

About this workshop

Dramatic advances in photonics technology mean that today's industrial laser systems offer unparalleled capabilities in precision manufacturing and advanced materials processing at the micro and nano scale, thereby providing the flexibility and accuracy required to manufacture the products of tomorrow. Moreover, laser materials processing is a key technology for the mass-production of many components ranging from inkjet print heads and flat panel displays, to MEMS components and circuit fabrication. Rapid developments in laser materials processing are continually yielding new applications and processes. User industries from general engineering through to electronics, semiconductor and medical and solar – all benefit from the precision and power of the laser.

Whether driven by the quest for higher efficiency or from the desire for greater functionality from the same thermal and/or physical footprint of device; the solution is almost invariably to shrink the feature sizes. Laser-processing provides an increasingly cost-effective route to achieving the necessary micro and nano-features. Staying abreast of the developments in these enabling technologies is key to maintaining a competitive edge.

This annual workshop seeks to bring together industrial users of laser processing technology, suppliers of laser-based equipment, researchers in new laser technology and industrialists to review the latest innovations in micro and nano-scale laser processing and the opportunities that they create. This year's event is held at the Rutherford Appleton Laboratory which has been at the forefront for both laser development and applications for more than 30 years, and provides an opportunity of seeing some of the state-of-the-art work and facilities.

Mike Osborne Workshop Chair



Mike Osborne's early career was as a physicist, specializing in laser development. After working in the US on some of the first medical applications of excimer lasers, Mike returned to the UK to work in the laser group at AEA Technology, Culham. In 2000 he founded OpTek Systems, a company specialising in laser micromachining systems and services, and which now has facilities in UK, USA, China and Korea. OpTek was given the Queen's Award for export in 2011. Mike is Technical Director and Chairman.

Who should attend?

One of the key features of an AILU workshop is the opportunity it provides for delegates to meet with the presenters and with one another: a comfortable environment, generous lunch and refreshment breaks, and a table top exhibition. This particular event provides an opportunity to keep up to date with the latest developments in laser micro-manufacturing and to visit state-of-the-art facilities. Whether an expert or novice, an engineer, research scientist or a manufacturing manager, it presents a valuable learning and networking opportunity and a chance to generate new ideas and valuable contacts

Tour

Two tours are being offered for delegates to choose between:

Micronanics Ltd, a micro-processing laser job shop on the RAL site, solves manufacturing problems predominately using lasers; these have ranged from high power laser targets for RAL's Vulcan laser to miniature electrode arrays to measure the brain function of living insects. The tour will offer access to four of Micronanics' research labs, which include within them UV Excimer lasers and its latest 7 axis high precision tool for mask scanning.

The Central Laser Facility short pulse laser activities include many state-of-the-art features both in short pulse generation, amplification and beam control.

About this workshop

Venue

The workshop is being held at the STFC Rutherford Appleton Laboratory site near Didcot, Oxfordshire. Refreshments, lunch and the exhibition will be held on the RAL Visitor Centre. The presentations will be held in the Pickavance lecture theatre directly across the road.



Delegates

On arrival at the RAL site all delegates should report to the AILU desk at the RAL Reception building at the main gate. Those arriving by car (except exhibitors, see details below) should park in the (sign posted) overflow car park on the right of the road leading up to the RAL Reception building. The lecture theatre and RAL Visitor Centre are but a short walk from Reception.

You will receive a name badge and a delegate pack containing essential notes for the day, including a detailed programme and a delegate list. The pack will also include a name and password to use for downloading PDFs of the presentations, which will be made available on the AILU web site as soon as possible after the event.

A buffet lunch (including vegetarian options) will be provided together with refreshments throughout the day. Please advise us of any special dietary needs.

Exhibitors

The exhibition, together with lunch and mid-morning refreshment breaks, will take place in the RAL Visitor Centre. The exhibition will end at completion of the lunch break.

On arrival by car, park at the RAL Reception building at the main gate, obtain a parking permit and then drive through the gate. Temporary parking is available outside the RAL Visitor Centre for loading and unloading and there is a visitors' car park nearby where you can leave your car for the day. Access to the site is available from 08:00 on the day. You can bring your own display stand and backboard; however, you can opt to have a table and backboard provided. 240V mains power will be available.

Registration (delegates and exhibitors)

To register for the event please complete the registration form opposite or [register online at www.regonline.co.uk/07NovAILU](http://www.regonline.co.uk/07NovAILU). Alternatively, members of AILU and/or the micro-nano Special Interest Group need only give their name by phone or email (T: 01235 539595; E: events@ailu.org.uk).

AILU members and members of the Institute of Physics receive a registration discount for this event. Delegates who pay the full price and who decide to join the Association within 10 weeks of the event will receive this discount on their first year's corporate membership subscription. For further information on membership go to www.ailu.org.uk and look for the link to 'about us'.

Travel

Full address: Rutherford Appleton Laboratory, Didcot OX11 0QX.

Air: The nearest airport is Heathrow, 53 miles away.

Rail: The nearest railway station is Didcot Parkway, 10 minutes from the site by taxi.

Car: The site is close to the A34. For full directions by road visit the event page on the AILU web site.

Accommodation

Please see the AILU web site page for this event for a list of nearby hotels and guest houses.

Courtesy of Micronanics

Latest advances in laser processing for micro and nano-scale manufacturing

Presentations, exhibition & tour

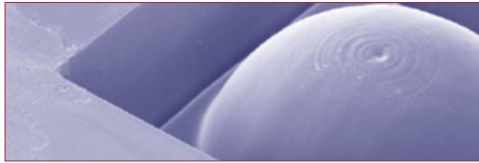
Wednesday 7 November 2012
STFC Rutherford Appleton Laboratory, Oxfordshire

Supported by:



IOP Institute of Physics

Programme



Micro-machined lens Courtesy Imperial College

08:15 - 09:00 Registration and refreshments

09:00 - 10:15 **Session 1**

Welcome

Mike Osborne Chair, Optek Systems

Current trends and UK strategy for laser micro-processing

Jack Gabzdyl Chair of the AILU Micro: Nano SIG

Keynote presentation

Laser nano fabrication in the manufacture of integrated circuits

Malcolm Gower Imperial College, London

Keynote presentation

Developments in ultrafast laser processing

Uwe Stute Laser Zentrum Hannover, Germany

10:15 - 10:45 Refreshment break & **EXHIBITION**

10:45 - 12:05 **Session 2**

Cutting of transparent hard and brittle materials with pico-second lasers

Oliver Heckl TRUMPF GmbH, Germany

Advances in ultrafast fiber laser technology and its application in precision materials processing

John Clowes Fianium

Scanning particle lens: micro/nano fabrication of periodic surface structures

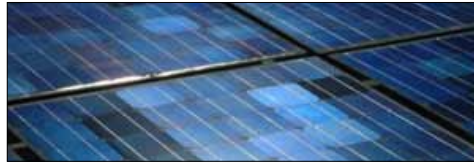
Lin Li University of Manchester

Effects of beam quality and optimisation of pulse parameters on deep engraving with fiber lasers

Paul Harrison SPI Lasers

12:05 - 13:05 Lunch & **EXHIBITION**

Front cover caption: A precision Tantalum insect next to a £1 coin manufactured using lasers by Micronanics Limited and assembled by the CLF Target Fabrication Group based at Rutherford Laboratory



Laser cut silicon PV array Courtesy: SPI Lasers

13:05 - 14:25 **Session 3**

Laser-based fabrication of micro-optics

Gideon Foster-Turner Optek Systems

Maskless selective laser patterning of PEDOT:PSS for organic electronic applications

Dimitris Karnakis Oxford Lasers

Pulsed UV laser micro-machining systems and applications

Paul Apte Micronanics and Rideo systems

Short pulsed laser developments at RAL

Ian Musgrave STFC Rutherford Appleton Laboratory



Part of the Vulcan 10 PW front end at RAL Courtesy STFC RAL

14:25 - 14:40 Refreshment break

14:40 - 15:40 **TOUR**

Delegates will be able to visit the Micronanics Laboratory or visit some of the short pulse laser developments within the Central Laser Facility (CLF); both on the RAL site.

15:40 End of workshop



Micronanics manufactured part



Astra-Gemini laser facility within the CLF

Registration:

Lasers for micro and nano manufacturing 7 November 2012

Name:
Title & initials First name Surname

Position:

Organisation:

Address:

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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:

Institute of Physics

£60.00 (= £72.00 incl. VAT) £40.00 (= £ 48.00 incl. VAT)
 I am unemployed or retired. I am a full time student.

£180.00 (= £216.00 incl. VAT)

I wish to register as an exhibitor. Please reserve me:

Space only A table A table and backboard

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 by FAX (+44 (0)1235 550499) or mail to AILU, 100 Ock Street, Abingdon, Oxon OX14 5DH, UK