Courtesy Material Solutions

The UK has a thriving community in Additive Manufacturing (AM) and this event will provide an insight into current developments and their future impact.

AM potentially offers large improvements in performance through enhanced design capability, with reduced cost and material consumption. AM remains a hot topic, with sectors such as Aerospace and Medical leading the way. The AM approach exploits a variety of techniques to add material, usually layer-by-layer, many of which are based around laser technology.

This event will address the current state-of-the-art in AM. It highlights case studies of success and the current technical barriers and other restrictions to successful commercialisation. The exploitation of AM requires a broad skills base spanning materials, material testing and processing knowledge, design, CAD and mechanical engineering. It is the intention of this event to at least touch upon all of these topics. Although laser AM will be the focus, the competition of energy sources such as electron beams and arc-based equipment will also be covered.

For this event we have brought together academic specialists and researchers in many disciplines with commercial users in laser and non-laser AM technologies to present their current views of the topic and present their latest work. The day will include lots of opportunities for discussion and questioning. Delegates will be able to assess the different processes, latest developments in commercially available systems, the products and applications for which AM can be exploited and the potential benefits of AM technology to their organisation in addressing today's manufacturing challenges.

A particular highlight of the day will be the opportunity for delegates to take a tour of the new and highly impressive Manufacturing Technology Centre.

**Rob Scudamore** Workshop Chair

Rob Scudamore is manager of the Electron Beam, Friction and Laser Processes Group at TWI and has recently been appointed as an Associate Director. He has been heavily involved with lasers for many years, especially laser welding and deposition. This has included Laser Metal Deposition (LMD) and Selective Laser Melting (SLM) of various metals, including high temperature materials, for repair and original build.

## Who should attend?

One of the key features of AILU workshops 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.

Delegates to this workshop will include industry specialists, current and potential users and researchers in additive manufacturing and attendance will be valuable to anyone with an interest in material processing, especially:

- Engineers and managers
  from manufacturing industry looking to enhance production capabilities or simply to keep abreast of the latest developments.
- Job shop owners
  looking for new technology pathways and new opportunities in small batch manufacturing runs for the engineering sector.
- Researchers
  in materials and in laser materials processing.

About this workshop

## Venue

The Manufacturing Technology Centre (MTC) represents one of the largest public sector investments in UK manufacturing. An initial £40 million has been committed to fund the construction of the 12,000m$^2$ facility and procure equipment and machinery to take research and development in manufacturing processes on to the next level.

The MTC represents a unique collaboration between the University of Birmingham, University of Nottingham, Loughborough University and TWI Ltd. Industrial members of the MTC include Rolls-Royce, Airbus, Aero Engine Controls, Hewlett-Packard, DMG, MTI, NPL, Arcam, Delfoi, Gudel, Vibrant NDT, ABB, Destaco, Gom and Group Rhodes.

## Delegates

On arrival you will receive a delegate pack containing a name badge and essential notes for the day, including a detailed programme and a delegate list. The pack will also include a name and password 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, refreshment and lunch breaks will all take place in The Street, a wide ground floor corridor adjacent to the seminar room. There are spaces for 10 exhibition tables, each 1.8 m long. Exhibitors can bring their own backdrop but the 1.8 m limit will be strictly applied. Tables (~1.8 x 0.75 m) can be hired if booked at least 1 week in advance. Most spaces have 240V mains power.

Access to the building is from 07:30 on the day. All exhibition material must to be brought in through the main entrance,

## Registration

To register for the event AILU members need only give their name by phone or email (courses@ailu.org.uk). Non members should complete the registration form attached and post/fax it to the AILU office.

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. For further information on membership go to www.ailu.org.uk and look for the link to 'about us'.

The AILU desk will be available throughout the day to arrange informal introductions with appropriate experts at the workshop, for discussions on any technical or business matters that delegates would like to raise.

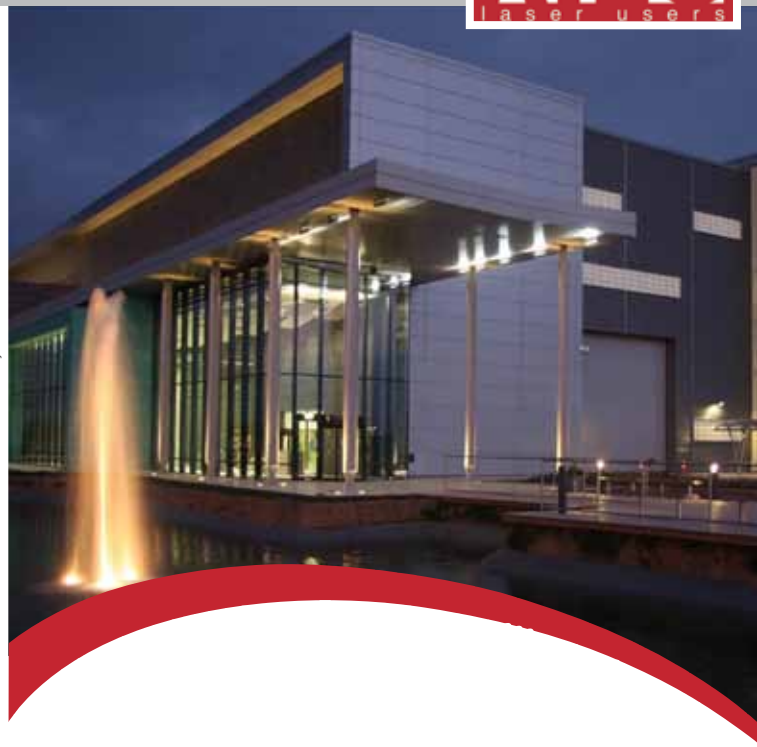
## Travel

**Air**: Birmingham and Coventry international airports are 16 and 7 miles away, respectively.
**Rail**: Coventry mainline station is 5 miles away. The Ansty Park x30 bus departs from the train station.
**Car:** The venue is close to junction 2 of the M6 and the end of the M69 motorway. Set Sat Nav systems by GPS coordinates: 52.432886, -1.413288. At entrance of car park press the intercom to raise the barrier. For full directions by road visit the event page on the AILU web site or www.the-mtc.org/.

## Accommodation

There are lots of hotels in Coventry and near the M6 junction 2, including the Holiday Inn (0871 423 4917) and Premier Inn Coventry (0871 5278266). See link to hotel listing on the event page on the AILU web site.





Courtesy of MTC

# Lasers lead the way in additive manufacturing

## Presentations, exhibition & tour

**Thursday 29 March 2012**

## Manufacturing Technology Centre

Pilot Way, Ansty Business Park, Coventry

**Supported by:**

Knowledge Transfer Network — Electronics, Sensors, Photonics

Knowledge Transfer Network — Materials

AMA ADDITIVE MANUFACTURING ASSOCIATION

The Additive Manufacturing Association was established in 1992 to promote the effective use of AM and associated technologies in product development and manufacturing. For more information see http://additivemanufacturing.org/

## Programme

Metal deposition by laser Courtesy Trumpf

08:15 - 09:00 Registration and refreshments

09:00 - 10:20 **Session 1**

**Welcome**
Rob Scudamore Chair, TWI

### Keynote presentation

**Multifunctional Additive Manufacturing**
Richard Hague Loughborough University

**Bionic designs in SLS - A current effort to design a product and its quality**
Steve Rommel Fraunhofer IPA, Germany

**Laser Additive Manufacture: A view on applications**
Emma Ashcroft TWI

**Cost effective & efficient remanufacturing**
David Wimpenny Manufacturing Technology Centre

10:40 - 11:10 Refreshment break and exhibition

11:10 - 13:00 **Session 2**

### Keynote presentation

**Challenges & potential for achieving widespread adoption of Additive Manufacturing in aerospace**
Jonathan Meyer EADS

**Powder bed power source - Laser or electron beam?**
Jeff Allen Rolls-Royce

**Additive Manufacture: From lab to production**
Iain Todd University of Sheffield

**Towards Additive Manufacture of functionally graded metal matrix ceramic composites**
Adam Clare Nottingham University

**LMD with disk- and diode lasers**
Jürgen Metzger Trumpf GmbH, Germany

13:00 - 14:00 Lunch & **EXHIBITION**

Micro laser sintering Courtesy EOS

14:00 - 15:30 **Session 3**

**A Renishaw perspective on additive manufacturing**
Stephen Crownshaw Renishaw

**Laser Sintering - current status and it's place in sustainable manufacturing**
Stuart Jackson Electro Optical Systems (EOS)

**Quality and precision in Additive Manufacturing**
Hadi Zarringhalam Material Solutions

**Lightweight and complex part design for Additive Manufacturing**
Phil Kilburn 3T RPD

15:30 - 16:10 **Tour of the MTC**

MTC specialises in a range of manufacturing processes that are particularly important to the High Value Manufacturing sector: net shape manufacturing; intelligent automation; advanced tooling and fixturing; high integrity electronics manufacturing; computerised engineering (modelling and simulation) and high integrity fabrication. Faculties already in place include:

Net Shape Manufacturing
The RECLAIM project, a UK collaborative project supported by the Technology Strategy Board, offers a new approach to the remanufacturing of high-value engineering components.

The RECLAIM machine is possibly the world's first combined laser cladding, machining and inspection unit for the remanufacture of high value parts.

NDT & Metrology
State-of-the-art equipment includes an automated ultrasonic immersion and eddy current inspection rig.

High Integrity Fabrication
The 125 and 300 tonne rotary friction welding machines are capable of joining dissimilar high strength alloys with improved consistency and high product quality and performance.

## Delegate registration

**Lasers lead the way in Additive Manufacturing 29/3/2012**

Name:
Title & initials 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, 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:
❏ GBP 160.00 (= £192.00 incl. VAT)
I am a member of AILU and/or one of the supporting organisations:
❏ Additive Manufacturing Association ❏ ESP KTN ❏ Materials KTN

❏ GBP 70.00 incl. VAT
I am unemployed or retired.

❏ GBP 45.00 incl. VAT
I am a full time student.

❏ GBP 200.00 (= £240:00 incl. VAT)

❏ I wish to register as an exhibitor. Please reserve me:
❏ Space (≤ 1.8m width) ❏ A table (~ 1.8 x 0.75 m)
❏ 240 V power

The applicable rate is:

❏ GBP 155.00 (= £186.00 incl. VAT)
I am a member of AILU or one the supporting organisations ticked above.

❏ GBP 195.00 (= £234:00 incl. VAT)

❏ I have registered above as both a delegate and an 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**