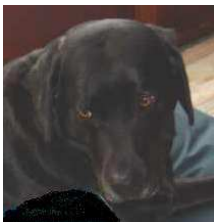


April 2009

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View from the Dean's Office

Happy Easter to all our readers! A bumper issue awaits with news of prizewinners, visitors and grant successes. The stories inside will tell you something about what we do within 'Sciences@Kent' and what impact this can have on everyday life. For example, learn about how fly research can impact on understanding about hearing loss (page 5) or how dogs, gyms and pharmacists come together in research on depression (page 7). You can follow up this work by visiting our website (www.kent.ac.uk/stms) but we are, as always, interested in hearing feedback from you about our newsletter or about articles you would like to see included, or you would like to contribute to. Please contact me (p.jeffries@kent.ac.uk) or our tireless editor Joanna (j.l.walpole@kent.ac.uk). You might also be interested in our new Faculty Plan (<http://www.kent.ac.uk/stms/faculty-office/departmentplans.html>) which is produced at this time of year as part of an annual planning cycle. Again, we would appreciate any feedback you can offer.

Best wishes.
Peter

Electronics Student Shows Design Flair

Hamza Al-Akesh, a Computer Animation MSc student, in the Department of Electronics was the winner of the Woolf Student Committee competition for the design of the new logo for the newly-built Woolf College. Hamza is pictured here being awarded his prize-winner's cheque for £100 by the Vice-Chancellor, Professor Julia Goodfellow at the official opening of Woolf College on Friday 13 March by Allan Willett CMG, Lord Lieutenant of Kent.

For more details of Hamza's design of the logo for Woolf College and more prizewinners from the Department of Electronics please turn to page 8



University Teaching Prize Winners 2008-2009

The University Teaching Prize winners have been announced and included amongst them are two scientists from the Department of Biosciences. The STMS Faculty Teaching Prize was awarded to Dr Peter Klappa for his successes in helping students to develop as effective learners. The panel particularly noted Peter's use of team-based, peer-assessed 'pub quizzes' as a lightweight formative assessment mechanism, and the obvious enthusiasm with which his students viewed this and other interventions.



Dr Peter Klappa, Senior Lecturer in Biochemistry



Darren Griffin, Professor of Genetics

The new Postgraduate Supervision Prize was awarded jointly to Professor Darren Griffin and Dr Stefan Rossbach from Politics and International Relations in the Faculty of Social Sciences. In addition to demonstrating excellent supervision skills themselves, both winners were commended by Professor Diane Houston, Dean of the Graduate School, for the different ways in which they had worked to improve the overall postgraduate experience within their departments, and fostered an active and productive postgraduate research community.

Engineering "ambassadorship" for Head of Electronics

Professor Sarah Spurgeon, Head of the Department of Electronics, has been appointed an 'engineering ambassador' for the Royal Academy of Engineering (RAE).

As part of her new role, effective from now until July 2011, Professor Spurgeon will help represent and promote the Academy's work, policies and achievements in education and engineering to the media.

Professor Peter Jeffries, Dean of the Faculty of Science, Technology and Medical Studies, was among those to acknowledge Professor Spurgeon's new role. He said: 'Professor Spurgeon is an excellent role model for the Academy. Engineering is a much wider subject nowadays than the traditional view might suggest and we are pleased that her contribution has been recognised in this way.'

Professor Spurgeon said 'I am delighted to have been given this opportunity by the Academy to promote the discipline of engineering, in all its guises. Engineering has a vital role to play in many of the challenges facing 21st century society including security, energy and healthcare and is key to our future economic growth, prosperity and well-being'.

In 2008, Professor Spurgeon received the highest accolade in her discipline when she was elected a Fellow of the Academy. Election to the RAE is by invitation only; up to 60 Fellows are elected each year from nominations made by existing Fellows.

Professor Sarah Spurgeon



Software Release on Open Licence

Two highly popular software systems, developed by the University of Kent for the learning and teaching of programming, have been released under an open source licence.



BlueJ, first released in 1999, is the world's most popular integrated learning environment for the teaching of object-oriented programming. With over 1000 institutions worldwide using it in their teaching, and more than one million downloads per year, it has a large community of enthusiastic users.



Greenfoot is a second environment aimed at teaching programming, specifically aimed at secondary school level. Being newer than BlueJ (released in 2006), it gained popularity very quickly. In 2008, it was downloaded 220,000 times from the universities servers. Both projects are supported by Sun Microsystems.

Both systems have previously been free to use, but the source code was not available. Now the BlueJ/Greenfoot development team, working in the Computing Education research group at the Computing Laboratory at the University of Kent, have opened the source code for everyone to download, read and modify.

This step makes another significant contribution to the programming teaching and learning community. Other institutions can now download and adapt the system for their own purposes, use it as a basis for student projects, include it in open source packages (such as Linux distributions), and donate contributions back to the community.

Michael Kölling, project leader of the BlueJ and Greenfoot projects, said:

"I think this will be very well received by our users. People have asked for this many times in the past, but we had technical reasons why we were reluctant to use an open source license. These issues have now been resolved, and we are happy that the University of Kent can make another significant contribution to the programming education community around the world."

The development team at the Computing Laboratory at Kent will continue to lead further development of both systems and provide user support, as it has done in the past.

International Research Collaboration in Trieste

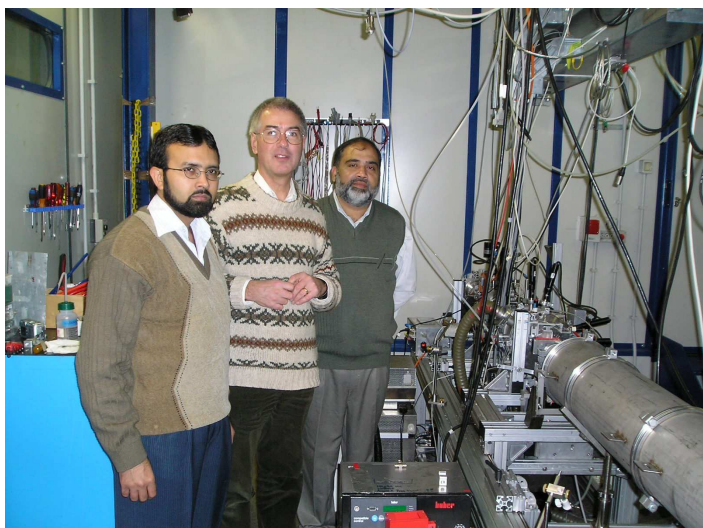
Dr Robert Benfield, Senior Lecturer in Inorganic Chemistry, and a member of the School of Physical Sciences Functional Materials Group, has been developing a new international research collaboration with a group from the Pakistan Institute of Engineering and Applied Sciences (PIEAS). This group, based in Islamabad, is led by Professor Mazhar Mehmood. The joint research project is studying aluminium oxide membranes as host materials for nanowires of metals, including magnetic metals such as cobalt. To understand and control the properties of these new functional materials, it is vital to characterise their structures on a variety of length scales. The best ways to do this involve different types of X-ray spectroscopy, and the experimental work is carried out at international synchrotron laboratories.

Dr Benfield was first approached by the Pakistan group in 2006, after they had seen his earlier papers on metal nanowire materials in leading journals such as the Journal of Physical Chemistry and Faraday Discussions.



Abdul Waheed controlling a synchrotron experiment

Abdul Waheed, a Ph.D. student, spent six months in Kent working on data analysis under Dr Benfield's supervision, during 2007, funded by a research scholarship awarded by the Pakistani Higher Education Commission (HEC). More recently, Dr Benfield and the PIEAS group carried out an X-ray scattering experiment at the ELETTRA synchrotron in Trieste, Italy (see pictures). Funding for this experiment was awarded by a programme jointly run by ELETTRA and the International Centre for Theoretical Physics in Trieste. Dr Benfield said, "This research collaboration is very timely. There is some excellent scientific research being done in Pakistan, and the HEC has initiated a strategy to increase its international impact by collaborations and joint publications. Our earlier work on metal nanowires had raised a number of unanswered questions about their structures. The PIEAS group have developed several new preparation methods for their membranes and nanowires. Comparing the differently prepared materials gives an ideal opportunity to understand the effects controlling their structures". Dr Benfield has now been invited to act as an external examiner for the PIEAS Ph.D. programme.



Dr Benfield (centre), with Dr Jimal Ahmad & Prof Mazhar Mehmood, at the ELETTRA (Trieste) synchrotron

Mamma Mia! Production Designer shares design secrets with Kent MSc students

Maria Djurkovic, veteran production designer on feature films such as "The Hours" with Nicole Kidman, "Vanity Fair" with Reese Witherspoon, and the all-time British box-office champion "Mamma Mia" with Meryl Streep, visited the Department of Electronics in March to give extended lectures to Computer Animation and Digital Visual Effects MSc students on how to go about designing looks and sets for films.

The students, about to embark on their final film projects, were fascinated to be shown the methodology, reference images and plans that resulted in the enormous Greek island village set that was built on the Bond film stage at Pinewood for "Mamma Mia", including special surfaces designed not to trip up leading actress Streep. The methods of assembling reference and choosing final designs for live action movies are identical to those involved in creating 3D computer-animated and digital set extensions that the students are engaged on.

David Byers-Brown, who leads the Masters programmes in Computer Animation and Digital Visual Effects, said: 'We are very lucky to be able to present the ideas and approaches of a professional production designer with such current and cutting edge experience. This is exactly where we want to set the bar for our students' abilities on graduating. We aim to produce graduates able to fit right in to the current film industry in Britain.'



Maria Djurkovic

Leverhulme Visiting Professor Award

The Leverhulme Trust has awarded the Department of Electronics £21,300 for a Visiting Professorship to enable Professor Vadim Utkin from the Ohio State University, Columbus, USA, to visit the department for a period of three months. In 2008 there were only 21 Visiting Professor awards made by Leverhulme - two in applied sciences, nine in basic science, nine in humanities and one in fine and performing arts, throughout the country. This success for Kent in the 2009 round is very good news.

Professor Utkin is one of the originators of the concepts of Variable Structure Systems and Sliding Mode Control. He is an author of five books and more than 270 technical papers. He has worked on the control of D.C., induction, and synchronous drives using sliding mode techniques in metal-cutting machine tools, process control and electric cars. His current research interests are the control of infinite-dimensional plants

(including flexible manipulators), sliding modes in discrete time systems, microprocessor implementation of sliding mode control, control of electric drives and alternators, robotics and motion control, IC (Internal Combustion) Engine control.

He is an Honorary Doctor of the University of Sarajevo, Yugoslavia and in 1972 he was awarded the Lenin Prize (the highest scientific award in the former USSR).

Professor Utkin was IPC chairman of 1990 IFAC Congress in Tallinn; now he is Associate Editor of "International Journal of Control".

Currently, Professor Utkin teaches courses on control principles for undergraduates, and courses in Optimal control, State Methods for Dynamic Systems Analysis and Control and Sliding mode control in electromechanical systems at the graduate level.



Professor Vadim Utkin who will be visiting the Department of Electronics from the Ohio State University in the USA.

Professor Utkin has held visiting positions at universities in the USA, Japan, Italy and Germany.

Electronics are awarded a second Distinguished Visiting Fellowship



Dr. John Batchelor and Professor Jiangzhou Wang in the Department of Electronics have been awarded a Distinguished Visiting Fellowship by the Royal Academy of Engineering, the second for the Department in recent months.

Professor Vijay Bhargava, the former Head of Department of Electrical and Computer Engineering at the University of British Columbia in Canada and the Editor-in-Chief of

the IEEE Transactions on Wireless Communications, is an internationally well-known Professor and has made a significant contribution to communications theory, especially in the field of wireless communications. He will visit eight British universities and deliver a seminar on advances in wireless communications in each university. Professor Bhargava's visit, which is scheduled to start on the 10th May 2009, will be hosted by the Department of Electronics.

Professor Vijay Bhargava

Invitation to nominate the 2009 Wain Lecture

As a result of a generous endowment from the family of the late Professor Louis Wain CBE, FRS, the University of Kent has established an annual Medal Lecture and Award in his memory.

The Wain Medal is awarded to a young scientist doing exceptional research in biochemistry. Candidates for the award must be under the age of 40 at January 1st in the year of the award and of British nationality. The successful candidate may be working in the United Kingdom or abroad. The Medal Lecture is a public lecture held within the University of Kent and the lecturer is expected to engage a wide audience in his/her presentation. In addition to the Medal, the successful candidate is given an Award of £1,000. Previous Medal winners have been Professors Gregory Challis, University of Warwick and Ben Davies, University of Oxford.

Nominations are now invited for the 2009 award. The curriculum vitae of the nominee and a covering letter explaining the reasons for the nomination should be sent to Professor Alan Bull (Chair of the Selection Panel) by June 12th by email to A.T.Bull@kent.ac.uk, or by post. The Lecture and Award presentation will take place in October/November 2009 at a date to be announced.

Address:

Professor Alan T. Bull
Department of Biosciences
University of Kent
Canterbury
Kent CT2 7NJ

Research Focus in the Faculty

In conjunction with the 200th anniversary of Darwin, we are featuring some of our scientists and their particular areas of research. This month, the focus is on current research being carried out in the Department of Biosciences by Dr Nerissa Marziano and Dr Pauline Phelan and their collaborative research with colleagues at University College London.

Flies have Ears Too!



Dr Pauline Phelan,
Lecturer in Cell Biology

Approximately one in every thousand babies is born with some degree of hearing loss, making deafness the most common sensory deficit in humans. In approximately half of these cases, the hearing loss has a genetic cause. Predominantly, mutations in genes encoding gap-junction proteins, connexins, have been linked to deafness with over 100 mutations so far identified. In fact, gap-junction gene mutations are responsible for ~80% of cases of hereditary sensorineural deafness. These findings indicate the vital role that gap junctions play in auditory function. Gap junctions

are intercellular channels that allow neighbouring cells to communicate directly with one another. They are found throughout the inner ear and are proposed to be involved in recycling potassium ions, which are essential for auditory transduction, but their precise functions are unknown.

Dr. Nerissa Marziano, a Daphne Jackson Research Fellow, and lecturer Dr. Pauline Phelan, both based within the Department of Biosciences, are developing a project to study this essential intercellular communication within the ear. Instead of humans, however, they will be looking at the ear of the fruit fly, *Drosophila*

melanogaster, and establishing whether the fly can be used as a model to study the role of cell-cell communication in auditory function. This work will be carried out in collaboration with researchers at the Ear Institute at University College London, an internationally-renowned research centre that houses the largest group of hearing-related scientists in the UK.

The *Drosophila* ear, known as Johnston's organ, is located in the fly's antennae (see figure). Johnston's organ is a mechanosensitive organ that responds to the wing-beat of flies during courtship songs. It comprises ciliated sensory neurons together with various supporting cells; mechanical stimulation of the organ results in electrical signals being sent via the neurons to the auditory centre in the brain. The fruit fly is emerging as an excellent model in which to investigate the genetic basis of hearing. This system is simpler than the mammalian ear, however, it functions in a remarkably similar manner and there are clear parallels between genes required for fly and mammalian hearing. The genes that code for gap junctions in *Drosophila* were identified relatively recently; these are called innexins and are the counterparts of the human connexins. The aim of this project is to investigate the utility of Johnston's organ for analyses of gap-junction gene function. It will be established if one or more of the eight fly innexins assemble gap junctions in Johnston's organ and play a role in hearing. This will be achieved using various approaches: electron microscopy to visualise gap junctions ultrastructurally, antibody labelling to examine specific innexin protein expression and recordings of auditory function in mutant or transgenic flies to determine the consequences of loss of innexin gene function on hearing.

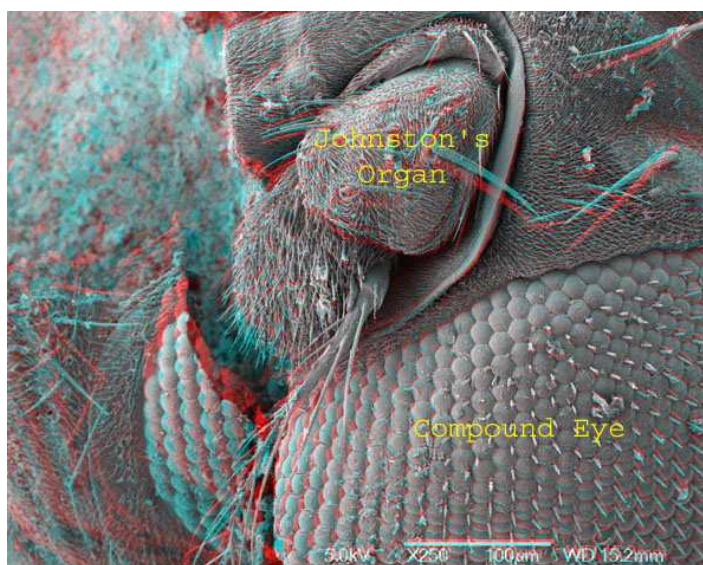


Dr Nerissa Marziano,
Daphne Jackson Research
Fellow

If successful, future studies in the *Drosophila* model, alongside ongoing studies in vertebrate systems, would speed progress in understanding the precise roles of gap junctions in hearing, which ultimately is essential for the development of effective treatments for inherited hearing loss.

Scanning Electron Micrograph image of a fly's head, showing the compound eye and one of the segmented antennae. Johnston's Organ is located within the second segment of the antenna, as labelled (from A. Forge, unpublished). This image is best viewed with red/green glasses.

Image courtesy of Professor Andy Forge, University College London



Next Month, we feature two more scientists from the Department of Biosciences whose research into genetics has taken them to Dubai in the United Arab Emirates. Dr Martin Völker and Professor Darren Griffin share a small piece of their story of the research they are undertaking into genome evolution and genetic diagnostics.

1.4 Million Pounds for Electronics In the space of just two weeks during March 2009, the Department of Electronics was awarded seven new grants from three awarding bodies [Engineering and Physical Sciences Research Council (EPSRC), British Coal Utilisation Research Association (BCURA) and the Royal Academy of Engineering].

Dr John Batchelor



Dr John Batchelor was awarded £499,023 by the EPSRC in collaboration with the University of Sheffield, giving a total project award of £797,682. Other investigators include Dr Paul Young, Professor Mohammed Sobhy and Dr Benito Sanz-Izquierdo. The three-year project, entitled Low Power Body Worn Antenna Systems, to build on the work of the Kent team to develop novel wearable antennas and also to characterize their transmission around the body as well as to off-body access

points. The work has a healthcare focus with the participation of Great Ormond Street Hospital, London. Gore, the hi-tech fabric manufacturers, also support the project. With better characterisation and modelling of antennas on people, it should be possible to reduce the transmit powers required for wireless devices mounted close to the body. A movement capture system and full 3D body scanner will be used to obtain exact dimensions and movements of people wearing antennas, allowing electromagnetic modeling of the bodies. The outcomes of the project should impact on health, fourth generation mobile communications, pervasive computing and care sectors.

Ms Ania Bobrowicz

Ms Ania Bobrowicz was awarded £137,761 by the EPSRC for a collaborative project with the Universities of Leeds and Dundee entitled SEEDS: Organic Approach to Virtual Participatory Design. A newly-released UK report on Delivering Digital Inclusion claims that inability to use new technologies is leaving more and more people behind, limiting their opportunities in areas as diverse as work, entertainment, education, communication, transport services and healthcare. This 18-month feasibility study focuses on ensuring that human interfaces of new technologies, applications and services are usable and appropriate for disabled and older people. The goal of the research would be to exploit digital technologies to create a virtual environment in which individuals' stories can be captured and made available to a range of designers so that they might propose design solutions that meet individuals' needs.



Professor Sarah Spurgeon (see photo page 2)

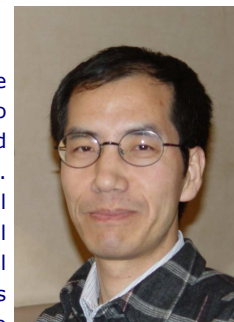
Professor Sarah Spurgeon was awarded £210,634 by the EPSRC for 'Output Feedback Control for Uncertain Variable Structure Systems with Resets'. Discontinuous systems are studied in many important fields such as economics, electrical circuit theory, mechanical engineering (impact theory, plasticity theory), biosciences, systems and control theory, and are typically viewed as a family of subsystems, equipped with rules determining how to switch between them. This project will consider robust control of complex discontinuous systems using only certain measured output information. The practical need for such a framework has been demonstrated by recent applications to biped robots, for example, and

is also supported by the needs of industry where tighter controls on efficiency are producing increasing levels of monitoring. Incorporating this information in the control loop is a natural next step and discontinuous systems often result. Theoretical developments will be facilitated by interaction with Visiting Researcher, Professor Orlov, from the CICESE Research Centre, Mexico, a recognised expert on stability analysis and robust control synthesis of uncertain discontinuous systems. The applied research will focus on the production of significant implementation studies relating to control of impact mechanical systems and the control of industrial food production processes, in collaboration with Pork Farms-Palethorpes.

Professor Yong Yan

Professor Yong Yan and Dr Gang Lu were awarded four grants totaling £582,631. Two are from the EPSRC, one from the BCURA and one from the Royal Academy of Engineering. The first concerns In-Depth Studies of Oxy-Coal Combustion Processes through Numerical Modelling and 3D Flame Imaging. Oxy-coal combustion with CO₂ capture from flue gas is an emerging technology being developed to achieve substantial reduction in carbon emissions from the power generation industry. The Kent team's contribution is to undertake 3D imaging of oxy-coal flames which are much more complex than conventional coal-fired flames. This award is part of a recent EPSRC call for Collaborative Research with China on Cleaner Fossil Fuels and follows the award made last year in response to the EPSRC call for Collaborative Research with China on Renewable Energy Sources. The other EPSRC grant awarded also concerns oxy-coal combustion but as part of a large scale collaborative project with Cambridge, Cranfield, Imperial College, Kent, Leeds and Nottingham funded under the EPSRC's Carbon Capture and Storage Programme. The Kent team will provide unique expertise in combustion sensors, instrumentation and digital signal/image processing.

The BCURA award is in the area of intelligent flame detection incorporating burner condition monitoring and on-line fuel tracking and is the fourth successful BCURA grant awarded to the Kent team since 2001. BCURA projects are funded jointly by the Department of Business, Enterprise and Regulatory Reform (DBERR) and a consortium of leading industrial organizations. Also in the area of coal/biomass combustion, an application to the Royal Academy of Engineering, for a Major Award for Research Exchanges with China has resulted in Professor Hao Zhou, a leading academic from Zhejiang University, working with the Kent team for six months. This high profile exchange award, along with the EPSRC China awards, will enhance Kent's partnerships with a number of prestigious Chinese universities in the area of clean coal and renewable energy research. Such UK-China collaborations will not only improve access to the best of available expertise and facilities for energy research in both countries with a long term sustainability, but also reduce significantly greenhouse gas emissions from electrical power generation on a much greater scale.



Health Article– Depression

Trudy Thomas, Head of Clinical and Professional Practice at the Medway School of Pharmacy, found the ideal way of combining her 3 passions; pharmacy, keeping fit and learning when she started her Ph.D. project last year. Trudy's research will look at the way in which pharmacists can help people with depression increase the amount of physical activity they undertake.

'The Black Dog'



It is estimated that 10% of the adult UK population (aged 16-75) suffers from depression. Depression is associated with a range of symptoms including low mood, feelings of sadness, irritability, sleep problems, worry and anxiety, feelings of worthlessness and lack of pleasure in everyday things. Whilst there is evidence that antidepressants are effective in moderate to severe depression and

these are recommended first line treatment, they are no longer considered for the initial treatment of mild depression because the risk-benefit ratio is poor. Short-term psychological support (problem-solving therapy, brief cognitive behavioural therapy and counselling) are advised for both mild to moderate depression. However there may be limited access for people currently to this type of help.

Research has shown that physical activity has a comparable effect on depression to that obtained from psychotherapeutic interventions. Overall physical activity has been shown to improve mood and reduce anxiety. It also has beneficial effects on stress

and sleep. However good research in the area is still lacking, making it difficult to say how much, or what type, of physical activity is needed to improve mental health. We don't even know the best way to encourage people to take more exercise.

Exercise on prescription schemes have been running nationally for a number of years and take referrals from people with mental health problems and the number of people referred is increasing. However people with depression don't always want to take part in a structured (often gym-based) exercise programme. Evidence shows that people with long-term conditions may need more intensive one-to-one support if they are to introduce exercise successfully into their lifestyle.

Trudy has been awarded funding by the Pharmacy Practice Research Trust to look at the role of the community pharmacist to undertake behaviour change counselling with people with mild to moderate depression. The aim is to increase the amount of physical activity they undertake. Community pharmacists are already helping people stop smoking and lose weight, so this new service will fit in well with the idea of the pharmacist being an easily-accessible health care adviser.

So if you are feeling a bit down this spring, you could do worse than take a walk to your local pharmacy. Alternatively you could join Trudy and the rest of the Universities at Medway Running Society on a Monday lunchtime or Wednesday evening. She might even have enough breath to tell you about her PhD!

This article features 'Oscar', a much-loved black Labrador.
Image courtesy of Krysia Dennis, Faculty of Social Sciences



Mrs Trudy Thomas is a Clinical Lecturer in the Medway School of Pharmacy. Trudy qualified as a pharmacist in 1988 and worked as a community pharmacist and Primary Care Trust adviser for both Swale and Canterbury PCTs. Trudy has extensive experience of postgraduate continuing education as a local tutor for the Centre for Postgraduate Pharmacy Education (CPPE) from 1992 to 2005. Trudy is joint head of clinical and professional practice and programme lead for the taught postgraduate programmes. She is programme leader for the PgCert in Independent and Supplementary Prescribing and as well as being course co-ordinator for a number of the Postgraduate Courses.

Effective collaboration between Arts, Sciences and Information Services nets Inspire Award

Rikki Carroll, a Final Year Web Computing student and part of the IS Web Team, has been awarded the Inspire mark for his final year project, "COPOR", supervised by Les Walczowski in the Department of Electronics. COPOR (Celebratory and Outdoor Performance Online Resource) is an online social network for the creative events industry developed for the Events and Experience Design department, part of SDFVA. This social network allows people to manage their own online profile, companies to have a profile in the system and event projects to be entered into the system.



The Inspire mark is part of the London 2012 brand family. It recognises that a project has been 'inspired by London 2012' and reflects the values of the Olympic and Paralympic Movements.

It is probable that COPOR will become the advised archive for 2012 cultural projects. A case study has been requested by London Organising Committee for the Olympic Games (LOCOG).

Prize-Winning Students in Electronics

Several Electronics students have recently put the slogan "you have to be in it to win it" to the test and have come out winners.



Prize-Winning Design Logo for New Woolf College

Hamza Al-Akesh a Computer Animation MSc student, with his prizewinning logo, pictured with Nancy Gaffield, Master of Woolf College. Hamza chose the quill as the logo because of its flexibility and writing excellence. He thought the simplicity of his design made it an effective logo.

Year in Industry Essay Competition



Tim Chapman, a Final-Year Computer Systems Engineering with a Year in Industry student, won this year's Association for Sandwich Education and Training (ASET) essay competition. The objective of the competition was to write about the experience gained from working for a year in industry, where academic and work-based learning are fully integrated. Tim's essay was entitled Industrial Placements: Beyond Academic Learning and gives an account of his experience on industrial placement at BAE Systems Ltd last year, both in terms of his apprehensions and achievements, and concludes that undertaking his year out in industry has enhanced his studies. He will be presented with a £700 prize cheque by a representative from ASET, accompanied by Keith Washington from BAE Systems, at the Engineering Industrial Panel meeting in Electronics on 13th May.

2009 £10 Challenge

Sinan Assaf, a Final Year Computer Systems Engineering student, won the University's 2009 £10 Challenge Competition, where the aim was to generate the most profit from a loan of £10 over a two week period.

Sinan recruited a team of three friends, a colleague from the Electronics Department, **Anna Fitzgerald-Clark** (3rd Year Multimedia, Technology and Design), **Fares Moustaf** who is a First Year student on the collaborative Computing/Electronics Web Computing programme and **Victor Ponsford** (1st Year Politics and International Relations) to help him with his mini enterprise called



'Cheaper Computer Care' and offered his services as a computing technician.

Sinan had business cards printed for free in exchange for distributing the printing company's leaflets. He advertised his services on his website and negotiated advertising for outside companies on his website in exchange for a percentage of any sales generated through his website. He used his £10 to travel to London to work for one of his new clients. The team made a fantastic profit of £370.24 from the loan, £100 of which was donated to "The Carer's Friend Association"

left to right: Anna Fitzgerald-Clark, Sinan Assaf, Fares Moustaf & Victor Ponsford

The £10 Challenge was one of the competitions organised by RoundOne, the University student-focused website.

UoK YouTube Challenge

Another recent RoundOne competition winner was a team of **Alaric King** (Final Year Multimedia, Technology and Design with a Year in Industry), **Adam Droy** (Final Year Multimedia, Technology and Design), **Richard Dadd** (English and American Literature and Creative Writing graduate) and **Daniel Fryer** (English and American Literature graduate) whose two minute video "Kent Uni is...." won The University of Kent YouTube Challenge.

"Upon hearing of the competition, all we needed was an idea we all liked. After an evening of drinking tea, eating cake and watching film clips, we formulated the idea of a huge blank canvas that people could fill with their particular loves regarding the University.

Focusing on one particular love was all well and good, we reasoned, but in so doing we were in danger of boring 99% of viewers. Conversely, a broad spectrum of topics could lead to an abundance of bland and subjective information. Here we realised the importance of giving the piece a distinctive 'look' where the interviewees could interact with an evolving animated background. Adding a dose of humour, we avoided making a two-minute rant.

Another important factor was choosing the right interviewees. In our pursuit of sincere responses and passionate, confident delivery we roped together a trustworthy band of friends and associates (eleven in total) and spent an afternoon recording interviews in front of green screen."

The video can be viewed at <http://www.kentroundone.co.uk/>

Easy-to-use Floorplans



Janos Kozma, a First Year Electronics and Communications Engineering student, won a Departmental prize to design easy-to-use floor plans of the building. He was presented with his prize cheque by Head of Electronics, Professor Sarah Spurgeon.

Toby Funnell, a Final Year Multimedia, Technology and Design student, was the lucky winner of a Wii in the University's weekly draw of students completing the National Student Survey Questionnaire.

Scientist of the Month

This month we meet Dr Alfred Kume who is a lecturer in Statistics. After graduating in High Mathematics in the University of Tirana, Albania, Alfred worked for an insurance company as an actuary for two years. In 1998 he began his PhD on Statistical Shape Analysis at the University of Nottingham. He stayed at Nottingham on completion of his PhD on an EPSRC (Engineering and Physical Sciences Research Council)-funded research fellowship until 2004 when he joined the Institute of Mathematics, Statistics and Actuarial Science. Alfred introduces us to his sphere of knowledge of shape analysis, computational statistics and applied probability.



Dr Alfred Kume, Lecture in Statistics in the Institute of Mathematics, Statistics and Actuarial Science.

How did you first get into science?

In my early school years, I was particularly attracted to sciences like Mathematics and Physics. The elegance of Mathematics was the one which suited me well, as I was always trying to solve mathematical problems by looking for the shortest proofs. Throughout my school and university years, I have been extremely fortunate to have had very good Mathematics teachers whose enthusiasm about Mathematics has been instrumental in my future decisions.

What is the focus of your current research?

The concept of shape is rather simple but the meaning can be somewhat different. The best mathematical definition that I know is: "Shape is the geometrical information which is invariant of shape preserving transformations, translations, rotations and scaling". Statistical shape analysis initially started from the need to answer questions of shape change among populations or describe the shape variability in a population. Populations of interest can be of biological nature such as computer images where the object of interest (e.g. face) is invariant of the relative distance and position of the camera which affects scale and rotation. Even though apparently simple, such

questions cannot easily be answered without defining a measure of shape difference. Natural definitions of such shape distances led to the discovery of some mathematical models called Shape Spaces which are Riemannian Manifolds or curved spaces. The simplest example which made the shape analysis accessible to a general audience is that of D.G. Kendall who showed that the shape of triangles in a plane is naturally represented by a sphere wherein the north pole is the shape of the equilateral triangle (its reflected counterpart is the south pole) while at the equator are the flat triangles. This example shows that the classical statistics methods cannot be directly applied without fully understanding the geometry of such objects. My research is primarily focused on improving the statistical methodology for estimating the mean population shape or describing the pattern of shape change in time (shape regression). I am recently exploring a simulation approach for shape inference, this is particularly useful for shapes of 3-D objects whose space is far more complicated than that of a sphere.

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

My closest collaborators are in Nottingham and here in the Institute of Mathematics, Statistics and Actuarial Science. Before coming here, I was fortunate to have been given the chance to work at Nottingham University with leading researchers like Professors Andy Wood, Ian Dryden and Huling Le. In our last paper, we studied a problem of describing the human movement of the right arm of some individuals asked to perform a particular task. It turns out that this type of movement can be closely modelled by a geodesic path in the shape space. This is entirely consistent with the First Newton's law of Motion since the geodesic is the natural object's trajectory in the absence of alternative forces. An analogous example is that of the satellites circling around the Earth along great circles which are the geodesics of their floating space. Another interesting problem that I have been closely involved is that of estimating the configurational Entropy of molecule observations obtained from molecular dynamics simulations. Since the molecule entropy is a function depending on the relative positions of the elementary atoms, the shape analysis can give a satisfactory answer here.

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

My main research achievements have been towards finding efficient estimation algorithms for mean shapes in different spaces. My recent work is based on the modelling of shape change in such a way that practitioners can relate their analysis with the correlation of important landmark points of the objects. The method is totally likelihood based while the complexity is not affected by the dimensions of the data.

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

My research interests have expanded here at Kent more towards applied probability and computational statistics. This has been mainly due to successful collaborations with colleagues from the Statistics group.

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

I would like to get more involved with the recent applications of shape statistics in bioinformatics. There has been exiting progress towards this direction where many well-known researchers have shown that shape analysis can be successfully applied to molecule matching problems.

The Centre for BioMedical Informatics is an interesting forum where researchers of relating disciplines can exchange research ideas and our meetings lead to successful collaboration with colleagues from other departments.

Alfred Kume is a speaker at the 4th Annual Symposium of the Centre for BioMedical Informatics to be held on Thursday 28 May 2009. see page 11 for further details.

Seminars

Date	Day	Time	Subject	Lecturer and Title	Location
1	Wed	2pm	Astrophysics	Dr Tim Gledhill, University Hertfordshire, Which way the wind blows? Using H2 to trace shocks and outflows in young Planetary Nebulae	Rm 110 SPS
3	Fri	3pm	Pure & Applied Mathematics	Stephen Goatham, Kent, Skymions, Fermions and Spin	Maths LT
6	Mon	2.30pm	Pure & Applied Mathematics	David Hernandez, CNRS - Ecole Normale Supérieure, Paris, Categorification of functional equations and Langlands duality	Maths LT
6	Mon	4pm	Biosciences	Professor John McCarthy - Manchester Interdisciplinary Biocentre, University of Manchester Dynamics and rate control in the eukaryotic translation machinery	Biosciences LT1
7	Tues	4pm	Computing	Edward Clarke Conley, Cardiff University School of Medicine, What's to become of me? Challenges in Diabetes Outcomes Analysis	Brian Spratt Room
7	Tues	7.30pm	School of Physical Sciences	Dr John Kemp, Journal Editor, SEKAS, The contribution of amateurs to astronomy	Keynes LT 6
8	Wed	4.15pm	Center for Cognitive Science and Cognitive Systems	Dr Andrea Greve; University of Cardiff	Computing lab S110B
9	Thurs	2pm	Statistics	Dr Alex Beskos, University College London, Diffusion limit for MCMC paths	Maths LT
14	Tues	4pm	Computing	Anthony Robins, University of Otago, New Zealand, Novice Programmers: Asking the Right Questions	Brian Spratt Room
21	Tues	2pm	Applied and Interdisciplinary Informatics Group	Dov Stekel, Birmingham	Computing lab S110B
22	Wed	2pm	Astrophysics	Philip Burrows, John Adams Institute, Oxford University, The Large Hadron Collider (LHC) at CERN	Rm 110 SPS

Charity Fundraising Activities

Now and again, all of us in the Science Faculty come up for breath and take some time to organise fundraising for charity. This year, collectively, departments have raised over £300. Red Nose Day saw the majority of the funds raised with the Department of Biosciences with £110 from donations from staff, which was organised by Ph.D. students Jane Wagstaff and Natasa Kalyva, the Department of Electronics raised over £50 by holding a 'Red Clothes Day' and here in the Dean's offices, Ann Tull raised over £60 from the sale of second-hand paperbacks.

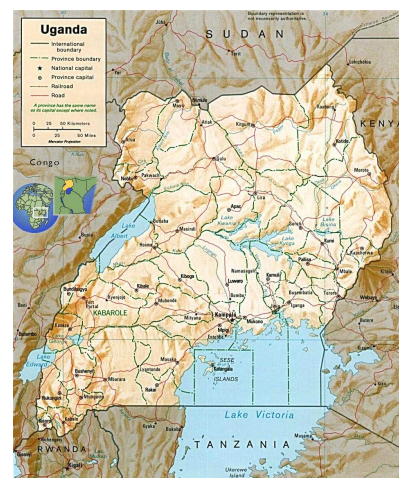


'Red Clothes Day' in the Department of Electronics

Ann Tull, STMS Faculty Office



Books are for sale in the Marlowe Kitchen—please come & browse



The Institute of Mathematics, Statistics and Actuarial Science raised nearly £90 earlier this year from a raffle in aid of the Missis Orphanage in Uganda.

Image courtesy of <http://www.geographicguide.net/africa/uganda.htm>

Centre for BioMedical Informatics

4th Annual Symposium

'Making Sense of Biological Data'

Thursday 28 May 2009

Grimond Lecture Theatre

12.50 - 6pm

List of Speakers and Abstracts

Professor David Wild, Warwick Systems Biology Centre, University of Warwick
Title: Statistical Machine Learning for Structural Bioinformatics

Professor Stephen Muggleton, Department of Computing, Imperial College London
Title: Pathway modelling of polysaccharide structures from *Campylobacter jejuni*

Professor Mark Girolami FIET, University of Glasgow
Title: Inference-Based Modelling Establishes the Role of BRAF in ERK Signalling

Professor Chris Holmes, Oxford Centre for Gene Function, University of Oxford
Title: Searching genomes for patterns that associate with human disease risk

Dr Araxi Urrutia, Department of Biology and Biochemistry, University of Bath
Title: Transcriptome evolution and gene order in the yeast genome

Dr Alfred Kume, Lecturer in Statistics, University of Kent
Title: An introduction to shape analysis with applications in Biology

Poster Competition

Wednesday 27th May, 2009 at 1pm

Grimond Lecture Theatre Foyer

Postgraduate and post-doctoral students are invited to submit posters on:-

The broad area of BioMedical Informatics

Cash prizes to the value of £175 have been sponsored by the Pro-Vice-Chancellor for Research and the Dean of the Faculty of Science, Technology and Medical Studies and will be awarded by the Vice-Chancellor, Professor Julia Goodfellow, to the winners of the competition.

Criteria against which posters will be judged:-

- Comprehensibility of the text for a wider audience
- Quality of the figures / pictures
- Proper use of space and good flow of information

**Posters – A1 size to be displayed in the Grimond Foyer no later than
Midday on Wednesday 27th May 2009**

Judging will take place between 9 and 11am on Thursday 28th May 2009

(Please bring Velcro tabs to attach posters to the display boards)

To register entries please contact:

Joanna Walpole (J.L.Walpole@kent.ac.uk) - 01227 827833



Recent Published Papers

The School of Physical Sciences

Barón M, Hatada K, Hess M, Jenkins AD, Jones RG, Kahovec J, Kratochvíl P, Kubisa P, Maréchal E, Moad G, Penczek S, Stepto RFT, Vairon J-P, Vohídal J, Wilks ES (2008) "Glossary of Terms Related to Kinetics, Thermodynamics, and Mechanisms of Polymerization". *Pure and Applied Chemistry*, 80, 2163-2193.

Milner DJ, Baldwin EC, Burchell MJ (2008) "Laboratory investigations of marine impact events: Factors in influencing crater formation and projectile survivability". *Meteoritics and Planetary Science*, 43, 2016-2026.

Abou Neel EA, Chrzanowski W, Pickup DM, O'Dell LA, Mordan NJ, Newport RJ, Smith ME, Knowles JC (2008) "Structure and properties of strontium-doped phosphate-based glasses". *Interface*, 6, 435-446.

Carta D, Casula MF, Corrias A, Falqui A, Loche D, Mountjoy G, Wang P (2009) "Structural and Magnetic Characterization of Co and Ni Silicate Hydroxides in Bulk and in Nanostructures within Silica Aerogels". *Chemistry of Materials*, 21, 945-953.

Falqui A, Corrias A, Gass M, Mountjoy G (2009) "A Transmission Electron Microscopy Study of Fe-Co Alloy Nanoparticles in Silica Aerogel Matrix Using HREM, EDX, and EELS". *Microscopy and Microanalysis*, 15, 114-124.

Davis CJ, Froebrich D, Stanke T, Megeath ST, Kumar MSN, Adamson A, Eislöffel J, Gredel R, Khanzadyan T, Lucas P, Smith MD, Varricatt WP (2009) "A census of molecular hydrogen outflows and their sources along the Orion A molecular ridge". *Astronomy & Astrophysics*, 496, 153-176.

Baron M, Hatada K, Hess M, Jenkins AD, Jones RG, Kahovec J, Kratochvíl P, Kubisa P, Marechal E, Moad G, Penczek S, Stepto RFT, Vairon J-P, Vohídal J, Wilks ES (2008) "Glossary of Terms Related to Kinetics, Thermodynamics, and Mechanisms of Polymerization". *Pure and Applied Chemistry*, 80, 2163-2193.

Srama R, Stephan T, Grün E, Pailer N, Kearsley A, Graps A, Laufer R, Ehrenfreund P, Altobelli N, Altwegg K, Auer S, Baggaley J, Burchell MJ, Carpenter J, Colangeli L, Esposito F, Green SF, Henkel H, Horanyi M, Jäckel A, Kempf S, McBride N, Moragas-Klostermeyer G, Krüger H, Palumbo P, Srowig A, Trieloff M, Tsou P, Sternovsky Z, Zeile O, Röser H-P (2009) "Sample return of interstellar matter (SARIM)". *Experimental Astronomy*, 23, 303-328.

Pickup DM, Valappil SP, Moss RM, Twyman HL, Guerry P, Smith ME, Wilson M, Knowles JC, Newport RJ (2009) "Preparation, structural characterisation and antibacterial properties of Ga-doped sol-gel phosphate-based glass". *J Mater Sci*, 44, 1858-1867.

Zhang F, Skoda MWA, Jacobs MJ, Dressen DG, Martin RA, Martin CM, Clark GF, Lamkemeyer T, Schreiber F (2009) "Gold Nanoparticles Decorated with Oligo(ethylene glycol) Thiols: Enhanced Hofmeister Effects in Colloid-Protein Mixtures". *J. Phys. Chem., American Chemical Society*, 113, 4839-4847.

Department of Biosciences

Okoro CK, Brown R, Jones AL, Andrews BA, Asenjo JA, Goodfellow M, Bull AT (2009) "Diversity of culturable actinomycetes in hyper-arid soils of the Atacama Desert, Chile". *Antonie van Leeuwenhoek* 95, 121-133.

Tuite MF, Cox BS (2009) "Prions remodel gene expression in yeast" *Nature Cell Biology*, 11, 3, 241.

Schmidt JM, Howard MJ, Maestre-Martínez M, Pérez CS, Löhr F (2009) "Variation in protein Ca related one-bond J couplings". *Methods in Molecular Biology* 47, 16-30.

Leadsham JE, Miller K, Ayscough KR, Colombo S, Martegani E, Sudbery P, Gourlay CW (2009) "Whi2p links nutritional sensing to actin-dependent Ras-cAMP-PKA regulation and apoptosis in yeast". *Journal of Cell Science* 122, 706-715.

Byrne LJ, Cole D, Cox BS, Ridout MS, Morgan BJT and Tuite MF (2009) "The number and transmission of [PSI⁺] Prion seeds (proagons) in the yeast *Saccharomyces cerevisiae*" (2009) *PLoS ONE*, 4, 3, e4670.

Robinson-Boyer L, Grzyb I, Jeffries P (2009). "Shifting the balance from qualitative to quantitative analysis of arbuscular mycorrhizal communities in field soils". *Fungal Ecology*, 2 (2009) 1-9.

Mead EJ, Chiverton LM, Smales CM, von der Haar T (2009). "Identification of the limitations on recombinant gene expression in CHO cell lines with varying luciferase production rates". *Biotechnology and Bioengineering*, 102, 6, 1593.

Recent Published Papers

Department of Electronics

Gorman T, Haxha S , Ju JJ (2009) "Ultra-High-Speed Deeply Etched Electrooptic Polymer Modulator with Profiled Cross Section". Journal of Lightwave Technology, 27, 68-76.

Ademgil H, Haxha S (2009) "Ultrahigh-Birefringent Bending-Insensitive Nonlinear Photonic Crystal Fiber with Low Losses". IEEE Journal of Quantum Electronics, 45, 351-358.

Henry M, Free CE , Izquierdo BS, Batchelor J, Young P (2009) "Millimeter Wave Substrate Integrated Waveguide Antennas: Design and Fabrication Analysis" IEEE Transactions on Advanced Packaging, 32, 93-100.

Abreu M, Fairhurst MC (2009) "Analysing the Impact on Non-Biometric Information on Multiclassifier Processing for Signature Recognition Applications". Proc. IEEE Second International Conference on Biometrics: Theory, Applications and Systems (BTAS 2008), Washington DC.

Abreu M, Fairhurst MC (2009) "An Empirical Comparison of Individual Machine Learning Techniques in Signature and Fingerprint Classification". Proc. European Workshop on Biometrics and Identity Management (BIOID2008), Roskilde University, Denmark, 134-143.

Seurat A, Edwards C, Spurgeon SK, Fridman E (2009) "Static Output Feedback Sliding Mode Control Design via an Artificial Stabilizing Delay". IEEE Transactions Automatic Control, 45,.256-265.

Conti A, Wang J et al (2008) "Wireless Cooperative Networks EURASIP Journal on Advances in Signal Processing".1-2.

Assimakopoulos P, Nkansah A, Gomes NJ (2009) "Use of a Commercial Access Point Employing Spatial Diversity in a Distributed Antenna Network with Different Fiber Lengths". IEEE Intl. Topical Meeting on Microwave Photonics, MWP2008, Gold Coast, Australia, Digest 189-192.

Nkansah A, Callaghan P, Gomes NJ, Batchelor J, Wake J (2009) "EVM and Throughput Performance Measurement of Simultaneous Transportation of GSM900, GSM1800, UMTS and WLAN over a VCSEL Based Multimode Fibre Link". URSI General Assembly, Chicago, IL, USA.

Wake D, Gomes NJ, Lethien C, Sion C, Vilcot J-P (2009) "An Optically Powered Radio over Fiber Remote Unit using Wavelength Division Multiplexing". IEEE Intl. Topical Meeting on Microwave Photonics, MWP2008, Gold Coast, Australia, Digest , 27-30.

Shen P, Nkansah A, James J, Gomes NJ (2009) "Multilevel Modulated Signal Transmission for Millimetre-Wave Radio over Fiber Systems". IEEE Intl. Topical Meeting on Microwave Photonics, MWP2008, Gold Coast, Australia, Digest, 27-30.

Shen P, James J, Gomes NJ, Hubbard PG, Ellison BN (2009) "Low-Cost, Continuously Tunable Millimeter-Wave Photonic LO Generation using Optical Phase Modulation and DWDM Filters". IEEE Photonics Technol. Letts., 20, 1986-1988.

Yan Y, Caillat S (2009) "Optimisation of Combustion Plant through Advanced Measurement and Computer Modelling" – COSAMM Final Report for InterregIIIa Project 309.

Yan Y, Cornwell S (2009) An Integrated Sensor System for Combustion Plant Optimisation Final Report for the Technology Strategy Board (TSB Technology Programme).

Recent Grants Awarded

Institute of Mathematics, Statistics and Actuarial Science

Dr Clare Dunning has been awarded £400 for research entitled 'Topological properties of the phase diagram for the BCS model with Ptip wave symmetry' by the Royal Society.

Medway School of Pharmacy

Dr Ali Nokhodchi has been awarded £42,000 for research entitled 'Development of an *in-vitro* testing method to be used for investigation of prandial effects on hydrophilic hypromellose matrix tablets' by Colorcon Ltd.

Dr Vadim Symbayev has been awarded £11,460 for research entitled 'The role of hypoxia-inducible factor 1 alpha in toll-line receptor 7/8 -induced inflammatory reactions' by the Royal Society.

Dr Bernhard Gibbs has been awarded £5000 for research entitled 'Testing basophil activation activity of peanut-specific antibodies' by King's College London.

Computing Laboratory

Dr Eerke Boiten has been awarded £73,820 for research entitled 'Formal methods and cryptography: the next generation of abstractions' by the EPSRC.

Mr David Soud (Kent IT Clinic) has been awarded £9965 for the creation of software interface for the Trixbox system by Phonecoach Limited.

Mr David Soud (Kent IT Clinic) has been awarded £4410 for website content management by Paul Cumberland Trading as BirdsBirdsBirds.

Department of Electronics

Professor Yong Yan and Dr Gang Lu have been awarded £318,282 for research entitled 'In-depth studies of oxy-coal combustion processes through numerical modelling and 3D flame imaging' by the EPSRC.

Professor Sarah Spurgeon has been awarded £210,634 for a project entitled 'Output feedback control for uncertain variable structure systems with resets' by the EPSRC.

Ms Ania Bobrowicz has been awarded £114,178 for a project entitled 'Sandpit: an organic approach to virtual participatory designs (SEEDS)' by the EPSRC.

Dr Richard Guest has been awarded £77,747 for a project entitled 'DocExplore' by the Managing Authority of Interreg 4A (an EU-awarding body).

Professor Mike Fairhurst has been awarded £25,000 for a project entitled 'SAIC University Challenge' by the Science Applications International Corporation.



A Rosette by any other name



The Rosette nebula is usually observed as a pink rose, coloured by the dominant reddish light which indicates that hydrogen atoms have been heated.

We look down into the open rose and can see the hot stars responsible for the heating. By filtering the light, and prescribing colours to emission from hydrogen (red), sulphur (green) and oxygen (blue) we repaint the rose and can find clues as to how it grew. We thus arrive at this composite image taken at the Kitt Peak National Observatory by Travis Rector as part of the collaboration with Professor Michael Smith of the School of Physical Sciences (see *The Astrophysical Journal Letters* 2008, 679, 101L). This data set led to the discovery of new jets generated by young stars and new stars of intermediate mass between those of our Sun and the massive ones which provide the ultraviolet light that burns away at the rims of the surrounding cloud.

In a separate project, Dr Jingqi Miao is modelling these evaporating layers and determining the shape of the bright rims with computer simulations. The CAPS group hopes to understand the meaning of the rose before its petals turn any browner.

For the technophiles, the observation was made by Travis A. Rector with narrow band filters H α , [SII] and [OIII] in most likely 1999 with the KPNO 90 cm telescope. The Rosette HH1 (HH 889), HH2 (HH 890) jets in dissipation and HH3 (HH 891) associated with a H α e/Be star were all discovered based on this dataset.

Professor Michael Smith, Professor of Astronomy.

**Café Scientifique
Ye Olde Beverlie,
St Stephen's Green, Canterbury
Tuesday 21st April 2009**

To be advised—please check website <http://www.cs.kent.ac.uk/people/staff/cgj/site/CS/>

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