

## About this workshop

The interest in composites has grown greatly over the past decade. Their unique properties offer increasingly important advantages in manufacturing; but cutting, drilling and other forms of material processing can present a major challenge. Lasers offer a unique solution; they are finding a growing number of industrial applications, and developments in both laser and material technologies have recently led to a further expansion in this area. This workshop provides a broad overview of the current status of both laser technology and composite types, with presentations from industrial users, researchers and laser manufacturers.

Specific themes include: laser processing of polymer composites within the aerospace industry; laser processing of metallic composite components; machining, cutting, drilling and texturing of carbon fibre composites; material addition and cladding of composites; current state of the art in lasers for composite processing.

### Janet Folkes Workshop Chair



Janet Folkes has a PhD in laser materials processing from Imperial College, London and has worked in the field of laser materials processing for more than 25 years in both academia and industry. Her interests have taken her worldwide including working for two years for in the Material Research Laboratories of Nissan Motor Company in Japan. She currently lectures in Manufacturing Engineering at the University of Nottingham and her present research interests include laser processing and waterjet machining applications.

### An Opportunity

One of the key features of an AILU workshop is the opportunity it provides for networking and for discussing technical matters: a comfortable environment, generous lunch and refreshment breaks, an exhibition and a clinic. The Clinic provides a quiet area for prearranged meetings; ideal for delegates to meet speakers to discuss particular issues that they would prefer to raise in confidence.

### Who should attend?

The workshop is valuable to anyone with an interest in laser material processing who wants to understand where this technology sits in relation to composite materials. The wide scope of this event means that there is something for everyone in the laser user and supplier community, from beginners to experts. Manufacturers and industrialists, supply companies, laser users, laser source manufacturers and suppliers, laser-based engineering subcontractors and machine integrators - all will benefit from gaining a greater appreciation of the current state of play and the resultant opportunities for applying this technology within their sector. The workshop nature of the meeting offers many opportunities for delegates to discover the interests and concerns of others in the laser composite-processing community and to establish valuable links.

This workshop also provides an ideal opportunity to visit the AMRC Composite Centre (previously the Composites and Advanced Materials and Technology Centre, CAMTeC) - a rapidly developing world class centre of excellence focusing on the development of composites. The Centre was formed in 2006 following a successful £4.5 million bid by the University of Sheffield and aerospace giant, Boeing, to clinch a deal with regional development agency Yorkshire Forward. It provides a research, design, manufacturing and technology transfer centre for composites developed for general manufacturing and aerospace applications.



### Venue

The workshop will take place in the Rolls-Royce Factory of the Future within the Advanced Manufacturing Research Centre (AMRC) with Boeing.



The Rolls-Royce Factory of the Future with its twin turbine towers

The AMRC is a collaboration between world-leaders in the aerospace supply chain, key government offices and international academic institutions. Delegates will get to see the AMRC's state-of-the-art facilities.

### Delegates

On the day the delegates will receive a name badge, essential notes for the day, together with a CD of key slides or presentation notes. A buffet lunch (including vegetarian options) will also 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 and afternoon refreshment breaks, will take place adjacent to the Rolls-Royce Factory of the Future room where the presentations will be held.

Space for pop-up stands and small tables will be provided. The area will be open from 07.30 on the day for exhibitors wishing to set up their stands before registration.

### 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 organisations for this event receive a registration discount. 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. Further information on membership can be found at [www.ailu.org.uk](http://www.ailu.org.uk), taking the link to 'about us'.

### Clinic

A selection of experts will be available for one-to-one technical and/or commercial discussions over most of the lunch period. Places can be reserved upon arrival or pre-booked at the AILU office.

### Travel

Full address: AMRC with Boeing, Advanced Manufacturing Park, Wallis Way, Rotherham S60 5TZ

The nearest railway station is Sheffield Midland, from which the AMRC is a short taxi ride. By car, the AMRC is close to Junction 33 of the M1 motorway. Links to directions and maps can be found on the AILU web site event page.

### Accommodation

The closest hotel to the AMRC is the recently opened Aston Hotel (S60 5BD, T: 0114 2615690). Alternatively there is the Hilton Sheffield (S4 7YA; T: 0114 2525500), Holiday Inn (S4 7YE; T: 0114 252 6511) and many other hotels in nearby Sheffield.

[www.ailu.org.uk](http://www.ailu.org.uk)

the association of  
**AILU**  
laser users

Courtesy of GSI Group

# Laser processing of polymer, metal and ceramic composites

## Presentations, exhibition & clinic

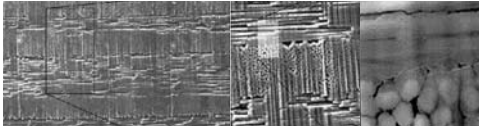
**Wednesday 3 December 2008**

Advanced Materials & Technology Centre,  
Rotherham

### Supported by:



## Programme



Laser cut carbon fibre panel Courtesy of Engineered Capabilities

08:30 - 09:15 **Registration and refreshments**

09:15 - 10:35 **Session 1**

### Welcome and introduction

Janet Folkes University of Nottingham

### Overview:

#### When two worlds collide

Neil Calder Engineered Capabilities

### Context:

#### Laser processing of polymer composites

Jagjit Sidhu BAE SYSTEMS

#### The potential for laser processing of metallic composites

Stephen Kyle-Henney TISICS



Courtesy TISICS

10:35 - 11:00 **Refreshment break**

11:00 - 12:40 **Session 2**

### Material interactions:

#### Laser hole drilling and texturing (for joining) of composites

Paul French John Moores University

#### Shaping aligned fibre composites – the Perform micro-perforation process

Roger Ford Integrated Materials Technology

#### Near field imaging for sub-wavelength processing

Lin Li University of Manchester

#### Laser cutting of uncured carbon fibre tapes

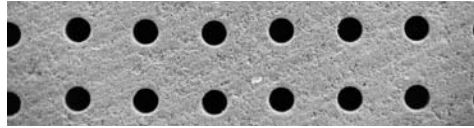
Antony Dodworth Bentley Motors

#### Material addition in composites manufacturing

Stephen Crownworth EOS

12:40 - 13:55 **Lunch & EXHIBITION**

13:10 - 13:40 **Clinic**



Percussion drilled 120µm holes in 1mm carbon fibre Courtesy GSI

13:55 - 14:55 **Session 3**

### Laser considerations:

#### Laser cutting of composites and ceramics

Mo Naeem GSI Lumonics

#### UV-laser capabilities for composite processing

Peter Blatt Coherent

15:00 - 16:00 **TOUR**

## TOUR: Rolls-Royce Factory of the Future

**The Advanced Manufacturing Research Centre (AMRC) with Boeing** is a £60M partnership which builds on the shared scientific excellence, expertise and technological innovation of the world's leading aerospace company and the world-class research within The University of Sheffield's Faculty of Engineering.

The AMRC's vision is to become a world-class global research facility developing innovative and advanced technology solutions for advanced materials forming. The University, Boeing and the AMRC are also keen to now build upon their internationally acknowledged research into other materials such as composites. Novel and new materials will form an integral part within the development of Boeing's new generation planes.

The AMRC has access to the latest machines, tools, and software available. Its capabilities are fully committed to applying traditional and experimental scientific principles for solving manufacturing challenges.

**The Rolls-Royce Factory of the Future** is part of the second phase of development of the Advanced Manufacturing Research Centre with Boeing (AMRC).

It houses the latest manufacturing equipment and production capabilities to enable businesses to trial new developments on a full-scale commercial production capacity, before making significant and high-risk investment decisions.

Information Communications Technology (ICT) and 'virtual' manufacturing are key components of the new facility, as are alternative manufacturing methods, such as additive manufacturing processes which grow 3-dimensional parts - considerably reducing material waste and increasing design flexibility.

The building is 4,200m<sup>2</sup> and distinctive in its architecture. It has been designed as a national exemplar of 'sustainable' – or environmentally friendly - building development.

The facility has stimulated significant interest from regional companies in the aerospace, automotive and medical sectors as it builds up an international reputation for manufacturing excellence.

Delegates will get to see these state-of-the-art facilities including the first carbon neutral manufacturing process.



Courtesy Ian Spooner

## Registration Form

Laser processing of polymer, metal and ceramic composites  
3 December 2008

### Delegate information

Title First name Surname

Position: .....

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

- I wish to register as a delegate. The applicable rate is:
- GBP 142.00 (= £166.85 incl. VAT)  
I am a member of AILU and/or one of the supporting organisations:
- Photonics KTN  Materials KTN  AMRC
- GBP 65.00 incl. VAT I am unemployed or retired.  GBP 40.00 incl. VAT I am a full time student.
- GBP 175.00 (= £205.63 incl. VAT)
- I wish to register as an exhibitor. Please reserve me a table. The applicable rate is:
- GBP 135.00 (= £158.63 incl. VAT)  
I am a member of AILU or one of the supporting organisations ticked above.
- GBP 175.00 (= £205.63 incl. VAT)
- I wish to register as a delegate and exhibitor. Please give me a GBP 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.

**Complete the form and return by fax or post.**  
**AILU, 100 Ock St, Abingdon, Oxon OX14 5DH UK.**  
**Fax: +44 (0)1235 550499**