

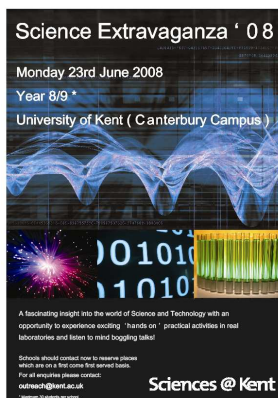
July 2008

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Making the Grade in the USA

Physics student, Giuseppe Le Voci, has spent Stage 3 of his studies in Indiana University at Bloomington Indiana during this past academic year. He has done so well there, scoring 9 "A" grades and 1 "B" grade, that Indiana University has awarded him a certificate for "High Scholastic Achievement", something which is unusual even for their home students.

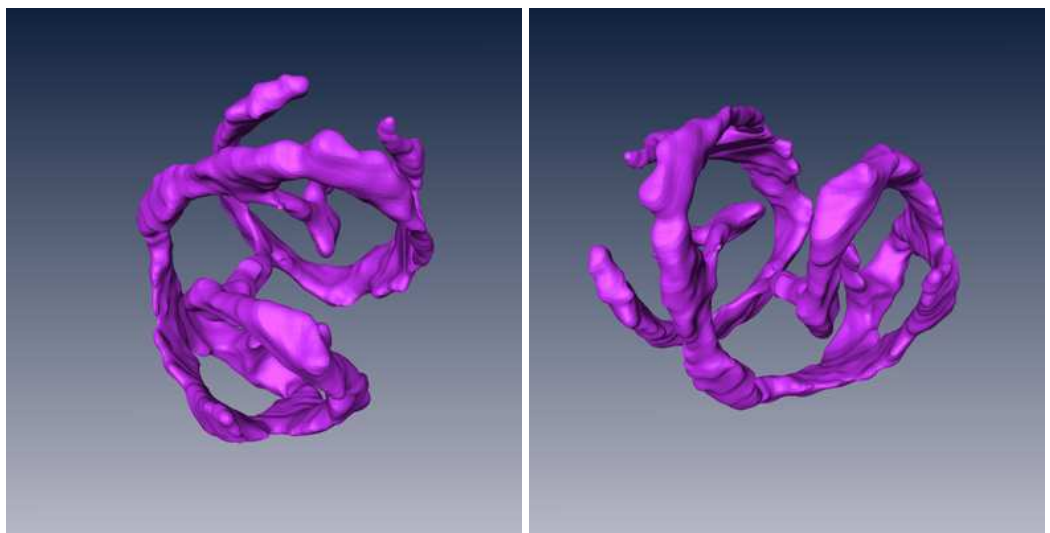
**Report page 9****View from the Dean's Office**

Summer already and a time for celebration as students become graduates and academics get a break from teaching! The Faculty is also celebrating the good news that the Medway School of Pharmacy (MSP) has recently successfully completed a four-year accreditation process with the Royal Pharmaceutical Society of Great Britain. Congratulations to staff and students for all the hard work. Summer is also a time of allergies and this issue highlights some of the work done at the MSP in this area. We also celebrate the continuing success of the Science Extravaganza, which started on a smaller scale last year, but this year brought some 420 schoolchildren on campus to enjoy a fun day of Sciences@Kent—a key event in our Science Outreach programme. Thinking of Outreach, just a reminder that 'Café Scientifique' will be taking a summer break, but resumes at the usual venue, "Ye Olde Beverlie" pub, St Stephen's Green, Canterbury on September 9th.

All the best
Peter

Leu-Val-Leu-based block copolymer aggregates

This month's images represent the research work currently being carried out by Dr Stefano Biagini's group in the School of Physical Sciences. The images are of Leu-Val-Leu-based block copolymer aggregates which develop into single, continuous, folded and branched molecule structures. These molecules are polymers which contain short peptide strands and mimic natural molecules found in the body. They have been produced with a view to developing a class of therapeutic agents for use in medicine.



These biopolymers were prepared by A Parry under the supervision of Dr Stefano Biagini, in collaboration with Dr Simon Holder in the School of Physical Sciences and Dr N. Sommerdijk from Eindhoven in the Netherlands.

Embedded Systems Group Helps to Optimise Image based People Counter

Peter Lee from the Embedded Systems group in the Department of Electronics, has recently completed a consultancy contract with Neuricam SpA (Italy) to optimise some the real-time signal processing necessary to process and extract data from two CMOS (complementary metal oxide semiconductor) cameras. The stereo camera system designed for use as a "people" or "object" counter and the new techniques developed as part of this agreement have enabled a reduction of over 20% in the firmware implemented on the FPGA chip used for the signal processing. These savings could result in a reduction in production costs for the current generation of systems and, more importantly, for developing new systems with enhanced resolution and accuracy. The device shown below has been developed by Neuricam SpA in Italy for access control in mass transportation and is currently being deployed in a number of applications on buses, trains and trams and in stations and airports.



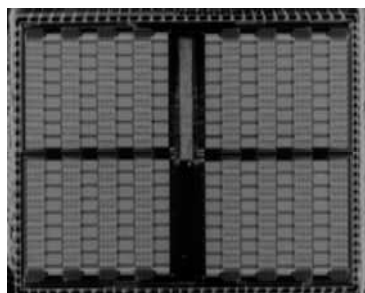
People Counter

A similar hardware architecture has also been used to develop an Automatic Number Plate Recognition System (ANPR) which is currently being field tested.



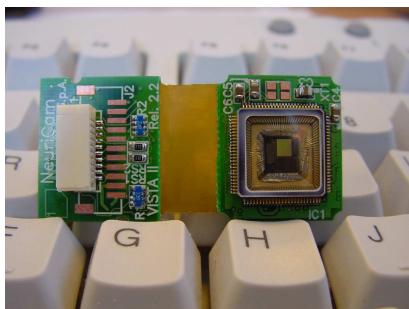
ANPR System

The University has worked with Neuricam for many years since first collaborating together as part of the European funded MiNOSS (Micro-Integrated Intelligent Optical Sensor Systems) project which was funded between 1992 - 1996. The work has included the development of the TOTEM neural processor chip which was developed in 1995. At this time it was capable of over % GOPs while operating at only 33 MHz.



**TOTEM Neural Processor Chip
(128 Neurons)**

In recent years this high speed signal processing architecture which has been integrated into other Vision System on Chip Technologies (ViSOC) such as the blind-spot detection camera system shown below. (An MPEG video of this operating in a Renault Megane Scenic device can be found on the Neuricam website <http://www.neuricam.com/main/solutionslist.asp?i2=Automotive>)



ViSOC Vision System

Between 2000 and 2003, Stephanie McBader, a student at the University of Kent studied for her PhD at Neuricam developing parallel processing architectures for vision-based systems with funding from the Marie Curie Fellowship programme. She later became a lecturer at the University before leaving to work in industry in 2005. In 2007 the University signed a Memorandum of Understanding with Neuricam, and with another company, Eurotech in Italy, and plans to continue collaborating on this technically challenging work.

Kent Forges Link in Brussels with KCC

As a member of the Kent Partnership, Kent personnel can access a range of services, including the use of Kent County Council offices in Brussels for meetings and hot-desking. This follows the recent appointment of a new Policy Officer, Francesca Vencato who is responsible for health, migration and higher education and particularly follows the EU Lifelong learning programmes such as Erasmus Mundus, Tempus, Marie Curie Fellowships. Over the coming months, Francesca will take a leading role in the support provided by the Kent Brussels Office to the University. This support includes developing profile-raising events in Brussels, organising exposure visits to the EU institutions and informing University staff of policy debates of relevance to their field of expertise. Francesca holds a First-class Honours degree in Political Science and International relations from LUISS University in Rome and an MA in European Studies from the College of Europe of Bruges, Belgium. She has co-ordinated research groups on EU regional policy, structural funds, advocacy and capacity building programmes for institutional and non-state actors in the framework of the EU enlargement progress as well as collaborating in joint policy projects with international actors including the United Nations Development Programme and the UK Department for International Development. She continues lecturing in post-Soviet and Asian studies as well as development and foreign policy studies.

Please contact Francesca Vencato for further information
mariafrancesca.vencato@kent.gov.uk
For full details visit <http://www.kent.ac.uk/european-office/>



Kent Academic Receives £200,000 for Project on Classroom Practice

Sally Fincher, Senior Lecturer in the Computing Laboratory, has been awarded £200,000 from the project strand of the National Teaching Fellowship Scheme (Higher Education Academy) to undertake the project "To see ourselves as others see us: sharing and representing disciplinary classroom practice".

The project, undertaken in collaboration with colleagues from Leeds Metropolitan University, the Open University, Glasgow Caledonian University and the University of Washington, Tacoma will:

- * Develop a community model of sharing teaching practice piloted in her previous 'Disciplinary Commons' project.

- * Create and evaluate different representations of practice (from rich, complex documents such as course portfolios, through to more abstracted and sparse forms such as guidelines and patterns).

- * Undertake a small-scale longitudinal study of educators, paying particular attention to their decision-making points, and to what materials and information influence them to make change.

The 3-year project starts in August 2008 and will involve a range of activities from interviews and focus groups to peer

observation and direct observation by the project team of teaching activity.

Earlier this year, Sally was awarded the title of Senior Fellow of the Higher Education Academy (HEA). This is the first time that Senior Fellows have been chosen by the HEA and Sally was one of just 14 academics across the country recognised as providing outstanding leadership in teaching and support in Higher Education.



Sally Fincher

California Dreaming

Professor Alan Bull, Emeritus Professor of Microbial Technology in the Department of Biosciences, visited California recently as an invited speaker at the Gordon Research Conference on Marine Natural Products in Ventura, California. His presentation on "Marine actinobacteria : developing a discovery platform" was well received and judged to be one of the Conference highlights. During his visit, he took advantage of the animals and flowers emerging in the Californian Spring and captured this image of an emerging Monarch butterfly getting ready for its great flight North.



Monarch Butterfly

Applied Mathematicians in Asia



Professor Elizabeth Mansfield, Dr Agnes Szanto & Professor Peter Clarkson

Five members of the Institute of Mathematics, Statistics and Actuarial Science attended the "Foundations of Computational Mathematics" conference which took place this year at the City University of Hong Kong, China on the 16th-26th June 2008. These conferences are held every three years.

Professor Elizabeth Mansfield gave an invited lecture on "Discrete gradients" in a workshop on "Symbolic Analysis", Professor Peter Clarkson gave a semi-plenary lecture on "Asymptotics for the Painleve Equations" in a workshop on "Asymptotic Analysis" and was a co-organiser of a workshop on "Special Functions and Orthogonal Polynomials", and Tania Goncalves, Andrew Wheeler and Jun Zhao, all Ph.D. students of Professor Mansfield, presented posters at the conference.

Also speaking at the conference were Dr Agnes Szanto (now an Associate Professor at the North Carolina State University, Raleigh, USA) and Dr Peter van der Kamp (now at La Trobe University, Melbourne, Australia), both of whom previously were postdoctoral assistants at the University of Kent, working with Professor Mansfield on an Engineering and Physical Sciences Research Council (EPSRC)-supported grant.

FRAMEWORK 7 AWARD

Professor Simon Thompson's involvement in a Framework 7 project got off to an excellent start when representatives from the 9 member organisations gathered at the University of Kent for the project's inaugural meeting in May. The project, Property-based Testing (ProTest), has been awarded a total of Euro 2,709,821 for a period of 3 years under the Pervasive and Trusted Network and Service Infrastructure call. Kent's share of the funding amounts to Euro 366,494.

The project will deliver methods and tools to support property-based development of systems. Property-driven development is a powerful new mechanism for gaining assurance of system reliability and functionality. However, in order to deliver its full benefits we need tools to integrate property-based testing into the development life cycle.

- At the start of the cycle, it will be crucial to develop mechanisms for property discover, from existing test sets and models.

- As software systems change and evolve, the tools to support the evolution of tests and properties will also need to evolve in line with the system change. It is here that Kent will make its principal contribution.

- Not all properties can be tested in advance of systems being executed, and so the project will develop tools for monitoring and post-hoc evaluation of system behaviour.

- At the heart of service oriented systems is concurrency: we will provide tools by which concurrent systems can be analysed for fundamental properties. As well as Kent, a number of universities from the UK and Europe are taking part in the project, including the University of Sheffield (lead institution), Universidad Politecnica Madrid, Spain and the Universities of Goteborg and Chalmers in Sweden. The Industrial partners are Ericsson, whose Erlang open-source concurrent functional language will be used throughout the project; Erlang Training and Consulting, a UK-based SME which provides a range

of services for the Erlang user community; Quviq, a small Gothenburg-based company which has developed the Erlang-based version of QuickCheck and LambdaStream which develops software products for streaming and on-demand media delivery.

This combination of academic expertise in refactoring, model-checking and testing, together with industrial expertise in telecoms and a tool vendor to apply and disseminate the results of the project will ensure real the economic impact of this research.



Professor Simon Thompson, Head of the Computing Laboratory

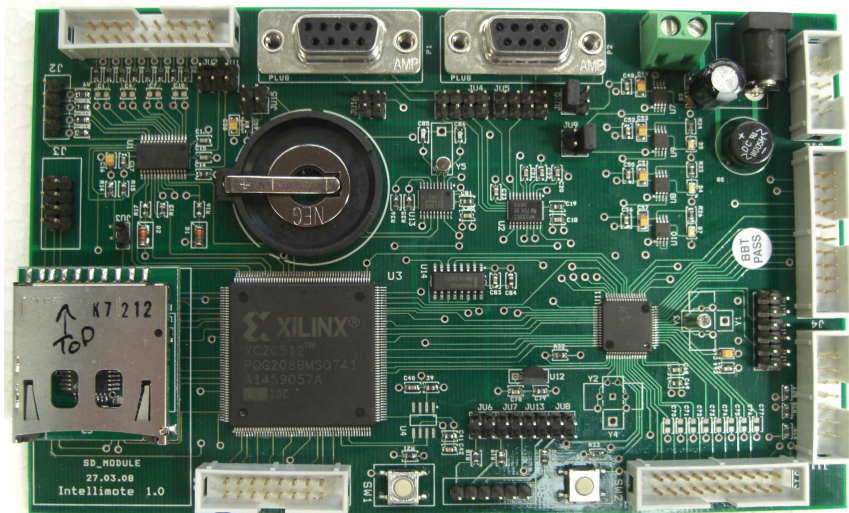
Embedded Systems Group develops Prototype "Intellimote" Wireless sensor node for Environmental Monitoring

Simon Jakes and Peter Lee, in the Department of Electronics, have developed and built a prototype processing module for a wireless sensor system that will soon be used as part of an environmental monitoring project at Crowden Brook in the Lake District. The prototype has been built to try and reduce power consumption and hence increase the battery life of the sensor modules. Most of the power is consumed by such devices when they communicate using wireless technology. A method of reducing the cost of communication is to perform data logging and analysis in the sensor module before transmitting the results. Additional intelligence has been added to reduce overall power consumption further by ensuring that most of the system is turned off most of the time. An integrated data logger (an SD memory card) ensures that no data are lost and a CPLD (Complex Programmable Logic Device) is used to control the low-level signal acquisition, low-level pre-processing (such as averaging) of the data reduces the amount and frequency information that needs to be transmitted to the host node. It is planned to site over 20 of these modules at Crowden

Brook where it will be used to analyse the effects of rain-fall on soil erosion.

Peter Lee anticipates a 2nd generation of this device will be built which is more integrated, with more processing power and consuming less power. Such a device has many potential uses in other environmental monitoring and data logging applications.

This work is part of an EPSRC WINES project funded by the EPSRC. The consortium includes partners from the Universities of Strathclyde, Glasgow, St. Andrews, Manchester and Lancaster.



Secure Digital (SD) Memory Card

Successful Postgraduate Poster Conference for Computing Laboratory



The Computing Laboratory held its annual Postgraduate Poster Conference on Monday, 23rd June 2008. Postgraduate students in their second year are invited every year to produce a short paper and poster describing their research. Whilst the papers are published as a Computing Laboratory Technical Report, the posters are displayed at the poster conference which provides an excellent opportunity for the whole Laboratory to meet, discuss the students' work and, of course, other research in progress by students and staff.

Attendees at the conference were given the opportunity to vote for their favourite poster based on visual impact, clarity and

content, and the 'Best Poster' prize this year was won by Neil Brown for his poster "Implicitly Mobile Data: Lightening the load in occam-pi". Neil was presented with a prize of book vouchers by the Computing Lab's Head of Research, Dr Alex Freitas, who said: "The quality of the research by our postgraduate students is very high, and it is with great pride that we showcase their work at the poster conference every year".



Dr Alex Freitas (left), Head of Research in the Computing Laboratory presents Neil Brown with his prize for the best poster. Neil's poster is featured on page 8 of this newsletter.

All the posters can be viewed on the Computing Laboratory's website.

National award for pioneering software developer

Michael Kölling, who has been recently promoted to Professor in the Computing Laboratory, University of Kent, has been awarded a National Teaching Fellowship by the Higher Education Academy.

Professor Kölling's £10,000 award is in recognition of his innovative work on the BlueJ and Greenfoot systems, both of which are used in the UK and abroad to enable students to learn computer programming via the Java programming language. He will receive his award at a ceremony in London on 24 September.

Since the 1990s, Professor Kölling has been working to address the shortage of computer scientists and programmers in the national employment market. Initially, this was through the development of BlueJ, a highly successful software system that fundamentally changes the way in which modern Java programming can be taught to beginners. Today, it is used in more than 850 institutions worldwide, including more than

the development of Greenfoot, an easy-to-use Java-based system designed to teach programming to secondary school students. With Greenfoot, students can create real interactive graphical computer applications, such as games and simulations, and so experience the challenge and satisfaction that arise from these activities.

Greenfoot is used at many schools and universities for programming teaching and, at present, there are more than 40 institutions actively using the system. The impact of Greenfoot on programming education was recognised last year, when the software won the Duke's Choice Award 2007, an industry award sponsored by Sun Microsystems.



half of all English universities. He is also co-author of a text book on BlueJ, which is the best-selling Java text book in Europe and number two in the USA.

Building on this success, Professor Kölling has been working on



Professor Michael Kölling, Computing Laboratory



Discovering new therapies for allergies and anaphylactic shock

In the month's medical article, Dr Bernhard Gibbs, Senior Lecturer in Immunopharmacology from the Medway School of Pharmacy, describes the misery of allergies, why they occur and how research may provide the breakthrough needed to treat some of the allergic diseases.

Allergies, such as hay fever, atopic dermatitis and allergic asthma pose an enormous socio-economic burden worldwide, especially in the UK where around 20% of the population suffer from one or more allergic diseases. Despite years of continuing development of various anti-allergic therapies, e.g. anti-histamines, steroids and bronchodilators, the allergic march is far from abating. It is not quite clear why cases of allergies continue to rise, although it is thought that genetic factors, increased standards of hygiene, certain cosmetics and various foods and drugs contribute to the complex epidemiology of these diseases.

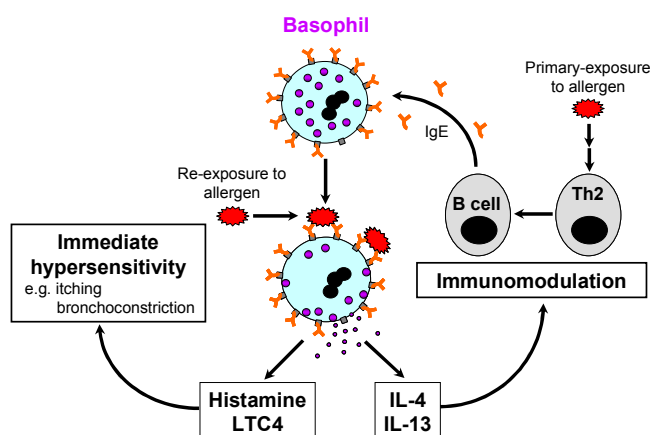
Allergies result from a "false alarm" within the immune system where it responds to foreign, but harmless, substances in our environment (allergens). This so-called Th2 response involves certain helper T cells which govern the production of a rare class of IgE antibodies that recognize the allergen. These IgE antibodies then bind to mast cells, located within various tissues such as the lung or skin, and basophils, which are found in the blood but also invade other organs. If an individual is re-exposed to the allergen this triggers a rapid response where the allergen binds to IgE and this activates mast cells and basophils to release chemical substances (mediators), such as histamine, which cause the symptoms of allergy. These commonly include itching, sneezing, cough and breathing difficulties but may also include diarrhoea, vomiting and cardiac arrhythmias. If high levels of histamine are released into the circulation this can lead to the worst case scenario of an allergic reaction, namely anaphylactic shock. This often kills within minutes unless prompt rescue medication is given (e.g.

adrenaline and anti-histamines followed by glucocorticoids).

While existing therapies for allergic diseases may temporarily alleviate certain symptoms they rarely lead to remission. Even the recently introduced Omalizumab, a state-of-the-art monoclonal antibody therapy that prevents IgE from binding to mast cells and basophils, is too costly for wide application within the NHS and there are reservations as to its effectiveness in the light of placebo controlled trials. The fact that mast cells and basophils from various species display different behaviours has stifled our attempts to generate more effective anti-allergic drugs and much funding into various rodent models of allergy has yet to yield major breakthroughs because of this heterogeneity.

Our own research is concerned with how to prevent human basophils and mast cells from releasing allergic mediators. Basophils support the underlying tendency of the immune system to react in an allergic manner (by releasing the cytokine mediator IL-4) and the prevention of their activation may lead to the remission of

chronic allergic inflammation. We have identified several key signalling pathways which control their activation and aim to target these pathways with new anti-allergic compounds. One method is to utilize the cells' own brake mechanism which is a phosphatase called SHIP-1 that switches off cellular activation. Together with colleagues in Israel, we are currently testing new antibodies that selectively trigger inhibitory receptors on these cells. Another exciting approach in finding a cure for allergies and preventing anaphylactic shock is allergen immunotherapy, where, under clinical supervision, a very low allergen dose is applied to the sufferer and then increased over time in order to develop tolerance. This involves reconditioning the immune system to stop producing allergen-specific IgE antibodies. However, before this takes place, patients often notice some improvement which may be due to desensitization of basophil and mast cell activation. Together with colleagues in the UK and France, we are now investigating how this desensitization works in order to improve allergen immunotherapy. Understanding how to manipulate the machinery that deactivates these allergic effector cells will eventually deliver a much needed breakthrough in the treatment of allergic diseases.



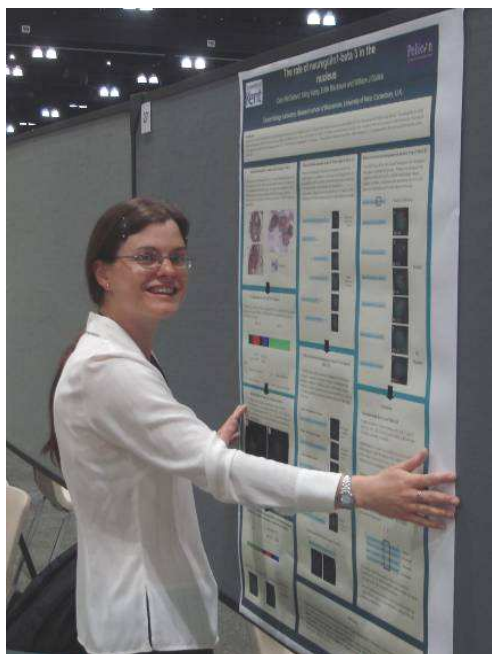
Bernhard studied Medicinal Chemistry as an undergraduate at University College London where he also completed his PhD in 1995. Thereafter, he led a research group at the University of Lübeck in northern Germany where he obtained his Habilitation in the field of "Experimental Allergology" in 2003. He joined the Medway School of Pharmacy in 2006 as a Senior Lecturer in Immunopharmacology. His research interests have focussed on human basophils and mast cells, which play a crucial role in propagating allergic diseases. In addition to his teaching and research at the School he is a *Privatdozent* at the University of Lübeck, council member of the European Histamine Research Society and member of the European Academy of Allergy and Clinical Immunology. He is author of over 50 peer-reviewed articles and was recently admitted into membership of the prestigious *Collegium Internationale Allergologicum*.

August issue:

In next month's article, Professor Fritz Mühlischlegel, Professor of Medical Microbiology in the Department of Biosciences will give views about Chlamydia.

Meet the Scientist

This month, we meet Dr Carol McClelland who is a Postdoctoral Research Associate in the Department of Biosciences, who shares her inspirations and interest in science. As a schoolgirl, Carol was inspired by the enthusiasm and teaching methods of her science teacher. Spurred-on by his encouragement to take A-Levels in Science, Carol is now conducting laboratory research into new targeted treatments for cancer.



Dr Carol McClelland, Postgraduate Research Assistant in the Department of Biosciences, presenting her work in the form of a poster at the Annual meeting for the American Association for Cancer Research in Los Angeles recently.

“How did you first get into science?”

Since I was a young girl I have been interested in the natural world and been fascinated by how living things work. But I was first really inspired by my science teacher at school, Mr Bird. His enthusiasm for the subject and the exciting way he taught made me want to continue on to A-levels and then a biology degree. During my undergraduate years and after a year out working in a histology laboratory in a hospital, I realised that my interests lay in human biology, particularly disease and I found cancer particularly fascinating. Here I had discovered something I was really interested in and that could help people, and I knew this was where I should be.

“What is the focus of your current research?”

Our group, led by Professor Bill Gullick, is interested in a group of proteins called the epidermal growth factor receptor (EGFR) family and we are investigating the role that this family plays in cancer. Within this family are a group of proteins called neuregulins

which have been shown to be involved in cancer and we are trying to work out the role of the many different forms of these proteins. From research undertaken on this family, many drug targets have been discovered including Herceptin used to treat breast cancer which targets a receptor in the EGFR family called ErbB2

“Can you tell us about your current research group, what the group is working on and the purpose of the research?”

My research is focused on 'neuregulin 1 beta 3' which is found in the nucleus of cells. This protein is not usually found in the nucleus as neuregulin 1 usually binds to receptors on the cell surface sending signals from the cell surface to the nucleus leading to different cell responses e.g. cell death and differentiation. Neuregulin 1 beta 3 is found in the nucleus without the presence of the receptors it usually binds to on the cell surface so I am trying to find out why it is there, what it is doing in that part of the cell, and if it also has a role in cancer.

“How has research in your area changed over the past few years?”

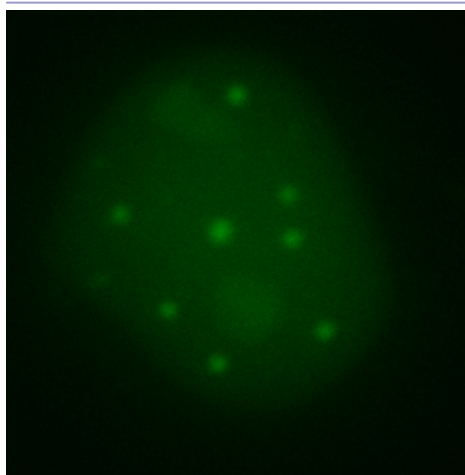
There has been an interest in the role of the EGFR family of proteins since the first member of the family, EGF, was discovered by Stanley Cohen in the 1960's. Since then much research has been undertaken into this family but the sequencing of the human genome, completed when I was in the early stages of my PhD, has opened up so many other areas of research and increased our understanding enormously. There have also been significant improvements in molecular biology techniques, mass spectrometry to analyse proteins and bioinformatics since the genome was completed.

“What do you consider is the most significant accomplishment in research in your area in the last few years?”

When the crystal structure of EGFR was solved, new drugs could be designed to target the binding sites of these proteins using the knowledge of these structures to stop cancer cells growing. This information could also be used to see why drugs fail and why small changes in structure could have big effects. The search for more targeted treatments for cancer has also begun, targeting the cancers of individuals, tailoring the dose of a drug to each patient so that the drug is working optimally for that patient.

“What kind of challenges do you see lie ahead in your specialism in the future?”

There are always many challenges, these systems are so complex and the actions of one protein or the actions of one drug on a protein can have effects on many other proteins and systems that we still have a lot to learn about. Completely targeted treatments are going to be very challenging with such a complex system but in the long term will benefit patients and clinicians alike.



Neuregulin 1 beta 3 is found in the nucleus of cells and forms a speckled pattern.

To show this Neuregulin 1 beta 3 was tagged with green fluorescent protein and visualised using low light digital microscopy.

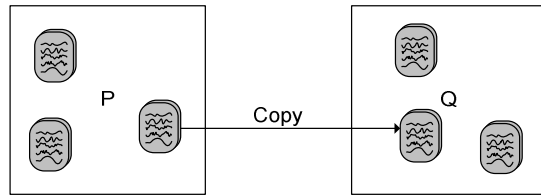
Next month's issue: Dr. Dominique Chu, Academic Fellow in the Computing Laboratory will give us an insight into how he developed his interest in Bio-inspired Computing and Systems Biology.

Implicitly Mobile Data

Lightening the load in occam-pi

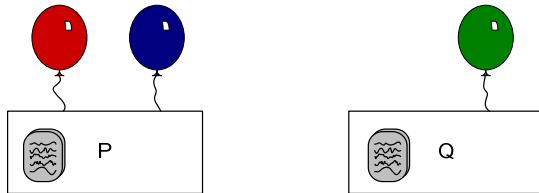
1. Original Model

Processes sharing data (and writing to it concurrently) are a source of programming bugs, because multiple conflicting concurrent writes can leave data in an incoherent state. The occam programming language solved this in the past by prohibiting shared data, leaving encapsulated processes with only private data. Private data (the stone tablets) can only be sent to other processes (from P to Q) by copying, but this is very slow.

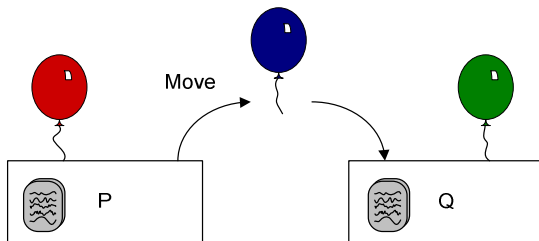


2. Explicit Mobility

To address this inefficiency without the hazards of shared data, occam-pi (the successor to occam) introduced explicit mobility. Data can be explicitly tagged by the programmer as mobile (the balloons):



When mobile data is sent between processes it is transferred, which is very fast. This means that the sending process P loses the reference to the data (the blue balloon's string), and cannot access the data again afterwards.



To support explicit mobility, the compiler performs *usage analysis* on the program and generates an error if a process that no longer holds a reference to data tries to read it, for example in this pseudo-code for P:

```

Declare mobile data blue
Write a value to blue
Send blue from P to Q ← Reference lost
Read from blue ← Compiler generates error here
    
```

This new movement behaviour requires the programmer to write their programs differently. To avoid this, and the burden of explicit tagging, we introduce implicit mobility.

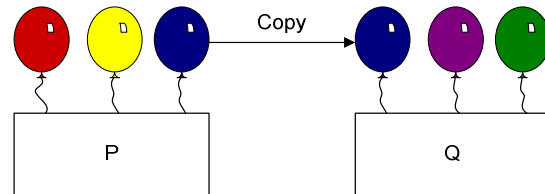
3. Implicit Mobility

Implicit mobility allows programmers to write as they did for the original occam, dealing only with copying behaviour. But behind the scenes, all data is actually mobile.

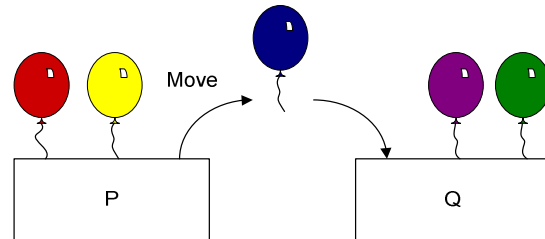
Instead of using the usage analysis to decide when a program has an error, the compiler makes the decision to either move or copy data. If the data is not read from again by the same process, it can safely be moved, otherwise it must be copied. So we have:

```

Declare blue
Write a value to blue
Send blue from P to Q ← Copies due to following line
Read from blue
    
```



If the final line of the previous code was removed, the compiler would instead decide to move the value:



Implicit mobility makes programs almost as efficient as using explicit mobility. It retains the simple copy semantics of occam and does not introduce any new features to the language itself.

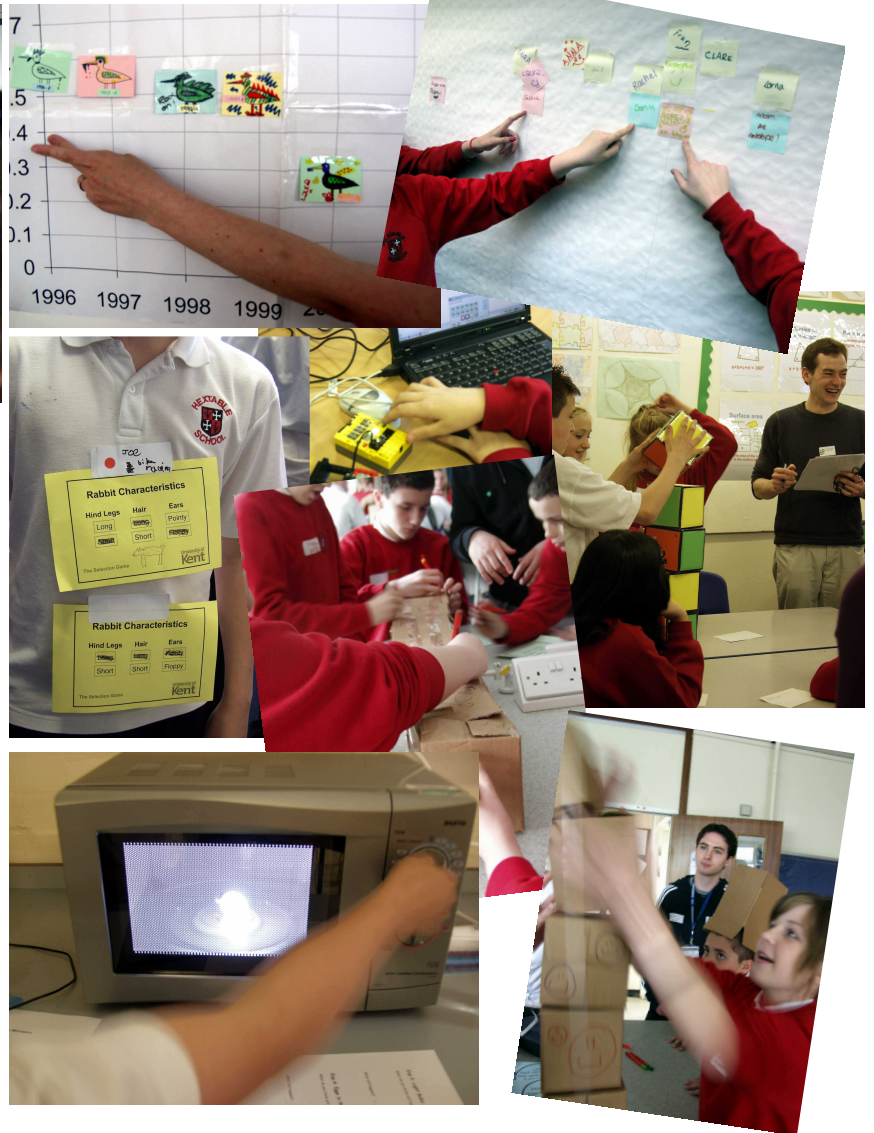
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Science Extravaganza is sell-out success



This year's Science Extravaganza on the 23rd June saw 16 schools and their year 8 students descend on the Canterbury University Campus to take part in workshops and competitions. Now in its second year, the Science Extravaganza offered 420 student places to local schools and colleges but such was the demand, the event was over-subscribed. The workshops were funded by the Faculty of Science, Technology and Medical Studies and The Partnership Development Office and took place in departments across the Faculty, namely Biosciences, Mathematics, Computing, Electronics, Physical Sciences and Pharmacy. The programme for the students was to attend one of 2 lectures and then to choose two out of ten 90-minute workshops.

The increasing popularity of science, technology, engineering and mathematics (STEM)-related subjects for students in years 7, 8 and 9, is placing greater demands on the Faculty's outreach work which already hosts regular activities for GCSE and A-Level students.



Science Extravaganza Competition Winners

Each student was given a booklet with questions that related to the 10 workshops and the 2 talks. There were also tie-breaker questions and prizes were awarded to the following:-

Sophie Satchwell; Maidstone Girls grammar School—ipod

Eleanor Grimshaw; Highsted Grammar School—place on SPS Space School

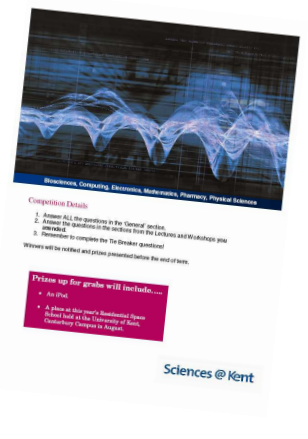
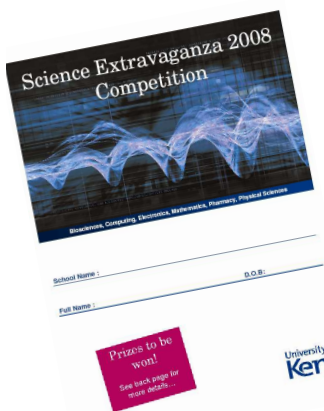
Joseph Brookman; The Howard School—place on SPS Space School

Jack Walbyoff ; Canterbury High School—Smiths Voucher

Kelly O'Connor; Archbishops School—Smiths Voucher

David Cabell; New Line Learning Academy—Smiths Voucher

Maisie Davenport; Highsted Grammar School—Smiths Voucher



Travelling Scientists

Presentations on Blood in Sweden and Poland



Dr Anthony Baines, Reader in Molecular Cell Biology in the Department of Biosciences

Dr Anthony Baines has recently returned from visiting Sweden and Poland. He was an invited speaker at two recent conferences where he gave talks entitled "The CAMSAPs". The first conference, "The Cytoskeleton - Regulation and Motility, 2008" took place between the 13 - 15 June and was hosted by The Swedish Association for Cytoskeletal Research at Djurönäset conference centre in the Stockholm Archipelago. The second conference, "Membrane Skeleton: Recent Advances and Future Research Directions" took him to Poland between the 15 - 18

June where the event took place at Zakopane in the Tatra Mountains.

The conferences coincide with the publication of an illustration that goes along with Anthony's paper:

"Mechanisms of elliptocytosis: significant spectrin substitutions" which features on the front cover of the June 15th issue of the journal "Blood". For more information on Anthony's article in Blood, please follow the link :

<http://bloodjournal.hematologylibrary.org/content/>



University of Salzburg, Austria

Dr Campbell Gourlay travelled to Austria in June where he presented an invited lecture to the Department of Cell Biology and Genetics at the University of Salzburg on the 20th of June. Campbell's research focuses on the role of actin organisation in apoptosis and ageing.

The visit has helped to establish some exciting possibilities for future collaborative work between Campbell's group and well established researchers at Salzburg who carry out research into in the role of mitochondrial function and translation in the process of cellular ageing.



Dr Campbell Gourlay, Research Fellow and Member of the Cell and Developmental Biology Group in the Department of Biosciences

From Barcelona to Bucharest

Darren Griffin, Professor of Genetics in the Department of Biosciences travelled to Spain and Romania in June. He attended the European Society of Human Genetics meeting held in Barcelona on 31st May - 3rd June where he presented a talk on the contentious issue of Preimplantation Genetic Screening that was sponsored by 'One Cell Systems' and 'Bridge Genoma'. He then travelled to Bucharest on June 8th with other scientists from his laboratory to attend the International Colloquium on Animal Cytogenetics and Gene Mapping (ICACGM) (8-12th). Professor Darren Griffin and Dr Martin Völker, his Post Doctoral Research Assistant gave plenary lectures. PhD students Ben Skinner and Kate Fowler gave oral presentations and PhD student Gothami Fonseka presented a poster and short oral presentation, with Ben Skinner winning a prize for one of the best oral presentations of the conference. Delegates were treated to a display of Eastern European music, food, hospitality and service. Highlights included a visit to Dracula's castle.

Broadband and Wireless in Sweden

Five members of the Broadband and Wireless Communications group, Dr Nathan Gomes, Dr David Wake, Dr Anthony Nkansah, Jeanne James and Philip Assimakopoulos attended the 6th ISIS workshop on "Fibre to the Home, Wireless Communications and their Interaction" in Stockholm, on 2 and 3 June.

Jeanne and Philip presented posters on their work. David Wake presented an invited paper on in-building fibre distributed antenna systems, while Nathan Gomes chaired the panel session which debated how wireless and optical technologies could best be merged for future broadband services.



Dr Nathan Gomes, Reader in Electronic Engineering in the Department of Electronics

...and Beijing

Professor Peter Clarkson gave an invited talk on "Vortices and Polynomials" at an international conference on "Nonlinear Waves - Theory and Applications" held at Tsinghua University in Beijing, China, 9th-12th June 2008.

Advance Notice – Key Events – September



1st Canterbury Workshop
on Optical Coherence Tomography & Adaptive Optics
8th-10th September 2008

University of Kent

HOME PROGRAMME LOCATION COMMITTEE SUBMISSIONS FEES SPONSORS OCT @ KENT

Programme

Tutorials/Invited Speakers

- Helder Crespo and Carla Rosa: Femtosecond lasers in OCT
- Christopher Dainty: Adaptive Optics
- Fabrice Harms: Applications of Adaptive Optics in ophthalmology
- Antonio B. Lobo Ribeiro: Optical Fibre Sources for Measurement and Imaging
- Yoshiaki Yasuno: Optical Coherence Tomography for the Investigation of Posterior and Anterior Eye Segments
- Robert Huber: "Wavelength swept laser sources: Technology and applications for optical coherence tomography"
- A.R. Tumlinson: Retinal intrinsic optical signal and optical coherence tomography
- David D. Sampson: Anatomical optical coherence tomography of the upper and lower airway,
- Haida Liang, Optical Coherence Tomography in Art Conservation & Archaeology – a new emerging field
- C. Torti: Revealing fine microstructural morphology in the living human retina using optical coherence tomography with pancorrection
- Jannick Rolland, Gabor Domain Optical Coherence Microscopy
- M. Pircher, Simultaneous SLO/OCT Imaging of the Human Retina in vivo with High Speed Axial Eye Motion Correction
- Robert J. Zawadzki, Challenges and possibilities for developing adaptive optics - ultra-high resolution optical coherence tomography for clinical in vivo retinal imaging



The Workshop and School will put emphasis on two aspects of non-invasive optical imaging, optical coherence tomography (OCT) and adaptive optics (AO), and will consist in tutorials, invited and regular papers presented in the following sessions:

- OCT Microscopy
- OCT in the clinic
- OCT technology
- Optical sources I
- Optical sources II
- Modulation of optical reflectivity
- OCT for art
- Adaptive Optics I
- Imaging the eye I
- Adaptive Optics II
- Imaging the eye II
- Two poster sessions
- Visits of the Applied Optics Group Labs
- Tutorial in intellectual property rights.

Conference fee:

This includes: access to the conference room, exhibition room, visit to the OCT/AO labs, coffee/tea, 3 lunches, drinks and nibbles during poster sessions, gala dinner, and the proceedings of the workshop on a CD.

Please fill in the form on the web at:

<http://www.kent.ac.uk/physical-sciences/oct-ao/fees.htm> and send it by email to:

wsoctao@kent.ac.uk and to p.c.douglas@kent.ac.uk with the "conference fee" in the subject line

Registration fee

Registration before 15/08/2008: £170

Registration after 15/08/2008: £195

Cancellation charges: 20% before 1st Sept., 50% after

A limited number of places for one day attendance (no proceedings, no dinner) are available for a registration fee of £45 (£52 after 15/08/2008).

For any further information please write to wsoctao@kent.ac.uk or contact:

Adrian Podoleanu, email ap11@kent.ac.uk Tel: +44 1227 823272

or George Dobre, email: g.dobre@kent.ac.uk

Sponsors



MARIE CURIE ACTIONS

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University of Kent, Canterbury, UK



Imagine Eyes, Paris, France



Michelson Diagnostics Ltd, Kent, UK



Multiwave Photonics, Porto, Portugal



Thor Labs



SUPERLUM, Moscow, Russia

MSc Studentships available

Biomedical Imaging

Four EPSRC CTA studentships are available for the [MSc in Biomedical Imaging](#).

The Biomedical Imaging is an internationally leading programme offering an advanced level of learning by providing students with a thorough understanding of the theories, concepts and application of major imaging systems used in medical and biomedical field.

The course covers the major forms of medical imaging including MRI, PET, ultrasound, CT, X-ray, and also the rapidly advancing fields of optical coherence tomography and molecular imaging. There is special emphasis on the use of computer techniques for manipulation and analysis of images, with modules on programming and medical image computing. Visiting lecturers include international authorities in the field. The programme includes lectures on applications of medical imaging given by leading clinicians from East Kent and London, industry scientists and bioscience researchers, case studies, laboratory work and visits to major facilities to see the imaging systems in action.

The MSc in BioMedical Imaging is aimed at those with a first degree in a numerate subject wishing to pursue a career and/or gain further knowledge in the area of medical imaging and image analysis.

The MSc programme is supported by EPSRC Collaborative Training Account funding and Ratiu Foundation UK; studentships are available. The EPSRC studentships are open to UK students, and cover payment of fees at the "home" rate and a maintenance grant of up to £12,000. EU students may also apply, but are only eligible for the payment of fees.

The Ratiu Foundation scholarship covers the tuition fees at the home/EU rate, plus a £3,000 scholarship. This scholarship is available to talented Romanian graduates.

Application Criteria

Applicants must normally hold a First or Second Class Honours degree, or equivalent qualifications subject to the University's approval, in a field related to the following:

- Biomedical Engineering
- Electronic or Mechanical Engineering
- Physics or Mathematics
- Computing
- Biosciences
- Medicine

All applicants will be considered on their own merits.

How to Apply for a place at the University of Kent

You may apply for a place on the programme using the [online form](#) by selecting "MSc - Master of Science Taught", and then choosing "BioMedical Imaging". You should apply for a place before applying for the studentship.

Acceptance on the Course

It is our policy to offer a place on the course to any applicant whom we believe to be well equipped to follow and likely to profit substantially from it. An offer of a place on the course does not constitute an offer of funding.

Applying for the Studentship

To apply for the studentship, candidates should send a CV and the names of two academic references to:

Information, Recruitment and Admissions Office

The Registry

University of Kent

Canterbury

Kent CT2 7NZ

e-mail. admissionspg@kent.ac.uk

tel. 01227 824123 (Postgraduate Admissions Processing)

This information can simply be a duplicate of the information provided to apply for a place.

The closing date for receipt of applications is Monday 28 July 2008

Recent Published Papers

Department of Biosciences

Sheth, Chirag C. , Mogensen, Estelle G. , Man Shun Fu, Blomfield, Ian C. and Mühlischlegel, Fritz A. (2008) "Candida albicans HSP12 is co-regulated by physiological CO₂ and pH" *Fungal Genetics and Biology*, 45, 1075-1080.

Tappenden, K.A., Gallimore, M.J., Evans, G., Mackie, I.J. and Jones, D.W. (2008) "Thrombin generation in whole blood – response to Al Dieri and Hemker" *British Journal of Haematology*, 141, 895-908.

Baines, Anthony (2008) "Mechanisms of elliptocytosis: significant spectrin substitutions". *Blood* 111, 5417.

Stymest, Krista H. and Klappa, Peter (2008) "The peroplasmic peptidyl prolyl cis-trans isomerases PpiD and SurA have partially overlapping substrate specificities" *FEBS Journal* 275, 3470-3479.

Leadsham, Jane E. and Gourlay, Campbell W. (2008) "Cytoskeletal induced apoptosis in yeast." *Biochimica et Biophysica Acta*. 1783 : 1406-12.

School of Physical Sciences

Carta, D., Casula, M.F., Mountjoy, G., Corrias, A. (2008) "Formation and cation distribution in supported manganese ferrite nanoparticles: an X-ray absorption study" *Physical Chemistry Chemical Physics*, 103, 108-3117.

O'Dell, L.A., Gunawidjaja, N., Holland, M.A., Mountjoy, G., Pickup, D.M., Newport, R.J., Smith, M.E. (2008) "Characterisation of sol-gel prepared (HfO₂)_x(SiO₂)_{1-x} (x= 0.1, 0.2 and 0.4) by ¹H, ¹³C, ¹⁷O and ²⁹Si MAS NMR, FTIR and TGA" *Solid State Nuclear Magnetic Resonance*, 33, 16-24.

Surfraz, M.B.U., Biagini, S.C.G., Blower, P.J. (2008) "A technetium intermediate specifically promotes deprotection of trifluoroacetyl HYNIC during radiolabelling under mild conditions" *Dalton Transactions*, 2920-2922.

Jiao, F., Hill, A.H., Harrison, A., Berko, A., Chadwick, A.V., Bruce, P.G. (2008) "Synthesis of Ordered Mesoporous NiO with Crystalline Walls and a Bimodal Pore Size Distribution" *Journal of the American Chemical Society*, 130, 5262-5266.

Leliwa-Kopystyński, J., Burchell, M.J., Lowen, D. (2008) "Impact cratering and break up of the small bodies of the Solar System" *Icarus*, 19, 5817-5826.

Caratti o Garatti, A., Froebrich, D., Eislöffel, J., Giannini, T., Nisini, B. (2008) "Molecular jets driven by high-mass protostars: a detailed study of the IRAS 20126+4104 jet" *Astronomy & Astrophysics*, 48, 5137-5152.

Burchell, M.J., Fairey, S.A.J., Wozniakiewicz, P., Brownlee, D.E., Hörz, F., Kearsley, A.T., See, T.H., Tsou, P., Westphal, A., Green, S.F., Trigo-Rodríguez, J.M., Domínguez, G. (2008) "Characteristics of cometary dust tracks in Stardust aerogel and laboratory calibrations" *Meteoritics and Planetary Science*, 4323-4340.

Department of Electronics

Sheng, W., Howells, G., Fairhurst, M.C., Deravi, F. (2008) "Template-Free Biometric Key Generation by Means of Fuzzy Genetic Clustering" *IEEE Transactions on Information Forensics and Security*, 3, 183-191

Akehurst, D.H., Howells, W.G., Zschaler, S. (2008) "OCL: Modularising the Language" *Electronic Communications of the EASST* 9, 1-20 - online only ISSN 1863-2122

Akehurst, D.H., Howells, W.G., Scheidgen, M., McDonald-Maier, K.D. (2008) "C# Makes OCL Redundant" *Electronic Communications of the EASST*, 9 - online only ISSN 1863-2122

Chapran, J., Fairhurst, M.C., Guest, R.M., Ujam, C. (2008) "Task-Related Population Characteristics in Handwriting Analysis" *IET Computer Vision*, 2, 75-87

Rabasse, C., Guest, R.M., Fairhurst, M.C. (2008) "A New Method for the Synthesis of Signature Data with Natural Variability" *IEEE Transactions on Systems, Man and Cybernetics, Part B: Cybernetics*, 38, 691-699

Robertson, J-B., Parker, E.A., Sanz-Izquierdo, B., Batchelor, J.C. (2008) "Electromagnetic Coupling through Arbitrary Apertures in Parallel Conducting Planes" *Progress in Electromagnetics Research B*, 8, 29-42

Sheng, W., Howells, G., Fairhurst, M.C., Deravi, F. (2008) "Template-Free Biometric Key Generation by Means of Fuzzy Genetic Clustering" *IEEE Trans. on Information Forensics and Security*, 3, 183-191

Veldhius, R., Deravi, F., Tao, Q. (2008) "Multibiometrics for Face Recognition IT-Sicherheit & Datenschutz" 3, 204-214 ISSN 1861-0641

Shao, J., Yan, Y. (2008) "Ultrasonic Sensors in Welding Chapter 5 in "Real-Time Weld Process Monitoring", Woodhead Publishing Ltd. ISBN 1845692683/978-1845692681

Recent Papers Presented at Conferences, Dept of Electronics

- Harmer, K., Howells, G., Sheng, W., Fairhurst, M.C., Deravi, F. (2008) "A Peak-Trough Detection Algorithm based on Momentum" International Congress on Image and Signal Processing (CISP2008), Sanya, Hainan, China
- Sheng, W., Harmer, K., Howells, G., Fairhurst, M.C., Deravi, F. "A Genetic Algorithm for Fingerprint Matching based on an Integrated Measure" IEEE Congress on Evolutionary Computation (IEEE CEC 2008), part of 2008 IEEE World Congress on Computational Intelligence (WCCI 2008), Hong Kong
- Wood, S.K., Akehurst, D.H., Howells, G., McDonald-Maier, K.D. (2008) "Array OL Descriptions of Repetitive Structures in VHDL" Fourth European Conference on Model Driven Architecture: Foundations and Applications (ECMDA), Berlin, Germany
- Lorrenz, P., Howells, G., McDonald-Maier, K.D. (2008) "An FPGA Based Adaptive Weightless Neural Network Hardware" Third NASA/ESA Conference on Adaptive Hardware and Systems (AHS-2008), Noordwijk, The Netherlands
- Papoutsis, E., Howells, G., Hopkins, A.B.T., McDonald-Maier, K.D. (2008) "Investigation of Sample Sizes and Correlations in Multi-Cluster Feature Distributions for an Efficient Encryption System" Third NASA/ESA Conference on Adaptive Hardware and Systems (AHS-2008), Noordwijk, The Netherlands
- Sartain, P., Hopkins, A.B.T., McDonald-Maier, K.D., Howells, G. (2008) "A Framework for Self-Diagnosis and Condition Monitoring of Embedded Hardware using a SOM-Based Classifier" Third NASA/ESA Conference on Adaptive Hardware and Systems (AHS-2008), Noordwijk, The Netherlands
- Hopkins, A.B.T., McDonald-Maier, K.D., Papoutsis, E., Howells, G. (2008) "Adaptive Online Profiling Hardware for ICmetrics Based Security" Third NASA/ESA Conference on Adaptive Hardware and Systems (AHS-2008), Noordwijk, The Netherlands
- Gomes, N.J. (2008) "Techniques for Millimeter-Wave over Fiber Communication Systems" Workshop on Radio over Fiber Technologies, IEEE Radio and Wireless Symposium (RWS 2008), Orlando, FL, USA - Invited presentation
- Shen, P., Magazov, S.R., Gomes, N.J., Davies, P.A. (2008) "Multi-Wavelength Clock Signal Generation Implemented by an Optical Frequency Comb Generator" Optical Fiber Communications Conference (OFC 2008), San Diego, CA, USA
- Assimakopoulos, P., Nkansah, A., Gomes, N.J. (2008) "Use of Commercial Access Point Employing Spatial Diversity with Switched Combining in a Distributed Antenna Network" 6th IIS Workshop of FTTH, Wireless Communications and their Interaction, Stockholm, Sweden
- James, J., Shen, P., Nkansah, A., Gomes, N.J. (2008) "Optical nm-Wave Up-Conversion of Closely Separated Channels using Optical Phase Modulator" 6th IIS Workshop of FTTH, Wireless Communications and their Interaction, Stockholm, Sweden
- Sanz-Izquierdo, B., Robertson, J-B., Parker, E.A., Batchelor, J.C. (2008) "Small FSS Arrays for Indoor Communications" International Workshop on Antenna Technology, Chiba, Japan
- Sanz-Izquierdo, B., Batchelor, J.C. (2008) "A Dual Band Belt Antenna" - Winner of Poster Prize International Workshop on Antenna Technology, Chiba, Japan
- Robertson, J-B., Sanz-Izquierdo, B., Batchelor, J.C., Parker, E.A. (2008) "Frequency Selective Structures for Wideband Applications Proc." 2008 NATO Advanced Research Workshop, Metamaterials for Secure Information and Communication Technologies, Marrakesh, Morocco - Invited
- Carter, R.M., Yan, Y. (2008) "A Novel Imaging System for Concurrent Measurement of Particle Velocity and Size Distribution in a Pneumatic Suspension" Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Victoria, Vancouver Island, 2050-2054
- Chen, X.Y., Wang, H.X., Shi, X.L., Yan, Y., Cui, Z.Q. (2008) "Lung Ventilation Monitoring Incorporating Prior Information by Electrical Impedance Tomography" Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Victoria, Vancouver Island, 1531-1536
- Cui, Z.Q., Wang, H.X., Tang, L., Zhang, L.F., Chen, X.Y., Yan, Y. (2008) "A Specific Data Acquisition Scheme for Electrical Tomography" Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Victoria, Vancouver Island, 726-729
- Wang, C., Meng, J., Huang, C.Y., Yan, Y., Wang, H.X. (2008) "A Digital Electromagnetic Induction Measurement System based on FPGA" Proceedings of IEEE International Instrumentation and Measurement Technology Conference, Victoria, Vancouver Island, 712-716
- Weston, J., Lee, P. (2008) "FPGA Implementation of Cellular Automata Spaces using a CAM Based Cellular Architecture" NASA/ESA Conference on Adaptive Hardware and Systems
- Nnolim, U., Lee, P. (2008) "Homomorphic Filtering of Colour Images using a Spatial Filter Kernel in the HIS Colour Space" I2MTC2008 - IEEE International Instrumentation and Measurement Technology Conference, Victoria, Vancouver Island, Canada
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Recent Grants Awarded

Department of Biosciences

Dr Mark Smales-Department of Biosciences has been awarded £746,935 for a project entitled 'Development of predictive tools for the isolation of highly productive recombinant cell lines', from Lonza Biologics plc.

Computing Laboratory

Professor Simon Thompson-Computing Laboratory has been awarded €366,495 930 for a project entitled 'Pro-Test: Property-based testing', by the European Commission FP7.

Professor David Chadwick-Computing Laboratory has been awarded £12,500 for a project entitled 'Project 78:JISC e-Portfolio HE Scenario Research Project (HEEPSS)', by Alpha Plus Consultancy Limited.

David Soud-KITC Support, Computing Laboratory has been awarded £800 for funding for KITC Support from P De Jager & Sons Limited.

Department of Electronics

Dr Nathan Gomes-Department of Electronics has been awarded \$100,216 for a project entitled 'ALMA Back End 1st LO Photonic Reference', from the National Radio Astronomy Observatory (NRAO).

Professor Jingzhou Wang-Department of Electronics has been awarded ¥16,000,000 for a project entitled 'MIMO in 4G Broadband Mobile communications', from the NTT DoCoMo.

Institute of Mathematics, Statistics and Actuarial Science

Dr Andy Hone-IMSAS has been awarded £2,500 funding for a vacation bursary in Mathematical Biology, from the Biotechnology and Biological Sciences Research Council

School of Physical Sciences

Professor Alan Chadwick-School of Physical Sciences has been awarded £147,345 funding for a project entitled 'An investigation of remediation methods for the sulfur problem in Mary Rose Timbers', from The Mary rose Trust.



The Formation of a New Star Cluster



The Rosette Nebula is a large, circular region located near one end of a giant dark cloud in our Galaxy. The ultraviolet light from a large group of hot massive stars (called NGC 2244) excite the atoms which then eject some of their electrons. In addition, the winds from these stars exert pressure on interstellar clouds to cause compression, followed by star formation in the nebula.

This image was taken in the infrared in order to see within the dark cloud. It demonstrates that a new cluster of stars is forming. The image, actually three combined images taken at different wavelengths to simulate three colours, was taken at the United Kingdom Infrared Telescope on top of Mauna Kea in Hawaii in a project led by Professor Michael Smith, who is in the process of investigating the nature of these new clusters and the wisps and ridges of clouds around them with colleagues in China, USA and Germany.

A first Letter to announce these exciting results was recently published in *Astrophysical Journal Letters*, 2008, 679, L101-L104.

Professor Michael Smith,
Professor of Astronomy,
School of Physical Sciences
<http://astro.kent.ac.uk/mds/mdsmith.htm>

Café Scientifique for 2008 Will resume in September at Ye Olde Beverlie, St Stephen's Green, Canterbury

Summer Break

Sep 9th 2008

Professor John Dore: Water: The magic of molecular science

Oct 14, 2008

Dr. Arnaud Wisman: Facing Death: How do we regulate the awareness of our own mortality

<http://www.cs.kent.ac.uk/people/staff/dfc/site/CS/>

Nov 11, 2008

Dr. Martyn Amos (Manchester Metropolitan University): Genesis Machines

Dec 9, 2008

Professor Martin Warren, Department of Biosciences: TBA

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