# CSAR

c/o Scientific Generics Limited
Harston Mill
Harston
Cambridge CB2 5GG
Telephone: +44 (0) 1223 875200
Facsimile: +44 (0) 1223 875201
(Organising Secretary's Home Number: 01799 525 948)
email: richard.freeman@genericsgroup.com
CAMBRIDGE SOCIETY FOR THE APPLICATION OF RESEARCH

# 'After silicon – *plastic?*'

Plastic Electronics

**Professor Sir Richard FRIEND**
Cavendish Professor of Physics, University of Cambridge

Monday, 10th May 2004 **7.*30 p.m. - 9.00 p.m.***
*The Wolfson Lecture Theatre, Churchill College, Cambridge*

**Chair:** to be advised
**Vote of Thanks:** to be advised

**Professor Sir Richard Friend writes:**

**Plastic Electronics**

Plastics (or, more correctly, polymers), are traditionally used within the electronics industry as passive materials, for encapsulation or for their electrically-insulating properties. However, there is now a class of polymers which can behave as semiconductors or as metals. Our understanding of the semiconductor physics of these materials has enabled us to use them as the active components in a range of devices. Polymer light-emitting diodes, LEDs, show particular promise, providing full colour range and high efficiency.

The electronic behaviour of these polymers is very different from inorganic semiconductors such as silicon or gallium arsenide. Polymer electronic devices require different strategies to make them useful. In some respects, these strategies resemble those already adopted by biology, for example in photosynthesis, and examples will be shown where the interfaces control charge separation (in solar cells) or combination ( in LEDs).

The real challenge for a new material lies in its manufacturability, so much of the current excitement with polymers is because they can be directly printed from solution in what amounts to a plastic electronic minifab. Full colour LED displays can be fabricated by using ink-jet printing to deposit patterns. Sub-micron geometry polymer transistors and circuits can be printed directly and the speaker will also describe the use of such circuits for active-matrix display backplanes.

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**About the speaker:**

**Professor Sir Richard Friend, FRS, FREng** has been on the Faculty in the Department of Physics, University of Cambridge, since 1980, where he is the Cavendish Professor of Physics. Professor Friend has pioneered the study of organic polymers as semiconductors, and has demonstrated that these materials can be used in wide range of semiconductor devices, including light-emitting diodes, transistors and photocells. He has been very active in the process of technology transfer of this research to development for products. He co-founded Cambridge Display Technology Ltd in 1994, where he is currently Chief Scientist.

Light-emitting polymer displays developed by Cambridge Display Technology are now being manufactured under licence and are now used in a number of consumer products. He co-founded Plastic Logic Ltd in 2000 to develop directly-printed polymer transistor circuits, and holds the posts of Director and Chief Scientist

**Organising Secretary's Notes:**

Cambridge Display Technology is the product of a discovery made at the Cavendish by Richard Friend back in 1989. David Fyfe, their CEO, gave us an excellent talk on the technology a couple of years ago. David is a member of the CSAR Council.

This is an opportunity to learn some more about the astonishing properties of these light-emitting organic polymers. It is also an excellent example of how a discovery made in the University is being commercialised.

http://www.britainusa.com/science/other_show.asp?SarticleType=2&other_ID=550
http://www.iee.org/events/kelvin.cfm

Best

Richard Freeman
*CSAR Organising Secretary*