

February 2008

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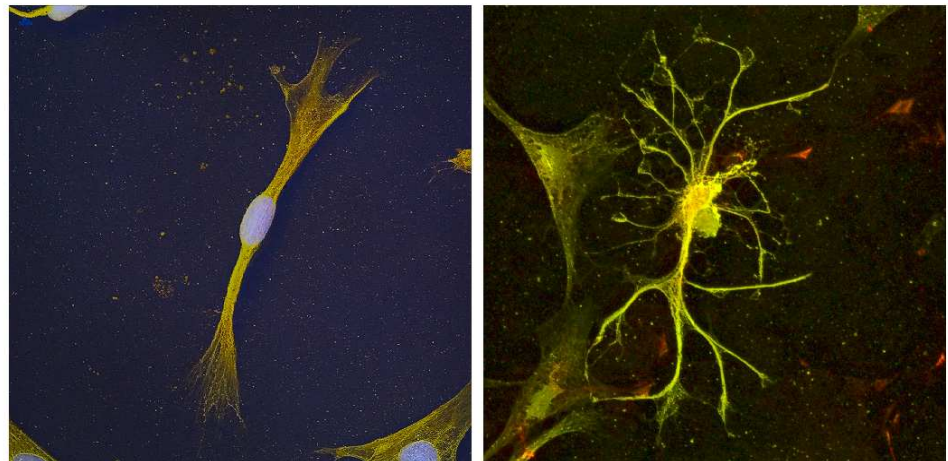


Spring Lecture Series—see back page

View from the Dean's Office

This month's issue reflects our increasing profile and impact in the UK with national recognition for Cyril Isenberg and Bob Newport. Our European profile is exemplified by Kent-organized conferences that have brought together experts in water interfaces and on signature analysis. Both aspects reflect the 2008 Faculty Plan (<http://www.kent.ac.uk/stms/departmental-plans07-08/index.html>) which aims to bring more international conferences to Kent and promote cross-disciplinary research through themes aligned with national priorities. The Faculty has also contributed significantly to the consultation on the new Research Excellence Framework, particularly important considering our significant increases in new grant awards over the past 12 months – very timely considering research income will be a key metric in the new system.

All the best
Peter

**Centre for Biomedical Informatics
Image of the month****Cells from the Nervous System**

This month's images are from the laboratory of Dr Anthony Baines, Reader in Molecular Cell Biology in the Department of Biosciences and Director of the Centre for BioMedical Informatics. The images shown here are microscope images of cells found in the cerebellum, a part of the brain linked to sensory perception and motor control. On the left is a nerve cell with two axons that reach out on each side to make contact with other cells. On the right is an astrocyte, a type of cell that supports the functioning of the nervous system. The cells are visualised by staining with fluorescent dyes that reveal the positioning of the proteins tubulin (left) and spectrin (right). In the left hand image, the DNA in the nucleus is also stained blue. The images come from work by Dr Mikayala King as part of a BBSRC-funded study, led by Dr Anthony Baines, into the roles of proteins of the cytoskeleton in the nervous system.

Dr Baines is a member of the American Society for Cell Biology and the Biochemical Society. He sits on the Research Board of Diabetes Wellness and Research Foundation. His current research is centred on the function of membrane associated cytoskeletal proteins and is funded by the Biotechnology and Biological Sciences Research Council (BBSRC) and the British Heart Foundation (BHF).



University of Kent physicist awarded an MBE

Dr Cyril Isenberg, a key figure in the School of Physical Sciences and Department of Electronics has been awarded the MBE in the New Year's Honours List. A physicist with a national and international reputation, he was awarded the Institute of Physics' Bragg Medal and Prize in 1994 for significant contributions to physics education and innovative contributions to the teaching of physics. He has held numerous positions within the Institute, including Chairman of the London and South East Branch.

Dr Isenberg is well known for his science communications activities, and

delivers a large number of popular lectures to schools and universities across the country. He has also made numerous television appearances and is perhaps best known as the organiser of the British Physics Olympiad. Over 10,000 UK A-level school students participate every year, out of which five are selected to take part in the International Physics Olympiad.

Professor Paul Strange, Head of the School of Physical Sciences, said 'I am delighted that Dr Isenberg's huge contribution to physics in the UK has been recognised with the award of an MBE'.

Although Dr Isenberg retired in 2002, as



Dr Cyril Isenberg, MBE

Photo courtesy Spencer Scott, UoK

honorary lecturer he continues to play an active role in the School, including the management of the University's Kent Physics Centre.

Computing Laboratory promotes programming lessons to children



Michael Kölling, Senior Lecturer and co-creator of Greenfoot.

The Computing Laboratory has teamed up with computing magazine PC Pro in an effort to popularise the way children learn to program computers.

PC Pro has recently published an article encouraging children of all ages to experience programming by creating

their own computer games using Greenfoot, an easy-to-use Java based programming system developed by staff from the University of Kent and Deakin University, Australia. By following the '12 easy steps to programming' guide <http://www.pcpro.co.uk/features/156921/teach-your-kids-to-code/page3.html> children can build a simple game in a single afternoon.

Greenfoot has been designed specifically for children of school age and makes learning to program fun. It incorporates many features which make it appealing and relevant to today's children who are accustomed to playing sophisticated and visually stimulating games online. Greenfoot also provides a bank of ready-made roleplay characters along with various capabilities that enable children to control and manipulate them easily. This means that children are able to focus their creative attention on devising and building the game rather than producing the graphics. By writing simple Java code

they are able to develop small programs, which can be extended and made as complex as they choose, and at the same time learn basic programming concepts.

Michael Kölling, Senior Lecturer at the Computing Laboratory, said "Programming is a creative, intellectually challenging and engaging activity that is both incredibly rewarding and highly useful, and Greenfoot makes it easy to do – so children no longer have an excuse for not doing it!".

With a new release of Greenfoot expected in February and an online games repository planned (where anyone will be able to play, rate, comment on and submit games written with Greenfoot in a similar way to YouTube) the future appeal of Greenfoot, as a way of teaching children to program, is ensured.

Further Greenfoot tutorials, teaching materials and user communities can be found at www.greenfoot.org.

Kent Professor awarded Doctorate

Bob Newport, Professor of Materials Physics in the School of Physical Sciences, has been awarded a DSc by the University of Leicester. Their criteria for such awards state that the person '... must be eminent in his/her field and have produced published work constituting a sustained, original and distinguished contribution to knowledge. Candidates would be expected to have a national, and usually an international reputation, in their field

and to have produced seminal publications which have led to significant developments in the area of research'.

Professor Newport's research interests have varied as his career of three decades has progressed. Currently his team are working on bioactive glasses which have potential for tissue regeneration and as antibacterial coatings. The driving motivation behind all their work is the desire to understand at the atomic scale, why materials behave as they do.



Professor Bob Newport

DEVELOPMENTS IN CJD RESEARCH

In the third of our medical articles, Professor Alan Colchester talks about the research developments into Creutzfeldt-Jakob disease over the past twenty years since the cattle disease bovine spongiform encephalopathy (BSE) was first recognised.

The disease of cattle called bovine spongiform encephalopathy (BSE) was first recognised in 1986 and its incidence rose rapidly, until more than 100,000 cattle had been affected by the peak of the epidemic in 1992. Subsequently cases have been detected in numerous other countries, but with numbers far less than the UK. As the epidemic spread in the UK, it became clear that the main cause was that cattle had been fed with the contaminated remains of BSE-infected cattle, and improved controls to stop such material entering feed gradually led to a fall in the number of cases. However, the origin of the first case or cases of BSE has never been satisfactorily explained. In principle, the cause could have been transmission of a related disease from another species (e.g. sheep scrapie) or a "spontaneous" event in a cow.

Some experts feared that the bovine disease might be transmitted to man but this was regarded as highly unlikely by others. Then, in 1995 the first of many unusual cases of the related human disease called Creutzfeldt-Jakob disease (CJD) were identified, and evidence soon pointed to the fact that these variant CJD patients had acquired BSE. Some of these patients were under my care and this was when I began research into CJD and BSE.

When investigating the possible original cause of BSE (and thus of variant CJD) it became increasingly clear to me that no convincing evidence had emerged to support the various previous theories. The most likely seemed to be that infection via cattle feed from an unidentified species (not sheep) had occurred, but what species? We then uncovered evidence from feed industry workers in the UK that *human* remains had entered cattle feed - but how could this have occurred? Trade statistics showed that large amounts of mammalian by-products, which were used in the UK in fertiliser and animal feed, had been imported from the Indian subcontinent during the appropriate time period. How were these products sourced within India? We learned about widespread trade by "bone collectors" who collect mammalian remnants



Bone collectors in Western India come across dead bodies in the River Ganges

in the huge region in western India drained by the Ganges. The bone collectors encounter large numbers of *human* cadavers in various stages of decomposition floating in the rivers or washed up on the banks (see illustration), because an important Hindu tradition is to dispose of a dead body in the Ganges. CJD occurs in humans with a similar incidence in different parts of the world. It is rare, but a single cadaver from an infected CJD case would contain a large amount of infective tissue, which is not inactivated by any of the normal chemical or heat treatments to which feed materials may be subjected. This is why so many iatrogenic CJD cases have occurred.

Cattle were being fed in the UK with material containing human remains and we believe that BSE was started by transmission from a single infected human to one or more cattle. The later events leading to the emergence of the "new" form of CJD via BSE thus exemplified "reverse transmission", in other words completion of a cycle whereby infection was transmitted back to the species from which it originated. This explains some of the unusual properties of the BSE agent in man.



Alan Colchester, Professor of Clinical Neuroscience & Medical Image Computing at the Kent Institute of Medicine and Health Sciences received his first degree in Physiology and Psychology and later his medical degree and MA from Oxford University. He studied for his PhD at the Institute of Aerospace Medicine and at the Institute of Neurology, University College London.

He is a clinical academic and divides his time between NHS clinical neurology and research and teaching at the University of Kent. He is Director of Research and Director of Graduate Studies at the Kent Institute of Medicine and Health Sciences at the University.

His research interests include medical image computing, structure-function relationships in the cerebral cortex, and Creutzfeldt-Jakob disease and bovine spongiform encephalopathy (CJD and BSE).

He is a Consultant Neurologist in East Kent and at Guy's & St. Thomas's Hospital in London. He led the substantial expansion of clinical neurosciences in East Kent, with the establishment of the East Kent Neuroscience Unit at the Kent and Canterbury Hospital and several new posts in neurology (including consultant, clinical academic, specialist registrar, SHO, nursing, therapy and rehabilitation appointments).

Alan Colchester is immediate past President of the International Society for Medical Image Computing and Computer Assisted Intervention (MICCAI) and its conference series which became established under his guidance as the leading conference in the field. He is a Patron of the Human BSE Foundation.

March issue:

William Gullick, Professor of Cancer Biology will be talking about new targeted treatments for cancer.

European Science Foundation conference on 'Water Interfaces'

A research meeting devoted to the subject of 'Water Interfaces in Physics, Chemistry and Biology: a multidisciplinary approach' was held last month in Austria and was organised by John Dore from the School of Physical Sciences in conjunction with Marie-Claire Bellissent-Funel from the Laboratoire Leon Brillouin, CEA, Saclay, France.

The theme of the conference was originally proposed in 2006 in the form of an outline programme submitted to the European Science Foundation and subsequently included in the list of European Science Foundation (ESF) supported meetings. Invited speakers came from a wide range of countries and disciplines, mainly from Europe, but also from the USA and Japan. There was also a large contingent of young researchers who gave short oral presentations or poster displays: another participant at the meeting was the Editor of Nature, who commented 'we publish many papers relating to water and I wanted to hear the latest information'.

The meeting was held in the conference centre of the University of Innsbruck in the ski-ing resort of Obergurgl, which provided a picturesque setting and allowed delegates to experience another aspect of water/ice interfaces during the free afternoons out on the snow-covered slopes. This venue was an interesting return for John Dore as he had been ski-ing on the same slopes as a research student over forty years previously, when staying in the village of Soelden, a little lower down the valley! This was also the region where he met his wife-to-be in an 'apres-ski' location (otherwise known as a bar) but that is another story!



Professor John Dore with conference delegates



Obergurgl, Austria, venue of this year's conference

Water and ice are common materials that are ever-present in the world around us but to the scientist they present many challenging problems for understanding due to their highly unusual properties. Water is one of a few materials that have a density maximum, such that the liquid expands as it is cooled below 4°C. This simple fact alone has enormous effects in a biological context because it means that ice forms on the top of a pond and stops the rapid transfer of heat into the submerged water regions by convection. The experimental techniques used in the studies involved a wide range of different techniques incorporating neutron diffraction, quasi-elastic neutron scattering and x-ray spectroscopy to NMR, Raman scattering, ion beams and ultra-fast optical methods. Several controversial topics were included amongst the presentations but perhaps one of the most fascinating presentations was a talk by Fabio Bruni [Rome] about deep inelastic neutron scattering (DINS) data for water taken at the ISIS pulsed neutron facility, showing that hydration water on proteins did not behave in the expected classical manner and that quantum effects could be important even at room temperatures. John Dore spoke about his recent collaborative work on water and ice nucleation in a

hydrophobic environment [with Beau Webber and other workers from Europe and Japan]. The results show that the liquid state can persist down to 50 K below the normal freezing point and also that water inside carbon nanotubes has a structure quite distinct from anything previously investigated. Throughout the meeting there was a lively discussion after the oral presentations, around the posters and during informal meetings of small groups over meals and otherwise. Due to the wide range of disciplines covered, everyone felt that they had learned something new. It is hoped to publish a selection of the presented papers in an appropriate journal and many delegates expressed the wish that a similar meeting should be arranged in a few years time to update the science.

Professor John Dore is Emeritus Professor of Condensed Matter Physics in the School of Physical Sciences. He is a founder member of European Mobility Scheme for Physics Students (EMSPS) and the European Physics Education Network (EUPEN) which is a thematic network currently making a comparability study of undergraduate Physics teaching across Europe.

We're not all going to die just yet!

TU24 2007 is the name given to an asteroid whose orbit took it past earth on the 29th and 30th January 2008. Close in space terms, its distance from our planet was about 1½ times further than the distance between the Earth and the Moon. The best place to have seen it was in the Northern hemisphere but unlike many comets that reflect lots of sunlight making them visible to the naked eye, its form as a dark object made it virtually impossible to see; randomly scanning the skies with a small telescope would not have revealed it. The only way to have caught a glimpse of TU24 was with a large telescope, knowing exactly where to look or on radar.

The size of the TU24 is a matter of some debate, but there is agreement amongst scientists that it is probably between 250 and 500 metres in size. Although this sounds small, travelling at 20 kilometres per second, it would leave a crater 5 kilometres wide were it to hit the Earth.

This near miss is not a particularly unusual event as something of this size passes the Earth every couple of years. In fact five years ago, the orbit of an asteroid of about the size of TU24 passed at an even closer distance to Earth than the moon's orbit.

There are many questions to which scientists cannot provide answers. Although the size can be agreed upon within a 250 metre range, the form of TU24 is still unknown. It could be solid like a huge lump of granite or it could be a pile of boulders sitting on top of each other.

As frequently as these types of events may occur, our state of readiness does not always match the speed and approach of an asteroid; the last time one passed our way, it was seen only two days after it had already passed. However, observers at the Catalina Sky Survey in Arizona, observed the approach of TU24 2007, as its name sug-



As to what happens when a passing rock hits the Earth, the picture shows Barringer Meteor Crater, Arizona (Image Source: NASA). The crater is about 1.3 km across and was formed in an impact about 49,000 years ago, probably by a 30 m diameter object travelling at 20 km/s. The tiny dots on the crater rim are trees, and yes the ribbons across the landscape are roads. Worse, this is only 1/3rd the diameter of the likely crater that would have formed if TU24 had hit us.

More images of impact craters on Earth can be found at <http://www.unb.ca/passc/ImpactDatabase/>

gests, in 2007 but not until October 11th. Some might be alarmed at having only three months notice of an asteroid hurtling towards earth.

But there is plenty of notice available for **2004 MN₄** otherwise known to the cognoscenti as 'Apophis'. At a size estimated to be close to 320 metres, it was first observed in 2004 and is predicted to either pass very close by or even hit the Earth in 2036. If it continues to follow its current orbit, it will miss Earth, but between now and then it is going to pass by Earth a couple of times. One of these passes will take place in 2029 where it will get a big kick from Earth's gravitational pull. It is only after this has happened, will scientists know the orbit of Apophis accurately enough. This leads to the inevitable question of 'what happens if its orbit takes it on a collision course with planet earth?'

Professor Burchell advocates that we need to land on Apophis five years in advance and try to push it out of the way. With technology readily available, the ability to land a space craft on a small object is entirely possible. However, we would need to have at least one practice run on one of the many asteroids that are due to pass Earth over the next 20 years or so, after which, we would know if this could work. The estimated costs of a trial run are in the region of £50M, however, funding for space projects in the UK is going through a difficult period and the current funding initiatives make for a pessimistic forecast for the future.

So, the next time you're looking at the sky at night, and notice something very dark rapidly approaching, contact your nearest observatory.

Professor Mark Burchell is Reader in Space Sciences in the School of Physical Sciences. His research is in hypervelocity impacts, the very violent events typical of Solar System impacts and conducts experiments using a two-stage light gun to achieve impact speeds in the laboratory of over 8 km s. In February, he will be hosting Café Scientifique – full details on back page.

The next known space event takes place next month where observers can witness a total eclipse of the moon on February 21 between 3 and 4 am, but then again, anything could happen...

Meet the Scientist

Each month, we focus on one of our scientists who describes their interest in science and how they are inspired. Our first scientist of the month for 2008 is Dr Farzin Deravi, Reader in Information Engineering in the Department of Electronics. His research interests include image processing, computer vision, shape and texture recognition, biometrics and joint audio-visual processing for recognition. From a young age, he was drawn to image recognition and robots. Today he has over 100 publications behind him and is at the forefront of the ground-breaking technology in biometric security and image classification.



Dr. Farzin Deravi, Reader in Information Engineering and Director of Research in the Department of Electronics.

“How did you first get into science?”

I seem to have been interested in discovery from an early age. My parents tell me that the first words I spoke (in Farsi) were “In Chichiye” meaning “What is this?” while pointing to some floral patterns in a carpet! Later on I remember conducting various “chemical experiments” in my bedroom. Perhaps an important early influence was seeing the US television series “Lost in Space” as a young boy. I would have loved to have a robot like Will Robinson’s – a motive that may in part be still driving my research. Inspirational maths and physics teachers at school in Tehran further encouraged this interest in science which led to a scholarship to study at the United World College of the Atlantic (AC) in UK. I will never forget the joy of wandering into the physics lab at AC for the first time and discovering the wonders hidden in every cabinet ...

“What is the focus of your current research?”

I am interested in the field of pattern recognition. In particular I have been investigating how visual patterns can be recognised by machines, automating many routine tasks that currently can be done only by humans. My recent work has focused on recognizing patterns to recognize human identity. This field of biometrics is currently receiving a great deal of attention for its potential to bring about greater security and trust in human transactions.

“Can you tell us about your current research group, what the

group is working on and the purpose of the research?”

The group is involved in a broad range of biometric research including the development of algorithms for individual biometric modalities such as face and fingerprint recognition as well as combining multiple modalities to achieve greater robustness and usability. The group is exploring the potential of multibiometric systems for ensuring the inclusivity of access to facilitate accessibility for all users, taking into account physical, cultural or other factors which may affect the public acceptability of biometric technologies. One recent initiative that demonstrates the nature of this research is the EU 3D Face Integrated Project. This collaborative project is aiming to produce the next generation face recognition technologies for unattended border control. We are also developing novel algorithms for recognizing skin texture and combining this information with face geometry and photometry to produce more reliable person recognition technologies which are resistant to spoofing attacks.

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

For biometrics in particular, one significant recent feature of research has been the shortening of the time lag between scientific breakthroughs and the development of standards which has accelerated since 2001. This rush to standards has been caused by the perceived urgency for deployments and has necessitated a closer relationship between researchers and the standards development process.

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

One important source of change has been the availability of greater quantities of data for testing and evaluation. The availability of large public databases (including hundreds and even thousands of images) has changed the threshold of evidence required for the evaluation of new developments substantially leading to much better reliability in scientific results.

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

Despite the roll-out of major biometrics projects nationally and internationally, many significant challenges remain that require a sustained and increasingly multi-disciplinary research. One such area is the need to ensure the legitimate privacy and anonymity rights of citizens while providing for their safety and security. Here, new technological solutions may need to be developed to augment legislation in order to guarantee that the benefits of a biometric future are fully realized without threatening our individual and collective freedoms.

Two of Dr Deravi’s research associates



Dr Ziheng Zhou



Dr Samuel Chindaro

March Issue:

Alistair Mathie, Professor of Pharmacology and Director of Research in the Medway School of Pharmacy describes his scientific interests.

Are comets really comets?

That is not a mis-print. We "know" comets are icy bodies with a bit of dirt thrown in (so called "dirty snow balls"), and in 2006 the NASA Stardust mission returned samples from comet Wild-2, the first time NASA had collected materials from a body in space and returned them to the Earth since the Apollo astronauts went to the Moon. The first papers about the Stardust samples appeared in just over a year ago in *Science* (vol 314, Dec 2006) and **Mark Burchell (SPS)** was a co-author on 4 of them. Comets were no longer quite so mysterious, we finally had samples in our hands.

Since then things have got trickier. A more recent analysis of the Stardust samples has been reported just last week in *Science* ("Comparison of 81P/Wild 2 Dust with Interplanetary Dust from Comets" by Hope Ishii, John Bradley, Zu Rong Dai, Miofang Chi M., Anton Kearsley, **Mark Burchell (SPS)**, Nigel Browning and Frank Molster, *Science*, 319, 447 – 450, 2008). This team, which combined staff from the USA (Lawrence Livermore and UC Davis in California), the UK (Kent and the Natural History Museum) and Holland (Netherlands Organisation for Scientific Research) compared Stardust cometary samples with the dust grains that fall onto the Earth from space

every day.

The dust grains from space include grains from comets, but it turns out that they are different to the Stardust grains. Indeed Hope and her colleagues reported that the Stardust grains looked more like asteroid dust than cometary dust grains. So at least some comets (e.g. Wild 2) may be more like icy asteroids than our traditional image of comets and contain materials that formed closer to the sun than previously thought.

One crucial step in this work was firing test mineral dust from Earth samples into aerogel collectors similar to those carried by the Stardust mission to collect cometary dust as it flew past comet Wild-2. This work was done at Kent using the two stage light gas gun in SPS (see picture). It showed that some of the structures previously reported in the captured Stardust cometary dust grains and taken as evidence of a traditional cometary origin of the dust, were really artefacts of the collection in the aerogel: The aerogel collection mechanism on the Stardust mission was processing all material but by accident.

Thus some of the conclusions made in the original report are no longer valid and the dust from Wild 2 looks like normal rocky dust grains. NASA scien-



The two stage light gas gun on which Professor Burchell conducted his experiments, in the School of Physical Sciences.

tists were expecting to find dust which is billions of years old, but their hopes have been thwarted by Wild-2. The scientists are now confronted with more questions than they had originally, most notably, what is the difference between an asteroid and a comet? It was thought that asteroids were formed near the sun whilst comets were formed in deep space. It would appear that doubt now surrounds this categorisation, or alternatively, it could simply be that Wild-2 was the exception and fits into neither category, or may be a body of a category of object not yet determined. Whatever the reason, it is going to be fun finding out!



The comet Wild-2 (pronounced 'Vilt'). Image: NASA

The news took America by storm, with national press coverage:

CBC <http://www.cbc.ca/quirks>

The Discovery Channel <http://dsc.discovery.com/news/2008/01/24/comet-dust.html>

The L.A. Times:

<http://www.latimes.com/news/science/la-sci-stardust25jan25,1,7403486.story?ctrack=2&cset=true>

SF Chronicle

<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/01/25/BAGCUL5HS.DTL&hw=David+Perlman&sn=001&sc=1000>

Nature:

http://blogs.nature.com/news/thegreatbeyond/2008/01/no_stardust_for_comet_mission.html

Science Daily

<http://www.sciencedaily.com/releases/2008/01/080124161617.htm>

IT Wire

<http://www.itwire.com/content/view/full/16291/1066/>

New Scientist: <http://space.newscientist.com/article/dn13224-comet-samples-are-surprisingly-asteroidlike.html>

Scientific American <http://www.sciam.com/podcast/episode.cfm?id=ADD0878B-D6C3-3B70-7B5BC373545BB82D>

National Geographic: <http://news.nationalgeographic.com/news/2008/01/080123-comet.html>

eflux media http://www.efluxmedia.com/news_NASA_Concludes_Wild_2_To_Be_An_Asteroid_Like_Comet_13238.html

Cosmos <http://www.cosmosmagazine.com/node/1825>

and Thaindian News

http://www.thaindian.com/newsportal/health/asteroid-resembling-materials-discovered-in-comet-dust_10014615.html

Forthcoming Lectures and Seminars – February

Date	Time	Speaker and Lecture Title	Lecture Theatre
1 Feb	3pm	Dr Gavin Brown, (Pure Mathematics), ' Gorenstein varieties and Cramer's rule in higher corank '.	IMSAS, McVittie Library
4 Feb	2.30pm	Ingo Runkel (KCL) (Pure Mathematics), ' Algebra and Topological Field Theory '.	IMSAS, McVittie Library
4 Feb	4pm	Dr. Matthew Crump, School of Chemistry, University of Bristol, ' The polyketide acyl carrier protein - A remarkable multi-functional enzyme '.	Biosciences LT 1
6 Feb	2pm	Professor Ian Bruce, Department of Biosciences, '	SPS Room 110
7 Feb	2pm	Dr Nikolaos Demiris (MRC Biostatistics Unit), ' Survival Extrapolation '.	IMSAS, Mathematics Lecture Theatre
8 Feb	2pm	Dr Colin Johnson, (Computing), ' Taxonomies for Learning in Computer Science '.	Computing S110B
11 Feb	2.30pm	Kasper Peeters (Utrecht University), (Pure Mathematics)	IMSAS, McVittie Library
11 Feb	4pm	Dr. Lisa Swanton, Faculty of Life Sciences, University of Manchester, ' Quality control at the endoplasmic reticulum folding factory '.	Biosciences LT1
12 Feb	2pm	Dr Colin Johnson, (Computing), ' Predicting Protein-Protein Interactions '.	Computing S110B
13 Feb	1pm	CBMI Dr Peter Nicholls and Dr Andy Hone, ' The immune system: from real world treatments to artificial applications '.	Marlowe LT 2
14 Feb	2pm	Professor Paddy (C.P.) Farrington (The Open University), ' Case Series Models and Extensions '.	IMSAS, Mathematics Lecture Theatre
15 Feb	3pm	Dr Chris Woodcock (Pure & Applied Mathematics),	IMSAS, McVittie Library
18 Feb	2.30pm	Tom McKay (UEA), ' On a plethysm conjecture of Foulkes '.	IMSAS, McVittie Library
18 Feb	4pm	Professor Simon R. Carding, Research Institute of Molecular and cellular Biology, University of Leeds, ' Host-microbe interactions in intestinal health and disease '.	Biosciences LT1
21 Feb	2pm	Dr Heather Turner (University of Warwick), ' Nonlinear Discrete-time Hazard Models for Entry into Marriage '.	IMSAS, Mathematics Lecture Theatre
22 Feb	3pm	Bryn Thomas (Pure & Applied Mathematics)	IMSAS, McVittie Library
25 Feb	2.30pm	Alexander Gorban (Leicester), (Pure Mathematics)	IMSAS, McVittie Library
25 Feb	4pm	Professor Ralf Stanewsky, School of Biological and Chemical Services, Queen Mary, University of London, ' Genetic dissection of the Drosophila circadian clock '.	Biosciences LT1
26 Feb	2pm	Mike Stout, ' Predicting Aspects of Protein Structure using Learning Classifier Systems '.	Computing S110B
27 Feb	1pm	CBMI Dr George Dobre and Dr Philippe Laissue, ' Optical Coherence Microscopy: multi-spectral tailoring and image processing '.	Marlowe LT 2
28 Feb	2pm	Professor Darren Wilkinson (University of Newcastle upon Tyne), ' Bayesian Inference for Biochemical Network Models '.	IMSAS, Mathematics Lecture Theatre
29 Feb	3pm	Dr James Shank, (Pure and Applied Mathematics),	IMSAS, McVittie Library

BBSRC Director to visit Kent Dr Doug Yarrow, Director of the Corporate Science Group within the Biotechnology and Biological Sciences Research Councils (BBSRC) is to visit Kent on February 11th. Dr Yarrow is responsible for directing BBSRC's programmes in Knowledge Transfer and Innovation; Industrial Interactions; International Relations; Public Affairs; Interaction with Stakeholders; and Policy Development. He will make a presentation entitled '**Excellence with Impact**' in the Darwin Conference Suite at 1.45pm. All are welcome.

IMSAS seminars for Spring Term

* The applied discussion group takes place Friday, 10.00-11.00 in the McVittie Library. Barry Vowden will present a variety of topics from Modern Analysis: measure theory, L_p spaces and Banach spaces, distributions, the Fourier transform, some topology, Stone-Weierstrass.

* The pure discussion group takes place on Wednesday, 13.00-14.00 in the McVittie Library. The topic for discussion this term is semi-invariants of quivers.

* The Differential Geometry and Physics Seminar takes place on Tuesday, 11.00-12.00 in the McVittie Library Steffen Krusch and Andy Hone will talk about selected topics in Differential Geometry and applications to Physics, and also introduce various concepts from Topology.

* The Geometry Seminar takes place on Wednesday, 11.00-12.00 in DS1. Gavin Brown and Jarek Buczyński will talk about selected topics in algebraic geometry.

Winners of Barbara Morris Prize for Learning Support

Les Walczowski, Senior Lecturer, and Mark Ellis, IT Manager, both in the Department of Electronics have been awarded the 2008 Barbara Morris Prize worth £5000, for Learning Support.

Building on previous work undertaken in this area, Les and Mark have created a new student learning portal based on Microsoft Sharepoint technology. This portal allows customised views for staff and students and provides essential course materials and information. Furthermore, this portal allows students to

submit coursework and engage in discussion groups and trawl module blogs and wikis to assist in their studies. Part of the development cycle has seen the creation of a customised SMS service to relay information to students in a contemporary manner. Some of this code is now used to provide the new central University SMS service. This has been a key part in the Departments e-learning provision allowing students to get the most from courses regardless of where they choose to study.



Dr Les Walczowski and Tony Ellis, Department of Electronics, winners of the Barbara Morris Prize for Learning Support

University Teaching Prizes

Four applications were received for the 2007/8 round of the University Teaching Prizes. All were judged to have merit and potential for an award at Faculty level, and some clearly highlighted ideas worthy of National recognition, but the panel felt that none were yet at a stage where they were sufficiently well-developed to recognize as prize-worthy. The panel decided that it would not be appropriate at this

stage to award the £5000 prize but that it ought to encourage all applicants to continue in their work and to provide constructive feedback. The reasons why the panel thought the projects had not yet quite made the threshold varied: some needed more development work, others needed more quantitative feedback from students, or needed to focus more on innovation or the wider applicability of the concept. The

panel also wished to ensure comparability across the three Faculties; and the Unit for the Enhancement for Learning and Teaching representation on all 3 Faculty judging panels felt that the other two Faculties had responded this year with projects of better quality than the Faculty of Science, Technology and Medical Studies! The panel noted that last year the Faculty of Humanities also did not award a prize and this year their panel received a greater number of proposals and a better quality of entry – it is hoped that the Faculty of Science will respond in a similar fashion.

Computing Students Head for the Great Outdoors

Every year the Computing Laboratory provides the opportunity for new research postgraduate students and research associates to have a weekend away at an activity centre. This year's excursion took place on some cold winter's days in early December. and the weather was typically changeable. The weekend of outdoor and indoor team activities included zip-lining, archery and negotiating obstacle courses. The aims of the weekend are for group members to get to know each other and to tackle issues of teamwork

and communication. Without a doubt, this weekend was a great success and enabled all participants to not only put names to faces once back in the Laboratory but it also started some lasting friendships.

Taking part this year were:

Lawrence Beadle
Rob Bunyan
Laurence Hellyer
Russell Hardy
Mudasser Iqbal
Nick Miles
Fernando Otero
Douglas Warren



Recent Published Papers

School of Physical Sciences

Biagini SCG, Surfraz M, **Blower P**, Facile Synthesis of MDTPA and BMDTPA: Design and Synthesis of Novel DPA-Peptide Conjugates for Radiolabelling (2007), *European Journal of Nuclear Medical Molecular Imaging*, **34**.

Newport RJ, FitzGerald V, Drake KO, Jones JR, Smith ME, Honkimäki V, Buslaps T, Kretzschmer M, In situ high-energy X-ray diffraction study of a bioactive calcium silicate foam immersed in simulated body fluid (2007), *Journal of Synchrotron Radiation*, **14**, 492-499.

Newport RJ, FitzGerald V, **Pickup DM**, Drake KO, Smith ME, A high energy X-ray diffraction study of sol-gel derived (Ta₂O₅)_x(SiO₂)_{1-x} glasses (x = 0.05, 0.11 and 0.25)-elucidating the role of tantalum in silica (2007), *Journal of Science & Technology*, **44**, 153-159.

Biagini SCG, **Blower PJ**, Surfraz M, King R, Mather SJ, How do HYNIC-conjugated Peptides Bind Technetium? Insights from LC-MS and stability studies (2007), *Dalton Transactions*, 4998-5007.

Pickup DM, Guerry P, Moss RM, Knowles JC, Smith ME, **Newport RJ**, New sol-gel synthesis of a (CaO)_{0.3}(Na₂O)_{0.2}(P₂O₅)_{0.5} bioresorbable glass and its structural characterisation *Journal of Materials Chemistry* (2007) - Royal Society of Chemistry **17**, 4777-4784.

Pickup DM, Ahmed I, Guerry P, Knowles JC, Smith ME, **Newport RJ**, The structure of phosphate glass biomaterials from neutron diffraction and ³¹P nuclear magnetic resonance data (2007), *Journal Physics Condensed Matter - Institute of Physics*, **19**, 415116 (8pp).

O'Dell LA, Savin SLP, **Chadwick AC**, Smith ME, A ²⁷Al MAS NMR study of a sol-gel produced alumina: Identification of the NMR parameters of the θ -Al₂O₃ transition alumina phase (2007), *Solid State Nuclear Magnetic Resonance*, **31**, 169-173.

Aleman J, **Chadwick AV**, He J, Hess M, Horie K, **Jones RG**, Kratochvil P, Meisel I, Mita I, Moad G, Penczek S, Stepto RFT, Definitions of Terms Relating to the Structure and Processing of Sols, Gels, Networks, and Inorganic-Organic Hybrid Materials (2007), *Pure and Applied Chemistry - IUPAC*, **79**, 1801-1829.

Savin SLP, **Chadwick AV**, O'Dell LA, Smith ME, Characterisation of Nanocrystalline Magnesium Oxide by X-Ray Absorption Spectroscopy (2007), *Chemphyschem*, **8**, 882-889.

O'Dell LA, Savin SLP, **Chadwick AC**, Smith ME, Structural Characterization of SiO₂ and Al₂O₃ Zener-Pinned Nanocrystalline TiO₂ by NMR, XRD and Electron Microscopy (2007), *Journal of Physical Chemistry - American Chemical Society*, **111**, 13740-13746.

Valappil SP, **Pickup DM**, Carroll DL, Hope CK, Pratten J, **Newport RJ**, Smith ME, Wilson M, Knowles JC, Effect of Silver Content on the structure and Antibacterial Activity of Silver-Doped Phosphate-Based Glasses (2007), *Antimicrobial Agents and Chemotherapy - American Society for Microbiology*, **51**, 4453-4461.

Dickson SJ, **Biagini SCG**, Steed JW, Anion binding in (arene) ruthenium(II)-based hosts (2007), *Chemical Communications - Royal Society of Chemistry*, 4955-4957.

Fitzgerald V, **Pickup DM**, Greenspan D, Sarkar G, Fitzgerald JJ, Wetherall KM, Moss RM, Jones JR, Newport RJ, A Neutron and X-Ray Diffraction Study of Bioglass® with Reverse Monte Carlo Modelling (2007), *Advanced Functional Materials*, **17**, 3746-3753.

Carta D, **Mountjoy G**, Gass M, Navarra G, Casula MF, Corrias A, Structural characterization study of FeCo alloy nanoparticles in a highly porous aerogel silica matrix (2007), *Journal of Chemical Physics - American Institute of Physics*, **127**, 204705-1.

Corrias A, **Mountjoy G**, Gozzi D, Latini A, Multi-walled carbon nanotubes decorated with titanium nanoparticles: synthesis and characterization (2007), *Nanotechnology - Institute of Physics*, **18**, 485610-16.

West MJ, **Went MJ**, The spectroscopic detection of exogenous material in fingerprints after development with powders and recovery with adhesive lifters (2007), *Forensic Science International*, **174**, page 1-5.

Pickup DM, Speight RJ, Knowles JC, Smith ME, **Newport RJ**, Sol-gel synthesis and structural characterisation of binary TiO₂-P₂O₅ glasses (2007), *Materials Research Bulletin*, **43**, 333-342.

Brown SD, **Strange P**, Bouchenoire L, Zarychta B, Thompson PBJ, Mannix D, Stockton SJ, Horne M, Arola E, Ebert H, Szotek Z, Temmerman WM, Fort D, Dipolar Excitations at the L_{III} X-Ray Absorption Edges of the Heavy Rare-Earth Metals (2007), *Physical Review Letters - American Physical Society*, **99**, 247401-4.

Recent Published Papers cont...

Biosciences

Danielle DiCara, Alison Burman, Stuart Clark, Stephen Berryman, **Mark J. Howard**, Ian R. Hart, John F. Marshall and Terry Jackson, Foot and mouth disease virus forms a highly stable, EDTA-resistant complex with its principal receptor, Integrin $\alpha\beta$ 6: Implications for Infectiousness (2008), *Journal of Virology* **82**, 1537-1546.

Jane L. Wagstaff, Irina Sadovskaya, Evgeny Vinogradov, Säid Jabbouri and **Mark J. Howard**, Poly-N-acetylglucosamine and poly (glycerol phosphate) teichoic acid identification from staphylococcal biofilm extracts using excitation sculptured TOCSY NMR (2008), *Molecular Biosystems*, **4**, 170-174.

Sara Bhana and **Dan R. Lloyd**, The role of p53 in DNA damage-mediated cytotoxicity overrides its ability to regulate nucleotide excision repair in human fibroblasts (2008), *Mutagenesis*, **23**, 1, 43-50.

Jane Povey, **Mark J. Howard**, **Richard A. Williamson** and **C. Mark Smales**, The effect of peptide glycation on local secondary structure (2008), *Journal of Structural Biology*, **161**, 151-161.

Ma Del Carmen A., Gonzalez-Chavez, **Ray Newsam**, Robert Lindeman, John Dodd and Jorge M. Valdez-Carrasco, Bacteria associated with the extraradical mycelium of an arbuscular mycorrhizal fungus in an As/Cu polluted soil (2008), *Publicado como Articulo en agrociencia* **42**, 1-10.

Computing

R. Alves, M. Delgado, F. Camargo, E. Benelli, and **A.A. Freitas**, Discovering multi-label hierarchical classification rules for protein function prediction (October 2007), in A. Plastino, A.P.L.F. de Carvalho, R. Ramos, and W.M. Junior, editors, *Proc. II Workshop em Algoritmos e Aplicacoes de Mineracao de Dados (Workshop on Algorithms and Applications of Data Mining)*, pages 87-90. Sociedade Brasileira de Computacao.

E.A. Boiten, J. Derrick, and G. Schellhorn, Relational concurrent refinement II: Internal operations and outputs (December 2007), *Formal Aspects of Computing*, page 43pp.

C.S. de Oliveira, A.S.G. Meiguins, B.S. Meiguins, P.I. Godinho, and **A.A. Freitas**, An evolutionary density and grid-based clustering algorithm (October 2007), in A.S. da Silva, V.G. Soares, and G. Elias, editors, *Proc. of the XXIII Brazilian Symposium on Databases (SBBD-2007)*, pages 175-189. Sociedade Brasileira de Computacao.

Siddhartha Ghosh, Ian Marshall, **A.A. Freitas**, Robust Autonomous Detection of the Faulty Sensors of a Sensor Array (December 2007), IEEE Signal Processing Society, Second IEEE workshop on Computational Advances in Multi-Channel Sensor Array Processing.

R.S. Gomez, J.C. Ausguto, Expressiveness of temporal query languages: On the modelling of intervals, interval relationships and states (November 2007), *Artificial Intelligence Review*, Electronic version available online (<http://www.springerlink.com/content/r3347p646152351m>).

Simon J. Haggett, **Dominique F. Chu**, and Ian W. Marshall, Evolving a Dynamic Predictive Coding Mechanism for Novelty Detection (December 2007), in *Research and Development in Intelligent Systems XXIV - Proceedings of AI-2007, the Twenty-seventh SGAI International Conference on Artificial Intelligence*. Springer.

Tuan-Anh Nguyen, **David Chadwick**, and Bassem Nasser, Recognition of authority in virtual organizations (September 2007), in *The 4th International Conference on Trust, Privacy and Security in Digital Business (TrustBus07)*.

A. Secker, **A.A. Freitas**, WAIRS: Improving classification accuracy by weighting attributes in the AIRS classifier (September 2007), in *proceedings of the 2007 IEEE Congress on Evolutionary Computation (CEC 2007)*, pages 3759-3765, Singapore, IEEE press.

Huiqing Li, **Simon Thompson**, Tool Support for Refactoring Functional Programs (January 2008), in *Partial Evaluation and Program Manipulation*, San Francisco, California, USA, pp 199 - 203.

Nik Sultana, **Simon Thompson**, Mechanical Verification of Refactorings (January 2008), in *Workshop on Partial Evaluation and Program Manipulation*, ACM SIGPLAN, pp 51 - 60.

Recent Grants Awarded

Dr Duncan Langford-Computing £8,987.00 from Axon Limited for Consultancy for Axon.

Professor W J Gullick-Biosciences £80,225.00 from the Breast Cancer Campaign for a project entitled 'Quantum Dot-labelled antibodies to quantify expression of the EGF receptor family in breast cancer specimens'.

Dr D P Mulverhill-Biosciences £350,484.00 from the BBSRC (Biotechnology and Biological Sciences Research Council) for a project entitled 'The role of tropomyosin in regulating actin filament dynamics in fission yeast'.

Dr Martin Warren-Biosciences £34,343.00 from the BBSRC (Biotechnology and Biological Sciences Research Council) (through the University of Oxford) for a project entitled 'Deciphering the d1 Haem Biosynthesis Pathway and its Relationship to a Novel Anaerobic Route to Proto haem'.

Dr P Klappa-Biosciences £2,000.00 from the British Council for partnership development between the University of Kent and the Universiti Teknologi, Malaysia.

Professor Cornelius Katona-Kent Institute of Medicine and Health Sciences £16,845.36 from the National Institute of Health Research (NIHR) via The Whitstable Practice for a project entitled 'Improving concordance in older people with type-2 diabetes'.

Peter Lee and Winston Waller-Department of Electronics £42,000.00 from the Electronics Knowledge Transfer Network (E-KTN) for E-KTN Regional Support.

Dr Gary Robinson-Department of Biosciences £30,000.00 from Sanofi Pasteur for the License Option linked to 35022 (Research part).

Gavin Topley-Computing Laboratory £4,115.00 from Text A Car Limited for the Development of SMS windows/Linux application.

Dr Pauline Phelan and Dr Anthony Baines (Fellowship)-Department of Biosciences £38,908.00 from Daphne Jackson Trust for a project entitled Gap Junctions in viral-mediated immune suppression / The role of CAMSAP1 in neurite outgrowth.

European perspectives on technology for handwritten signature analysis

A European Workshop on Signature and Handwriting Analysis for Person Identification was organised just before the Christmas break by the Department of Electronics, on behalf of the COST Action 2101 Biometrics for Identity Documents and Smartcards (Cooperation for Scientific and Technical Research).

The Workshop brought together some of Europe's principal researchers in the area of automatic signature verification and the exploitation of all forms of handwriting for the purposes of establishing or verifying the identity of the writer. Although a very well-established biometric modality, the handwritten signature has some particular characteristics which, in some applications, make it less attractive than other possible modalities, yet it remains a very natural, popular and generally accepted means of confirming identity and authorising transactions. The Workshop sought to identify the principal outstanding research issues which must be addressed if significant advances are to be made in this field, while also aiming to

developing a better understanding of industry's needs, and how to improve the match between technological capability and application requirements.

The format of the Workshop was based on short presentations from all attendees, each addressing a number of key issues relating to perceptions of the current state of the art, priorities for research, end-user needs, and the relations between research and exploitation. Each participant also provided a brief overview of his/her current research activity and exploitation pathways. Through these presentations and interactive discussion the Workshop was able to produce a brief report identifying future research directions, opportunities for partnership building and exploitation routes. A key aim of the Workshop was to assemble much of the information required to define the basis of an action plan to inform more integrated activity within the research community, both in the immediate short term and in the longer term. Moreover, by encompassing both research key themes and considering possible consortia profiles, the Workshop was able to lay the foundations to develop proposals for future collaborative research projects. These ideas will be followed up during the early part of 2008.

The Workshop was led by Professor Michael Fairhurst (who is also Vice-Chair of the COST 2101 Management Committee) and Dr Richard Guest from the Department of Electronics.





CBMI
Spring Lecture Series
Wednesdays at 1-2pm
Marlowe Lecture Theatre 2

Feb 13	Dr Peter Nicholls, Senior Lecturer in Molecular and Cellular Biology, Department of Biosciences	Dr Andrew N W Hone Reader in Applied Mathematics, Institute of Mathematics, Statistics and Actuarial Science
Title: The immune system: from real world treatments to artificial applications		
Feb 27	Dr Philippe Laissue, Research Associate, Kent Institute of Medicine & Health Sciences	Dr George Dobre Lecturer in Applied Optics, School of Physical Sciences
Title: Optical Coherence Microscopy: multi-spectral tailoring and image processing		
Mar 12	Dr Colin Johnson, Senior Lecturer, Computing Laboratory	Dr Konstantinos Sirlantzis, Lecturer, Department of Electronics
Title: Classification of images of cancer patients		
Mar 26	Dr Anthony Baines, Reader in Molecular Cell Biology, Department of Biosciences	Martin Ridout Reader in Statistics, Institute of Mathematics, Statistics and Actuarial Science
Title: Analysis of the Evolution of Genes		



Professor Mark Burchell

Café Scientifique
Ye Olde Beverlie,
St Stephen's Green,
Canterbury at 7pm.

Tuesday February 12, 2008
Professor Mark Burchell:
Life in Space and How We Will Find It

Is the Earth unique or are the materials and conditions for life widespread in space? In which case is there life elsewhere and how will we be able to find it? Indeed did life even start here on Earth or arrive from elsewhere? Astrobiology is a field with many fundamental questions: slowly scientists are starting to be able to find answers. How far have we got and how far have we still to go? There is plenty to talk about.

Café Scientifique in 2008

March 11, 2008

Dr. Andy King: Tick-bites and odd-bods: Using science to hack computer systems

April 8, 2008

Prof. Fritz Mühlischlegel: Staying healthy in the hospital

May 13, 2008

Dr. Sarah Johns: Risk, Reproduction, and Teenage Motherhood: An evolutionary approach

June 13, 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/>

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