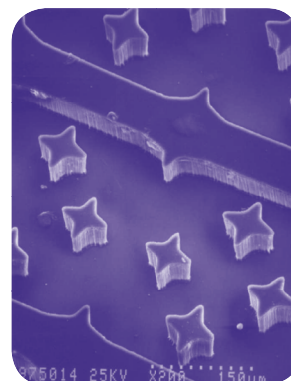
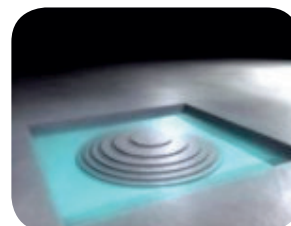
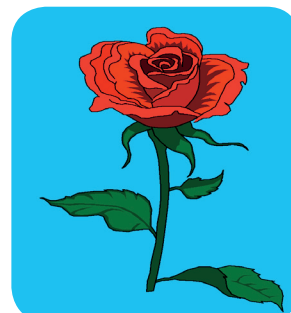


Scottish Manufacturing Institute Conference

26th and 27th June 2007

Programme

Scottish
Manufacturing
Institute



Tuesday 26th June 2007

19.30 RECEPTION

20.00 DINNER

Wednesday 27th June 2007

08.45 REGISTRATION AND COFFEE

09.25 WELCOME

09.30 Can We Measure What We See? Visual Appearance –
A Framework for Measurement
Dr Michael Pointer (Visiting Professor, University of Leeds)

10.15 Laser Micro-machining in Production
Dr Phil Rumsby (Oerlikon Exitech Optics UK Ltd)

11.00 COFFEE

11.20 Microfluidic Modelling for MEMS
Dr. Robert Barber (Daresbury Laboratory, Warrington, uk)

12.05 "Researcher stand-up": A quick-fire summary of SMI
projects

12.40 LUNCH AND POSTER SESSION

SMI RESEARCH HIGHLIGHTS

14.00 Lights, Cameras, Textures
Prof Mike Chantler (Scottish Manufacturing Institute)

14.30 A New Production Technology for Micro-optics
Prof Howard Baker (Scottish Manufacturing Institute)

15.00 Swell, Depose and Attract: Industrial outputs of
MEMS-SMI Projects
Prof Marc Desmulliez (Scottish Manufacturing Institute)

15.30 LABORATORY VISITS

16.30 END



Dr Michael R Pointer
(Visiting Professor, University
of Leeds)

Can We Measure What We See? Visual Appearance – A Framework for Measurement

This presentation will discuss the components of a framework on which a set of measurements could be made to provide correlates of visual appearance: colour, gloss, translucency and surface texture. It will be shown that the interactions between the various components of the framework are complex, that physical parameters relating to objects are influenced, at the perception stage, by the physiological response of the human visual system and, in addition by the psychological aspects of human learning, pattern, culture and tradition.

Biography

Dr Pointer received his PhD from Imperial College, London and then worked in the Research Division of Kodak Limited on fundamental issues of colour science applied to the photographic system. After a period working at the National Physical Laboratory, he is now a Visiting Professor at the University of Leeds as well as working for a number of companies as a consultant scientist. He has authored over 70 scientific papers, is a Fellow of The Royal Photographic Society and the Institute of Physics, and an Associate Director of the International Commission on Illumination (CIE).



Dr Phil Rumsby (Business
Development Manager, Oerlikon
Exitech Optics Ltd)

Laser Micro-machining in production

Lasers are now widely used for production micro-machining operations in many important Industries. This has come about due to 2 major activities - laser manufacturers introducing robust, long lifetime, high power, pulsed lasers covering a wide range of wavelengths and pulse-lengths and laser tool manufacturers building novel, efficient, beam delivery and part motion control systems. Some key recent improvements in laser beam conditioning and delivery and advances in substrate and beam motion are discussed together with examples of important new Industrial micro-machining processes that have been enabled by these developments.

Biography

After receiving a BSc degree in Physics from Birmingham, Dr Rumsby moved to Oxford and gained his D.Phil working in the area of experimental plasma physics. He has been working with lasers and industrial applications of lasers for almost 40 years. Initially he worked with ultra high power lasers for scientific research activities at the UK Atomic Energy Authority and the Rutherford Appleton Lab. At the latter organisation he was Deputy Head of the Laser Division and Head of the High Power Laser Group, supervising development and scientific use of the VULCAN high power laser facility. He founded Exitech (with Malcolm Gower) in 1984 and concentrated on the development of novel industrial laser micromachining applications and the design and manufacture of advanced industrial laser micro-machining tools. He is now Business Development Manager for Oerlikon Optics UK Ltd. He has published over 50 papers and filed over 10 patents dealing with novel optical systems for laser micromachining and with new laser manufacturing methods.



Dr Robert Barber (Associate
Director of C3M, Daresbury
Laboratory, Warrington, UK)

Microfluidic Modelling for MEMS

Microfluidic modelling can play an important role in the design of MNT-based products, from initial proof-of-principle studies through to device optimisation and packaging considerations. However, the emergence of MNT-based products has resulted in the growing realisation that the fluid flow in such small-scale devices is not necessarily the same as that experienced in the macroscopic world. The presentation will provide an overview of current microfluidic modelling techniques and their application to MNT-based devices. A number of case studies will be presented highlighting situations where conventional (macroscale) modelling provides a reasonable description of the flow alongside other studies where non-equilibrium and surface phenomena begin to have an adverse effect on the flow predictions.

Biography

Dr Barber is the Associate Director of C3M, the Centre for Microfluidics and Microsystems Modelling at STFC Daresbury Laboratory in Warrington, UK. He received his Ph.D. in Computational Fluid Dynamics in 1990 and spent 10 years as a Lecturer in Engineering Fluid Mechanics at the University of Salford before joining Daresbury Laboratory in 2000. He specialises in low Reynolds number hydrodynamics and the numerical modelling of non-equilibrium gas-phase flows in MEMS. His research activities also include the simulation of micro-reactors and rapid mixing devices for high-throughput life-science applications, air-segmented and capillary-driven liquid handling systems, electroosmotic/electrophoretic systems and ultrasonic particle separation devices.



Prof Mike Chantler (SMI)

Lights, Cameras, Textures

Visual texture subliminally permeates our decisions to purchase or not to purchase all commodity items – from mobile phones through to automobiles. We often use it to gauge quality, wearability, longevity, 'street cred.' and other perceived characteristics critical our buying decisions. Yet there are currently no commercially effective ways to digitally manage these surface textures.

Mike Chantler will present recent SMI research that is providing answers to some of these problems. These technologies enable standard hardware such as digital SLR cameras, document scanners, studio flash equipment, and Vista level graphics hardware to be combined to provide novel low-cost methods for capturing, measuring, searching, and visualising three-dimensional surface textures for use in desktop, internet and company intranet environments – promising a revolution in the way in which we manage these resources.

Biography

Mike Chantler received his PhD in three-dimensional texture analysis in 1994. He has over sixteen year's experience of working with surface textures and he established Heriot-Watt's Texture laboratory in 1996. He has attracted over £2 million of EPSRC and European funding and has published over 100 papers on texture. He is an Electrical Engineer by training and worked for six years in software engineering (having formed a small graphics/software firm in the eighties) He and his team have recently formed the award winning spinout TotallyTextures Ltd.



Prof Howard Baker (SMI)

A New Production Technology for custom Micro-optics

Diode lasers are now the most common primary source of laser radiation for industrial applications, used directly, or as a pump source for fibre and solid-state lasers with up to 12 kW power. The extensive micro-optic component requirements for this laser sector have driven the development of a new production process for custom manufacture at Heriot-Watt University, using ultra-precision laser micro machining followed by a selective laser smoothing process. The talk will cover the technical challenges of the process and show how the custom corrective micro-optics have resulted in an increase in brightness of up to a factor of ten for industry-standard, high power diode lasers. Applications of the technique to the latest generation of diode laser emitters will be featured.

Biography

(Professor of Power Photonics, Heriot-Watt University; Technical Director, PowerPhotonic Ltd). Howard Baker has specialised in the engineering issues of high power industrial lasers for most of his career, which started in 1973 with a PhD in metal vapour lasers at Manchester University. Since joining HWU in 1987, he has developed the planar waveguide lasers that are now the predominant technology for sealed-off CO₂ lasers in industrial use. Since the mid-nineties, he has specialised in the development of diode lasers for direct industrial applications, and in extending the planar waveguide technique to solid-state lasers. Currently, the enhancement of diode lasers by corrective optics is a major research interest, also the development of photonic devices using ceramics technology.



Prof Marc Desmulliez (SMI)

Swell, Depose and Attract: Industrial outputs of MEMS-SMI Projects

For the various projects that have been carried out in the MEMS theme of the SMI, Marc Desmulliez will emphasize the research outputs that are particularly relevant to industry. For example, in the field of DC-DC power conversion, the highest output power efficiency and density in the world was achieved using the LIGA process in the case of a microengineered converter. A novel technique, called electrostatic lithography, has also been created which allows the patterning of polymeric features without the need of a mask. Advances in pulse reverse electroplating has also permitted the manufacturing of magnetic alloys suitable for high frequency applications. Finally, laser assisted direct writing of metal lines onto polyimide has been achieved without the need of water, permitting thereby the patterning onto 3D surfaces.

Biography

Marc Desmulliez graduated from the French Grande Ecole Supélec (Paris) in 1987. After two MSc in Modern Optics and Microwave (U.C.L.) and Theoretical Physics (Cambridge), he obtained his Ph.D. in Optoelectronics at Heriot-Watt University in 1995. Marc Desmulliez has directed the MIMicroSystems Engineering Centre since 2000. The Centre, specialising in MEMS and Microwave Engineering, has currently 7 academic members of staff and over 30 PhDs and Research Associates. Research interests include MEMS, advanced packaging and integration. Marc Desmulliez has over 150 publications in these fields of research.