lecture will consider how we can use our love of physics, our desire to understand, and our ability to collaborate, to shape a better world. He will illustrate the talk with some of the remarkable structural engineering projects that he has helped to bring into existence.

Steve McKechnie is a structural engineer and a director at Arup. He has spent the last 37 years designing buildings of all shapes and sizes, in the UK and around the world, ranging in scale from Heathrow's Terminal 5 and the 'The Scalpel' in the City of London to the Rana Begum Sculpture 'Catching Colour' at London City Island. He is now the Structural Engineering Discipline Leader at Arup's London office. He leads an engineering team that concentrates on some of the most interesting and challenging projects such as the 120m span timber tension structure at Il Portico, Milan and La Sagrada Familia in Barcelona, where he has designed six new towers using prestressed stone masonry panels and the glass and steel composite star dedicated to the Virgin Mary. He is responsible for the professional development of and graduate recruitment into the 300-strong team of structural engineers in Arup London. He also teaches and sits on the advisory board at University College, London.

3RD AUGUST LOOKING AT LIQUID CRYSTALS

Professor Sally Day

University College London

Liquid crystals are well known for their use in displays, this lecture will describe how they work and how they have been developed using the knowledge and skills of teams of many different scientists and engineers and how they bring together their skills and ideas to design systems for people to use. The lecture will include demos to help explain the science and developments and why even though new types of displays are being invented all the time, liquid crystals will still have a role in many photonic systems, including maybe holographic displays.

5TH AUGUST PUBLIC HEALTH - CHRONIC DISEASE IMPACT IN URBAN ENVIRONMENTS

Professor Tollulah Oni
University of Cambridge

Tackling the impact of climate change on health will require a focus on cities, where over 50% of greenhouse gas emissions arise, particularly in low and middle-income countries. Nowhere is this more important than in Africa, the fastest urbanising region globally. The urbanisation process in African cities is characterised by multi-dimensional climate-sensitive precarities such as haphazard land use which pose health threats through inequitable access to safe public space, clean air, healthy foods and walkable built environments. These contexts are also experiencing a rapid rise in non-communicable diseases (NCDs) such as obesity and diabetes. However, policy responses to NCDs remain mostly fragmented and vertical, with little focus on multisectoral action for prevention. Given that rapid urbanisation can accelerate climate vulnerability in ways that are harmful to health and that the rising NCD burden outstrips the pace of economic development, a focus on prevention is critical. Addressing these challenges requires a focus on urban public space for equitable NCD and climate intervention, an embrace of digital solutions and more robust youth participatory research. The lecture will explore the use of participatory youth-led citizen science approaches to generating evidence to inform integrated policy action and advocacy for healthy climate resilient cities.

Born in Lagos, Professor Oni completed her medical training at University College London, a Masters degree in Public Health at the University of Cape Town and a doctorate in Epidemiology at Imperial College London, UK. She is the Programme Lead of the Global Diet and Physical Activity Group and Network at the University of Cambridge MRC Epidemiology Unit and an Extraordinary Professor & Chair at Innovation Africa@UP, University of Pretoria, South Africa where she leads the Urban Better Satellite Studio. She is also an Honorary Associate Professor and Lead of the Research Initiative for Cities Health and Equity (RICHE) group at the University of Cape Town. Profiled in the Lancet journal, Science magazine, and the British Medical Journal, she is a 2019 World Economic Forum Young Global Leader, a

6TH AUGUST HOW CHEMICAL ENGINEERS ARE ADDRESSING TODAY'S CHALLENGES

Dr Ollie Folayan
Optimus Plus

The design and operations of processes that produce and/or utilize energy are fundamental aspects of chemical engineering but with the move towards cleaner energy sources how will the role of chemical engineers evolve? In this talk Dr Ollie Folayan will discuss the ways in which chemical engineers are offering solutions to achieving government's net zero targets whilst ensuring that energy needs continue to be met. From the utilisation of carbon capture technologies to the progressive replacement of fossil fuels and the introduction of renewable energy sources (RES) and alternative carbon feeds.

Ollie Folayan is Head of Process Engineering at Optimus Plus Aberdeen and a visiting professor to the School of Engineering, University of Dundee. He has more than 20 years industry experience. Ollie acquired a BEng in Chemical Engineering from Sheffield University in 1999 and a PhD in Combustion from University of Leeds in 2002. In 2018 Ollie Folayan was accepted into the Fellowship of the Institution of Chemical Engineers (IChemE). Ollie has authored 5 internal publications in combustion and has co-authored three publications on the influence of role models and on the sustainability of engineering in the UK.

Ollie has been a judge of the Young Woman Engineer of the Year and he won Diversity and Inclusion Award by the IChemE in 2021"



6TH AUGUST THE JAMES WEBB SPACE TELESCOPE: FROM FIRST LIGHT TO NEW PLANETS

Professor Mark McCaughrean
European Space Agency

After more than three decades of development, construction, integration, and test, the NASA/ESA/CSA James Webb Space Telescope was launched from French Guiana on Christmas Day 2021 before six months of complex deployment and commissioning in orbit around the Sun-Earth L2 point. In this talk, I'll give an overview of the scientific rationale for this astonishing machine, the technological challenges that had to be overcome in realising it, and a look forward to some of the scientific breakthroughs that it promises as it enters full operation.

Professor Mark McCaughrean is the Senior Advisor for Science & Exploration at the European Space Agency. He is also responsible for communicating results from ESA's astronomy, heliophysics, planetary, and exploration missions to the scientific community and wider public. After studying at the University of Edinburgh, he worked in universities and research organisations in the US, Germany, and UK before joining ESA in 2009. His scientific research focuses on the formation of stars and their planetary systems, and he is an Interdisciplinary Scientist on the NASA/ESA/CSA James Webb Space Telescope Science Working Group. He is also the co-founder of Space Rocks, which celebrates space exploration and the art, music, and culture it inspires through public events and more.

9TH AUGUST ETHICAL GUIDANCE FOR DISRUPTIVE SCIENCE AND TECHNOLOGY?

Professor Peter-Paul Verbeek
University of Twente, The Netherlands

Science and technology have a large impact on our society. Some people even say that we live in the age of the 'fourth Industrial Revolution'. Artificial Intelligence changes how doctors arrive at a diagnosis and how pupils learn at school. Robotic technologies change how people work, and sometimes even replace human beings. And climate engineering technologies might be an answer to global warming but also bring enormous risks. This impact of science and technology raises many ethical questions, that cannot be answered by simply saying 'yes' or 'no' to them. Emerging technologies actually challenge the ways in which we can do ethics in the first place. What do 'agency' and 'responsibility' mean when artificial agents can act as well? What is 'democratic representation' when climate engineering might urge us to also include future generations, and the rights of ecosystems? This keynote will explore how emerging technologies urge us to expand our ethical frameworks. It will also explain the basics of the 'Guidance Ethics Approach' that enables bottom-up ethical reflection to support responsible research and innovation.

Professor Peter-Paul Verbeek is the Distinguished Professor of Philosophy of Technology at the Department of Philosophy of the University of Twente, The Netherlands. He is also a scientific co-director of the DesignLab of the University of Twente. Professor Verbeek is a member of the Royal Netherlands Academy for Arts and Sciences KNAW and an honorary professor of Techno-Anthropology at Aalborg University, Denmark. He is currently one of the six Principal Investigators of a 10-year research programme on the Ethics of Socially Disruptive Technologies. His work has received several awards, including an NWO-VENI award, VICI Award, VIDI award, the Borghgraef Prize in Biomedical Ethics (Leuven University), the World Technology Award in Ethics (World Technology Network, New York). He is the author of *Moralizing Technology: Understanding and Designing the Morality of Things*. He is the chair of the UNESCO World Commission on the Ethics of Scientific Knowledge and

MONDAY 1ST AUGUST – SPECIALIST LECTURES

1.1

IMMUNOLOGY - PATTERN RECOGNITION RECEPTORS

Dr Ivy Dambuza

University of Exeter

The lecture will give a general introduction to fungal microbes, in particular the medically relevant fungi that cause infections to humans. The lecture will also touch on the environmental niches of these fungi, and how our body's immune systems defend us against these deadly pathogens. A bit of the research that I conduct to understand the mechanisms that are involved and how we can leverage these for making therapies and developing vaccines.

Dr Dambuza has a BSc in Chemical, Molecular and Cellular Biology, BSc (Hons) in Biochemistry and Microbiology, MSc in Immunology, and a PhD in Clinical Sciences and Immunology of Infectious Diseases-All from University of Cape Town, South Africa. She spent time as a Postdoctoral Visiting Fellow researching autoimmunity at the National Institutes of Health, USA. She is currently working as a Research Fellow at the Centre for Medical Mycology focusing on understanding protective immunity to fungi, University of Exeter.

1.2

VEHICLE ELECTRIFICATION

David Hudson

ePropelled

Students attending this session will have a chance to understand some of the scientific principles that are used in the design and engineering of modern electric vehicles. They will be challenged to contribute their own understanding of some of these ideas and also given some practical examples of the challenges faced in delivering mobility solutions for the Net Zero age..

David Hudson is Head of EV Business for ePropelled, a Massachusetts-based technology company that offers leading-edge electric propulsion systems for a range of applications. He is responsible for the development and execution of its EV strategy, using a broad portfolio of innovations to meet the needs of global eMobility manufacturers. David has over 40 years experience in automotive engineering. He spent more than 15 years at Jaguar Cars before moving into automotive consultancy, working with leading powertrain companies on three continents. For the past decade, he worked with India's Tata Motors to support their electrification and low-carbon technology delivery plan. He is passionate about the cause of electrification of transport and strongly believes in maximizing the efficient use of energy in all sectors. David was a participant in LIYSF in 1979.

1.3

GENE EDITING AND GENE THERAPY FOR IMMUNE DISEASES: CORRECTING

NATURE'S SPELLING MISTAKES
Professor Emma Morris

TBC

This lecture will consider how genetic mutations can cause serious diseases affecting the immune system and how new genetic engineering technologies can be used to correct these mutations. We will consider examples of how these are used to treat patients.

Professor Morris is a doctor and a scientist. In the hospital she looks after patients undergoing stem cell transplants and having gene therapy treatments for inherited diseases of the immune system and various forms of cancer. Her research group is developing new methods to use gene editing to treat diseases. She has 3 teenagers, a dog and loves outdoor swimming.

1.4

IMPACTS OF SCIENCE, TECHNOLOGY & INNOVATION ON 21ST CENTURY CARRIER CHOICE

Dr. Aisha Umar Maigar

Kashere Federal University

This lecture will consider Science, Technology and Innovation and how it impacts on career choice in the 21st century. New learning strategies such as global citizenship skills, innovation and creativity skills, technology skills and many more have evolved due to more globalization, increased digitalization and thus emerging careers in the 21st century have increased such as data scientists, robotic engineers, AI and a lot more. It also looks at career readiness and pathways, sources of innovation and how they affect career choice amongst youths aspiring in STEM careers. Finally we will consider challenges the ability to learn, unlearn and relearn in order to upskill and reskill so as to choose a career that fits in the 21st century.

Dr. Aishatu Umar Maigari is an Associate Professor of Analytical Chemistry at Federal University, Kashere, Gombe State, North east, Nigeria. She obtained her Ph.D from Abubakar Tafawa balewa University, Bauchi while her Masters and Bachelor's Degrees were obtained from Bayero University, Kano, Nigeria and presently the Honourable Commissioner of Science, Technology and Innovation, Gombe State, Nigeria. Dr. Aishatu's work career spans over 22 years as a teacher, lecturer, researcher, administrator and girl-child mentor. She has at various times held positions as Head of department, Secretary of Research and Development Committee, Deputy Director, Research and Innovation and UNICEF Desk officer for Female Teacher Trainee Scholarship scheme (FTTSS) where over 500 girls from rural less privileged families were sponsored to become teachers. She has over 30 publications in her field of Analytical Chemistry with specialization in health risk assessment of heavy metals in soil and water.

1.5

UNDERSTANDING ELASTIC DEFORMATIONS: NEW WRINKLES ON GAUSS' PIZZA THEOREM

Professor Dominic Vella

University of Oxford

Thin objects are easy to deform, as we see in everyday life: a piece of paper crumples, while bridges may vibrate in the wind. It is also clear that such thin structures choose to bend, rather than compress, whenever possible. Gauss' "Remarkable Theorem" has a lot to say about how such bending deformations can happen, and its consequences are everywhere from pizza slices to the domed roofs of buildings. However, as I will show, this is not the whole story and super-thin objects have some neat ways around Gauss' Theorem.

After undergraduate study at Cambridge, a year at Harvard and a PhD back in Cambridge, Dominic worked in Paris as a post-doc supported by the Royal Commission of 1851. He returned briefly to Cambridge, before moving to Oxford to take up his current position in 2011. He works to develop mathematical models of a range of physical problems including floating objects (the 'Cheerios effect'), the wrinkling of thin elastic objects and snap-through instabilities; his current research is supported by the EPSRC and the Leverhulme Trust.

Dr Gemma Bale

University of Cambridge

Gemma is a medical physicist who creates optical technology to monitor the brain, both its activity and health, in spaces where conventional brain monitors won't fit: from monitoring newborn brain injury in intensive care, to understanding dog cognition, to searching for a biomarker of dementia. This lecture will illuminate the science and engineering behind this technology - using live demos - and take an in-depth look into the future of brain monitoring.

Dr Gemma Bale is the Gianna Angelopoulos Lecturer in Medical Therapeutics, leading the Neuro Optics Lab in the Departments of Engineering and Physics at the University of Cambridge. Her Lab is focused on pioneering optical tools to monitor relevant physiology for both basic science and medical applications and translating them into clinical research and practice. Gemma studied Physics (BSc) at Imperial College London where she became interested in using optics for medical applications. To pursue this, she undertook a Masters in Photonics Systems Development at UCL and the University of Cambridge, and discovered near-infrared spectroscopy (NIRS) – a non-invasive technique that can monitor the brain. Gemma is an award-winning science communicator and is passionate about making science and engineering more accessible. Gemma's research interests are in non-invasive optical neuromonitoring techniques. Gemma has pioneered techniques in the neonatal intensive care unit and has shown the clinical promise of the measurements. She has also developed miniature, portable devices which are being used around the world in a range of different scenarios, from paediatric surgery to psychiatric wards. In 2018, she undertook a Media Fellowship – working as a science journalist for BBC Radio 2, and in the same year was awarded the Isambard Kingdom Brunel Award for Engineering, Technology and Industry by the British Science Association, as part of its prestigious Award Lecture series.

3.2

UNDERSTANDING THE DATA FROM THE LARGE HADRON COLLIDER

Professor Freya Blekman

Vrije Universiteit Brussel, Belgium

Ever wondered about why the 27 kilometer Large Hadron Collider was built and what scientists do with it? Then this is the talk for you! The collider is the Swiss army knife of experiments, and investigates anything from new particles and forces to the birth of the universe. As one of the physicists who works with the enormous detectors that record the collisions of the Large Hadron Collider, this lecture will not only convince you that particle physics is necessary and interesting for everyone (including tax payers), but also on the fun and social aspects of this exceptional human effort to understand the building blocks of matter. And if you bring your laptop, the lecture will teach you how to understand and analyse LHC data yourself. Only a modern web browser is necessary.

Freya Blekman is a professor of physics at the Vrije Universiteit Brussel and visiting lecturer at Oxford University. She works at CERN, where she uses the data from the Large Hadron Collider, collected with the enormous Compact Muon Solenoid (CMS) experiment, to search for undiscovered physics processes and new particles. Blekman is also responsible for the communication to the outside world of the 130+ papers per year by the 3000+ person strong CMS Collaboration and has won multiple prizes on science and science communication.

3.3

GENERATIVE MACHINE LEARNING: BEYOND TIKTOK FILTERS

Dr Yingzhen Li

Imperial College London

You might have played around with TikTok filters or Instagram camera effects. Generative machine learning, as the technology behind them, has far more applications in real-life and big impacts to our society. In this lecture, I will explain to you the state-of-the-art techniques of generative machine learning and what they can do for generating image/video/audio/text and beyond. On the other hand, these latest techniques has issues such as robustness and cost sustainability problems, for which I hope they will be addressed in the future by aspiring innovators like you.

Dr Yingzhen Li is a Lecturer in Machine Learning at Imperial College London, UK. Before that she worked at Microsoft Research Cambridge and Disney Research. She received her PhD from the University of Cambridge. Yingzhen is passionate about building reliable machine learning systems, and her published work has been applied in industrial systems and implemented in popular deep learning frameworks. She is a regularly invited speaker at international machine learning conferences, and she gave an invited tutorial at NeurIPS 2020. When not at work, Yingzhen enjoys reading, hiking, video games, and following news on latest technology developments.

3.4

SOFT, STIFFCONTROLLABLE ROBOTIC SYSTEMS – FUTURE APPLICATIONS AND IMPACT

Dr Helge Wurdemann

University College London

Departing from traditional types of robots, which are based on an arrangement of rigid link elements connected via joints, soft material robots are made of fundamentally different structures. With the increased interest in the use of soft materials for the creation of highly dexterous robots, soft material robotics has established itself as an important research topic within soft robotics. This talk will present a number of soft material robots with applications in healthcare, industrial settings and autonomous driving. Examples include miniaturised soft, stiffness-controllable manipulators for minimally invasive surgery and large-scale structures that guide drivers when changing between different levels of autonomy in highly automated vehicles. Scalability, stiffness controllability and modelling are challenging topics in the field of soft robotics that will be discussed along with innovative opportunities for future systems.

Helge Wurdemann is a roboticist and Associate Professor of Robotics leading research on soft haptics and robotics at UCL. He is also Co-Director of the Intelligent Mobility at UCL (IM@UCL, www.im-ucl.com) lab, a full-size driving simulator. His Soft Haptics group (www.softhaptics.website) focuses on the hardware design and application of soft material robotic systems that have the ability to change their shape and stiffness on demand bridging the gap between traditional rigid and entirely soft robots. Dr Wurdemann is Turing Fellow at the Alan Turing Institute and Co-General Chair of the IEEE International Conference on Robotics and Automation 2023, the premium robotics conference, which will be hosted for the first time in the UK.

3.5

MAKING NEW MEDICINES FOR NEURODEGENERATION

Professor Marcus Rattray

University of Bradford

We are in an era of rapid scientific discoveries to understand disease and discover effective treatments. However, we are still lack medicines to treat many important conditions, two examples being Motor Neurone disease and dementia. This specialist lecture will discuss how to develop safe and effective medicines and explore the science underlying medicines development, including the innovations that are being developed to conquer illnesses.

Marcus Rattray is Professor of Pharmacology, University of Bradford and a Fellow of the British Pharmacological Society. He has held academic positions at the University of Reading, King's College London, and was a postdoctoral fellow at the National Institutes on Drug Abuse in Baltimore, USA. Marcus' research interests have been understanding the processes involved in neurodegenerative diseases, particularly motor neurone disease and Alzheimer's disease and working towards the discovery of more effective medicines.

5.1

WHEN THE AIR HITS YOUR BRAIN

Dr Michael Amoo – LIYSF 2011

Cork University Hospital

This lecture provides a brief overview into the science and intricacy of the human brain. It explores the diseases that affects this unique organ; from trauma to tumours. It also presents current challenges and discussions regarding future areas of research.

Michael Amoo is a Specialist Registrar (SpR) in Neurosurgery at Cork University Hospital, Ireland. Working as part of a multi-disciplinary team, he is involved in the management of patients with a variety of brain disorders. He has a special research interest in traumatic brain injury. Michael attended LIYSF in 2011. For over 200 years The Royal College of Surgeons Ireland has played a major role in medical education and training in Ireland. Founded in 1784 to train surgeons, today the College provides extensive education and training in the healthcare professions at undergraduate and postgraduate level.

5.2

MOVING TOWARDS TREATMENTS FOR DEMENTIA AND MOTOR NEURON DISEASE

Dr Rubika Balendra – LIYSF 2003

University College London Hospital

The health and socioeconomic burden of dementia is vast, and will only increase over the next few decades. Motor neuron disease is a devastating neurodegenerative disease which affects one in 250 people. How will we move towards finding treatments for these diseases? This lecture will discuss recent developments in this field of neurodegeneration with a focus on using genetics to drive forwards our understanding of mechanisms and therapeutics. We will discuss novel disease models, including human stem cell-derived neurons and fruit flies, as approaches to investigate clinically applicable pathways in neurodegeneration.

Rubika is a Specialist Registrar doctor in Neurology in London. She completed a PhD as a Wellcome Trust and UCL Leonard Wolfson Research Training Fellow investigating motor neuron disease and frontotemporal dementia at the UCL Institute of Neurology. She read medicine at Cambridge University and UCL. She trained in clinical and academic medicine as an Academic Clinical Neurosciences Foundation Trainee at Cambridge University. She continued clinical and academic training as an Academic Clinical Fellow at King's College London. She enjoys teaching science and medical students and is actively involved in public engagement in science. She was an LIYSF participant in 2003 and a staff member from 2004-2007.

5.3 THE IMPACT OF HYDROGEN FUEL TECHNOLOGY

Maurice Brown – LIYSF 1986

Utrecht University, The Netherlands

The Hydrogen fuel cell has been around since 1839. This relatively obscure, but highly valued technology, helped power the United Space programme from the 1960's and still today. The technology holds great promise, as it presents a real alternative to fossil fuel energy. However, the industry will face a tough future. Promoters of this energy source must master the learning curve of the energy industry, if it is to become a feasible alternative. How does this technology work, what are its applications and what problems does it face as an industry?

Maurice Brown is from Kingston, Jamaica, studying at Campion College and the College of Arts Science and Technology. He moved to the Netherlands in 1994 and completed his Bachelor's degree in International Business Administration and Master's Degree in Business Management. He became a consultant to the aviation industry and later, held financial positions in various international companies. Currently, he is lecturer in Finance and Business Strategy at the University of Applied Sciences, Utrecht, (Netherlands) and is owner of a small company looking into promoting and exporting to developing countries.

5.4 BIOJOYVERSITY - A PLATFORM FOR YOUTH INNOVATION TO SAVE THE PLANET

Dr Becky Parker – LIYSF 1978

Queen Mary University

How can more young people have agency and genuinely contribute to tackling the challenges facing the planet? Biojoyversity is a positive platform which supports students by giving them expert guidance and support from across the world. It is a direct mechanism to support and share innovation from the most innovative people - young people. Come to the talk to find out how you can be part of this growing movement to empower young people in climate action and innovation.

After a physics degree and research at the University of Chicago, Dr Parker taught in a variety of schools and found when she offered genuine research opportunities to her students they thrived in the subject. She has supported students to work with the UK Space Agency and NASA putting a payload in space, and have developed many research projects with CERN, the Wellcome Trust, universities, and research institutes. She is now working to support and release the potential of students to contribute to tackling the climate crisis. She is a Visiting Professor in the School of Physics and Astronomy at Queen Mary, University of London.

5.5

MACHINE LEARNING IN MEDICAL IMAGE ANALYSIS – HOW AI IS AUGMENTING DIAGNOSIS

Dr Matt Sinclair – LIYSF 2004

Heartflow

In recent years, advances in machine learning applied to image and video analysis have revolutionized applications across many domains, including but not limited to autonomous vehicles and drones, video streaming, facial recognition, and medical image analysis. In this talk we will explore how AI is impacting the way in which medical images are being used to aid and improve medical diagnosis. A broad introduction on AI in computer vision will first be presented, and then we will look at applications in medical imaging, including work we are doing at HeartFlow to improve outcomes for patients with coronary artery disease.

Matthew is a Research Manager at HeartFlow, leading teams on deep learning and biophysical modelling to assess coronary artery disease in patients non-invasively. He is also an Honorary Research Fellow at Imperial College London, where his research focuses on automating and aiding clinical assessment of medical image data, particularly fetal ultrasound and cardiac MRI. He graduated from the University of Auckland in 2009 with a Bachelor of Biomedical Engineering and received his PhD from King's College London in 2014, where he worked on the analysis of blood flow distribution in the coronary circulation.

Professor Graziella Branduardi-Raymont
University College London

X-ray astronomy is generally associated with astrophysical sources encompassing the most energetic and exotic phenomena in the Universe, such as neutron stars and black holes. However, X-ray emissions are common in our own solar system. Over more than two decades the XMM-Newton and Chandra observatories have provided a wealth of X-ray data on the solar system; these have opened a new window on the phenomena taking place in planetary atmospheres and magnetospheres, on minor solar system bodies, and on their response to solar activity. Synergetic measurements of Jupiter with Juno currently orbiting the planet and a campaign of concurrent multi-wavelength observations have achieved remarkable discoveries. More science questions have been opened up, so we will look forward to the time when the next major ESA X-ray observatory, Athena, will be flying. On a shorter timescale we will witness the impact of the buffeting of the solar wind, and the effects of space weather, on our own planet, by mapping the Earth's dayside magnetosheath in X-rays with the Soft X-ray Imager onboard the space mission SMILE (Solar wind Magnetosphere Ionosphere Link Explorer). The science that SMILE will return is a showcase of how astronomy and space plasma communities can work together to add remarkable value to their individual endeavours.

Graziella has been fascinated by astronomy and space research since she was a teenager. After a degree in Physics at the University of Milano, Italy, and a PhD in X-ray Astronomy at University College London (UCL), she worked at the Harvard-Smithsonian Center for Astrophysics, USA and then returned to UCL's Mullard Space Science Laboratory where she is based. After participating in major X-ray observatory missions over many years, Graziella is now co-leading the development of a joint ESA-Chinese Academy of Sciences mission called SMILE (Solar wind Magnetosphere Ionosphere Link Explorer) which will investigate the X-ray emission produced in the near Earth environment by the dynamic impact of the solar wind.

8.2

EDITING A HUMAN; CRISPR GENOME EDITING FROM EMBRYO TO ADULT

Dr Helen O'Neill

University College London

The unlocking of DNA has led to a genetic revolution that has shaped our understanding of evolution, treatment of disease and our interpretation of identity. We no longer look just to our mother, but to our molecules for reasons why we are the way we are. We can rely on deciphering our genetic code through mistakes; when a mutation occurs, we mine the molecules for a cause. But what if we could correct that mistake? Genome editing (or CRISPR-Cas) is a revolutionary tool which allows DNA or RNA to be altered at directed loci in the genome with ease and efficiency. The technology, which is derived from and mimics the immune system of bacteria, offers unprecedented ability to alter, correct or insert genes into a genome. The technology has been adopted globally in the research setting and offers limitless potential for personalised medicine; indeed somatic cell therapies are already benefiting from this technology. The advances in genome editing coupled with assisted reproductive technologies and genomics lend themselves to germline therapy and the correction of genetic disorder in embryos. Will genome editing shape our evolution by functioning as the newest spell check of our genetic language?

Dr Helen O'Neill is a lecturer in Reproductive and Molecular Genetics and Director for the MSc in Reproductive Science and Women's Health at the Institute for Women's Health, University College London (UCL). She has an honours degree in Genetics, an MSc in Prenatal Genetics and Fetal Medicine from UCL and did her PhD and postdoctoral research on the genetics of ovarian development in the Department of Stem cell biology and developmental genetics at the National Institute for Medical Research. She lectures both masters and medical students and is active in public engagement involving genome editing. She is CEO and Founder of Hertility Health, a precision medicine based approach to reproductive health and fertility.

8.3

SCIENTIFIC INNOVATION IN A GLOBAL ECONOMY

Prof. Patrick Nwabueze Okechukwu

UCSI University Kuala Lumpur

The aim of scientific research and innovation is to solve problems and improve the quality of lives. As was evidenced in the invention of covid19 vaccines, electric cars and other engineering and technologies enjoyed today. Basic knowledge in (STEM) Science Technology Engineering and Mathematics drives innovation by getting individuals to think outside the box and create actionable solutions through scientific research. The cornerstone of STEM is transcending beyond the norm and improving the quality of lives and enriching global economy through commercialisation. This talk focused on the relevance of basic knowledge of STEM to scientific research innovation products for the treatment of Diabetes mellitus and Diabetes wound healing cream and process of commercialisation.

Associate Professor Dr Patrick Nwabueze Okechukwu is a lecturer and head of department Praxis, Industry and Community Engagement in the Department of Biotechnology, Faculty of Applied Sciences, UCSI University Kuala Lumpur Malaysia. He possesses a Doctor of Philosophy (PhD Research) Pharmacology, and his research interest is in drug discovery and development from natural products and synthetic compounds, for the treatment of Diabetes mellitus and associated disease complications such as kidney, wound healing, inflammation, and bone fragility. Dr Patrick's previous research led to commercialisation of "BIOSPIRULINA™ marketed by YSP-Shine Pharmaceutical Industry Bhd, inventions, Diabe-Con powder (lowers plasma glucose, reduces lipids and antioxidant) and Lamogen wound-healing cream were published by the Department of Higher Education, Malaysia Ministry of Higher Education in R &D Products of Universities in Malaysia 2016. He has won many awards and his invention "Norectic Diabetes Wound Healing Cream, was selected as top 4 best product in a keenly contested 'Swiss International Innovation Competition 2021/2022

8.4

ATMOSPHERIC SCIENCE - AIR QUALITY AND ITS IMPACT ON HUMAN HEALTH

Dr Lekan Popoola

University of Cambridge

Poor air quality affects both human and the natural environment. It has both human health and economic burdens, an estimated 6.4 million premature deaths were associated to ambient particulate matter in 2019, with approximately \$8.1 trillion (6.1% of global GDP) global cost of health damages associated with exposure to air pollution. In this talk, we will briefly look at the history, the sources, impacts, mitigations, and interventions for air pollution. We will also discuss links between climate change and air quality, particularly the co-benefits of climate mitigations and adaptations in relation to better air quality.

Dr Olalekan (Lekan) Popoola is a research scientist at Yusuf Hamied Department of Chemistry, University of Cambridge where he also obtained his PhD in Chemistry. Lekan has over 11 years of experience in the development and application of low-cost air quality sensors for atmospheric observations. He was a prominent member of the Cambridge research group that led the pioneering work in the use of low-cost sensor in air quality research in the UK. His research is fundamental to how sensors and sensor networks are utilised for a range of studies including air pollution assessments, exposure studies and greenhouse gas observations.

8.5

SEARCHING FOR NEW PHYSICS WITH ATLAS AT THE LARGE HADRON COLLIDER

Dr Kate Shaw

University of Sussex

The Large Hadron Collider results have changed the landscape of particle physics where new particles and interactions are being investigated. With the third Run of the machine to start in Spring 2022, we hope to see new clues to answer fundamental questions about the Universe, such as what is dark matter, how we can understand the asymmetry between matter and antimatter, and how can we describe gravity at a quantum level. This talk will investigate how and why we are searching for New Physics, what it might mean when we do, and look at the benefits to humanity this massive machine may bring.

Kate Shaw is an experimental particle physicist at the University of Sussex, UK, working on the ATLAS experiment at the Large Hadron Collider, and the Deep Underground Neutrino Experiment (DUNE) at Fermilab, where her field of research focuses on searching for New Physics. Shaw is also a staff scientist at the Abdus Salam International Centre for Theoretical Physics (ICTP), Italy, a UNESCO institute where she founded and co-coordinates the ICTP Physics Without Frontiers programme.

FRIDAY 29TH JULY LONDON SCIENTIFIC VISITS

29.A Association of Anaesthetists of Great Britain & Ireland

Founded in 1932 by Dr Henry W Featherstone, The Association of Anaesthetists of Great Britain and Ireland (AAGBI) represents the medical and political views of over 11,000 anaesthetists in the UK, Ireland and internationally.

29.B Chelsea Physic Garden

Since 1673 Chelsea Physic Garden has occupied four acres of land on the edge of the Thames. First established by the Apothecaries in order to grow medicinal plants, this extraordinary garden in London has had wide reaching impact around the world.

29.C Health Services Laboratory

Health Services Laboratories is a partnership between The Doctors Laboratory, Royal Free London NHS Foundation Trust and University College London Hospitals NHS Foundation Trust. We provide pathology services to both the NHS and private healthcare. We combine The Doctors Laboratory's long standing, specialist pathology expertise with the Royal Free London and UCLH's internationally recognised heritage of continual research, development and academic excellence. We maintain rigorously high standards of quality, while also delivering efficiencies to healthcare through careful workforce planning, pioneering technology, and significant investment in infrastructure and IT.

29.D Imperial College London, Department of Chemical Engineering

See the laboratories, pilot plant and computing facilities of one of the UK's largest departments of its kind.

29.E Imperial College London, Department of Life Sciences

One of the largest life science groups in Europe, research of full breadth of modern life science activity including, Molecular Biosciences, Cell & Molecular Biology and Ecology & Evolution.

29.F King's College London Centre for Stem Cells & Regenerative Medicine

Led by Professor Fiona Watt, located on the Guy's Hospital campus, the Centre acts as a focus for cutting edge stem cell research taking

29.G Linnean Society

The Linnean Society of London is the world's oldest active biological society. The Society takes its name from the Swedish naturalist Carl Linnaeus (1707–1778) whose botanical, zoological and library collections have been in its keeping since 1829. These unique collections are of continuing fundamental importance as a primary reference for taxonomy.

29.H London Metropolitan University, Science Centre

£30 million science centre which is home to the Superlab, a state-of-the-art teaching lab with room for 280 students. The four-floor science centre also houses modern research labs for HIV and microbiology research, as well as a forensic science lab and nmr spectrometer.

29.I London Wetland Centre

Over 100 acres of wetland sites, with extensive populations of wild birds, plants and insects. Talk to the experts about biodiversity and conservation.

29.J National Physical Laboratory

UK's principal facility in measurement and materials science. Visit state of the art facilities ensuring accuracy, consistency and innovation in physical measurement.

29.K The Royal Institution

The Royal Institution (Ri) is an independent charity dedicated to connecting people with the world of science with over 200 years of history. At the LOreal Young Scientist Centre students will undertake a magnets and motors workshop, seeing a demonstration of Faraday's original electric motor and then building a simple battery powered motor that uses similar principles.

29.L University College London, Jill Dando Institute of Security and Crime Science

Visit the first Institute in the world devoted to crime science. Research is concentrated on new ways to cut crime and increase security.

TUESDAY 2ND AUGUST NATIONAL SCIENTIFIC VISITS

2.A Airbus UK

Core activities at Filton include the design, engineering and support for Airbus wings, fuel systems and landing gear integration.

2.B Cranfield Univeristy

Cranfield University has a global reputation for inspirational teaching and research, industrial-scale facilities and superior links with industry and commerce.

2.C University of Essex, Human Performance Unit

The HPU provides physiological testing, nutritional support and body composition assessments to athletes. Athletes are attracted to Essex University due to the high calibre coaching and sports science services.

2.D John Innes Centre, Norwich Research Park

An independent, international centre of excellence in plant science and microbiology working to generate knowledge of plants and microbes through innovative research to benefit agriculture, the environment, human health and well-being.

2.E Laing O'Rourke

HS2 is Britain's new high speed rail line being built from London to the North-West, with HS2 trains linking the biggest cities in Britain. HS2 is the largest infrastructure project in Europe and the most important economic and social regeneration project in decades. Laing O'Rourke's and its specialist business Expanded is underway with the construction of the main station box at HS2's Old Oak Common in West London. Laing O'Rourke is an international engineering and construction company delivering state-of-the-art infrastructure and buildings projects for clients. It is the largest privately owned construction company in the UK.

2.F Morgan Motor Company

Morgan Motor Company is a family-owned manufacturer since 1909 that hand-builds iconic British sports cars, famous the world over for their unique blend of craft, heritage and pure driving experience. Explore the factory and meet the Technical Director.

2.G National Space Academy

National Space Academy delivers a programme that uses inspirational contexts from across space science, exploration, astronomy and satellite applications.

2.H University College London, Mullard Space Science Laboratory

Exploiting the capabilities of rockets and spacecraft as platforms for scientific instruments it strives to understand our physical environment and our place in the Universe.

30.R University of Sussex, School of Life Sciences

Sussex has world-changing impact in many areas, including renewable energy, drug design and quantum chemistry. Biology is for those who are curious about the natural world and who want to understand the past, present and future of life on Earth, seeking solutions to some of the most important problems facing humanity – from managing environmental change to controlling disease.



Imperial College
London



UNIVERSITY OF
CAMBRIDGE



UNIVERSITY OF
OXFORD



THURSDAY 4TH AUGUST OXFORD & CAMBRIDGE SCIENTIFIC VISITS

4.A British Antarctic Survey

The British Antarctic Survey (BAS) is an international leader in Antarctic science. BAS provide world-leading research infrastructure that enables scientists to work safely and effectively in the polar regions.

4.B University of Cambridge, Scott Polar Research Institute

The institute is the oldest research institute of its kind, with a mission to enhance the understanding of the Polar Regions through scholarly research and publication.

4.C UK Atomic Energy Authority, Culham Science Centre

The Culham Centre for Fusion Energy (CCFE) is the UK's national laboratory for fusion research, owned and operated by the United Kingdom Atomic Energy Authority (UKAEA). CCFE hosts the world's largest magnetic fusion experiment, JET (Joint European Torus).

4.D HR Wallingford

HR Wallingford has been involved in research and consultancy to solve water-related challenges worldwide for 70 years. The company has impressive physical modelling facilities which include seven wave basins, used to build and test scale models of ports, harbours and beaches.

4.E Oxford Botanic Garden and Arboretum, University of Oxford

Our collections house over 5,000 plant species, some of which grow nowhere else. Join leading researchers and educators at Oxford Botanic Garden for insights into our interdisciplinary research and conservation during its 400th anniversary year.

4.F The Oxford Museum of Natural History

Oxford University Museum of Natural History was established in 1860 to draw together scientific studies from across the University of Oxford. Today, the award-winning Museum continues to be a place of scientific research, collecting and fieldwork. Highlights in the collections include the world's first scientifically described dinosaur – *Megalosaurus bucklandii* – and the world-famous Oxford Dodo, the only soft tissue remains of the extinct dodo.

4.G University of Oxford, History of Science Museum

The History of Science Museum houses an unrivalled collection of historic scientific instruments in the world's oldest surviving purpose-built museum building. By virtue of the collection and the building, the Museum occupies a special position, both in the study of the history of science and in the development of Western culture and collecting.

1.J University of Oxford - Nuffield Department of Clinical Neurosciences

NDCN provides a focus for world-leading translational neuroscience allowing the swift transfer of basic biomedical findings to the clinical setting and the delivery of evidence-based therapies.

1.K University of Oxford, NIHR Oxford Biomedical Research Centre

The Nuffield Department of Clinical Neurosciences (NDCN) provides a focus for world-leading translational neuroscience allowing the swift transfer of basic biomedical findings to the clinical setting and the delivery of evidence-based therapies for the benefit of society and the economy.

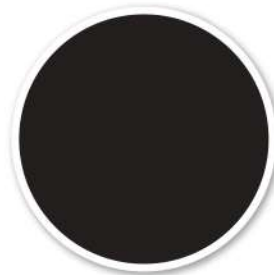
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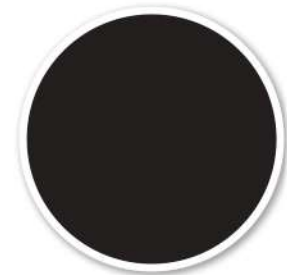
PROGRAMME VENUES

HALLS OF RESIDENCE

Beitgate Halls of Residence
Hall Host: Noga Arad

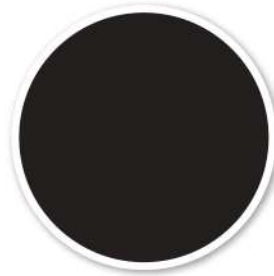


Beit Halls

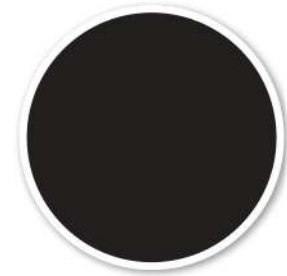


Metrogate House

Tarathorne Halls of Residence
Hall Host: Enrico Caprioglio

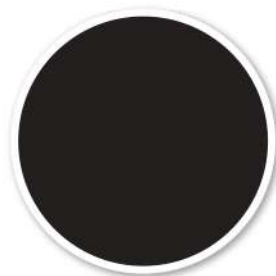


Copthorne Tara Hotel



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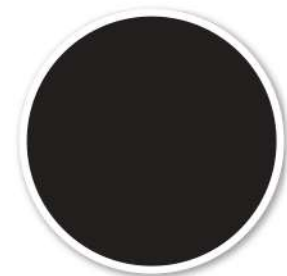
PROGRAMME VENUES



**Royal Geographical
Society**



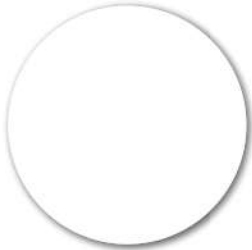
**Imperial College
London**



Copthorne Tara

LIYSF CAMPUS MAP

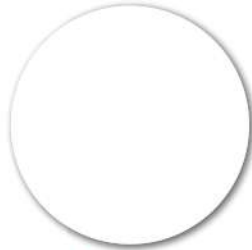
STAFF TEAM



Richard Myhill
Director
England



Adam
Programme Assistant
Nigeria



Émer Hickey
Chief of Staff
Ireland



Zach Cassar
Brand Manager
Malta



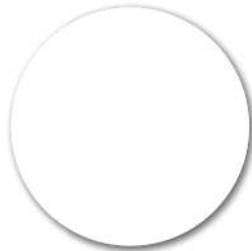
Claire Marlow
Finance Director
England



Jeetendra Kumar
Developer
India



Siddhant Gupta
SEO Manager
India



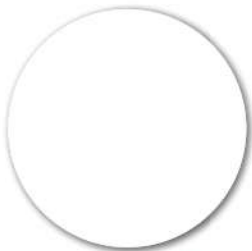
Minushika Punchihewa
Engagement Manager
New Zealand



Dave Harris
Media Assistant
New Zealand



Moses Moloi
Videographer
South Africa



Noga Arad
Beitgate Hall Host
Israel



Enrico Caprioglio
Tarathorne Hall Host
Italy

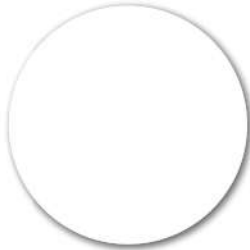
BEITGATE HALLS OF RESIDENCE



Natalija Vujacic
Programme Liaison
Bermuda



Montserrat Hermosillo Ortiz
Programme Liaison
Mexico



Amy Stinton
Deputy Host
Guernsey



Riccardo Caprioglio
Counsellor
Italy



James Robinson
Counsellor
UK

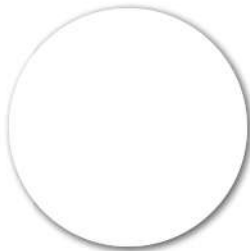
TARATHORNE HALLS OF RESIDENCE



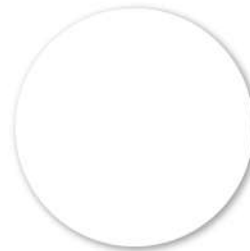
Nic Reay
Student Welfare Officer
England



Bianca Aschieri
Deputy Host
Italy



Yousif Almazmi
Counsellor
UAE



Ella Burgun
Counsellor
Australia



Teresa Echevarria
Counsellor
Spain



Hannah George
Counsellor
Canada



Sean Mata
Counsellor
Ireland

SUPPORTING ORGANISATIONS

LIYSF is very proud to have the support across the globe of: National Government Offices, British Council Offices, National and International Science Competitions, Science Organisations, Schools and Universities. We are truly grateful to all organisations for their work in nominating and supporting students to attend, a selection of them are shown here:

Anglesey Council in Memory of Tomos Wyn Morgan	<i>Wales</i>	John Roan School	<i>England</i>
Arkwright Scholarships Trust	<i>UK</i>	Kang Chiao International School	<i>Taiwan</i>
ASDAN	<i>China</i>	Louisiana State Univeristy Laboratory School	<i>USA</i>
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British School of Brussels	<i>Belgium</i>	National Youth Science Forum	<i>Australia</i>
Calouste Gulbenkian Foundation	<i>Portugal</i>	Polish Children's Fund	<i>Poland</i>
Campion College	<i>Jamaica</i>	The Qatar Foundation	<i>Qatar</i>
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Celia and Glyn Allen	<i>Guernsey</i>	REDE POC	<i>Brazil</i>
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Dublin City University	<i>Ireland</i>	Research Council of Norway	<i>Norway</i>
English School	<i>Cyprus</i>	Research Promotion Foundation	<i>Cyprus</i>
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Foundation Jeunes Scientifiques Luxembourg	<i>Luxembourg</i>	Royal Society of New Zealand	<i>New Zealand</i>
University of Fraser Valley	<i>Canada</i>	Swedish Federation of Young Scientists	<i>Sweden</i>
Fundació Catalunya-La Pedrera	<i>Spain</i>	Swiss Youth in Science	<i>Switzerland</i>
GC School of Careers	<i>Cyprus</i>	Technologie & Innovation	<i>Austria</i>
Hungarian Association for Innovation	<i>Hungary</i>	Young Scientists for Africa	<i>UK</i>

ACKNOWLEDGEMENTS

Our thanks to all those who assisted in the planning of LIYSF 2022. In particular, to the lecturers and speakers whose contribution is invaluable.

The universities, industries and research centres for their generosity in hosting visits to their establishments and providing virtual content. The Government departments, schools, colleges, universities, educational groups, science competitions and foundations worldwide, which select and sponsor overseas participation. Thanks to our science Bazaar Judges.

Thanks to our sponsors, Peter Brewer, Stephen Brosnan and Vanessa Smith in enabling LIYSF to continue.

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**THE NEXT EDITION OF LIYSF:
64TH LONDON INTERNATIONAL YOUTH SCIENCE FORUM
28TH JULY – 11TH AUGUST 2023**



John was a tremendous force of LIYSF for over 50 years and although he retired in 2008, he remained involved and a great friend to the forum until his passing this year. He brought such passion in his leadership of the forum and made it a wonderful, inclusive, educational and varied conference each year, with a genuine interest in engaging with people and making them feel welcome. He had a tremendous witty sense of humour, with a wealth of hilarious stories and anecdotes that came from a rich and varied life. He and his sparkle will be sadly missed.

**LIYSF CIC
85 GREAT PORTLAND STREET
LONDON
W1W 7LT
UNITED KINGDOM**

WWW.LIYSF.ORG.UK | INFO@LIYSF.ORG.UK | +44 20 8295 8395