

ULTRA PRECISION CONFERENCE

ADVANCES IN ULTRA PRECISION
INNOVATING THE FUTURE

27th April 2017



PROGRAMME

09:00-09:30	REGISTRATION		
09:30-09:40	INTRODUCTION	Prof Bill O'Neill	University of Cambridge
09:40-10:10	SPEAKER 1	Wolfram Meyer	SIOS-Germany
10:10-10:40	SPEAKER 2	Dr Petros Stavroulakis	University of Nottingham
10:40-11:00	Break - Tea/ Coffee		
11:00-11:30	SPEAKER 3	Prof Tim Wilkinson	University of Cambridge
11:30-11:55	PhD Presentations		
11:55-12:00	Lab Introduction	Paul Morantz	Cranfield University
12:00-13:45	Lunch/ Tours/ Posters		
13:45-14:15	SPEAKER 4	Dr Michael de Podesta	NPL
14:15-14:45	SPEAKER 5	Dr David Myles	M-solv Ltd.
14:45-15:00	Break - Tea/Coffee		
15:00-15:30	SPEAKER 6	Andrew Cox	Contour Fine Tooling Ltd.
15:30-16:00	SPEAKER 7	Dr Peter Docker	Diamond Light Source
16:00	Closing Remarks		

EXHIBITORS



**AEROTECH
LTD.**

Since 1970, Aerotech has designed and manufactured the highest performance motion control, positioning tables/stages, and positioning systems for our customers in industry, government, science, and research institutions around the world. Always guiding our development efforts is our commitment to providing our customers with products and services that provide:

- The lowest cost of ownership
- Highest throughput
- Highest accuracy
- Best return on investment

Our philosophy of building superior motion control systems starts with designing and manufacturing technically superior components. Other suppliers integrate general purpose components into their motion systems and claim to sell you a "superior" system. An Aerotech system begins with Aerotech motion components that are already best in class and specifically designed and optimized for the highest performance and lowest cost of ownership available. From technically superior components to high performance sub-assemblies to best-in-class, highly integrated motion subsystems, Aerotech can accommodate the requirements of your application and outperform competitive solutions.



**ARMSTRONG
OPTICAL LTD.**

Founded in 1997, Armstrong Optical Ltd. is a specialist supplier of optical metrology instruments for both R&D and production. This includes interferometers for measuring shape, distance and thickness and instruments for MTF, optical centration, focal length and most optical parameters. In addition we supply chromatic confocal sensors and controllers and custom optical / mechanical assemblies. Please visit our stand to see the Precitec CHROcodile C Chromatic Confocal Sensor, the Trioptics TRiAngle Electronic Autocollimator and the Trioptics μPhase® 1000 Interferometer.



**SIOS Meßtechnik
GmbH**

SIOS Meßtechnik GmbH specializes in the development and manufacture of precision metrological instrumentation. The company was founded in 1991. The close collaboration with the Institute of Process Measurement and Sensor Technology of the Technical University of Ilmenau on scientific and engineering matters forms the basis for innovative, top-quality, ultraprecision products.

SIOS manufactures precision laser-interferometric measuring systems for use in nanometrology that measure lengths, angles, straightness, vibrations, or other parameters with ultrahigh precisions and resolutions and are also easy to use. Application areas of the SIOS laserinterferometric measuring systems are in nanometrology, microelectronic-device fabrication, gauging and calibration, calibrating machine axes and metrological instrumentation, microtechnology, industrial testing and inspection, coordinate-measurement and positioning systems, feedback control of precision drives, precision-machinery manufacturing, pharmaceutical manufacturing, research and development.



**BRONKHORST
UK LTD.**

Bronkhorst UK Limited is a wholly owned daughter company of Bronkhorst High-Tech BV of the Netherlands and offers local sales and after-sales support, calibration and service facilities, application engineering and user training courses.

Product expertise includes gas and liquid mass flow measurement and control, pressure measurement and control, vapour production and control and primary calibration systems.

The UK Operation was established in 2002 and with quite outstanding success the result has been a 300% increase in both sales turn-over and staffing level. This wealth of knowledge and experience is enhanced with business skills in contracts management and customer care to provide an overall service that is intended to be second to none. Planned strategic growth has successfully developed into a truly world-wide organisation with representation in over seventy countries. This success has been built on a close collaborative approach that has seen product development closely allied to both the needs and the wishes of our customers.



**PROFESSIONAL
INSTRUMENTS**

PI is a worldwide leading supplier of solutions in the fields of motion and positioning. PI does not only develop and produce a broad range of positioning stages and actuators for linear, rotary and vertical motion or combinations of different axes. PI also adapts those solutions to customer-specific applications or supplies finished subsystems for motion and positioning.

SPEAKERS



Prof Bill O'Neill
Professor of Laser Engineering
University of Cambridge

9:30

Introduction - Ultra Precision Conference

Bill is a Professor of Laser Engineering within the Cambridge University Engineering Department and Director of the Centre of Industrial Photonics. He has researched and published widely on the subjects of laser-matter interactions, optical engineering, high power laser based manufacturing technologies, and micro/nano fabrication techniques. He is a Fellow of the Laser Institute of America and the Institute of Physics.



Mr Wolfram Meyer
Technical Consultant
SIOS

Speaker 1
9:40

Modern homodyne interferometers, highly precise, fast and effective

He has studied precision engineering with a focus on precision mechanics, optics, electronics and informatics at The University of applied science, Jena (Germany). He has worked in the field of metrology, develop gear and spline inspection systems. Wolfram has also worked with machine building developing volumetric compensation of machine tools with laser Interferometer. Furthermore, in R&D for drive technologies.

PhD Speakers

Chris Wright
Ultra precision hybrid laser-FIB platform

Jason Ten
High speed mask-less laser controlled precision additive manufacture

Yoanna Shams
An inkjet/ultrafast laser hybrid for digital fabrication of biomedical sensors

Matt Pryn
Holography as a consumer display solution

George Meakin
Display motion error reduction through novel binary dithering schemes

Clare Collins
Ordered Nanomaterials for Electron Field Emission

Sam Brown
Design and development of solid state additive manufacturing department



Dr Petros Stavroulakis
Research Fellow
University of Nottingham
Speaker 2
10:10

High-precision form metrology meets artificial intelligence

Since March of 2015, he has been employed at the University of Nottingham as a research fellow in Additive Manufacturing (AM) metrology. He is focusing on researching and developing the next generation of 3D optical inspection equipment which will employ the concept of Information Rich Metrology (IRM) to break the physical performance barriers of traditional diffraction-limited optical measurement equipment and provide the AM industry with the tools necessary to accomplish tight quality control of 3D printed parts.



Prof Tim Wilkinson
Professor of Photonic Engineering
University of Cambridge
Speaker 3
11:00

Nanophotonic Holograms - a precision manufacturing challenge

Tim Wilkinson is the Professor of Photonic Engineering at the University of Cambridge, he is also a Fellow of Jesus College. He has had a long-term research interest in the applications of liquid crystal (LC) devices, holograms, nanophotonics and related applications. His research has pioneered hybrid LC/CNT (carbon nanotube) technology including design and fabrication of plasmonic optical filters, waveguides, resonators and super-resolution lenses.



Dr Michael de Podesta
Researcher
National Physical Laboratory
Speaker 4
13:45

How does anyone really know what the temperature is?

Michael graduated with a B.Sc. from Sussex University in 1981 and then in 1985 completed a D.Phil. in the electronic properties of metals at cryogenic temperatures. After postdoctoral work at Bristol University he was appointed a lecturer at the University of London in 1987 and joined NPL in 2000. At NPL he leads the team which has made the most accurate temperature measurements ever, detailing the errors in all other thermometers on Earth. Michael is a chartered physicist, a member of the Institute of Physics and in 2009 he was awarded an MBE for Services to Science.



Dr David Myles
Research Engineer
M-solv Ltd
Speaker 5
14:15

Scanned Mask Imaging: high resolution solid state laser ablation

Dave Myles is currently working as a development engineer at M-Solv. He received his MPhys degree from the University of Warwick before completing an EngD in applied photonics with Heriot-Watt University. His doctoral project focused on the development of a high resolution, solid state laser mask imaging system at M-Solv, where he has continued to work on completion of his EngD.



Mr Andrew Cox
General Manager
Contour Fine Tooling Ltd.
Speaker 6
15:00

Scanned Mask Imaging: high resolution solid state laser ablation

Andrew has been with Contour Fine Tooling for 22 years and is now the General Manager. Prior to that, he was the Head of Diamond Machining for British Aerospace (Precision Optical Engineering). He started at British Aerospace as an Optical Physicist and transferred into Diamond Machining. His research while at British Aerospace was Hybrid Diffractive Optics for the Infra-red. Since being at Contour Fine Tooling he has been involved with a number of research programmes with many different universities, Cranfield, Heriot-Watt, Brunel, Strathclyde, Bremen and Hong Kong.



Dr Peter Docker
Senior Mechanical Project Engineer
Diamond Light Source
Speaker 7
15:30

Obtaining Precision from the Bottom Up

Dr Docker began his career in all things nano and micro in 2000 in the MEMS group at Birmingham University developing resonant pressure sensors within a collaborative framework with GE Druck. Micro-metre dimensioned structures built in silicon were maintained in resonance and changes in stiffness of supporting structures allow the device to express very accurately changes in pressure. After this time he was recruited by the Chemistry Department at Hull University to develop a system for 'At scene of Crime' DNA analysis. He developed the on-chip architecture, optics, data collection and power control for the electrophoresis.

Advances in Ultra Precision – Innovating the Future

Attendee List 2017



Dulce Aguilar
University of Cambridge
Muhammad Alamgeer
NICAAS College
Rafael Ales
Cranfield University
Peter Atkin
University of Cambridge
Min Aunh
Cranfield University
Malcolm Aw
APPLIED SIMPLICITY
James Barrington
Cranfield University
Charlie Barty-King
University of Cambridge
Liam Blessing
Lambda Photometrics Ltd.
Patrick Bointon
University of Nottingham
Sally Bristow
Diamond Hard Surfaces Ltd
Sam Brown
University of Cambridge
Yukui Cai
University of Strathclyde
Florian Caroff
Nikon Metrology
Martin Carrizales
Cranfield University
Peter Christopher
University of Cambridge

Clare Collins
University of Cambridge
John Cook
University of Cambridge
Gaxan Cortazar
IK4-TEKNIKER
Mike Cottee
Physik Instrumente Ltd
Erik Cox
Inclusive Designs Ltd
Andrew Cox
Contour Fine Tooling Ltd
Peter Cubbin
Inclusive Designs Ltd
Michael de Podesta
NPL
Ashley Dennis
Cranfield University
Karishma Dhanani
Cranfield University
Andrew Dickins
Cranfield University
Fei Ding
University of Strathclyde
Peter Docker
Diamond light source
Fabian Duarte Martinez
Cranfield University
Trevor Elworthy
LumeJet Print Technologies Ltd
Sophie Fuller
University of Cambridge

Nadeem Gabbani
University of Cambridge
Anthony Gee
Optical Science, UCL
Saurav Goel
Cranfield University
Daniel Gortat
University of Cambridge
Kevin Grimley
Physik Instrumente Ltd
Peter Grundschock
SIOS Meßtechnik GmbH
Xiaoguang Guo
Dalian University of Technology
Habibul Hasan
University of Strasbourg
Derrick Jepson
Aerotech Ltd
Renaud Jourdain
Cranfield University
Vasileios Karkasinas
Cranfield University
Gordon Lamb
Cambridge Consultants
Katjana Lange
University of Cambridge
Zhipeng Li
University of Strathclyde
Elkin M Lopez-Fontal
University of Cambridge
Xichun Luo
University of Strathclyde

James Macdonald
University of Cambridge
Bartek Majorek
Cranfield University
Aimal Mazidi
Cranfield University
Patrick McKeown
EUSPEN
George Meakin
University of Cambridge
Fanfan Meng
University of Cambridge
Ian Meredith
Master Abrasives
Wolfram Meyer
SIOS Meßtechnik GmbH
Ken Middleton
Lambda Photometrics
Muhammad Mohsin
Aerotech Ltd
Stephen Moore
Potter Clarkson LLP
Paul Morantz
Cranfield University
David Myles
M-Solv Ltd.
Daniel O'Connor
NPL
Bill O'Neill
University of Cambridge
Krste Pangovski
University of Cambridge

Ludmil Petkov
Cranfield University
Matt Pryn
University of Cambridge
Diego Punin
University of Cambridge
Eugene Richer
Armstrong Optical
Ian Routledge
Armstrong Optical
Chris Sansom
Cranfield University
Aroop Sen
Cranfield University
Yoanna Shams
University of Cambridge
Danny Sims-Waterhouse
University of Nottingham
Petros Stavroulakis
University of Nottingham
Troy Stehr
Bronkhorst UK
Jason Ten
University of Cambridge
Pazhani Thulasy
Gonville hotel
Yanling Tian
University of Warwick
Paul Turney
Network Rail
Daniel Villanueva
Cranfield University

Chris Walker
Diamond Hard Surfaces
Ray Whitehouse
Vac Techniche Ltd
Tim Wilkinson
University of Cambridge
Ben Williams
Sartorius