



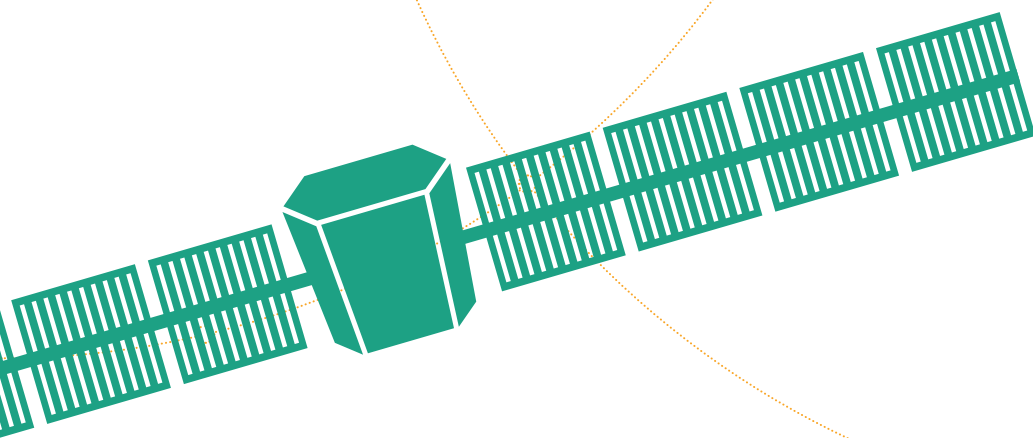
SpaceLab 2014

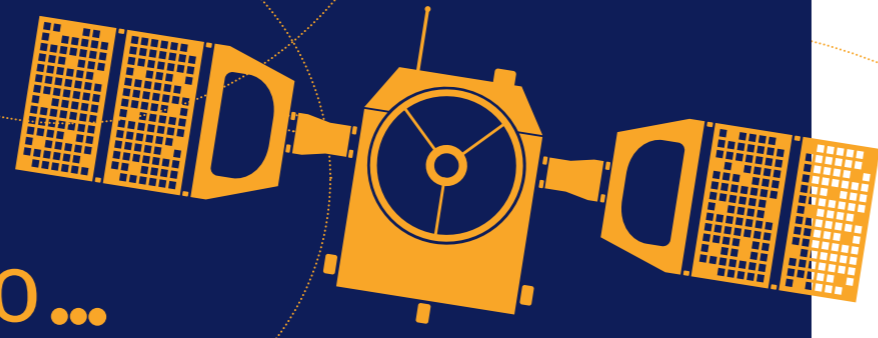
25 September 2014

Sir Alexander Fleming Building

••• www.imperial.ac.uk/spacelab

Imperial College
London





Welcome to... Imperial SpaceLab 2014

The **second annual conference** in space science, engineering, medicine and business.



James Stirling

Provost, Imperial College London

It's my great pleasure to welcome you all to Imperial SpaceLab 2014. Initiatives such as the SpaceLab, which brings together academics across the College working on shared problems, both demonstrate Imperial's existing research strengths and push us to develop our capabilities further. I look forward to seeing SpaceLab go from strength to strength over the next year and beyond.

W. James Stirling



Prof Steven Schwartz

Director, Imperial SpaceLab

Welcome to Imperial SpaceLab 2014. The past year, our first, has seen us chase a comet, win leading roles on scientific missions, conduct dialogues with government agencies, and initiate partnerships with both space and non-space commercial enterprises. Today's event emphasises the excellence of Imperial's broad research portfolio, and the increasingly important element of external collaboration. As you listen to the presentations and wander through the Research Marketplace, let your imagination conjure up new ideas and opportunities.

Steven Schwartz



Simon Hepworth

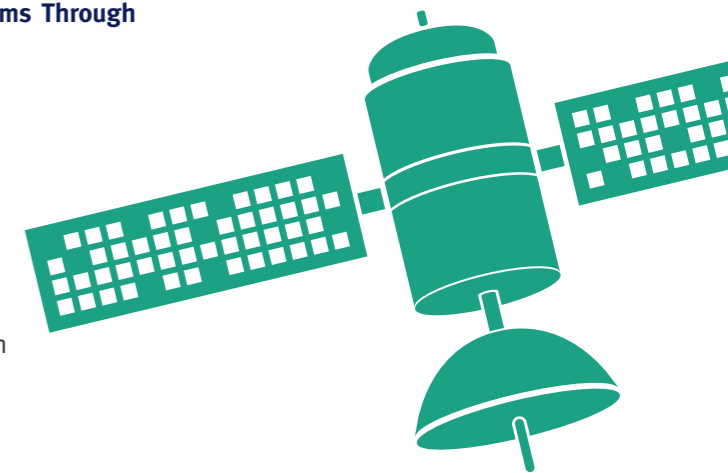
Director, Enterprise

It's wonderful to see you all here at the second annual SpaceLab conference - our chance to communicate the fantastic research that Imperial is engaged in. We've worked hard to produce a more interactive event this year, with keynote presentations, demonstrations, pitches, posters, and time for networking, which we hope will lead to lasting connections beyond the day itself. The SpaceLab is a chance to connect our researchers with industry, and other stakeholders, to explore opportunities for collaboration.

Simon Hepworth

Programme

- **09:15 Registration**
- **10:00 Welcome and introduction**
Professor **Steven Schwartz**, Director, Imperial SpaceLab
Professor **James Stirling**, Provost, Imperial College London
- **Morning Plenary**
Astrostatistics, Cosmology and Brains: Model Testing in Few and Many Dimensions
Professor **Alan Heavens**, Imperial College London
- **Lightweight Manufacturing Technologies**
Dr **Liliang Wang**, Imperial College London
- **Rosetta: Why we are Chasing a Comet?**
Dr **Marina Galand**, Imperial College London
- **Delivering Growth Through the UK Civil Space Strategy**
Catherine **Mealing-Jones**, UK Space Agency
- **12:15 Lunch and the Research Marketplace**
Over an extended lunchtime, participants will be able to browse exhibits and find out more at spotlights in the Research Marketplace
- **14:00 Afternoon plenary**
Challenges in Planetary Protection
Dr **Gerhard Kminek**, European Space Agency
- **Carrington: The UK Next Generation Space Weather Monitoring Mission**
Dr **Markos Trichas**, Airbus Defence and Space
- **Providing Commercial Landscape Intelligence Platforms Through Earth Observation**
Tim **Vallings**, Rezatec
- **Autonomous Computing and Software Systems**
Professor **Julie McCann**, Imperial College London
- **15:50 Refreshments**
- **16:10 Panel discussion**
Introduction: What's the Point of Space Policy?
Professor **David Southwood**, Imperial College London
- **Debate: How Can we Collaborate to Raise Impact?**
David **Southwood** (Chair)
Professor **Richard Templer**, Director, Climate KIC
Professor **Michele Dougherty**, Imperial College London
Paul **Febvre**, Satellite Applications Catapult
Doug **Liddle**, Surrey Satellite Technology Ltd
- **17:20 Closing remarks**
Professor **Maggie Dallman**, Dean of Natural Sciences, Imperial College London
- **17:30 Networking reception**



Professor Alan Heavens



Alan is Professor of Astrostatistics at Imperial, and Director of the Imperial Centre for Inference and Cosmology. His main research work is in cosmology, where he has developed principled statistical methods for analysing a number of different types of data, including galaxy surveys, distortion patterns in the shapes of distant galaxies caused by light bending along the line of sight, and light left over from the Big Bang. He is a Director of Blackford Analysis, a spin-out company of the University of Edinburgh specialising in medical image analysis, and is a Fellow of the Royal Society of Edinburgh.

Dr Liliang Wang



Liliang is a Research Fellow in the Department of Mechanical Engineering at Imperial. He received his PhD degree from Delft University of Technology and joined the College in 2009. His research experience is in metal forming and process modelling, which includes finite element modelling of metal forming processes, tribology in metal forming processes and the development of advanced metal forming technologies. His work has found wide applications in the aviation and aerospace companies, including Aviation Industry of China and China Academy of Launch Vehicle Technology.

Tim Vallings



Tim is the Commercial Director at Rezatec; a company founded in 2012 to help businesses better manage their land-based assets by making use of the increasingly sophisticated but complex array of Earth Observation (EO) imagery and data. Tim has nearly 20 years of international commercial and development experience gained with Intertek plc, Combisafe and Helveta Ltd. He spent nine years with Intertek living and working in Mozambique and Rwanda, directing national-scale monitoring programs. Since 2010, he has been working with software in the extractive industries, focused on forestry, energy, water and food.

Professor Julie Mccann



Julie is Professor of Computing Systems at Imperial and leads the Adaptive Emergent Systems Engineering group. Her work revolves around autonomous computer systems and how they adapt to new environments, drawing inspiration from nature's intricate systems. Julie has collaborated with the Royal College of Arts, The University of the Arts, Interactive Institute Stockholm, Sun Microsystems, Thames and Severn-Trent Water, BT, Arup, and the BBC to name a few. She has also been a consultant for TV and film on occasion and has been invited to talk on self-adaptive computing to audiences such as NASA and European Space Agency.

Dr Marina Galand



Marina is a Senior Lecturer at Imperial. She investigates solar and auroral particle energy deposition in atmospheres of bodies throughout the solar system. She collaborates with science teams of major space missions, including Cassini, Venus Express, and Rosetta, using sophisticated kinetic and fluid models to bind elements between datasets from different instruments to optimise the scientific output. She is a Co-Investigator for the Rosetta Plasma Consortium and has published more than 60 papers in major international journals. She was awarded the Zeldovich Medal in 2006 for her contribution in Space Physics.

Catherine Mealing-Jones



In 2012, Catherine joined the UK Space Agency on loan from the Home Office as Director for Growth, Applications and EU Programmes. Her role was made permanent in 2014. She is responsible for expanding the UK Space Agency on a national and international scale by monitoring global and European space bodies, such as the Global Monitoring for Environment and Security. She is responsible for overseeing innovation and growth strategy. Her previous roles include Director of Technology and Business Change at UK Border Agency, and Deputy Regional Director of Corporate Development at the Government office for the East of England.

Panel Discussion:

Professor David Southwood



Panel Chair

David is a Professor of Space and Atmospheric Physics at Imperial, and a member of the Steering Board of the UK Space Agency. Until 2011, he was the Director of Science and Robotic Exploration at the European Space Agency in Paris, a post he held for a decade. His other notable roles include Head of Earth Observation Strategy at ESA and Head of the Physics Department at Imperial. He is also chairman of the Board of Trustees of the London Institute of Space Policy and Law, past president of the Royal Astronomical Society and a fellow of the Royal Aeronautical Society.

Professor Richard TEMPLER



Director,
Climate KIC

Professor Michele Dougherty



Professor of Space Physics,
Imperial College London

Paul Febvre



Chief Technology Officer,
Satellite Applications Catapult

Doug Liddle

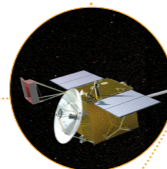


Head of Science,
Surrey Satellite Technology Limited

Dr Gerhard Kminek



Gerhard is Planetary Protection Officer at European Space Agency (ESA). He is responsible for the development and maintenance of the ESA planetary protection requirements and standards, and for the monitoring and independent verification of their correct implementation in ESA programmes. Since 2008, he has been the vice-chair of the Committee on Space Research Planetary Protections Panel. In his talk, he will briefly describe the origin and scope of planetary protection and subsequently address the new challenges related to recent discoveries on Mars, sample return missions from different planets and moons in the solar system, and human missions.



Dr Markos Trichas

Prior to joining Airbus Defence and Space, Markos was a researcher at Harvard University, Rutherford Appleton Laboratory and Imperial. Since joining the Space Future Programmes for Earth Observation, Navigation and Science team at Airbus he has led the Space Weather and Near Earth Objects detection and mitigation programmes. He is also part of Airbus' Innovations team, responsible for identifying, researching and promoting future technologies. He has authored and co-authored more than sixty papers, with almost 4000 citations. Markos holds a PhD in astrophysics from Imperial.



Research Marketplace

The SpaceLab is a network of 140 researchers working across aeronautics, materials, instrumentation, high-energy physics, mathematics and data analysis, computing and software, earth sciences and civil engineering, robotics, climate change and environmental policy, security, and business and biological risks – to name only a few areas. You can find out more about our capabilities and research themes at www.imperial.ac.uk/spacelab.

This year we have introduced a Research Marketplace to the conference programme to showcase what Imperial can do and to learn more about key initiatives taking place within the sector. Take the opportunity to start conversations and build new connections.

We have programmed nine spotlights, taking place at three screens within the Marketplace, to showcase and explore just some of the space research and work ongoing in the following fields: planetary impact, lasers, space weather, magnetometers, next-generation satellites, antenna technology, handling intellectual property, and satellite data communications services.

If something catches your attention and you would like to discuss how to take an idea forward, Imperial's Corporate Partnerships team will be on hand during the day. Alternatively please follow up with Josie Worner on j.worner@imperial.ac.uk.



Contributors	Organisation	Title	Time
• Michael Damzen	Imperial College London	Next Generation Space Lasers for Future Earth Observation Missions	13:00
• Patrick Brown and Barry Whiteside	Imperial College London	Instrumentation for Space Physics and Industrial Partnerships	13:10
• James Lewis	Imperial College London	Understanding the Interactions Between Organic Compounds and Geological Materials Within Earth, the Solar System and Beyond	13:20
• Richard Ghail	Imperial College London	The Vensar Phased Array Radar for Envision: Taking Europe's Earth Observing Expertise to our Nearest Exoearth	13:00
• Gareth S. Collins and Thomas M. Davison	Imperial College London	iSALE: A Multi-Material, Multi-Rheology Shock Physics Code for Simulating Planetary Impact Phenomena	13:10
• Jonathan Eastwood	Imperial College London	Space Weather Research at Imperial College London	13:20
• Kumar Singarajah	Avanti	Next Generation Ka-band Satellite Systems - Key R&D Steps Needed to Increase Satellite Capacity	13:00
• Philip Davies	Deimos Space UK Ltd	Deimos-2: Heralding A New Generation of Low-Cost High-Resolution Imaging Satellites	13:10
• Lamia Baker	Imperial Innovations	Technology Transfer	13:20

• [Screen 1](#) | • [Screen 2](#) | • [Screen 3](#)

Contributors	Organisation	Title
Richard Templer and Catherine Oriol	Climate-KIC	Climate Change and Space
Stephen Fuller	GRACE	Supporting Students and Businesses in Downstream Applications of the Satellite Programme
Chris Cochrane	Imperial College London	The Highlands of Venus
Gareth S. Collins, Katarina Miljkovic and Mark Wiczorek	Imperial College London	Large Impact Crater Formation on the Moon and Earth
Matthew Genge	Imperial College London	Meteorites, Cosmic Dust and Impact Rocks: Messengers From the Past
Sophie Damy	Imperial College London	Space-Based Technologies to Support Railway Operations
Thomas Davison	Imperial College London	Impact Processing of Planetesimals in the Early Solar System
Adam Masters	Imperial College London	Cassini-Huygens Science
Patrick Brown, Leah-Nani Alconcel and Michele Dougherty	Imperial College London	J-MAG Consortium: Magnetometer Science on the JUICE mission
Vidhya Sridhar	Imperial College London	Array Signal Processing for Space Applications
Helen Brindley, Richard Bantges, Jacqueline Russell, Jonathan Murray, Christopher Dancel, Claudio Belotti and John Harries	Imperial College London	Spectral Signatures of Climate Variability and Change Diagnosed from IASI and IRIS Satellite Observations
David Johnson	Imperial College London	Data Science Institute
Sian Williams, Jamie Banks, James Ingram and Helen Brindley	Imperial College London	Monitoring Clouds and Aerosol and their Effect on the Earth's Radiation Balance from Space
Enrico Biffis, Erik Chavez and Wouter Buytaert	Imperial College London	Using Satellite Data to Manage Extreme Weather Risk in Current and Future Climate Scenarios: An Application to the Rural Sector in Mozambique
Soraia Pimenta	Imperial College London	Recycled Composites for Damage Tolerant Applications
Luc Vandeperre	Imperial College London	Ceramics in Space at the Centre for Advanced Structural Ceramics (CASC)
Matthew Santer	Imperial College London	Small-Satellite Deployables
Cedo Maksimovic and Karl M Smith	Imperial College London	The Blue Green Dream: Achieving Climate Change Resilience for Future Cities
Joaquim Peiro and Mashy Hazan	Imperial College London	Modelling SLOSH Dynamics Using Smooth Particle Hydrodynamics (SPH)
Mirko Kovac	Imperial College London	Aerial Robotics for Planetary Exploration
Christopher Chen, Simon Good, Heli Hietala, Timothy Horbury, Lorenzo Matteini	Imperial College London	Space Plasma Physics Research at Imperial College London
Susarla Raghuram, Lorenzo Matteini, Marina Galand, Steve Schwartz, Chris Carr, Emanuele Cupido and Anthony Allen	Imperial College London	Rosetta Plasma Science at Imperial College London: Comet 67P Under Scrutiny
Liliang Wang	Imperial College London	Fast Hot Stamping Process: A Novel Lightweight Forming Technology for Manufacturing High Strength, Complex-Shaped Components
Jane Cryer	Imperial Consultants	Space Experts at Your Service
Michael Johnson	JA	Open Source Mass Customisable Generic Spacecraft for Interplanetary Space Exploration
Andrew Bowyer	Magna Parva	In-Orbit Manufacture of Very Large Space Structures
Michael Popov	Prime States Quantum Lab Ltd	Quantum LUCA Hypothesis
Nick Potts	Printech Circuit Laboratories Ltd	Bespoke PCB Solutions for Space Missions
Gavin Ward	Quintec - a Thales business	Gateway to New UK Research Opportunities in Space With Thales

SpaceLab 2014

About the SpaceLab

The Imperial College SpaceLab launched in July 2013. It was set up to encourage new collaborations and increase translation activity between Imperial's researchers and the space sector. The network of 140 researchers works across space science, engineering, medicine and business.

If you would like to find out more about things you've heard today, or would like to discuss a potential collaboration, please contact:

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