

Institute *of* **Physics**

ITEC Group

Information Technology, Electronics, Communications

Newsletter

December 2002

ITEC Group Committee, 2002 - 2003

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Editorial

In the year since the last Newsletter, the ITEC Group Committee has continued to build up the activities of the Group. In this issue, we are able to report on a successful meeting (*The Future of Electronic Devices*, held at Portland Place on March 22nd) and an interesting visit (to the Meteorological Office, Bracknell, on June 13th). We are also able to set out a schedule of future Group activities. These include a planned visit to QinetiQ at Malvern in February and a two-day meeting that will form part of the 2003 Physics Congress in Edinburgh next March.

Your Committee is anxious to promote and co-ordinate meetings that will be of interest to Group members. We have prepared a checklist of Guidelines to assist this process and, in particular, to indicate the advance warning that is likely to be needed. One or more Committee members will always be available to assist with planning and holding an event.

Our Group web-site is being developed and will be updated regularly. Changes and improvements will be rolled out over the next few weeks. The pages can be found at <<http://groups.iop.org/IT/>> and will contain the latest details of planned events, reports of meetings and changes to the Committee. We are pleased to welcome Dr Simon Chandler as Web-master for the ITEC Group web-site and are grateful to the many others who offered their services, making the final decision very difficult.

We are in discussion with the producers of *Technogames* about providing a prize for Physics in *Technogames* and developing and distributing a *Technogames* pack for teachers.

We would like to issue the Group Newsletter more frequently than once per year, but do need to have your views, letters and feature articles on topics that you think might interest other members. Do, please mail or e-mail me with information about scheduled events or any other activities that could be promoted via the Newsletter or the web-site. Also, if you are not already on our e-mail distribution list, please go to <<http://groups.iop.org/IT/>> in order to register.

I've been asked to draw members' attention to the Institute's career web-site, <http://careers.iop.org>. This has been developed further to include an open access discussion area. Members are encouraged to post questions or comments and share their own wealth of experience by answering the questions of others. The *Discussion Board* will be a permanent part of the web-site.

Finally, but not least, a happy Christmas and best wishes for the New Year,

John Gowar
J.Gowar@bristol.ac.uk

Meetings held in 2002

Sensor Innovation and Technology Transfer **Wednesday, 30th January, 2002**

The Future of Electronic Devices: **Friday, 22nd March, 2002**

This half-day meeting for non-specialists included eight papers and six posters. It was attended by 45 members. The keynote address (Professor J J O'Reilly, CEO, EPSRC) and abstracts of papers and posters can be found on the Group web-site. These reviewed current research activities on devices ranging from microwave vacuum tubes to semiconductor devices for power and optoelectronic applications based on silicon/germanium, silicon carbide and gallium nitride. Other papers discussed quantum lasers and the possibility of future electronics based on electron spin - particularly appropriate in Paul Dirac's centenary year.

Visit to the Meteorological Office, Bracknell **Thursday, 13th June, 2002**

The visit included a presentation on the range of work carried out by the Met Office, including the specialist advice (e.g. to the NHS), long-range forecasting and long-term projections of climatic effects (malarial mosquito risk in UK). We visited the data centre, the main computer rooms (housing two 800 Gflop/s Cray supercomputers, cooled by freon!) and the main forecasting office.

Planned Meetings for 2003

Visit to QinetiQ Malvern: Wednesday 26th February
1:30 - 4.30 pm

The visit will include both the Knowledge and Information Systems Division and the Sensors and Electronics Division. We hope that Julia King, IoP Chief Executive, will join us on this visit.

ITECC 2003 25th & 26th March

The Information Technology, Electronics and Computing Conference, 2003, will be a two-day conference held, together with Physics Congress 2003, at Heriot Watt University, Edinburgh. Its aim is to bring together researchers and practitioners from all the domains of interest to ITEC group members.

The meeting will explore mismatches between emerging electronics/software and intended future applications, and encourage the development of cross-disciplinary collaborations that can address outstanding challenges. There will be an emphasis on the creative use of new devices and infrastructures.

With this in mind we are proposing the following session topics:-

Future Materials; New electronic devices; Emerging electronic applications; Next generation infrastructures; Novel applied physics; External factors.

For further information, please refer to the Congress literature or contact the ITEC Group Hon. Secretary. Please think seriously about submitting a paper and attending, and do encourage your colleagues to do so too.

ITEC Group AGM: 25th March, 2003

This will be held at the end of the first day of the ITECC 2003 meeting in Edinburgh. Nominations for officer and committee posts should be sent to the Hon. Secretary.

Other Planned Meetings

A half-day meeting on *Dynamic Firmware*.

A half-day meeting on *Photonics Applications*.

A family visit to *explore@Bristol* in October 2003.

An evening visit to Jodrell Bank.

ITEC Meeting Organisation

CHECKLIST

		Completed
Committee:	Title	
	Audience	
	Presenters	
	Event (, 1 or 2 day, evening, local, Congress)	
	Timescale	
	Appoint organiser/organising committee	
	Fix budget	
	After event, receive report on meeting and finances	
Organiser/	Call for papers	
Sub-committee	Book venue / catering / audio-visual equipment	
*	Nominate chair & members of review committee	
	Organise publicity: Physics World, Web, e-mail, Newsletter, What's On In Physics, IEE, IEEE, INCOSE, other groups, local groups	
	Select & notify presenters	
	Produce and issue programme	
	Prior to event, check venue and presenters	
	After event, report on meeting and finances	
	Produce Report for Committee and Newsletter	

NOTES

Title:

This should be meaningful and concise, to catch readers attention.

Target Audience:

Specialist, broad overview, industrial or academic? This will affect the duration, location, presentation, etc.

Presenters:

Invite speakers, or rely on the call for papers?

Type of Presentation:

Visit; half-day; one or two days. Daytime; evening. Half-day meetings are less attractive to those who have to travel a long distance. Evenings are good for industrial members. Congress events have the advantage that the Congress organisers will sort out publicity and venue. Visits are a popular way to see behind the scenes, and many companies and organisations have professionals trained in giving visit talks. Don't forget to invite the local group to such visits.

Planning Timescale

The bigger the event, the longer you will need. Typically allow 3 months for a call for papers, one month for reviewing and selecting presenters, and one month for publicity.

Appoint Organiser / Organising sub-committee

The ITEC Committee can assist planning. They may ask you to carry on as organiser, or a small sub-committee could be set up to share the work, especially for larger events.

Fix budget

The committee is keen for events to be well attended. It can support costs such as publicity, organisation, venue, food, presenters' travel, and bursaries for students to attend. Large events will aim to recover costs through attendance fees.

Call for papers

A call for papers should go out through *Physics World* and other relevant publications at least four months before the event. The call should give guidelines on the nature of the meeting, target audience, length of presentation. Note that invited speakers should be given the courtesy of a longer slot, say 45 minutes against 30 minutes. Include details of the presentation equipment that will be available, e.g. microphone, OHP, slides, PowerPoint PC & projector. Indicate whether or not posters will be displayed.

Book Venue / Catering / Presentation equipment

Book a suitable venue. This should be large enough for the expected audience, located somewhere convenient for travel and have adequate facilities, eg catering and presentation equipment.

Nominate Chair and Review Committee members

With several papers being submitted for consideration, you will need to ensure that they are suitable by review. Again the committee can help identify suitable reviewers. You will also need to nominate a chair to preside over the presentations, to ensure that the presenters maintain the time schedule, and to take questions in an orderly fashion.

Select and notify presenters

Inform the successful and unsuccessful submissions as soon as possible. Invite unsuccessful submissions to provide a poster display of their work in a foyer area.

Produce Programme and Issue

Organise into suitable sessions, and publish the programme. Distribute as part of your publicity.

Publicity

Use a combination of publicity mechanisms to reach your audience: *Physics World* / Web / *What's On In Physics* / e-mail / Other Groups/ Local Groups / IEE / IEEE / INCOSE. We often co-sponsor events with other groups or organisations in return for publicity in their mailings. We can reach more than 700 ITEC members through the IoP e-mailing lists. Flyers can be produced either for inclusion with the *Physics World* mailing, or as a separate mail shot (but this is expensive).

Check venue and presenters

A week before the event, check that the venue is still booked, catering has a reasonable idea of numbers attending, your presenters are all fit and well.

Receive & review report on finances after event

Ask the treasurer for a report on costs and receipts from the event.

Produce Report post event

Produce a report on the event for the web-site, the newsletter and the committee. This may include photographs, summaries of the key points, number of attendees etc. Include any lessons that have been learned about the venue, the subject matter, or the target audience, in order to assist the planning of future events.

Student Travel Bursaries

Student members of the Group can benefit from travel bursaries to attend meetings, including international conferences. The request for a bursary should be made on the official application form, which is available from the Bursaries Secretary (Prof. Keith Blow). For contact details, please see the Committee page.

The rules governing the allocation of bursaries are:

Grants are awarded only to full-time PhD students at UK universities who are not in receipt of salaries

Grants are awarded only to student members of the ITEC Group

Support may be available for national or international conferences/meetings

The student must be presenting a paper at the conference or meeting and the subject of the paper must be relevant to his or her PhD studies and to the Group

The application must be made on a fully completed application form which must reach the Bursaries Secretary no later than two weeks before the conference or meeting

The maximum sum awarded as any one bursary is £250 and may be set at a lower level for particular conferences or meetings

The maximum sum that can be awarded to any one student in respect of all applications made during their PhD is £250

The committee wishes to see as broad a take-up of bursaries as possible, so normally a maximum total of £250 will be awarded to any one research group for any one conference/meeting

Before payment is made applicants are required to send a short report of the conference or meeting to the Bursaries Secretary, to arrive no later than ten weeks after their return.

About the ITEC Group Committee, 2002/2003

Professor Ian W. Marshall, F.Inst.P., Chairman

Ian Marshall is a long-term research manager at BT Exact Technologies (formerly BT Labs). He is also Visiting Professor of Telecommunications at South Bank University, and a Royal Society Industrial Fellow at University College, London. Since graduating from Durham in 1981 he has led research in optical communication networks, broadband networks, and distributed computing systems, and spent several years as a senior strategy adviser in BT headquarters. Currently he is leading a long term research project investigating ad-hoc networks of computational devices such as sensors, smart tags and wireless communicators, using ideas derived from bacterial colonies to co-ordinate their activity. He is a chartered engineer, and a Fellow of the Institute of Physics, the British Computer Society and the Geological Society. In addition he is the deputy chair of the IoP CEng committee, and has co-chaired a range of network research conferences.

Kevin Hyman, M.Phil, Eur Ing, CEng, CPhys., Hon. Secretary/Treasurer

Kevin Hyman started work for the Admiralty Surface Weapons Establishment in 1978 doing research on infrared, lasers, optics and fibre-optics. His first degree is a BSc in Applied Science from the Royal Military College of Science. At ASWE he studied for an MSc in Microwaves and Modern Optics and took a part-time MPhil in Pre-detector Signal Processing at UCL. He then worked for Vosper Thornycroft designing Naval Computer Systems. The next 5 years were spent doing studies with EASAMS in Radar, millimetric waves and infrared sensors, primarily for the RAF, including the designing, building and airborne testing of a novel collision warning system for fast jets. He now works for the IT house, EDS, providing state-of-the-art command, control and planning systems for the RAF and Navy. He is a Microsoft Certified Solution Developer and has a Diploma in Engineering Management. Other interests include System Engineering, Electronics, Computing, Optics and Security, and playing and organising Octopush (Underwater Hockey).

John Gowar, F.Inst.P., Newsletter/Publicity

John Gowar is a Visiting Fellow in the Department of Electrical & Electronic Engineering at the University of Bristol, having retired as a Senior Lecturer in July 2000. He graduated in Physics at the University of Oxford in 1961 and worked for 10 years at the Hirst Research Centre of GEC plc before joining Bristol University. His initial interests were in low pressure gas discharge devices and, through hydrogen thyratrons, in electronic switches for the generation of high power pulses. More recently, this led to work on magnetic pulse compression. His present interests range from the technology of optical communication systems to the behaviour of power semiconductor devices. He published a textbook on optical communication and has co-authored two books on power semiconductors.

Professor Keith Blow

Keith Blow studied at Cambridge University being awarded a BA in Physics and Theoretical Physics in 1978. He then joined the Theory of Condensed Matter Group of the Cavendish Laboratory and received a PhD for studies on Deep Impurities in Semiconductors in 1981. He joined the Optics Division of BT Labs in 1981 and worked on the theory of non-linear optical propagation effects in fibres, principally the propagation of solitons. This work developed into optical switching and the first demonstration of soliton switching in non-linear optical loop mirrors. In 1990 he set up a group working on quantum optical properties and non-linear spatial optics as well as continuing work on all-optical processing which is currently concerned with ways of using and manipulating the information that can be sent over the enormous bandwidth of optical fibres. In 1999 he moved to the Photonics Research Group at the University of Aston to continue work on optical networks and optical computation as well as to start a new activity on the applications of dynamic hardware in the Internet.

Richard Horton

Richard Horton was first employed in 1978 as Head of Physics and later also as Head of IT at Harrogate Ladies' College. He is presently *Director of Applied Physics and ICT Systems* concentrating on sixth form physics, amateur radio and the planning and development of ICT systems. More than 90 pupils have passed Amateur Radio examinations and many have engaged in exciting space communication projects - contacts with the Mir and International Space Stations via Amateur Radio, and with the US Space Shuttle. He is a Board member of the Radio Society of Great Britain and currently serves on its Management Committee as *Director of Amateur Radio Development*. He chairs a committee that has created a new *Foundation Licence* aimed especially at young people. He sits on the City & Guilds Radio Amateur examination committee and on a new examinations group for the Radio Communications Agency. In 1984 he started *edhitec education*, a company which develops and markets school network software. It now also authors and produces multi-media CD-ROMs for NHS Health Trusts.

John N. Hutchinson

Not available

Dr Brian Jones

Brian Jones has recently retired from teaching physical electronics at the Physics Department of Lancaster University. However, he is still active in research into electromigration, a failure mechanism in the interconnects within an integrated circuit. His other research interests are electrical noise; mainly 1/f noise and its use as a reliability predictor; defect states in GaAsFETs measured through DLTS and noise and other methods; and relaxation semiconductors, which were well known many years ago but have been neglected although they are fairly common.

Dr Mervyn E Jones

Director of Continuing Education at Imperial College, London. Specialist in lithography for electronic devices.

Dr Keith Kirby, M.Inst.P., MIEE

After originally qualifying with an HNC, Keith Kirby gained an MSc in Electronic Control Engineering at the University of Salford and a PhD at Cranfield University on Ultrasonic Doppler Flow Measurement. He is Principle Hardware Design Engineer at Pace Micro Technology, having spent most of his career in the development and management of electronic hardware design. He has been a part-time consultant at Salford University Business Centre and a part-time lecturer teaching final HNC course units. His outside interests include walking and table-tennis.

Tim Scaife, BSc, Cphys, MinstP

After graduating in Physics from Bristol University in 1976, Tim Scaife worked on Charge Coupled Device Filters at the GEC Hirst Research Centre, Wembley, before moving to Ferranti Semiconductors, Oldham, in 1979. There, he supported customer designs on mixed-signal Application Specific Gate Arrays, until transferring to Ferranti's US Subsidiary, Interdesign, in Scotts Valley, California, in 1983. He ultimately became responsible for the US CMOS Engineering activities and Semicustom Design Centres. Following the sale of Ferranti Semiconductors to Plessey Semiconductors and subsequent acquisition by GEC, he took on responsibility for IT, Network and Telecommunications functions in the USA. In 1995 he moved to the parent company in Swindon to assume responsibility for Global Networks and Telecommunications. He is presently working as a Voice Data Specialist with the National Trust in Swindon.

Dr Michael Uren

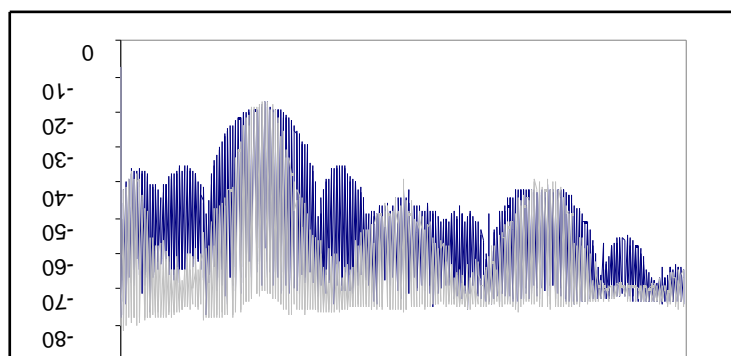
Mike Uren received his BA degree in natural sciences (experimental physics) in 1978 and his PhD in 1981 for research on low temperature behaviour of silicon MOSFETs, both from the University of Cambridge. He carried out post-doctoral work at IBM Yorktown Heights, NY, on infrared spectroscopy of MOSFETs before joining the Silicon Division of the then RSRE (now QinetiQ Ltd), Malvern, UK. His research career has spanned work on CHEMFETs; porous silicon formation mechanisms and devices; SOI-CMOS device physics, modelling and reliability; random telegraph noise and 1/f noise; and silicon MOS interface traps. His current research interests lie mainly in the area of wide bandgap materials and devices, in particular gallium nitride based microwave HFETs, and silicon carbide transistors and diodes for high power/high temperature applications. He is the team leader for wide bandgap devices at QinetiQ, is a fellow of the Institute of Physics and a QinetiQ fellow.

Dr Nick Wright

Nick Wright joined Newcastle University in 1994 having previously completed both undergraduate and PhD degrees at Edinburgh University, where he worked on the characterisation of a wide range of semiconducting materials using x-ray techniques. Nick has wide experience of semiconductor processing with particular strengths in implantation, silicide technology and advanced interconnects. He has also been instrumental in the development and provision of courses on semiconductor processing, DRAM Technology and Clean Room Design for Infineon and other major companies. He is currently a Lecturer in the Department with research interests in silicon carbide devices and silicon processing technology.

What was it?

Answer: A comparison of the spectra of binary PSK and duo-binary PSK signals. Thanks to Liz Tyler (British Aerospace, Sowerby Research Centre and University of Bristol) for providing the spectra.



Constitution and Rules of the IT, Electronics & Communications Group of the Institute of Physics: Approved by Council on 21 October 1999

1. **Name**
The Group shall be known as the IT, Electronics & Communications Group of The Institute of Physics.
2. **Definitions**
In these Rules (By-Laws 52-57)
 - The Group** means the IT, Electronics & Communications Group of The Institute of Physics.
 - The Institute** means The Institute of Physics.
 - The Council** means The Council of The Institute of Physics.
 - Corporate Members** means Honorary Fellows, Fellows and Members of The Institute of Physics and Fellows of the former Physical Society.
 - Non-corporate members** means Graduates and Associate Members.
 - Members** means Corporate and Non-corporate Members.
 - Students** means Student Members of the Institute
 - Affiliates** means Affiliate Members of the Institute.
3. **Scope**
The Group shall concern itself with matters relating to the application of physics within the fields of Information Technology, Communication Systems and Electronics. The remit of the Group is wide but includes; electronic materials for device applications, new device processing methods, device physics, sensors, circuits and systems, information processing, information distribution mechanisms, communication networks, communication technology and other related disciplines.
4. **Objects**
The objects of the Group shall be:
 - (a) To hold meetings of members of the Group, either independently or jointly with other bodies, for the reading and discussion of papers, for the delivery of lectures and for the discussion generally of subjects coming within the scope of the Group.
 - (b) To stimulate interest in the subjects falling within the scope of the Group.
 - (c) Generally to advance the science and technology of the subjects within the scope of the Group.
 - (d) To do all such other things as are incidental or conducive to the attainment of these objects.
5. **Membership**
Membership of the Group shall be open to Corporate and Non-corporate Members, Student Members and Affiliates of the Institute (as defined in Clause 2) upon written application to the Institute headquarters, subject to such fees as may from time to time be imposed by the Council. The rights, privileges and obligations of every member of the Group shall be personal to him/herself and shall not be transferable. Any person who ceases to belong to one of the classes of membership mentioned above shall *ipso facto* cease to be a member of the Group.
6. **Officers**
The Officers of the Group shall be a Chairman and an Honorary Secretary (who may also act as Honorary Treasurer) together with such other Officers as may from time to time be elected by the Group. Only members of the Group shall be eligible to be Officers of the Group and in accordance with the By-Laws of the Institute they must be Corporate Members, Graduates or Associate Members of the Institute unless Council otherwise determines.
7. **Committee**
The affairs of the Group shall be managed by a Committee comprising the Officers of the Group together with (normally not more than nine ordinary members of the Committee and such additional members as may be co-opted from time to time under Rule 10. Only members of the Group shall be eligible for membership of the Committee. In accordance with the By-Laws of the Institute the majority of the ordinary members of the Committee must be Corporate Members, Graduates or Associate Members of the Institute unless Council otherwise determines.
8. **Period of Office for Officers and Committee Members**
The Chairman and Honorary Secretary shall (normally) be elected for a maximum term of three years, previous service on the Committee not being taken into account, and shall be eligible for re-election to serve for a maximum of six years in all. Ordinary Members of the Committee shall (normally) be elected for a period of not more than four years. No Honorary Officer or Ordinary Member may be re-elected to the same post until the elapse of two years.
9. **Election of, and Nominations for, Honorary Officers and Committee Members**
Vacancies for Officers and ordinary members of the Committee shall be filled by election at the Annual General Meeting of the Group. Nominations, which shall be proposed by not less than two members of the Group and be accompanied by the written consent of the nominee, shall be sent to reach the Honorary Secretary of the Group not later than twenty-eight days before the Annual General Meeting. The names and affiliations of such nominees shall be printed in the notice of the Annual General Meeting.
10. **Co-option to the Committee**
The Committee shall have power to fill casual vacancies and to co-opt members up to a maximum of one-third of the total membership of the Committee as may be required from time to time for special

purposes. These co-opted members might include members of other Group Committees or other professional bodies for the purpose of programme co-ordination. Honorary Officers or Ordinary Members of the Committee appointed to fill casual vacancies shall stand down at the next Annual General Meeting. They shall be eligible for election to the post vacated; the period served as a co-opted Honorary Officer or Ordinary Member shall not be taken into account (see Rule 8).

11. Quorum for Committee Meetings

At Committee Meetings, four members of the Committee, at least one of whom shall be an Officer, present in person shall constitute a quorum.

12. Annual General Meeting

A General Meeting of the Group shall normally be held annually to elect Officers and members of the Committee and to transact other business. The Agenda for any Annual General Meeting shall be sent to all members of the Group at least twenty-one days before the meeting. Any member of the Group wishing to bring forward business of a character suitable for consideration at the meeting shall give notice of his/her intention in writing to the Honorary Secretary at least seven days before the meeting.

13. Extraordinary General Meeting

An Extraordinary General Meeting of the Group shall be called by the Honorary Secretary of the Group on receipt of instructions from the Committee, or of a written request signed by not less than ten members of the Group, and shall take place within eight weeks of the receipt by him/her of such instructions or request if these so specify. The Agenda for any Extraordinary General Meeting shall be sent to all members of the Group at least twenty-eight days before the meeting and shall not contain the item 'any other business'.

14. Quorum for General Meetings

Twelve members of the Group present in person shall constitute a quorum at an Annual or Extraordinary General Meeting.

15. Group Meetings

Every member of the Group shall be entitled to attend its meetings and shall be entitled to introduce visitors unless the Committee gives notice that this Rule shall not apply to any particular meeting.

16. Professional Status and Communications with Outside Bodies

In accordance with the By-Laws the Group shall not communicate with an outside body on any matter of professional conduct or status or on any matter whatsoever beyond those concerning arrangements for meetings or the supply of technical information for the benefit of the members of the Group without the express prior authority of the Council.

17. Authority of the Constitution and Rules

- (a) Clauses 2 and 5 to 17 of this Constitution and Rules are immutable except by council. Amendments to Clauses 1, 3 and 4 are permitted provided that the following procedure is observed.

Alterations or additions to Clauses 1, 3 or 4 shall only be made at the Annual General Meeting or at an Extraordinary General Meeting called for the purpose. The proposed alterations or additions shall be set out in full in the notice calling the meeting. Such alterations or additions shall be approved for submission to the Council only if supported by a majority vote of those members present and voting at the meeting. The amendments shall not operate unless and until they have received the approval of the Council.

- (b) The Group and its members shall be subject in all things to the Institute's Charter of Incorporation and By-Laws.

- (c) Where the rules are silent the decision of the Committee shall stand.

