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CAMBRIDGE SOCIETY FOR THE APPLICATION and APPRECIATION  
of RESEARCH

## ENGINEERING WITH LIGHT

### The industrial application of high-powered lasers.

Professor Bill Steen

Emeritus Professor of the University of Liverpool

Distinguished Research Fellow of the University of Cambridge, Metallurgy and Material Science Department

*Monday, 21<sup>st</sup> February 2005; 7.30 - 9.00 p.m.*

*The Wolfson Lecture Theatre, Churchill College, Cambridge*

**Chair and Vote of Thanks:**

To be confirmed

#### Professor Steen writes:

The invention of the laser in 1960 gave the world a new form of industrial energy. On all previous occasions when a new form of energy has been mastered it has led to a significant change in our quality of life. The same is expected to happen for optical energy. Optical energy is however the most flexible form of energy we have ever known. Whereas we have spent the last century exploring the applications of electricity with astounding results we are surely destined to spend the next hundred years exploring the applications of optical energy. It has already generated some extraordinary results ranging from medical breakthroughs to explosions in communication capacity and many domestic joys such as CD players, laser printers and much else.

In this talk I wish to present some of the many industrial processes that have developed from the application of high powered lasers (>100W or so). These include non contact cutting, welding, surface cladding, weld build techniques, casting without moulds, marking, bending, cleaning of art works or electronic circuits and optical shot peening.

The story has just begun and with the advent of ultra short pulses capable of cutting without heating by generating solid state plasmas one might wonder where it will end – if ever. However this is an area of science rapidly developing with large investments in equipment but little in training. This is an issue Universities need to address.

#### About the speaker:

Professor Bill Steen was the James Bibby Professor of Engineering Manufacture at the University of Liverpool, Department of Engineering from 1988 until his retirement in 1998. He remains an Emeritus Professor. He is also a Distinguished Research Fellow of our Department of Metals and Material Science here in Cambridge.

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He has been active in laser material processing since 1968, when he started the world's first university-based laser material processing group at Imperial College. While at Liverpool he ran the largest university based research group in the U.K. on the subject of laser material processing.

Professor Steen was until recently the President and co-founder of the Association of Industrial Laser Users (AILU) in the United Kingdom, established in 1995. The Laser Institute of America presented him with the Arthur L. Schawlow award in 1996 for his services to laser engineering (the first European to so be honoured).

### **The CSAAR Organising Secretary adds.....**

Well, there's nothing like going right up to the line; in my attempts to fill the gap in our programme for 21<sup>st</sup> February, I have managed to recruit several excellent speakers – but for next year!

Nowadays, people book up their commitments literally years in advance, which leaves no scope for last-minute engagements.

So for next year I hope to have talks on early warning systems for Tsunamis; silent aircraft (yes, really!); plastic electronics; holographic projectors (pocket-sized, of course) to name but a few.

Professor Steen has very kindly to give us a lecture on the use of high-power lasers in engineering, a topic which has always seemed a black art to me! I use laser-cut metals and other materials quite often in my work, and I never cease to be amazed by the elegance and precision of the finish. Not even slightly what I would expect.

Professor Steen is a regular attendee at our lectures, and very generously responded to my cry for help, which I broadcast to our members that use email. Please do come along and make it worth his while!

### **Housekeeping:**

The final lecture of this Term will be on Asperger's Syndrome. The speaker is a world expert on the subject, Professor Simon Baron-Cohen, Director of the Autism Research Centre here in Cambridge.

Starting with Professor Baron-Cohen's lecture, we shall charge **non-members** a nominal sum of £2.50 each for admission. I shall have a list of all our *paid up* CSAAR members to tick you all off as you enter, so you don't need to worry! Member's guests, spouses etc will also be given free entry

Next year, we'll introduce a two-tier membership system; individual membership, and joint/family membership. The latter will, for a small extra charge, enable people to bring along the wife, husband, partner, kids, servants and camp followers as well. Bargain!

The reason for the change is to recognise the fact that our fee-paying members are a very important part of both our audience and also our finances; and that, at present, they really subsidise the lectures for those non-members who simply turn up on the day. We are an unashamedly minimalist society, existing on a budget of around £5k/year, so any losses or missed income are potentially damaging to us. Time to set matters right!

**Coffee and biscuits available, as usual, in the foyer from ~7.00 p.m.**

Best

Richard Freeman

*CSAR Organising Secretary*