Issue 04

UNIVERSITY OF SURREY

Advanced Technology Institute Newsletter

Faculty of Engineering and Physical Sciences

18 New PhD Graduates in April 2010

The postgraduate graduation ceremony held on 16 April was a truly momentous occasion, with 18 graduands from the ATI. Collectively, if we assumed each of these research students took an average of 3.5 years to complete their thesis work, this would equate to over 60 person years of research contributions by the graduands to the international knowledge base. We are very proud of their achievements and know they will continue to fly the ATI flag high in their chosen fields. The ethos of the Institute in contributing to society and making a difference will remain throughout their lives and I am grateful to my colleagues and staff at the ATI for ensuring we have provided the highest quality environment for their research. I look forward to hearing news from the graduands in the years to come. Nothing gives me more pleasure than to see the success in their careers as they too make their mark and contribute to society with their knowledge. I wish you all a great future and keep in touch!

Ravi Silva, Director ATI

ATI graduands gather outside Guildford Cathedral

Congratulations to. . .

- Stephen Sweeney on being promoted to Professor
- Goran Mashanovich on receiving two Surrey Learning & Teaching Awards
- Basudev Pradhan on being awarded a Humboldt Fellowship
- Kosmas Tsakmakidis on being awarded Researcher of the Year for the Faculty
- Radu Sporea on being awarded PhD+ funding
- Nadir Hossain, on being awarded a SPIE Scholarship
- Patrick Bowen for his Goldwater State Scholarship
- Emiljana Krali on winning two prizes for her MSc project

STOP PRESS: £7.3M has been awarded to Surrey by EPSRC for fabrication, physics and quantum information applications of single atom devices in silicon. More to follow from PI, Prof Ben Murdin, in the next newsletter.

About the ATI

The ATI addresses the perceived 'grand challenges' in renewable energy, healthcare and information technology. Activities are broadly divided into four research groups: nanoelectronics, photonics, ion beams and theory and advanced computation.

Postgraduate Study
MSc in Nanotechnology and Nanoelectronic Devices – contact
Programme Director
Dr David Carey - david.carey@surrey.ac.uk

PhD Research – contact
Postgraduate Admissions Tutor
Dr Maxim Shkunov - m.shkunov@surrey.ac.uk

Newsletter Editor - Miss Kelly Green - k.d.green@surrey.ac.uk

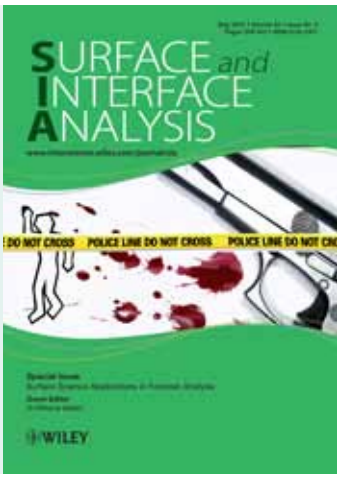
Contact
Advanced Technology Institute
University of Surrey
Guildford GU2 7XH
T: +44 (0)1483 689859
F: +44 (0)1483 689404
E: ATI-enquiries@surrey.ac.uk

www.ati.surrey.ac.uk

Fighting Crime with Ion Beams

Dr Melanie Bailey was recently interviewed by Materials Views on her role as Guest Editor for a special edition of the journal 'Surface and Interface Analysis'.

This edition reports on new and up and coming analysis techniques that could become the future for forensic analysis. The techniques analyse the surface of materials, such as gunshot residue and glass fragments, and the analysis can help strengthen the links between suspects and a crime scene. Some of the techniques are new, and some are well established, but are applied to solve new problems in forensic science. Melanie gives an interview to the journals editor at John Wiley and Sons which is available as a podcast from the Chemistry division of John Wiley and Sons, Ltd.



Prof Silva to Chair JEMI Conference

Professor Ravi Silva will chair the JEMI Conference on 1 and 2 June 2010 in the iconic town hall of Cardiff, which has attracted over 135 SMEs. He will open proceedings with a rallying call to technologists titled **"Manufacturing Our Way Out of Recession: Through Innovative Low Carbon Technology"** at a meeting themed on low carbon technologies for this electronic manufacturing sector.

New Grants

A consortium involving the universities of Heriot-Watt, Warwick, Surrey and Leeds have been awarded EPSRC funding of £1.43M (fEC). Professor Graham Reed is PI of the Surrey component which will receive £307K (fEC). The grant will enable Graham, along with Professor Russell Gwilliam and Dr Goran Mashanovich, co-investigators of the grant, to further their studies on single photonic detectors in silicon.

Professor Stephen Sweeney is PI of a grant recently awarded to conduct research into developing short wavelength InP-based QCLs in collaboration with the University of Sheffield. These high performance quantum cascade laser sources operating at the short wavelength end of the 3-5 micron atmospheric transmission window are of interest for applications such as healthcare (breath analysis), security (explosive detection) and the environment (greenhouse gas sensing). It is expected that the research will provide unprecedented levels of performance and functionality for these applications and will also exploit the potential of such devices for new developments in intersubband non-linear optics. Surrey will receive £206K of the total £815K grant awarded by EPSRC.

Congratulations

Congratulations to Dr. Basudev Pradhan on being awarded a Fellowship from the Alexander von Humboldt Foundation. Basudev works with Professor Silva in the field of organic inorganic solar cells, funded by E. ON. Under this Fellowship he has chosen to continue his research on organic photovoltaics at the University of Potsdam during 2010 and 2011. Basudev comments "I am honoured to have received this fellowship. I am very excited about the opportunity to drive forward my scientific research and to build international collaborations."

Mr. Nadir Hossain, a PhD student in the Photonics group, has been awarded a SPIE Scholarship in Optical Science and Engineering. The award of $2000 recognises Nadir's research into developing new types of silicon-compatible semiconductor lasers for optical computing and communications. Professor Stephen Sweeney, Nadir's supervisor, said "I am immensely proud to see Nadir's work being recognised with this scholarship, adding to Nadir's previous awards of a Royal Academy of Engineering and Kwan Trust Fellowship. This illustrates the importance and value placed on his research which is being carried out in collaboration with our colleagues at Philipps-University in Marburg, Germany, and Arizona State University in the US."

An undergraduate exchange student from North Carolina State University, supervised by Professor Jeremy Allam, has been awarded one of two North Carolina State Goldwater Scholarships. Patrick Bowen was the first exchange student under this agreement to come to Surrey, joining the ATI in October 2009. Patrick is currently working on measuring how electrons move in organic materials used in solar cells.

Congratulations also go to Emiljana Krali on being awarded The Varian Project Prize and The MSc Advisory Board Prize for her MSc project " Modelling the Efficiency of Organic Photovoltaic Devices", supervised by Dr Richard Curry.

Congratulations to Dr Goran Mashanovich who has been awarded two Surrey Learning and Teaching Awards in recognition of good practice through innovative teaching methods.

Researcher of the Year Award for Kosmas Tsakmakidis

Dr Kosmas Tsakmakidis has been awarded "Researcher of the Year 2008/9" for the Faculty of Engineering and Physical Sciences. Kosmas was selected for his theoretical contributions to the field of metamaterials and slow light and for playing a leading role in promoting the said research within the academic community.

Kosmas is a Royal Academy of Engineering/EPSRC research fellow working with Professor Ortwin Hess in the Theory and Advanced Computation Group within the ATI. In 2007 their research was published in Nature where they proposed the first (and, until now, the only) method that can allow for true stopping of light. The method makes use of meta-materials, which have enabled researchers to look at the theory of 'invisibility' cloaks and 'perfect' lenses. Their proposals have recently been verified by a number of international groups.

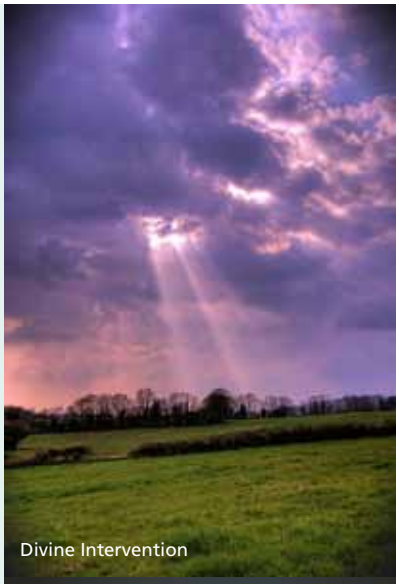
Kosmas also recently won the runner-up prize in the Engineering section of this year's SET for BRITAIN awards. Professor Ravi Silva comments "Kosmas is working at the cutting edge of science and truly making waves in the physics community with his research on slow light. He should be an inspiration to all young scientists who have a dream and passion to use their abilities to contribute to society. He is a great advocate of the ATI having done his PhD at this Institute."

PhD+ Award to Radu Sporea

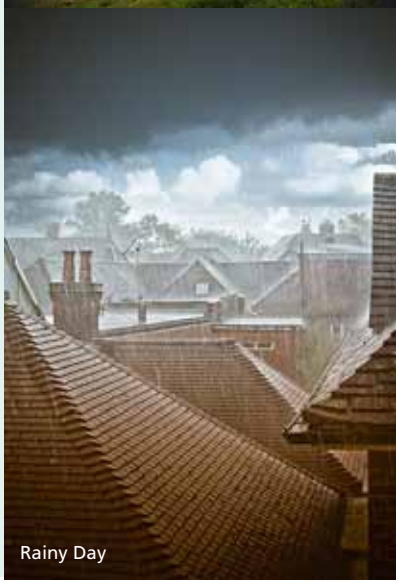
Congratulations to Radu Sporea on being awarded EPSRC PhD+ funding. On completion of his PhD, Radu will continue at the ATI as a Research Fellow, working with Professor Ravi Silva and Professor John Shannon.

Speaking about his research Radu comments: "I am very proud of being awarded PhD+ funding because it means that I will be able to continue my research after my PhD studentship ends. Additionally, knowing that a job is waiting for me when I finish my doctorate lets me concentrate on my research and on producing a high-quality thesis. The electronic device I am currently investigating is called the Source-Gated Transistor (SGT). It was invented at Surrey and addresses the limitations of standard transistors. My PhD research has concentrated on investigating the performance characteristics of the SGT. Next year I will take this one step further by creating design rules and circuit demonstrators. To the Industry, the adoption of SGT technology is much like learning a new language. I intend to establish ground rules for analog circuit design and manufacturing using the SGT. These structures are made by Philips Research and, based on our results, we expect to license the technology to industrial third parties. The result will be the real coming of age of plastic electronics, and will enable the UK to create a unique market lead in the field. I am also planning public engagement and outreach activities aimed at communicating the latest developments in electronics and equally at raising public awareness of the University's contribution to Science. This year I will be speaking at the Cheltenham Science Festival.

Time (and weather) permitting, I like to spend my free time taking photos. For the past couple of years I have been the President of the University's Photography Society. My photo "Rainy Day", taken from my flat in Haslemere has been entered into two exhibitions."



Divine Intervention



Rainy Day

Celebrating Student Success

It was wonderful to see so many of our graduands in attendance at the degree ceremony, held in April at Guildford Cathedral. Following the reception we were delighted to welcome graduands and their family and friends to the ATI for an informal gathering in celebration of their achievements. Congratulations to all.

Student	Supervisors	Thesis Title
James Cannon	Prof Ortwin Hess Dr David Faux	Non-equillibrium Molecular Dynamics Simulations of Flow Through Carbon Nanotubes
James Chamings	Prof Stephen Sweeney Prof Alf Adams	Efficiency Limitations and Band Anti-Crossing in Novel Dilute Nitride Optoelectronic Devices
Lok Cee Chong	Prof Ravi Silva Dr Richard Curry	Palladium Modified Fullerite Systems for Catalytic Applications
Joanna Coote	Prof Stephen Sweeney Dr Sub Reddy	Semiconductor Lasers as Miniature Biosensors
Shehan De Silva	Dr Charles Free Prof Ravi Silva	Integration of CNT Bio Potential Sensors Based on a SAW Backscatter Device
Lucian-Dragos Filip	Prof Ravi Silva Dr David Carey	Modelling of Field Emission and Tunnelling Processes for Carbon Nanotubes and Multilayered Structures
Frederic Gardes	Prof Graham Reed Dr Neil Emerson	High Speed Silicon on Insulator Phase Modulator
Archontis Giannakidis	Prof Ravi Silva Prof Maria Petrou	Solving the Inverse Radon Transform for Vector Field Tomographic Data
Kevin Howard	Dr Neil Emerson Prof Michael Underhill	The Application of Entropy in Optimising Systems
Harry Igbenehi	Prof Karen Kirkby Prof Roger Webb	Three-dimensional Proton Beam Writing for Micro Electromechanical Systems Applications
Ling Liao	Prof Graham Reed Dr Mario Paniccia (Intel)	High Speed Silicon-on-insulator Optical Modulators Based on the Free Carrier Plasma Dispersion Effect
Nilushan Mudugamuwa	Prof Ravi Silva Prof Michael Kearney	Excimer Laser Crystallised Polysilicon Solar Cells
Fumitaka Ohashi	Prof Ravi Silva Dr Vlad Stolojan	Fabrication of Carbon Nanotube Devices Using Thermal Chemical Vapour Deposition
Dietmar Reschner	Prof Ortwin Hess Prof Alf Adams	Theory and Simulation of Quantum Dot Semiconductor Amplifiers and Lasers
David Thomson	Prof Graham Reed Dr Neil Emerson	Silicon Based Total Internal Reflection Optical Switch
Lewis Wong	Prof Kevin Homewood Dr Manon Lourenco	Optical & Structural Properties of Ion Beam Fabricated Amorphous and Polycrystalline Iron Disilicide
Nicholas Wright	Prof Graham Reed Dr Neil Emerson	Reduction of Free Carrier Lifetime By Ion Induced Defects in Silicon
Peng Yuan Yang	Prof Graham Reed Prof Russell Gwilliam	Proton Beam Writing: A Novel Tool for Silicon Waveguides Fabrication

Advanced Technology Institute
University of Surrey
Guildford GU2 7XH

T: +44 (0)1483 689859
F: +44 (0)1483 689404
www.ati.surrey.ac.uk

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