LIYSF

LONDON INTERNATIONAL YOUTH SCIENCE FORUM

London International Youth Science Forum

"Science Serving Mankind"

29 July - 12 August

2009

London International Youth Science Forum 2009

Royal Parade Mews
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2 The London International Youth Science Forum

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

Founder Patron:
HRH Prince Philip, Duke of Edinburgh OM KG KT, 1959-1969

Past Patron:
HRH The Duke of Kent KG, 1983-1988

President:
Professor Richard O'Kennedy BSc PhD CBiol FIBiol FIBioII (Ireland)

Past Presidents:
The Rt Hon Lord Nathan 1959-1962
Sir John Cockcroft OM, 1963-1967
Sir Lawrence Bragg CH FRS, 1968-1969
Dame Kathleen Lonsdale FRS, 1970-1971
Professor Sir Joseph Rotblat KCMG CBE FRS, 1972-1974
Professor Sir Hermann Bondi FRS FRAS, 1975-1979
The Rt Hon Lord Ritchie Calder 1980-1982
The Rt Hon Lord Briggs 1983-1986
The Rt Hon Lord Porter OM PRS, 1987-1989
Sir John Meurig Thomas FRS 1990-1993
Professor Brian F G Johnson FRS FRSE FAcadEuropa 1994-2004

Associates:
Drs Hiskia Achmad, ITB (Indonesia)
Celia Allen, BA MIMgt
Sir Andrew Bowden MBE
Dr Frances Calman, MB BS FRCP FRCR
Helen Chambers BSc PGCE
Dr Andrew Coates BSc MSc DPhil
Harry Cole CENG MIEE
Constantine Costa
Maurice Deloz
Dr Alexis Dimaras PhD
Dr Peter Douglas BSc PhD
Dr Christopher Finn BSc (hons) MSc PhD
Dr and Mrs Mike Gluyas
Dr Arthur Tarrant PhD FIstD FCIBSE FSLL CPhys CEng
Dr Albert Hudspeth
Dr Cyril Isenberg BSc PhIIP
Prof. Brian Johnson FRS
Prof. Rodney Jory Jp FAIP AM BSc PhD
Sr Dott Roberto Lenti
Professor David Lowe MD FRCS FRCPath FBiol
Prof. Trevor Letcher
Dr Ricardo Marques da Costa
Jean Maudsley BSc PGCE
Prof Gareth McKinley Ba Meng
Prof Andrew Mills BSc PhD MRSC Cchem
Jonathan Norgate MA (Cantab)
Prof Richard O'Kennedy BSc PhD MIBiol DipFS DipC DipCS
Martin Perkins MA Cmath FIMA FRSA MRI
Prof Sir John Meurig Thomas FRS
Prof Viji Thambyraja BSc PhD LLB MHPEd FRSC CChem Cbiol Mbiol AMIC
Prof Neil Williams

The following countries will be represented this year:

Australia	England	Indonesia	Norway	Spain
Austria	Estonia	Israel	Poland	Sweden
Bahrain	France	Jamaica	Portugal	Switzerland
Canada	Georgia	Japan	Republic of Ireland	Thailand
China	Germany	Korea	Russia	United States of America
Cyprus	Greece	Kuwait	Slovakia	Wales
Czech Republic	Hungary	Malta	South Africa	
Denmark	India	New Zealand	South Korea	

LONDON INTERNATIONAL YOUTH SCIENCE FORUM, ROYAL PARADE MEWS, CHISLEHURST, KENT BR7 6TN UNITED KINGDOM

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The Prime Minister
2007 – present

10 DOWNING STREET
LONDON SW1A 2AA

I'm delighted to welcome you all to the 2009 London International Youth Science Forum – a fantastic opportunity for tomorrow's young scientists to meet with leading experts and to further your interest and your skills in science. The reach of science extends far beyond the lab, touching all of our lives every day of the year – from the food we eat and the clothes we wear to the homes we live in and the way that we communicate. And science will be central to addressing some of the biggest challenges facing our planet today, from climate change and energy security to ending global poverty.

I want to see us create a modern scientific culture for our times, capturing people's imaginations and unlocking scientific talent so that more young people choose scientific careers and scientists get the recognition they deserve, both here in Britain and beyond.

You are the scientists of tomorrow, and you have travelled from all over the world to take part in this event – so I hope that you will make the most of the opportunities at this year's Forum and go on to achieve great things over the months and years ahead.

Gordon Brown

July 2009

London International Youth Science Forum 2008 participants.

6 Acknowledgements

LIYSF offers its thanks to all those who so generously assisted in the planning and preparation of LIYSF 2009, and 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.

The schools, educational groups, science competitions and foundations worldwide, which select and sponsor overseas participation.

John Needle for his continued support, enthusiasm and consultancy in the preparation of the London International Youth Science Forum.

The schools, colleges and local authorities who nominate candidates from Britain to attend LIYSF and the industrial, commercial and charitable institutions who sponsor their attendance.

Imperial College London for working with LIYSF to provide its facilities.

The European Commission which sponsors the attendance of prize winners from the EU Contest for Young Scientists.

The British Council offices in Hungary, Poland, Slovakia and Thailand for their support and assistance, where participation is made possible through their involvement.

The George McGowan Memorial Fund.

President
Professor Richard O'Kennedy

It gives me pleasure, as President, to welcome you to the fifty first London International Youth Science Forum.

You will have a marvellous opportunity to meet young scientists from many countries and to discuss the major issues that we face. Your ideas, enthusiasm and innovative approaches to devise ways of overcoming our many scientific, social and economic problems are needed. Indeed, perhaps never before have the challenges been greater.

On the Forum you will learn a great deal from the lecturers, the scientific programme, the other participants and, most importantly, about yourself – how you can contribute, how some of your preconceived ideas about other people and cultures were incorrect and perhaps you will find your true vocation for life. I know I did when I was a participant.

So make sure you enjoy yourself but also make every effort to contribute. I am confident that coming on the Forum will be a wonderful and exciting experience and I look forward to meeting you.

Richard O'Kennedy

Richard O'Kennedy PhD, C.Biol, F.I.Biol, F.I.Biol.I
LIYSF President
Vice-President for Learning Innovation
Professor of Biological Sciences
Dublin City University

HALLS OF RESIDENCE

Imperial College London
Evelyn Gardens Halls of Residence
40-44 Evelyn Gardens
London SW7 3BQ

Hall host – Erik Szabo

Imperial College London
Beit Halls of Residence
London SW7 2AZ

Hall host – Ojali Negedu

PROGRAMME VENUES

Royal Geographic Society
1 Kensington Gore, London SW7 2AR

Sir Alexander Fleming Building
Imperial College London

Imperial College Student Union

Director of LIYSF
Mike Clark

The London International Youth Science Forum celebrates its 50th anniversary this year. In celebration of this special occasion, we are delighted to mark a new chapter in our history with our new venue at Imperial College London.

LIYSF 2009 sets out to offer a broad spectrum of the sciences, but will also have the underlying theme of "Science Serving Mankind". In a time when the gap between theories and scientific practices is ever decreasing, it is sometimes easy to forget how far we have come even in the last 50 years. Within all fields of science, the advancements and impact on mankind are critical. We all share a responsibility to balance all developments with the world that we live in.

Key topics of debate within the scientific world in 2009, particularly the international year of astronomy and the legacy of Charles Darwin, will be addressed in detail at LIYSF. As the rate of scientific development undoubtedly increases, this is a great opportunity for you to think about the future and what your contribution and impact will be.

LIYSF offers a unique opportunity to share ideas with your student peers from around the world, to learn about different international scientific approaches and share in each other's cultures. Make the most of every single opportunity over the next two weeks, to learn, share and question everything about the scientific world.

Recently I have been privileged to have received letters and past programmes from a number of delegates who attended early LIYSFs in the 1960s. One message that has been consistent over the last 50 years is that attending LIYSF has had a major impact on the careers of our past delegates and friendships made at these events have been maintained for life.

You are in the heart of one of the world's leading cities; here you will meet fellow participants who are likely to become lifelong friends. It is these friendships that will bring LIYSF to life. Enjoy this year's exciting LIYSF programme: in the lecture halls; meeting scientists foremost in their fields; visiting the world class research establishments and organisations that have been arranged for you; and - last but not least - making new friends from the global science community at LIYSF 2009.

A very warm welcome to Imperial College London and LIYSF 2009.

Mike Clark
Director of LIYSF

Programme of Events

Principal Lectures and Demonstrations | Specialist Seminars | Visits | Social Programme | Optional Visits

WEDNESDAY 29TH JULY, 2009

Arrivals

Welcome and Orientation in Halls of Residence

THURSDAY 30TH JULY, 2009

1015 Introductions, Programme and Health and Safety Briefing – Royal Geographic Society

1100 Opening Ceremony – Royal Geographic Society

1430 LECTURE/DEMONSTRATION: 'EXPLOITING ANTIBODY-BASED SYSTEMS FOR THE DETECTION OF CANCER AND OTHER DISEASES' – PROF RICHARD O'KENNEDY – SAF LT G16

2000 Welcome Party at Imperial Student Union

FRIDAY 31ST JULY, 2009

0900 Morning Visits to Research and University Departments

1430 LECTURE/DEMONSTRATION: 'FUSION – POWERING THE FUTURE?' PROF STEVE COWLEY – Phys LT1

1630 Sale of all optional excursions including theatre visits

2000 The Science Forum Bazaar – SAF16 Reception Lobby

SATURDAY 1ST AUGUST, 2009

1000 LECTURE/DEMONSTRATION: 'THE MAGIC OF SOAP BUBBLES' DR CYRIL ISENBERG – SAF LT G16

1400 Optional Sightseeing Tour of London

1930 Student Topics – SAF LT G16

SUNDAY 2ND AUGUST, 2009

0900 Optional Excursion to Stonehenge and Salisbury

2000 The Great Crossword Treasure Hunt – Imperial College and surrounding area

MONDAY 3RD AUGUST, 2009

1000 Specialist Lectures – SAF

1430 LECTURE/DEMONSTRATION: 'FORENSICS AND THE IMPACT OF TECHNOLOGY ON SCIENCE' – CHARLES BROOKSON – SAF LT G16

1930 Optional Theatre Visits

TUESDAY 4TH AUGUST, 2009

0900 Day Visits to Research and Industrial Establishments

WEDNESDAY 5TH AUGUST, 2009

1000 Managing the Warming World – Plenary Sessions and Discussion Groups – SAF

1330 Reports / Plenary Session / Headline Theme Agreement

2000 LECTURE/DEMONSTRATION: 'EXPLORING THE SOLAR SYSTEM' – PROF. ANDREW COATES – SAF LT G16

THURSDAY 6TH AUGUST, 2009

0900 Day Visits to Oxford and Cambridge to include establishment visits and free time

1930 Optional Theatre Visits

FRIDAY 7TH AUGUST, 2009

1000 Specialist Lectures – Elec Eng.

1330 LECTURE/DEMONSTRATION: 'DARWIN' – DR SANDRA KNAPP – Phys Clore

1500 Afternoon Visits to Scientific Museums

2000 International Cabaret – Imperial Student Union

SATURDAY 8TH AUGUST, 2009

1030 LECTURE/DEMONSTRATION: 'CHEMISTRY AND LIGHT' – DR. PETER DOUGLAS – SAF LT G16

1330 LECTURE/DEMONSTRATION: 'COLOUR IS FUN' – DR. ARTHUR TARRANT – SAF LT G16

1500 Science Forum Olympics – Ethos Sports Hall

2000 Songs of Home in Evelyn Gardens Common Room

SUNDAY 9TH AUGUST, 2009

0900 Optional Excursion to Hampton Court Palace and Windsor

2000 'At Home' in Evelyn Gardens Common Room

MONDAY 10TH AUGUST, 2009

1000 Science Serving Mankind – Plenary Sessions and Discussion Groups – SAF

1330 Reports / Plenary Session / Headline Theme Agreement

1930 Optional Theatre Visits

TUESDAY 11TH AUGUST, 2009

1000 Participants Forum

1430 LECTURE DEMONSTRATION: 'VISION OF THE FUTURE' – DR KEITH MARTIN – SAF LT G16

1600 Closing Ceremony

2000 Farewell Party at Imperial Student Union

Principal Lectures and Demonstrations

Key Note Address

Professor John Ellis
FRS, FInstP

CERN – European Organisation for Nuclear Research

John Ellis' research interests focus on the phenomenological aspects of particle physics, though he has also made important contributions to astrophysics, cosmology and quantum gravity. Most of his publications relate directly to experiment, from interpreting measurements and the results of searches for new particles, to exploring the physics that could be done with future accelerators. He was one of the pioneers of research at the interface between particle physics and cosmology, which has since become a sub-speciality of its own: particle astrophysics. He has long been an advocate and supporter of future accelerators, notably the LHC.

He obtained a B.A. and a Ph.D. from Cambridge University and, after brief post-doc positions at SLAC and Caltech, he went to CERN where he has worked ever since. He was awarded the Maxwell Medal and the Paul Dirac Prize by the Institute of Physics in 1982 and 2005 respectively, and has been an Elected Fellow of the Royal Society of London since 1985 and of the Institute of Physics since 1991. He has been awarded Honorary Doctorates by the University of Southampton and by Uppsala University. He has twice won the First Award in the Gravity Research Foundation essay competition, in 1999 and 2005.

Welcome Address

Professor Lord Winston
HonFREng, FMedSci, DSc, FRCOG, FRCP, FRCS Ed, FRCPS (Glasg), FI Biol

Emeritus Professor of Fertility Studies, Imperial College London

Lord Winston, Professor of Science and Society and Emeritus Professor of Fertility Studies at Imperial College, runs a research programme in the Institute of Reproductive and Developmental Biology, on improvements in transgenic technology in animal models, with a long-term aim of improving human transplantation. He has around 300 scientific publications in peer-review journals on reproduction and embryology. He is also Chancellor of Sheffield Hallam University, Chairman of the Royal College of Music and was voted "Peer of the Year" by his fellow Parliamentarians in June 2008 for his expertise and work on the Human Fertilisation and Embryology Bill.

He is an Honorary Fellow of the Royal Academy of Engineering, a Fellow of the Academy of Medical Sciences, an Honorary Fellow of Queen Mary College, and holds honorary Fellowships of the Institute of Biology, the Royal College of Surgeons of Edinburgh and the Royal College of Physicians and Surgeons of Glasgow. He has been awarded honorary doctorates at sixteen universities.

Thursday 30th July

Professor Richard O'Kennedy
PhD, CBiol, FIBiol, FIboll
President of LIYSF

Exploiting antibody-based systems for the detection of cancer and other diseases

Our immune system is one of the most powerful systems that we possess to combat disease. We can exploit components of this system e.g. antibodies, to develop highly sensitive and specific methods of detecting and treating cardiac disease, cancers, bacterial and viral infections, and a host of other pathogens.

To achieve this requires the input of multidisciplinary teams consisting of biologists, doctors, physicists, chemists, engineers, materials specialists, veterinarians, computing experts, nurses, sociologists, health-care workers and many more. Successful approaches must be clearly patient-focused, be economically practical and provide the necessary outcomes to improve our health. This lecture will give examples showing how this approach is necessary for the improvement of human health and welfare world-wide.

Richard is a Professor of Biological Sciences at the School of Biotechnology. He is also the principal investigator at the Biomedical Diagnostics Institute and Vice-President for Learning Innovation, Dublin City University.

Friday 31st July

Professor Steve Cowley

Fusion - Powering the future?

With fossil fuel reserves dwindling and environmental concerns over the emission of greenhouse gases, the search for alternative energy sources is becoming a prominent social issue.

A world-wide research programme is studying the viability of nuclear fusion - the process that powers the Suns - as a future energy source. The world's largest magnetic confinement fusion experiment and European flagship facility, the JET device, has been operating at the Culham Science Centre in Oxfordshire for twenty five years and has successfully demonstrated the fusion of Deuterium and Tritium ions, producing some 16MW of fusion energy. Whilst challenges remain to be overcome, fusion power offers the potential of almost limitless electricity with no greenhouse gas emission and short lived radio-activity compared to fission.

Professor Steve Cowley became the Director of the UK's fusion research programme at Culham Science Centre in September 2008. Having received his BA in Physics from Oxford University and his Ph.D. from Princeton University, Steve has worked on fusion research at Imperial College, London, Princeton, Culham and UCLA. He is a Fellow of the American Physical Society and the Institute of Physics.

Saturday 1st August

Dr Cyril Isenberg,
Bsc, PhD, IIP
Department of Physics,
University of Kent at Canterbury

Magic of Soap Bubbles

The unexpected stability of soap bubbles has led scientists to study the properties of films and bubbles – much research has been carried out and is presently being undertaken by chemists, physicists, mathematicians and biologists.

The lecture-demonstration will explore the properties of soap films and soap bubbles. These include the vibrational modes, minimum energy and area films constrained by wire boundaries, coloured interference phenomena, applications to the solution of minimum roadway networks, and giant bubbles.

Dr Isenberg is a solid state theoretical physicist. He gained his qualifications and early postdoctoral research experience at King's College, University of London. He subsequently worked as a resident research associate at the Argonne National Laboratory, near Chicago, Illinois, in the USA. However, most of his career was spent on the staff of the Physics Laboratory of the University of Kent at Canterbury, UK.

Monday 3rd August

Charles Brookson CEng FIET FRSA M.Inst.ISP

Mobile phones - From the past to the present and the future

We will look at the evolution of mobile phones, from the past, to the present and the future. From my own point of view, which is the security one, we'll look at the risks and threats to mobile phones over the years.

In the 1980s you could just listen to the phones with a radio. Then we introduced digital phones and scrambling of the signal, but over the years these have been broken, and we have had to introduce new ways to improve the security.

Today we have the possibility of viruses, just like Personal Computers. And what does the future hold? We'll look at how technology will evolve to home base stations and very high speed data …

Charles Brookson works in the Department of Business, Enterprise and Regulatory Reform and is a Professional Electronic Engineer. He previously was Head of Security for one2one (now T-Mobile, UK), and worked within British Telecom for twenty years before.

He has been Chairman on the GSM Association Security Group for 20 years, spanning 219 countries, the GSMA unites more than 750 of the world's mobile operators, as well as 200 companies in the broader mobile ecosystem.

He is Chairman of the NISSG, a group that was set up to co-ordinate security standards amongst the three European Security Standards Organisations. He is also Chairman of ETSI OCG Security, which is responsible for security within ETSI.

Wednesday 5th August

Professor Andrew Coates,
MSc, DPhil
Mullard Space Science Laboratory, University College London

Exploring the solar system

We will take a tour of the solar system, exploring some of the diverse objects within it. On one, blue-tinged planet, life has emerged – could it be elsewhere too? Our tour will include a world which is blisteringly hot on one side but freezing cold on the other, a dry world with no atmosphere which was once wet, a twin to Earth which has a runaway greenhouse effect, a moon in the outer solar system with an atmosphere like the early Earth, other moons with active volcanoes and geysers, and icy bodies which are left-over building blocks of the solar system. Along the way we will find what space missions have taught us, including several operating in 2009 such as Cassini-Huygens, Mars Express and Venus Express. We will look at what exploring space tells us about our own, special place in the Universe.

Professor Andrew Coates is Deputy Director of the Mullard Space Science Laboratory (MSSL), UCL, and is Head of Planetary Science at MSSL – he leads the ExoMars PanCam team and is lead co-investigator on instruments on Cassini and Venus Express, and is co-investigator on Mars Express, on Rosetta (en route to a comet) and on BepiColombo (to Mercury).

Friday 7th August

Dr Sandra Knapp
Department of Botany, The Natural History Museum

Documenting diversity – do we need to bother?

Charles Darwin is best known for his articulation of the idea of evolution by natural selection, which truly changed the way in which we view not only the world around us, but also ourselves. How he came to this great idea has been widely discussed by many, but one episode of his life is often swept to the background as unimportant or a waste of time. In addition to coming up with big ideas, Darwin spent many years studying the taxonomy of barnacles, and wrote a monograph of the subject. I will discuss why taxonomy was important to Darwin, and why it continues to be important today in our rapidly changing world. Using examples from my own work on plants and from the work of others, I will explore the challenges to taxonomy in today's scientific culture. I will discuss why the documentation of life on Earth is as important now as it was in Darwin's day, not only so we know the other species with which we share the planet, but as a crucible for the generation of new ideas as to how this incredible diversity has evolved.

Sandy is a plant taxonomist and specialises on the family Solanaceae, which includes potatoes and tomatoes. Her work includes description of new species, investigating evolutionary relationships and working with communities in South and Central America.

Saturday 8th August

Dr Peter Douglas, BSc PhD CSci CChem MRSC ASIS FRPS
Assisted by Dr Mike Garley

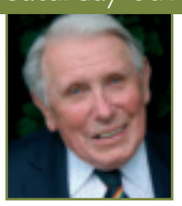
Chemistry and Light

The aim of the lecture is to show the importance of photochemistry in our world.

We will look at how light is made: this serves to demonstrate how light can be generated electrically, thermally and chemically, and how visible light can be generated from ultraviolet light. We will also consider how light is used today in technology and everyday life, this includes its use in photography, electronics, entertainment, plastics, medicine and security. Finally, we will consider how light might be used in the future to solve two of the most important problems facing mankind i.e. the production of clean water and clean energy. The lecture ends with demonstrations illustrating ways in which light can be used to purify polluted water, and how sunlight can be used as the ideal non-polluting energy source by conversion into electricity or a chemical fuel.

Dr Douglas obtained his BSc in Chemistry from Newcastle University, followed by a PhD from University College London for research on solar energy conversion carried out at The Royal Institution under the supervision of Nobel Laureate George Porter. After a few years in the research laboratories of Kodak Ltd he joined the staff at Swansea University where he is currently a Senior Lecturer in Chemistry.

Saturday 8th August



Dr Arthur Tarrant, PhD FinstP FCIBSE FSLL CPhys CEng MRI Visiting Research Fellow, University of Leeds (assisted by Andrew Hanson)

Colour is Fun

The precise specification of colour is vital to many branches of industry, and particularly to the consumer industries. We have to be able to specify colours with tolerances, just as we have to specify engineering dimensions with tolerances. But colour is not a simple physical quality like the diameter of a shaft. It is a psycho-physical phenomenon which occurs as our eyes and brain try to make sense of all the physical signals that come to them.

The lecture will describe the processes by which a specification of colour can be achieved and will go on to examine some of the many factors that affect the appearance of colours. It will show how a plain technical problem of commerce can, on analysis, offer an intellectual challenge of the highest kind to scientists. Perhaps it will also convey something of the delight of the scientist who works in this fascinating field.

Dr Tarrant studied physics at the University of London and first worked at the National Physical Laboratory. Later he worked at the University of Surrey. His main research has been on spectroscopy; daylight and the performance of optical instruments.

Tuesday 11th August

Dr Keith Martin MA (Cantab) DM (Oxon) MRCP FRCOphth Eye Surgeon, Addenbrooke's Hospital Cambridge Research Fellow, Wilmer Eye Institute, John Hopkins Hospital, Baltimore USA

A vision for the future: new technologies in the science of sight

Our understanding of the human eye has increased enormously over the last hundred years, yet numerous disease processes retain the ability to deprive us of our most vital sense. Sadly, many people today remain blind with conditions such as cataracts that are easily, quickly and completely treatable with access to appropriate healthcare. In these cases, the problems are economic, political and logistic. For other conditions, however we have no effective cure. When the optic nerve is damaged by trauma or severe glaucoma, the vital cells that connect the eye to the brain die. In the past, we have had no way to help people to affected by such conditions to see again.

In this lecture we will look at new technologies being used to restore vision in previously hopeless situations. Recent successes in ocular gene therapy will be discussed, and we will also consider the prospect, no longer science fiction, of rewiring the optic nerve using stem cells, with all the associated ethical and moral issues involved. Finally, we will explore some of the new generation tiny electronic devices that now can be used to replace a failing retina.

So join us to see why the future might just be brighter for those who have lost their sight.

Keith Martin graduated from the University of Cambridge with First Class honours in Medical Sciences and Neurobiology in 1990 and Oxford University Clinical School in 1993. He undertook three years of Research and Clinical Fellowship Training in glaucoma at the Wilmer Eye Institute, Johns Hopkins University, Baltimore, USA and at the Institute of Ophthalmology in London. He was awarded a Doctor of Medicine degree for his glaucoma research in 2004. Dr Martin established the University of Cambridge Glaucoma Research Unit in 2005 and has raised over £750,000 in grant funding over the last 4 years. Dr Martin was elected Treasurer of the World Glaucoma Association in 2009. He is also basic science Editor for the Journal of Glaucoma. In 2008, Dr Martin won the National Centre for Reduction, Replacement and Refinement of Animal Research Prize for the best original contribution to the reduction of animal suffering in any branch of the medical research published within the last two years.

3rd August Specialist Lectures

10 00 - Sir Alexander Fleming Building

Lecture 03 A

Dr Tom Ingram MB ChB MRCP

Doctor… Is it my heart?

In this lecture we will examine one of the world's biggest killers – ischaemic heart disease, reflecting upon the evolution of our understanding of angina and heart attacks. We will join Mr Smith as he has his heart attack; looking at the pathology behind his presentation, the treatment which he receives and the complications which can occur. Then we will look to the future, on the one hand exploring the exciting new therapies of stem cell transplantation and reperfusion injury limitation. However an appreciation will also be given as to why, despite the significant advances we have made, the rate of decline in the incidence of heart disease has slowed and may even be on the rise again (especially in the young). The worrying prediction that this could be the first generation to be outlived by their parents should sharpen all of our minds as we enter an uncertain future.

Tom Ingram graduated from the University of Leeds in northern England. He was selected onto the All Wales specialist training programme in Cardiology. Most recently he has been awarded a three year competitive research grant from the British Heart Foundation to look into blood flow characteristics during times of reduced oxygen supply to the heart

Lecture 03 B

Stacy Williams, Bsc Mphil

Did Financial Mathematics Cause the Credit Crunch?

The last decade saw an explosion in financial complexity, as increasing numbers of scientists turned their hand to finance. Suddenly the world changed.

The credit crunch hit in July 2007, leading us into the worst global recession the world has seen since the Great Depression. A great deal of blame has been directed towards the complex credit derivatives, and risk management techniques developed by financial mathematicians, in the years preceding.

Was too much complexity at the hands of the mathematicians really a major factor in the near collapse of the world financial system? This seminar looks at role of Quantitative Finance during the financial storm and what the future holds for it as an applied science.

Stacy Williams is Head of FX Quantitative Strategy and is responsible for the development of HSBC's algorithmic trading platform, which provides optimised execution and smart order routing across the many electronic exchanges. Stacy supervises doctoral research in collaboration with the Oxford University Centre for Industrial and Applied Mathematics (OCIAM).

Lecture 03 C

Dr Robert Adam, BA MB BS

Drugs, Dopamine and Impulsivity

Ever since humans first evolved, they have (unlike most other animals) sought pleasure or escape through the use of psychoactive substances. It seems that the neurotransmitter, dopamine, plays a vital role forming a common pathway in the neural circuitry for addiction.

In this seminar, we will explore the many, varied roles of dopamine so far known in the human brain - much of which we have learned through studying various conditions such as Parkinson's disease and schizophrenia. Then we will focus particularly on the role of dopamine in drug addiction. Finally, I will introduce the new field of neuroeconomics where it seems that dopamine may have a pivotal role in how we make decisions. We can begin to speculate as to whether the disruption of dopaminergic systems causes certain individuals to become addicted to drugs and/or make very poor decisions - whether as a result of drugs themselves or underlying disease.

Dr. Adam first attended LIYSF in 1994 and was subsequently a member of staff in 1995, 1996, 1997 and 2000. He studied pre-clinical sciences at Gonville & Caius College, Cambridge University. He completed his clinical medical training at University College London. He has specialised as a neurology and psychiatry resident at New York University Medical Center. He now studies impulsivity in a wide range of disorders, especially Parkinson's disease, using eye movements and will be submitting his doctoral thesis in 2010.

Lecture 03 D

Judith O'Toole BVSc, MRCVS HdipEd

Animals don't read the text books

In recent years the veterinary world has provided us with many examples which illustrate how nature and science are constantly changing. The emergence of new diseases in recent years has shown us that we can never afford to become complacent, believing that if we know the facts of a subject today, we will know them tomorrow. This seminar will take a look at the history of veterinary medicine and explain how scientific advances have helped to reveal mysteries of the past. We will discuss the evolution of new pathogens whilst also considering the understanding of certain diseases as merely a new way of looking at old information.

Graduated with Degree in Veterinary Science (Bristol) 1990, Judith worked as a veterinary surgeon until 1998. She obtained Post Graduate Diploma in Education (UCD) 1998, set up Diploma in Veterinary Nursing in UCD 2001-2003. Teaching Science in Mount Temple Comprehensive School 1998 to present.

Lecture 03 E

Dr Dan Brett BSc, MSc, PhD, DIC

Chemical Engineering

This lecture will give an overview of what chemical engineering is, and what chemical engineering students and professionals do. We will then use an example of an exciting new alternative energy technology, called the fuel cell, to show how chemical engineering can be applied to global challenges such as the future of energy production.

Dr. Dan Brett holds a B.Sc. in Chemistry, M.Sc. and Ph.D. in Physical Chemistry from Imperial College London. Dan has worked as a Research Associate in the Department of Chemistry and Department of Chemical Engineering (ICL), where in 2006 he was made a Research Fellow. Dr. Brett is the Secretary of the Society of Chemical Industry Electrochemical Technology Group, Associate Editor of the Analytical Chemistry section of The Scientific World Journal, Co-Director of the ICL Fuel Cell Network, Honorary Lecturer in the Department of Earth Science and Engineering, ICL and Co-Director of The Centre for CO2 Technology at UCL.

5th August Specialist Lectures – Managing the Warming World Specialist Study Day.

10 00 - Sir Alexander Fleming Building

Participants will work in their topic groups with their seminar leader to discuss their topic in relation to the theme and prepare a plenary report to present at the end of the day. This day will be moderated by Professor Matthew Leach. Professor Leach is an engineer by training and his research interests relate to decentralised systems (both energy and waste treatment), with a focus on the technologies, economic and policy aspects.

Seminar **5 A**

Professor Matthew Leach, PhD, DIC CEng, FEI, FRSA
Director of the Centre for Environmental Strategy, University of Surrey

Energy Production and Use

The UK Government and EU has adopted a long term target of reducing carbon dioxide emissions, and using more renewables in the overall energy mix. The UK, like most developed countries, faces an enormous task to put in place low carbon energy systems. The challenges facing many developing countries are different. Whilst they also have roles to play in tackling climate change, through adoption of cleaner technology and lower carbon energy systems, the pressing short and medium term priority is for economic and social development, to improve quality of life. We will explore how countries might try to meet these challenges, the changes in the energy systems required, and the social, commercial, and political obstacles to be overcome.

Professor Leach is an engineer by training and his research interests relate to decentralised systems (both energy and waste treatment), with a focus on the technologies, economic and policy aspects.

Seminar **5 B**

Dr Michael Peters, BSc PhD

Education and Social Change

During the last decade in particular, exposure of climate change as a key policy issue has increased dramatically, filtering through to the public in a range of ways from films and media coverage to online 'carbon footprint' calculators. This has led to the challenge of engaging individuals, households and communities in practical action to combat climate change and enable the transition to a sustainable, low carbon future.

Key topics that will be covered in this session include; Impact of the Media – in educating and disseminating knowledge about climate change, influencing society's attitudes and lifestyles; Policy – how various policy instruments have been used, and can be used, to bring about social change progress towards more sustainable patterns of energy and environmental management; Family, friends and work colleagues – the potential educational impact that these connections and contacts have in influencing attitudes, values and behaviour change.

Michael is a member of the Centre for Environmental Strategy and currently Senior Research Fellow on the ESRC Research Group on Lifestyles, Values and the Environment (RESOLVE).

Seminar **5 C**

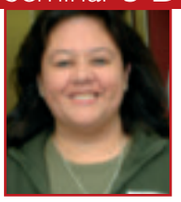
Dr Steve Pedley

The impact of climate change on the provision of drinking water supply and sanitation services

The global rise in temperature that is predicted to occur over the coming decades will have far reaching consequences for many of the natural cycles that maintain our environment. In the opinion of many experts the water cycle is one of the most sensitive to temperature rise, with the result that some regions will experience significant increases in rainfall whilst others will become much drier. No matter what direction the amount of rainfall takes relative to current amounts, it will have significant impacts on the freshwater resources upon which we rely for domestic use, industry and agriculture. Using information about the design, construction, operation and maintenance of different facilities we will assess their relative vulnerability to climate change

Dr Pedley is a microbiologist with over 25 years experience of research and consultancy work. For the past 13 years he has specialised in water quality, pollution control and public health.

Seminar **5 D**



Dr Rocio A Diaz-Chavez, BSc PhD

Sustainability assessment of bioenergy projects - A view on developing countries

Renewed interest in biofuels has been motivated by different concerns such as high oil prices, energy security and the effects of climate change. Though the use of biomass has many arguments in favour, the possible negative social and environmental implications obscure these positive possibilities. The topics covered in this session will include the sustainability issues behind using biomass resources for biofuel production, the positive impacts of using biofuels and the environmental issues of bioenergy crop production.

Dr Rocio A Diaz-Chavez is a Research Fellow at the Centre for Environmental Policy of Imperial College London and MSc tutor for the Distance learning MSc of the Centre for Development, Environment and Policy at SOAS.

Seminar **5 E**

Dr Vanesa Magar, BSc PhD MIMA

Coastal Defence and Management in a Warming World

Explaining the nature of the risk of flooding to those protected by flood defences is one of the major challenges faced by coastal engineering today. Indeed, those designing, commissioning and constructing defences and those insuring assets in the areas protected by flood defences all need to have a good understanding of the link between a particular structure and the risk associated with it. Since the 1950s, many new issues have impinged upon coastal engineering which have led to a more holistic approach to coastal flood defence and protection. Simultaneously, extensive development has taken place in coastal regions around the UK, increasing the number of people and the value of the assets at risk of flooding. Furthermore, there is now clear evidence that relative sea levels are rising around much of the UK and, coupled with the associated change in storm patterns caused by climate change, create a very thorny problem – what preventive actions should the authorities undertake in order to protect the UK's coastal areas appropriately?

Vanesa Magar currently holds an RCUK Academic Fellowship at the School of Marine Sciences and Engineering at the University of Plymouth. She has taught Hydrodynamics, Coastal Processes, Mathematics and Computing to oceanographers, coastal scientists and engineers.

7th August Specialist Lectures

10 00 - Electrical Engineering Building

Lecture **07 A**

Dr Jochen Guck

Do biological cells care about physics?

This lecture will consider the relevance of molecular aspects of cells, their global physical – mechanical and optical – properties. The mechanical properties of cells are largely determined by the cytoskeleton, an internal hybrid polymer network. This cytoskeleton evolves during the normal differentiation of cells, is involved in many cellular functions, and is characteristically altered in many diseases, including cancer. We can exploit the deformability of the cytoskeleton as a link between molecular structure and biological function to distinguish between different cells.

Jochen gained an honours degree in Physics at the University of Würzburg, and his Master of Arts and Ph.D in Physics at the University of Texas, Austin. Since 2007 he has lectured at the Cambridge Physics Department (UK). He is part of the Sector for Biological and Soft Systems and is involved in the Physics of Medicine initiative at the Cavendish Laboratory.

Lecture **07 B**

Dr Freya Blekman

Research at the knowledge frontier: Particle Physics at CERN

In this lecture I will describe what it is like to be a particle physicist. I will discuss the outstanding problems we are currently trying to solve and how this affects our understanding of the world around us and the universe. In addition, I will also describe how we work at CERN, what our experimental methods are and how we interpret the collisions at the Large Hadron Collider.

Freya Blekman is a particle physicist specialised in the studies of top quarks, the most massive particle currently known. Freya did a lot of work at Femilab, Chicago, USA. After having worked as a researcher for Imperial College in London she is now working at CERN, Switzerland, for Cornell University.

Lecture **07 C**

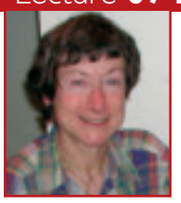
Dr Helke Hillibrand

Technological roadmaps for sustainable agriculture

Agriculture is a key motor of global economic development. Over the past 25 years agricultural output has grown more rapidly than population, but the main challenge remains simultaneously to serve the growing demand for food, feed fuel and fibre in terms of quality and quantity. In the past, the Green Revolution has allowed for a quantum leap in agricultural production globally. However, further technological advancements will be needed in order to match the progress of the past, securing agricultural supply for a globally increasing demand, determined by consumer patterns shifting towards an even higher per capita demand for processed and refined agricultural products.

Helke is the Dean of Graduate Studies for the EMBL International PhD Programme. Helke studied Biology and Chemistry in Bochum and Paris and has 13 years of professional experience as a plant molecular biologist in the public and private sector. Previously Helke worked as a Senior Scientist, heading the enabling tool platform of BASF Plant Science Company

Lecture **07 D**



Dr Graziella Branduardi-Raymont

'Space Astronomy and the Exotic Universe

Scientists in virtually all branches of astronomy make use of instruments in space to learn more about the Universe. This lecture focuses on X-ray and gamma-ray astronomy, explains the basics of how observations are carried out in space, and describes some of the very recent results from the European Space Agency's (ESA) XMM-Newton observatory (the largest scientific spacecraft ever built by ESA) and the NASA Swift mission, dedicated to 'catching gamma-ray bursts on the fly'.

Graziella has more than 30 years experience in astronomy research from space; Co-investigator for the Reflection Grating Spectrometer flying on ESA's XMM-Newton observatory. Current research fields: X-ray properties of active galaxies and solar system objects.

Lecture **07 E**

Professor Donna Blackmond

How amino acids took a left turn: models for the origin of biological homochirality

Donna G Blackmond received the PhD in Chemical Engineering from Carnegie-Mellon University. She was a professor of Chemical Engineering at the University of Pittsburgh from 1984-1992. In 1992, she became an Associate Director at Merck & Co., Inc., responsible for setting up of a new laboratory for research and development in the kinetics and catalysis of organic reactions. From 1996-99 Professor Blackmond was a Research Group Leader at the Max-Planck-Institut für Kohlenforschung in Mülheim an der Ruhr, Germany. In 1999 she became Professor and Chair of Physical Chemistryat the University of Hull. She joined Imperial College London in 2004, where she holds joint professorial appointments in the Departments of Chemistry and Chemical Engineering & Chemical Technology as well as the Chair in Catalysis.

Professor Blackmond holds a Royal Society Wolfson Research Merit Award. She received an Arthur C. Cope Scholar Award from the Organic Chemistry Division of the American Chemical Society (2005). She was a Woodward Visiting Scholar at Harvard University (2002-2003) and a Miller Institute Research Fellow at University of California, Berkeley (2003). She received the Royal Society of Chemistry's Award in Process Technology i(2003), the North American Catalysis Society's Paul H. Emmett Award (2001), the Organic Reactions Catalysis Society's Raul Rylander Award (2003), and the NSF Presidential Young Investigator Award (1986-91)

10th August Specialist Lectures – Science Serving Mankind Specialist Study Day.

10 00 - Sir Alexander Fleming Building

Participants will work in their topic groups with their seminar leader to discuss their topic in relation to the theme and prepare a plenary report to present at the end of the day. This day will be moderated by Sir Colin Terry.

Seminar **A**

Sir Colin Terry – KBE, CB, BSc(Eng), CEng, FREng, FRSA, FILog, FCGI, FRAeS

Mechanical Engineering

This seminar study will focus on the current issues within the field of Mechanical Engineering, in relation to "Science Serving Mankind".

Sir Colin has had a long career in the Royal Air Force, attaining the rank of Air Marshal and Chief Engineer (RAF), Head of Logistics and Commander in Chief of Logistics Command and was responsible for 15,000 personnel and 30 aircraft types.

Sir Colin is currently President of his College Association, and member of the Courts of Cranfield and Imperial College London, latterly where he obtained an Honours Degree in aeronautical engineering. Sir Colin Terry is the President of the Council of the Royal Aeronautical Society, Chairman of the Engineering Council and is a member of the Engineering Technology Board (ETB). Since July 2004 he has been chairman of Meggit plc, and as a Chartered Engineer, advises several international aerospace companies.

Seminar **B**

Dr. John de Mello

Nano Technology

Dr. John de Mello is a Reader in Nanomaterials in the Department of Chemistry at Imperial College, specialising in plastic electronics. He has published over 60 papers and 4 patents, and was a co-recipient of the Royal Society's 2007 Brian Mercer Award for Innovation in Nanotechnology. He is a cofounder of Molecular Vision Ltd.

Seminar **C**

Dr. M. Debora Iglesias-Rodriguez

Acidification of the Oceans

Debora works on the relationships between phytoplankton evolution and climate change, particularly how changes in the dominance of phytoplankton groups may alter the fluxes of carbon between the atmosphere, the upper ocean and the ocean interior. The reason why 'we care' is because the oceans are the largest reservoir of carbon on Earth and, therefore, understanding how carbon fluxes are controlled in the present-day is central to predicting future scenarios. My work deals with different levels of organisation from molecular (genetic) to ecological via the use of satellite data.

Seminar **D**

Dr Maesha Deheragoda

Bioscience

This lecture will introduce the historical concept of science changing our society through the introduction of antibiotics and immunisations. We discuss how society in the developing and developed worlds is structured and how science is meeting these needs. Topics covered in this section will include bioengineering of food crops, stem cell therapy for degenerative disease, cancer research, embryo research and the human genome project and its impact on genetic disease. We will consider the ethical and social implications of these advances and consider how the future of mankind may be shaped through further advances in science.

Maesha trained in Natural Sciences at the University of Cambridge. She then went onto study Medicine at Barts and the London School of Medicine in London. She is qualified as a paediatrician and then trained in Pathology at University College Hospital, where she is a Clinical lecturer in Pathology. Maesha is active in research into pancreatic cancer.

Seminar **E**

Helen O'Brien MA MEng

Space Physics

Space exploration, through the use of astronomy and robotic and human exploration provides huge scientific advances and also can help unite nations in common peaceful goals. It is however an expensive endeavour – ESA's budget for 2009 is Euro3.6 billion. We will reach out to the stars but should we be looking for alternative places to live in our solar system and beyond?

Helen is a space instrumentation researcher in the Space Magnetometer Laboratory at Imperial College London. She was involved in building the magnetometer on the joint European Space Agency - Chinese Double Star satellite which is currently in Earth orbit, and am now working on designs for future missions to study Mercury, the Sun and the outer planets. Graduated with a Masters in Engineering at Cambridge University. She spent 4 years drilling oil wells in Oman, Norway, Brazil and Venezuela.

FRIDAY 31ST JULY – HALF DAY VISITS

31/1 **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.

31/2 **Imperial College London: Earth Science and Engineering**
Research and teaching spanning both earth science and earth engineering.

31/3 **Zoological Society of London: Veterinary Department**
Caring for the health of the animals in London Zoo; and research into the welfare and conservation of free living animals.

31/4 **Imperial College London, Dept of Chemical Engineering**
See the laboratories, pilot plant and computing facilities of one of the UK's largest departments of its kind.

31/5 **University College London: Dept of Anatomy & Developmental Biology**
Research into neuroscience; neurobiology; evolutionary anatomy; cell & developmental biology.

31/6 **Imperial College London: Dept of Life Sciences Biochemistry**
The latest developments in Biochemistry.

31/7 **Royal Botanic Gardens at Kew with The Jodrell Laboratory**
World-famous centre for botanical research and study; includes a visit to The Jodrell Laboratory.

31/8 **Imperial College London: Dept of Materials**
Research into biomaterials for tissue engineering and regenerative medicine; and bio-nanotechnology for nanostructures and create nano-biomaterials.

31/9 **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.

31/10 **Old Operating Theatre and Herb Garret**
Original operating theatre dating from 1821, with original instruments; find out about surgery before anaesthesia and antisepsis.

TUESDAY 4TH AUGUST – FULL DAY VISITS

04/1 **Airbus UK, Filton**
Aircraft design, assembly and manufacture.

04/2 **Rothamsted Research Centre**
Briefing on sustainable agricultural development in developing and emerging countries. We will share research excellence in agricultural and environmental sciences for the benefit of world-wide agricultural and environmental sustainability.

04/3 **Tilbury Power Station**
The science of electricity generation at a major power plant.

04/4 **University of Warwick: Electrochemistry & Interfaces/Electron Microscopy Dept**
The application of electrochemistry to the understanding of fundamental and industrially significant interfacial chemical processes at the micro to nanoscale.

04/5 **University College London: Mullard Space Science Laboratory**
Exploiting the capabilities of rockets and spacecrafts as platforms for scientific instruments it strives to understand our physical environment and our place in the Universe.

04/6 **University of Kent: Electronics Laboratory**
Design and research in electronics and digital multimedia equipment.

04/7 **Rutherford Appleton Laboratory**
To explore fundamental questions about the origin of the universe and the structure of matter.

04/8 **National Oceanography Centre**
National centre for marine and earth science technology in the UK. Campus houses over 500 staff and 750 students.

THURSDAY 6TH AUGUST – OXFORD AND CAMBRIDGE VISITS

06/C/1 **Cambridge University Department of Physics: Cavendish Laboratory**
Prestigious research centre: visit the departments specialising in microelectronics; polymers and colloids; high speed photography; low-temperature physics.

06/C/2 **Babraham Research Campus**
Centre which undertakes innovative biomedical research to discover the molecular mechanisms that underlie normal cellular processes and functions, and how, over lifetime, their failure or abnormality may lead to disease.

06/C/3 **Cambridge Earth Sciences Department**
From geophysics and applied mathematics, geochemistry and sedimentology, petrology and volcanism, palaeontology and evolutionary biology, to the physics and fundamental properties of materials.

06/C/4 **EMBL – European Bioinformatics Institute**
The EBI is a centre for research and services in bioinformatics. The Institute manages databases of biological data including nucleic acid, protein sequences and macromolecular structures.

06/O/1 **Oxford University Botanic Garden and the Museum of Natural History**
This educational and scientific centre is Britain's oldest botanical garden.

06/O/2 **UKAEA Culham – The United Kingdom Atomic Energy Authority**
The UK centre for the magnetic confinement fusion research and the home of the major European fusion experiment JET. It has a high technology incubator, Culham Innovative Centre and a technology transfer programme.

06/O/03 **Pit Rivers Museum**
The Pitt Rivers Museum cares for one of the world's great collections. It is equally famous for its celebrated displays and its leading role in contemporary research and museum curatorship.

FRIDAY 7TH AUGUST – SCIENTIFIC MUSEUMS VISIT

1/NHM **Natural History Museum**
Exciting interactive exhibitions about the Natural World.

1/SM **Science Museum**
See, touch and experience the major scientific technological and medical advances of the last three hundred years.

There is an active social calendar with events designed to enable those from around the world to learn about different cultures.

THURSDAY 30TH JULY

20.00 Welcome party at Student Union, Imperial College.

FRIDAY 31ST JULY

20.00 Science Forum Bazaar in Sir Alexander Fleming Building, Imperial College.

SATURDAY 1ST AUGUST

19.30 Student Topics – LT G16, Sir Alexander Fleming Building, Imperial College.

SUNDAY 2ND AUGUST

20.00 The Great Crossword Treasure Hunt, Imperial College and surrounding areas.

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FRIDAY 7TH AUGUST

20.00 International Cabaret at Student Union, Imperial College.

SATURDAY 8TH AUGUST

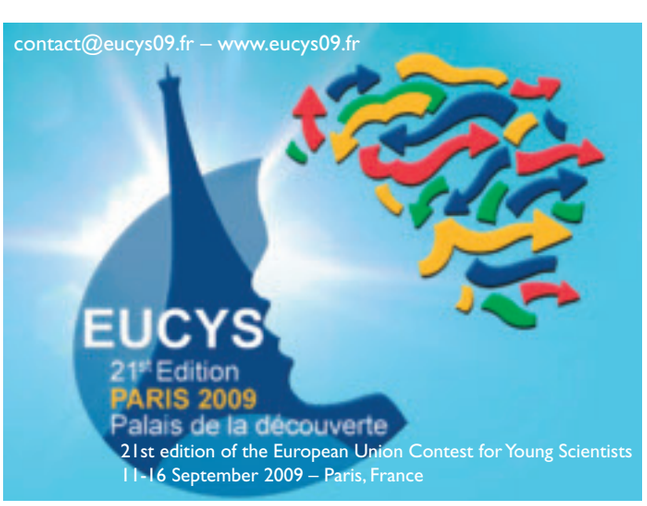
20.00 Songs of Home in Evelyn Gardens Common Room.

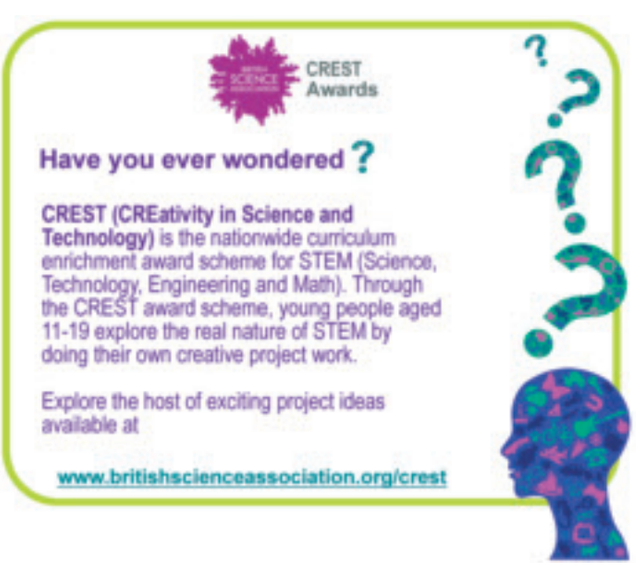
SUNDAY 9TH AUGUST

20.00 "At home" in Evelyn Gardens Common Room.

TUESDAY 11TH AUGUST

20.00 Farewell Party at Student Union, Imperial College.





Optional Visits

LIYSF offers a varied programme of optional visits. Friday 31st July at 16.30 tickets will be on sale from LIYSF staff for London sightseeing, Stonehenge and Salisbury visits and two theatre nights. Monday 3rd August at 16.00 tickets will be on sale from LIYSF staff for Hampton Court and Windsor and final theatre night.

SATURDAY 1ST AUGUST

13.00 Optional sightseeing tour of London.

SUNDAY 2ND AUGUST

09.00 Optional excursion to Stonehenge and Salisbury.

MONDAY 3RD AUGUST

19.30 Optional theatre visits.

THURSDAY 6TH AUGUST

19.30 Optional theatre visits.

SUNDAY 9TH AUGUST

09.00 Optional excursion to Hampton Court Palace and Windsor.

MONDAY 10TH AUGUST

19.30 Optional theatre visits.

LIYSF Partners

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A world-class education in a world-class city

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LIVING CONSERVATION

Programme Managers
Laura Thomas and Richard Myhill

Chief of Staff

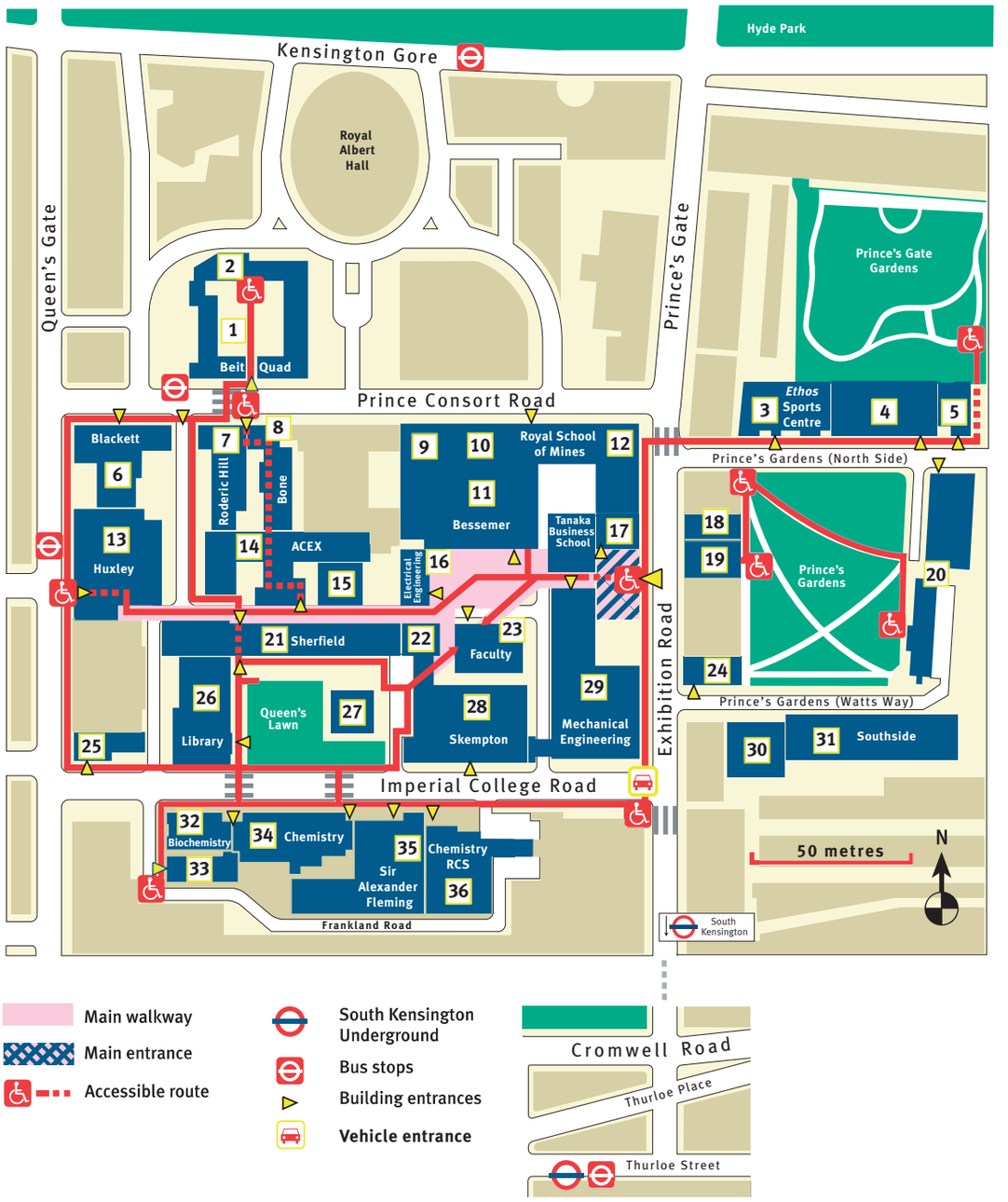
Jess Chaplain
Full Time Teacher

	Beit Hall	Evelyn Gardens
		
Host	**Ojali Negedu** Studying Pharmacy at Kings College London	**Erik Szabo** Full time employment
		
Hall Organisers	**Guncha Welsapar** Studying Medicine at The Karolinska Institute Sweden	**Lukas Stritesky** Studying at University level

	Beit Hall	Evelyn Gardens
Supporting Hall Hosts	 **Sam Taylor** Studying Mathematics at Warwick University	 **Joao Vicente** Studying Environmental Engineering at Porto University Portugal
Chief of Counsellors	 **Negin Baradari** Studying at University level	 **Samia Elkommos** Studying Mathematics at Imperial College
Counsellor	 **Andreas Wagner** Studying at Braunau Austria	 **Oliver Collas** Studying at Elizabeth College Guernsey
Counsellor	 **Kenney Easson** Studying at the Linlithgow Academy	 **Maria Esterban** Studying at the British Council of Madrid
Counsellor	 **Sally Money-Coomes** Studying at the British School of Brussels	 **Sofia Bartholdson** Studying Medicine at the Karolinska Institute Stockholm Sweden

Imperial College London

South Kensington Campus



Buildings where wheelchair access is not possible at this time

1	Beit Quadrangle
2	Imperial College Union
3	*Ethos* Sports Centre
4	Garden Hall
5	Weeks Hall
6	Blackett Laboratory
7	Roderic Hill Building
8	Bone Building
9	Royal School of Mines
10	Aston Webb
11	Bessemer Building
12	Goldsmiths Building
13	Huxley Building
14	ACE Extension
15	William Penney Laboratory
16	Electrical Engineering
17	Tanaka Business School
18	52 Prince's Gate
19	53 Prince's Gate
20	Eastside (under construction)
21	Sherfield Building Student Accommodation Centre Conference Office
22	Grantham Institute for Climate Change
23	Faculty Building
24	58 Prince's Gate
25	170 Queen's Gate
26	Imperial College and Science Museum Libraries
27	Queen's Tower
28	Skempton Building
29	Mechanical Engineering Building
30	46–48 Prince's Gardens
31	Southside
32	Biochemistry Building
33	Flowers Building
34	Chemistry Building
35	Sir Alexander Fleming Building
36	Chemistry RCS