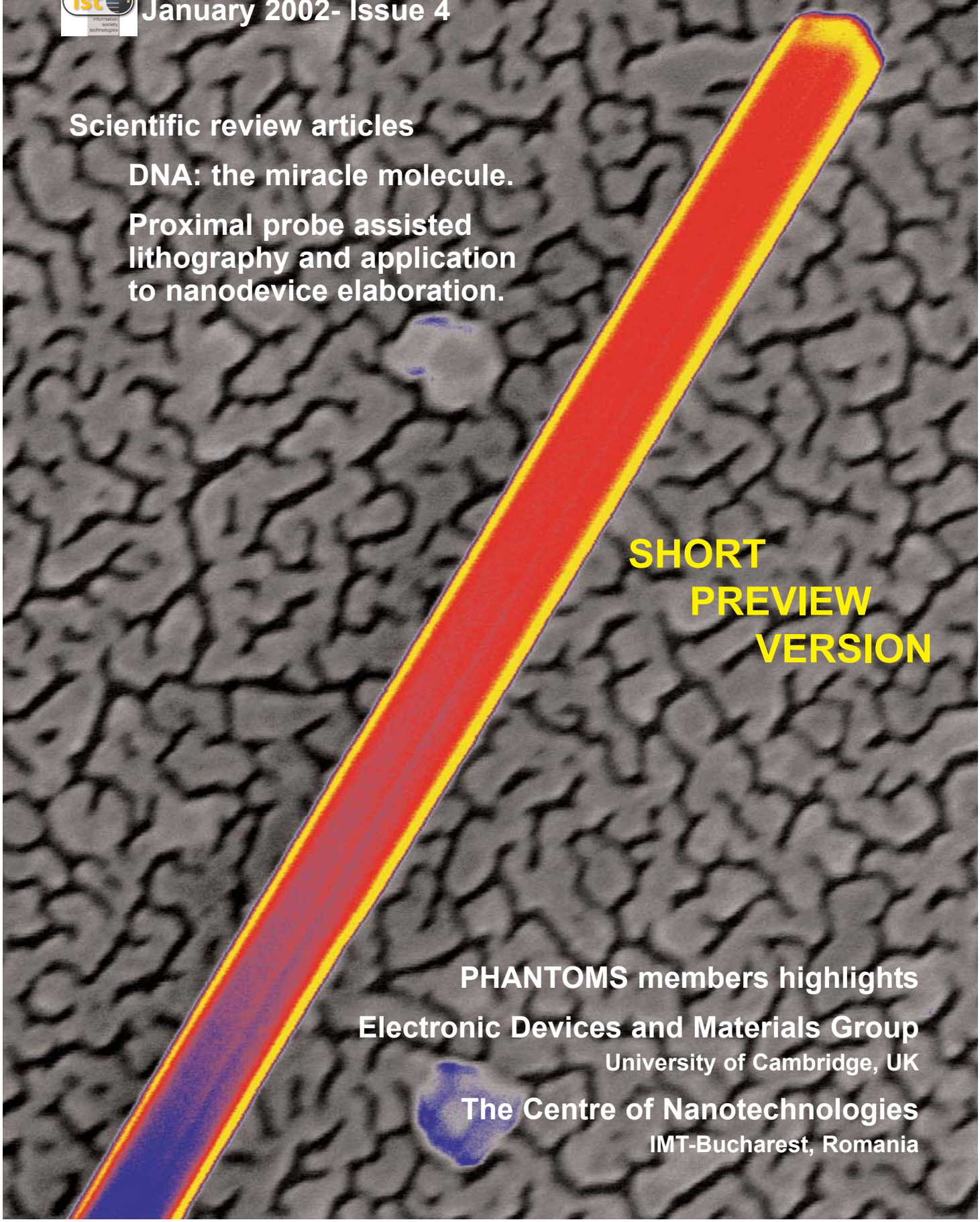
PHANTOMS NEWSLETTER

January 2002- Issue 4

Scientific review articles

DNA: the miracle molecule.

Proximal probe assisted lithography and application to nanodevice elaboration.

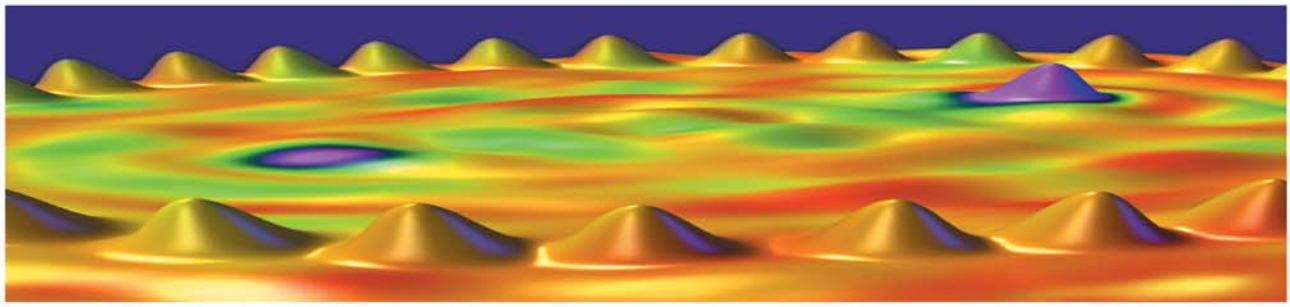


SHORT PREVIEW VERSION

PHANTOMS members highlights

Electronic Devices and Materials Group
University of Cambridge, UK

The Centre of Nanotechnologies
IMT-Bucharest, Romania



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PHANTOMS

IST NANOELECTRONICS NETWORK

INTRODUCTION

In order to fill partially the Nanotechnology knowledge gap, at PHANTOMS we are working to supply, over the next 12 months, to our Newsletter readers new sections such as the extended "Members Highlights" description given in this issue.

In order to always provide more information in the field of *Nanotechnology for Information Processing and Storage*, the PHANTOMS Newsletter will continue evolving (new format) and growing.

Anyway, the principal aim of this Newsletter will always be to provide reliable and interdisciplinary information to a wide range of industrialists, researchers, students, decision makers and others who are interested in nanoelectronics and related applications.

This fourth issue includes two scientific review articles about DNA Conductivity, by J. Gomez-Herrero et al., and Proximal Probe lithography, by D. Tonneau et al., upcoming conferences, nano-vacancies and updated news on the Network such as new members and other relevant information. We invite readers to provide their feedback to the editorial board and submit contributions for publication.

The editorial board would like to acknowledge J. Gomez-Herrero and D. Tonneau as well as their collaborators for their contributions in this issue and to K. B. K. Teo for providing the cover picture.

This bi-monthly publication is supported by the EU-IST program within the PHANTOMS Network activities.

Antonio Correia (Editor)

PHANTOMS NEWSLETTER

Funded by the European Comission

The European Commission Community Research ist information society technologies

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CONTENTS

NEW PHANTOMS MEMBERS

* Company

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Federal Inst. of Materials Research and Testing (Nanoanalytics MicroSystems Tech.) - Germany http://www.bam.de	Heinz Sturm heinz.sturm@bam.de
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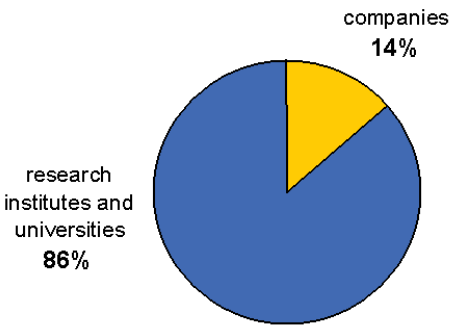
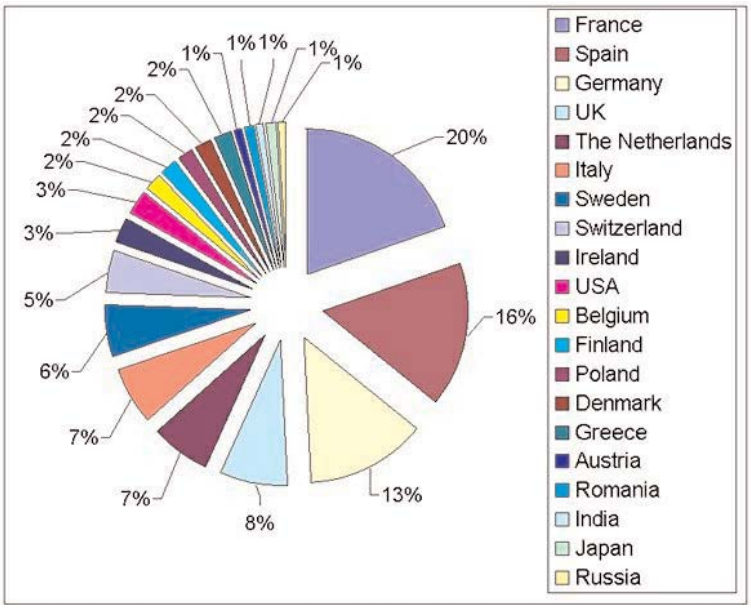
PHANTOMS membership members passes 100 in December 2001

The 106 members come from government research institutes, universities and industry from 17 different European countries, US, Japan and India.





*Company

More information about the Phantoms members, as well as the submission form at:
http://www.phantomsnet.com/phantom/net/database.html

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Scanning Probe Microscopy Group (Physics Department, University of Pune, India) **http://physics.unipune.ernet.in/%7Espm/**	Shivprasad Vitthal Patil **shiva@physics.unipune.ernet.in**

PHANTOMS Membership submission

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http://www.phantomsnet.com/phantom/net/database_form.html

MEMBERS HIGHLIGHTS 1

Electronic Devices and Materials Group

Department of Engineering
University of Cambridge, UK

Professor Bill Milne

Bill Milne is the Head of Electrical Engineering at the University of Cambridge in UK. He obtained his PhD from Imperial College London in 1973 and joined the Department of Engineering at the University of Cambridge in 1976 after spending 3 years working at the Plessey Co. Research Laboratory, Caswell. He was appointed to the 1944 Chair in Electrical Engineering in 1996. His research interests include the application of amorphous silicon and microcrystalline silicon to large area electronics specifically for displays/solar cells and the deposition, characterisation and application of carbon based materials for electronic applications. He has published/presented over 400 papers in these areas.

Electronic Devices and Materials Group

Bill, in tandem with Prof. John Robertson, leads the Electronic Devices and Materials Group at the Department of Engineering, University of Cambridge. The research group also consists of 9 postdocs, 16 PhD students and 3 visiting researchers. The group's research interests cover the deposition, characterisation and application of various silicon and carbon based materials.

The research into thin film silicon focuses on 2 main areas: low temperature silicon deposition and MEMS. The group has recently succeeded in the low temperature (~70°C), large area deposition of device-quality amorphous silicon, silicon dioxide and silicon nitride. These materials pave the way for the large scale fabrication of TFT's and solar cells on plastic substrates to bring down their costs/ manufacturability. The preparation of micro-crystalline silicon, poly silicon and silicon nanowires are also being investigated. Our MEMS work is in sensors (eg. accelerometers) and coupling elements for optical-based communications.

The carbon materials investigated in the group include diamond-like carbon, nanoclustered carbon and carbon nanotubes. Diamond-like carbon, with properties such as extreme hardness, chemical innertness and room-temperature preparation, has tremendous potential for hard disk coatings, corrosion/scratch resistant coatings for optics, field emission displays, MEMS and SAW devices. The nanoclustered carbon and carbon nanotube work is focused on energy storage, electrochemistry, field emission displays, electron guns, vacuum devices and nanoelectronic devices.

The group has 2 clean rooms, a deposition laboratory and a measurement laboratory. The group has strong links with industry, having successfully collaborated with companies such as Philips, Thales (previously Thomson-CSF), Samsung, Motorola and Seagate to name a few. The group also actively participates in various EC/EU projects such as CARBEN, NANOLITH, CANVAD, TAKOFF, and CARDECOM.

For additional information, please contact Bill Milne at email: wim@eng.cam.ac.uk

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http://www.cam.ac.uk/

Group:
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http://www2.eng.cam.ac.uk/~www-edm/people/wim.html

Group information:
nº of Permanent position: 3
nº of Postdocs: 9
nº of PhD students: 16
nº of Visiting Researchers: 3

Projects Coordinated:
CARBEN

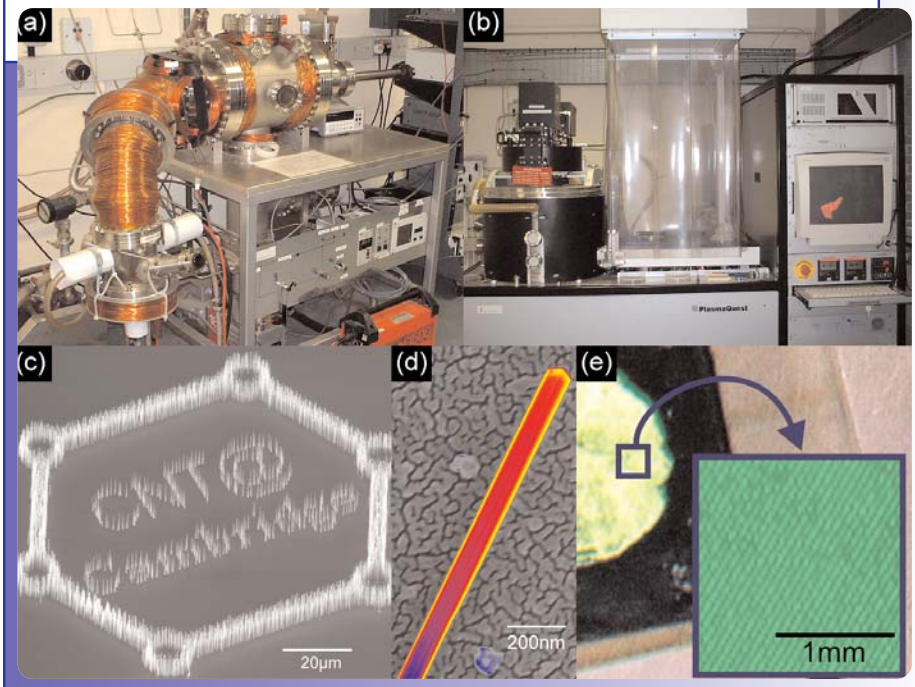
Participating Projects:
NANOLITH-IST-FET, CANVAD, TAKOFF, CARDECOM.

Selected Publications:

1. "*Nanostructured Materials and Devices for Sensor and Electronic Applications*", D.F. Moore, W.I. Milne and S. Oda, IEE Power Engineering Journal 13, 89 (1999).
2. "*Uniform patterned growth of carbon nanotubes without surface carbon*", K.B.K. Teo, M. Chhowalla, G.A.J. Amaratunga, W.I. Milne, D.G. Hasko, G. Pirio, P. Legagneux, F. Wyczisk, and D. Pribat, Appl. Phys. Lett. 79, 1534 (2001).
3. "*The Growth Mechanism of a-Si:H Determined by in -situ STM*", A. Flewitt, J. Robertson and W.I. Milne. J. Appl. Phys. 85, 8032, (1999).

Instruments and Equipment Available:
PECVD,ECRCVD,ECWRCVD,RIE,RTA,STM,Kelvin Probe, UV-Vis, IR, Raman, Ellipsometer,I-V,C-V, SEM,Clean Room and ancillary equipment

Areas of Expertise:
Thin Film Materials and Devices.
Carbon Nanotubes



Courtesy of K.B.K. Teo, Electronic Devices and Materials Group, University of Cambridge
(a) Off plane double bend filtered cathodic vacuum arc system for preparing high quality diamond-like carbon.
(b) Electron cyclotron resonance plasma-enhanced chemical vapour deposition system for low temperature amorphous silicon, oxide and nitride.
(c) Patterned growth of aligned carbon nanotubes.
(d)Crystalline silicon nanowires grown by vapour-liquid-solid mechanism.
(e) Image of the phosphor screen using a diamond-like carbon thin film edge field emitter.

EDITORIAL INFORMATION

January 2002, Issue 4.

PHANTOMS Newsletter is published by CMP Cientifica
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Associated editor: Adriana Gil (adriana@cmp-cientifica.com)

Phantoms Newsletter contains information about the European network on nanoelectronics, including scientific review articles, Phantoms members highlights and vacancies, nanoelectronic conferences and nanonews.
Letters to the editor and articles are welcome for publication.

For any question please contact the editor at:
antonio@cmp-cientifica.com

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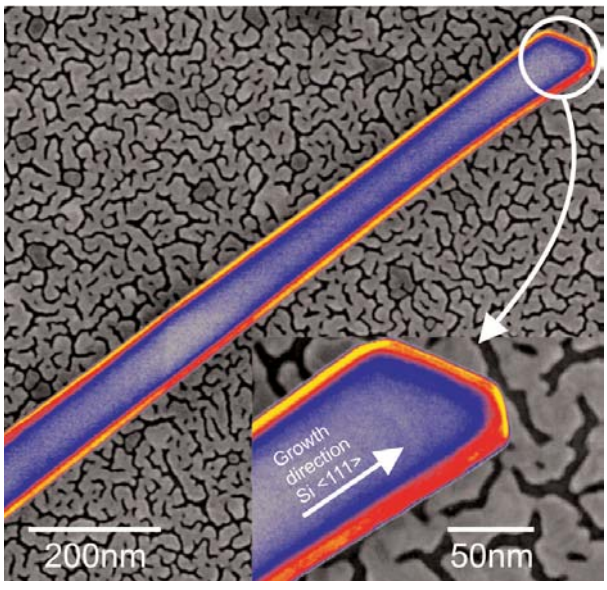

Cover picture:
Crystalline silicon nanowires grown by vapour-liquid-solid mechanism. Courtesy of K.B.K. Teo, Electronic Devices and Materials Group, University of Cambridge.