About this workshop

The delivery and manipulation of laser light is arguably as important as the laser technology itself in providing reliable and flexible manufacturing processes. Sustained advances in laser technology (increasingly high brightness, high peak powers, high repetition rates) have continued to present new challenges and opportunities. Novel fibre optic designs and coupling optics have been developed for high average and high peak powers to enable truly 3D processing, whilst innovative robotic solutions provide the essential laser-workpiece positioning capability. The high average power, high repetition rate ultrafast lasers recently developed require ultra-high speed beam manipulation to fully exploit their capabilities, and solutions are being developed using acousto-optic or polygon scanners, coupled with appropriate processing strategies.

This workshop brings together industrial and academic experts from the UK, Europe and the USA to provide a series of talks on the current state of the art. The scope includes free space and fibre optic beam delivery, workstation integration and beam sharing considerations, robotic control of laser beams, high speed scanning for large area surface functionalisation and applications of integrated systems including laser cladding and hardening and remote decommissioning applications.

Duncan Hand Workshop Chair

Duncan Hand is Professor of Applied Photonics at Heriot-Watt University in Edinburgh and is currently a member of the School of Engineering and Physical Sciences management team as Director of Research and Deputy Head of School.
His work on manufacturing includes laser precision machining; the use of adaptive optics in laser manufacturing processes; and laser micro-joining. In this work he collaborates with a range of companies including GE Aviation, Renishaw, BAE Systems and Selex.

Who should attend?

In addressing the critically important areas of the delivery and manipulation of high power beams, this workshop will present successes, current limitations and challenges over a wide and fascinating variety of industrial examples including key laser types (from CW to ultra-short pulse), processes (including welding, drilling and surface functionalization) and scale (from macro to micro). For existing and potential users the event offers insights into ways of dramatically improving process productivity, quality and flexibility; for potential users and those wishing to update their understanding of the current capability of laser materials processing, the workshop will provide a unique and excellent review for beginners and experts alike.

The wide scope of this event means that there is something for everyone in the laser user and supplier community, from. Manufacturers and industrialists, supply companies, laser users, laser source manufacturers and suppliers, laser-based engineering subcontractors and machine integrators. All will gain from a greater appreciation of the current state of play; the resultant opportunities recent developments present; and insight into the future development of a laser-composite supply chain within the UK. The workshop nature of the meeting offers many networking opportunities.

Networking Opportunities

A key feature of AILU workshops are the opportunities they provide for networking and for discussing technical matters: a comfortable environment, generous lunch and refreshment breaks, and a small exhibition and, in this case, a tour of the Centre for Industrial Photonics. Delegates will be able to ask questions after presentations; and in general make contact, establish valuable links and share interests and concerns with others in the laser community.

About this workshop

Venue

The Hauser Forum is a new venue for AILU. Based on the Cambridge University West Site it is only 100 m walk from the Institute for Manufacturing.

Delegates

On the day delegates will receive a name badge, a list of delegates, essential notes for the day and a password for accessing the key presentation slides, which will be made available on the AILU website shortly after the end of the event. A buffet lunch (including vegetarian options) will also be provided together with refreshments throughout the day. Please advise us of any special dietary requirements.

Exhibitors

The exhibition will be held, together with lunch and refreshment breaks, in the Break Out Room, which is adjacent to seminar rooms where the presentations will be made. A maximum of eight tables (or 2 m wide spaces for pop-up stands) will be available. Exhibitors can access the Hauser building from 07:30 on the day. The allocation of tables is 'first come first served'.

Tables (160 x 80 cm) will be provided together with space for pop-up stands and there will be mains power available for low wattage use (e.g. for computers). Please let us know as soon as possible if you require significant power.

Registration

Delegates and exhibitors who are AILU members need only phone or email their names; otherwise a registration form should be completed.

AILU members and members of supporting organizations receive a registration discount. For delegates who pay the full price and who decide to join the Association within 10 weeks of the event this discount will be deducted from their first year's corporate membership subscription. Full information about membership can be found at www.ailu.org.uk, taking the 'about us' link.

Travel

Full address: Hauser Forum, 3 Charles Babbage Road, Cambridge CB3 0GT

Air: London Stansted is the nearest international airport to Cambridge, located 30 miles to the South of the city, with easy access by train (direct rail link to Cambridge), coach, or car (M11).

Rail: The venue is a 10 minute taxi drive from Cambridge railway station.

Car: The closest motorway junction is Jn 13 of the M11. For full directions see the event page on the AILU web site.

Download map for location of parking

Parking: We have reserved parking space close to the Hauser Forum, at the Roger Needham Building. A detailed map is available for download on the AILU web site showing the location. In addition, the Madingly Road Park and Ride car park on the outskirts of Cambridge is only 10 minutes walk away.

Accommodation

Details of accommodation with links to sites with full descriptions can be found on the AILU web site page for this event. These include the Cambridge University Campus, the nearest hotel (the Premier Inn Cambridge North (Girton), which is 1 mile away), the Travelodge Cambridge in Lolworth and plenty of bed and breakfast and hotel accommodation in and around the city.

Courtesy of Tec Systems

www.ailu.org.uk

the association of AILU laser users

Power beam delivery and manipulation

Essential technology for achieving high flexibility and productivity with lasers

Presentations, exhibition and tour

Tuesday 3rd December 2013

Hauser Forum, University of Cambridge

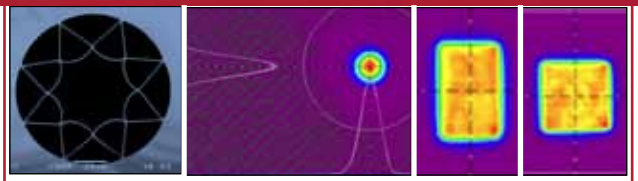
Supported by:

IOP Institute of Physics Quantum Electronics and Photonics Group

EPSRC Centre for Innovative Manufacturing in LASER-BASED PRODUCTION PROCESSES

Knowledge Transfer Network Electronics, Sensors, Photonics

Programme



Negative curvature fibre structure Courtesy of Heriot Watt University, and (purple background) Input (circular) and output (rectangular and square) output beam profiles Courtesy of PowerPhotonic

08:15 - 09:15 Registration and refreshments

09:15 - 10:30 **Session 1**

Welcome
Duncan Hand — Heriot-Watt University

Keynote
Fibres for flexible beam delivery in high power laser applications
Jon Shephard — Heriot-Watt University

High-power fibre optic cable with integrated active sensors
Magnus Pålsson — Optoskand AB, Sweden

Refractive beamshaping for high-power laser applications
Roy McBride — PowerPhotonic

10:30 - 11:00 Refreshment break

Remote welding Courtesy ERLAS

Multi-axis welding Courtesy Tec Systems

11:00 - 12:30 **Session 2**

Beam delivery and other considerations in robot controlled fibre laser workstations
Tony Jones — Tec Systems

Integrated process monitoring and back reflection protection in fibre laser beam delivery
Mark Greenwood — GSI Group

Changes in types of lasers available as well as turbine engine designs have resulted in new requirements for positional accuracy, speed and flexibility of the focused laser beam
Mark Barry — Prima Power Laserdyne, USA

Invited
High productivity in laser welding: using a scanner for remote welding in combination with fast workpiece handling and automated processing
Roland Dierken — ERLAS, Germany

12:30 - 13:40 Lunch & **EXHIBITION**

Programme

3D structured cylinders Courtesy of Schepers GmbH

13:40 - 15:10 **Session 3**

Keynote
High speed scanning of an ultra short pulsed laser for high throughput surface structuring
Beat Neuenschwander — Bern University of Applied Science, Switzerland

Invited
Surface structuring of printing tools and embossing dies with an ultrafast ps laser machining system
Stephan Brüning — Schepers GmbH & Co. KG, Germany

High precision 2D kinematic laser processing
James Hall — Tannlin

The use of snake-arm robotic manipulators for remote decommissioning applications
Paul Hilton — TWI

15:10 - 15:30 Refreshments

15:30 End of workshop

15:30 - 16:15 **TOUR**
Centre for Industrial Photonics
Institute for Manufacturing

TOUR: Centre for Industrial Photonics

The Centre for Industrial Photonics (CIP) is at the forefront in developing leading-edge laser based manufacturing process technologies including:-

- High efficiency laser sources
- Micro and Nanosystem laser fabrication methods
- Additive fabrication through supersonic laser deposition of metals
- On-line and in-process optical diagnostics and control
- Ultra-short pulse laser interactions
- Hybrid ion, plasma, and laser machining for ultra precision applications

SprayLaze - Supersonic laser deposition Courtesy CIP

The CIP addresses future manufacturing needs through strong partnerships with government, academia and industry. It is part of a global network of photonics-based research and education organisations that seek to deliver excellence in research, education, technology transfer and photonics-based manufacturing developments.

Registration

Power beam delivery and manipulation 3rd December 2013

Name: .....
Title & initials First name Surname

Job title: .....

Organisation: .....

Address: .....

Post Code: .....

Tel: ..... Fax: .....

E-mail: .....

Payment options

❏ Please invoice me

❏ I wish to pay in advance by:
1. Bank/Euro cheque in £ Sterling or EURO, payable to AILU
2. Visa/Mastercard (billing in GBP):
Name on Card

Number _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ Exp _ _/_ _
Please debit my account

Delegate/exhibitor options

❏ I wish to register as a delegate. The applicable rate is:
❏ £140.00 (= £168.00 incl. VAT)
I am a member of AILU and/or one the supporting organisations:
❏ Centre for Innovative Manufacturing in Laser-based Production Processes
❏ Institute of Physics

❏ £60.00 (= £72.00 incl. VAT)
I am unemployed or retired.

❏ £40.00 (= £ 48.00 incl. VAT)
I am a full time student.

❏ £160.00 (= £192.00 incl. VAT)

❏ I wish to register as an exhibitor. Please reserve me:
❏ Space only ❏ A table
The applicable rate is:
❏ GBP 140.00 (= £168.00 incl. VAT)
I am a member of AILU or one the supporting organisations ticked above.
❏ GBP 180.00 (= £216.00 incl. VAT)

❏ I wish to register as a delegate and exhibitor.
Please give me a £50 plus VAT discount on the total fee.

Signed: ..... Date: .....

Cancellations will be accepted up to 1 week before the event; otherwise the full fee may be charged.

Please return completed form to the AILU office:
FAX: +44 (0)1235 550499;
Mail: AILU, 100 Ock Street, Abingdon, Oxon OX14 5DH, UK

AILU reserves the right to alter the programme or cancel the meeting at short notice and accepts no responsibility for the views expressed by the speakers or delegates.