newsletter

ISSUE 01

SCHOOL OF Physics

Inside...

Welcome to the inaugural issue of the School of Physics Newsletter which aims to provide an annual update on what's happening in the School, from teaching to research & outreach to spin-out.

Professor James Lunney,
Head of School

Featured in photo:
Professor James Lunney

The national and international context in which Irish universities operate has changed radically over the last few decades. In particular, our student population has greatly increased, our research activity has expanded dramatically and there is growing emphasis on doing research which impacts society and enterprise.

It is important to have effective outreach to the world beyond the university, and connecting with our alumni is an important element of this effort. This newsletter will also introduce you to some of the development projects in the School, and give you an opportunity to get involved. I hope that readers will feel encouraged to keep in touch with the School, and where possible to visit us or participate in our public events. In that regard, I invite you to visit us online at www.tcd.ie/physics.

Ions Old & New

Eighty years ago Ernest Walton* 'split the atom' using a beam of hydrogen ions; the photo shows an early ion accelerator constructed by Walton in Trinity in the 1950's.

Today, the latest addition to the suite of world-class facilities in CRANN is a helium ion microscope, one of only a few such instruments worldwide. Not only can this instrument image insulating samples with superior resolution, but the ion beam can also be used to fabricate structures on the nanoscale.

Featured in photo:
Walton ion accelerator

Featured in photo:
Helium ion microscope

**A sculpture commemorating Ernest Walton is one of the three priority funding areas in the School of Physics.*

I-LOFAR so Far

In the 19th century Birr Castle in County Offaly housed the largest telescope in the world. Professor Peter Gallagher leads an Irish cross-border consortium of astronomers, computer scientists, and engineers who are planning to build a rather different telescope on this site.

LOw Frequency ARray, or I-LOFAR is a radio telescope working at the lowest frequencies accessible from Earth. Combining many thousands of simple dipole receivers (just like the one in your radio at home) with the latest in high tech computing, I-LOFAR will be able to survey wide areas of the sky all at once and will open up a new window for astronomers.

When completed, I-LOFAR will consist of over 5,000 separate antennas spread in "stations" all over Europe. The main project is based in the Netherlands, and most of the array will be there, but outposts are planned in Germany, France, Sweden, Poland, the UK and now Ireland. The consortium is now busily raising funds and recently received significant donations from Irish philanthropists. The target is €1.3m and the consortium has high hopes of breaking ground by 2014. Further details on I-LOFAR can be found at www.lofar.ie.

I-LOFAR is one of the three priority funding areas in the School of Physics.

Eric Finch Retires

Featured in photo:
Helen, Jean, Alison and Eric Finch

Professor Eric Finch, master of the demonstration lecture and good shepherd of the Senior Freshman laboratory, retired in 2012.

Eric holds the distinction of being the first person in the school to feature on YouTube, demonstrating the Doppler Effect in the green space outside the Fitzgerald Building. Fellow Emeritus Finch will continue to give his specialist Senior Sophister lectures on Semiconductor Devices.

Nano Brewery

In microbrewery the focus is on the quality of the beer. Nano brewery is all about retaining that quality: Professor Jonathan Coleman and his team in CRANN have partnered with world-leading brewing company SABMiller on a project to increase the shelf life of bottled beer in plastic bottles.

Current plastic bottles have a relatively short shelf life, as both oxygen and carbon dioxide can permeate the plastic and diminish the flavour. However, a novel material, when added to plastic bottles will make them extremely impervious, meaning that oxygen cannot enter and that the carbon dioxide cannot escape, thus preserving the taste and 'fizz'.

The team will exfoliate nano-sheets of boron nitride, each with a thickness of approximately 50,000 times thinner than one human hair. These nano-sheets will be mixed with plastic, resulting in a material that is extremely impervious to gas molecules. As well as increasing the shelf life of the beer itself, less material is required in production, reducing cost and environmental impact.

Featured in photo:
Richard Corker, SABMiller
and Professor Jonathan Coleman

Featured in photo:
Jason Jenson operates the biosensor

Nano Biophysics

Membrane proteins are the most important target for drug-discovery programmes, with half of all marketed drugs affecting membrane proteins. Finding a way to use these proteins in the detection of viruses in a liquid offers potential for the fast detection of illnesses, hazardous microbes and/or contamination.

Professor Martin Hegner's research group has developed a quantitative virus biosensor for protein membranes. This biosensor uses an array of resonating microcantilevers to measure virus interactions under physiological conditions. The sensing technique utilises nanomechanical silicon sensors coated with biomembranes that have been shown to detect the presence of viruses in liquid environments within minutes.

These microcantilever-based sensors are small in size, they only consume tiny amounts of immobilized material and analyte, and they are capable of multiplexed detection. Future applications for this technology are based on faster detection of viruses in liquid which can be exploited in the food, medical, health and pharmaceutical sectors. In the future, development of large-scale, parallel cantilever sensors could be used as a tool for label-free and real-time functional microarray analysis.

Postgrad Winners

Featured in photo:
Professor William Phillips and Nina Berner

Congratulations to Nina Berner who won the 2012 Rosse Medal of the Institute of Physics in Ireland for her poster presentation 'Towards Organic Network Formation on a Semiconductor Surface'. Nina was presented with her medal by the chair of the judging panel, Professor William Phillips, Nobel Laureate in Physics.

Congratulations also to Paul Higgins, of the TCD Astrophysics Research Group, who was the winner of the 'Space Zone' category of 'I'm a Scientist, Get me Out of Here!'

This is an X Factor-style competition in which students get to challenge the scientists over intense, fast-paced online live CHATs before picking the winners.

In Brief

Postgrad student Arlene O'Neill represented Dublin in the 2012 Rose of Tralee Festival, where she fearlessly explained nanomaterials to the nation!

Professor Jonathan Coleman was the recipient of the 2012 Kroll Medal of the Institute of Materials.

Alumnus Noel Duffy's first collection of poetry *In The Library Of Lost Objects* was shortlisted for the 2012 Rupert and Eithne Strong Award.

New Lecturers are Winners

Featured in photo:
Professor Valeria Nicolosi

Professor Valeria Nicolosi holds a joint appointment in the Schools of Physics and Chemistry. She was awarded the 2012 RDS Intel Prize for contributions to nanoscience, which was the topic of her public Prize Lecture.

Featured in photo:
Mark Kearns and Professor Shane Bergin

Professor Shane Bergin is a TCD Science of Materials graduate who recently rejoined the school. He won the top prize in 'Designs for Learning 2012' for his D'art of Physics project, which would see commuters use smartphones to access mobile content that interacts with content placed on public transport itself.

Top of the Class

Congratulations to the star of the 2012 class, Stephanie Hyland. Stephanie, who graduated in Theoretical Physics, is now at St. John's College in Cambridge, doing the famous Part III of the Mathematical Tripos.

Adding to her many achievements is her selection as a Gates Cambridge Scholar, one of the most prestigious international scholarships in the world.

SFI Researcher of the Year

The Science Foundation Ireland Researcher of the Year 2012 is Professor Michael Coey of the School of Physics.

Featured in photo:
Michael Coey, Mark Ferguson (SFI), Minister of State Sean Sherlock

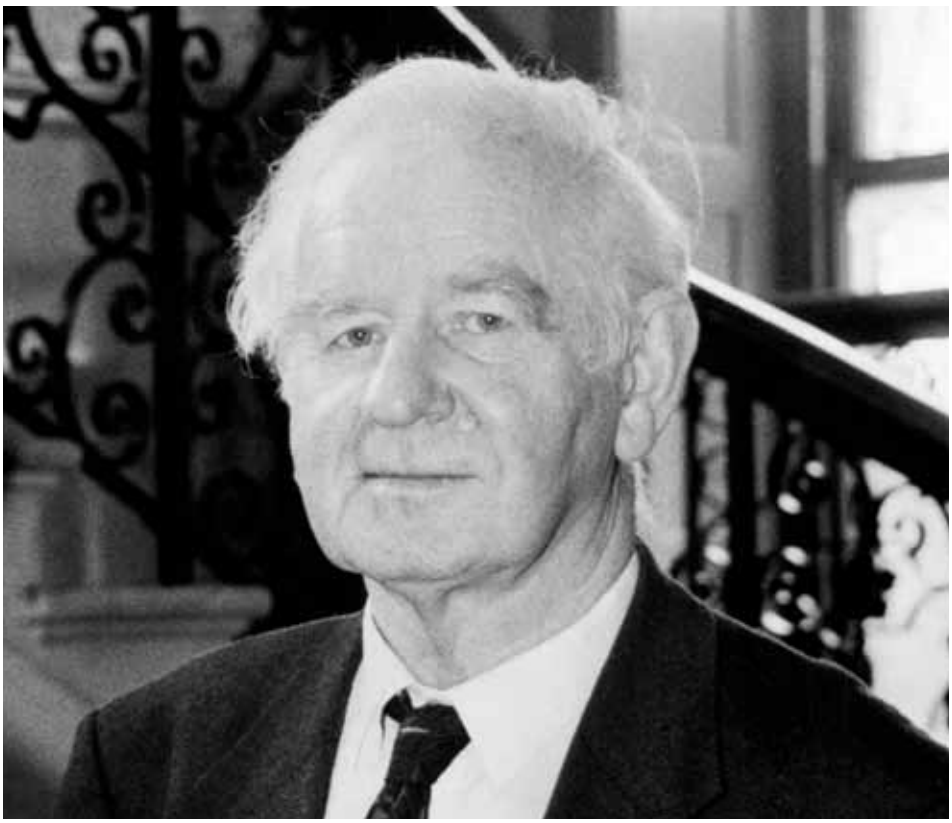
Professor Coey is a founder member of CRANN, TCD's Centre for Research on Adaptive Nanostructures and Nanodevices. His long career in science has been marked by remarkable scientific discoveries, particularly in the area of magnetism.

Professor Coey formally retired in 2012 but will continue to be involved in the School. The College will shortly begin the search for his successor as Erasmus Smith Professor of Natural & Experimental Philosophy.

A start-up grant associated with the new appointment is one of the three priority funding areas in the School of Physics.

In Fond Remembrance

Cyril Delaney, Fellow Emeritus of Trinity College Dublin and former Professor of Experimental Physics, died recently aged 87. He was a talented and inspirational scientist and a highly regarded lecturer to many generations of students.



Cyril's research centred on the physics of radioisotopes and radiation detectors. He also worked on the design and analysis of electronic circuits for detectors. He spearheaded public lectures on the issues surrounding the use of nuclear energy and of nuclear radiation in general. One of his early activities in Trinity was to emphasise the importance of radiation safety and dosimetry at a time when the use in Ireland of X-rays and nuclear radiation was not subject to any formal regulation.

He is survived by his wife Mary, his children Susan, Ian, Janet, Catherine and Gwyneth, by 14 grandchildren and one great granddaughter.

Featured in photo:
Professor Seamus Heaney, Professor Jean-Patrick Connerade, President Michael D. Higgins and Professor Iggy McGovern

Science Meets Poetry

Dublin was designated European City of Science in 2012, which was celebrated with a wide range of events nationwide, including poetry.

As part of the European Science Open Forum, the school hosted a day-long seminar *Science Meets Poetry* in the Schroedinger Theatre. Honoured guests included Seamus Heaney and President Michael D. Higgins. The seminar attracted poets and scientists (and poet-scientists) from a wide range of European countries. This was the fourth meeting in a biennial series begun by Professor Jean-Patrick Connerade, who co-chaired with Professor Iggy McGovern. The seminar included lectures, readings, discussion and a poetry poster session!

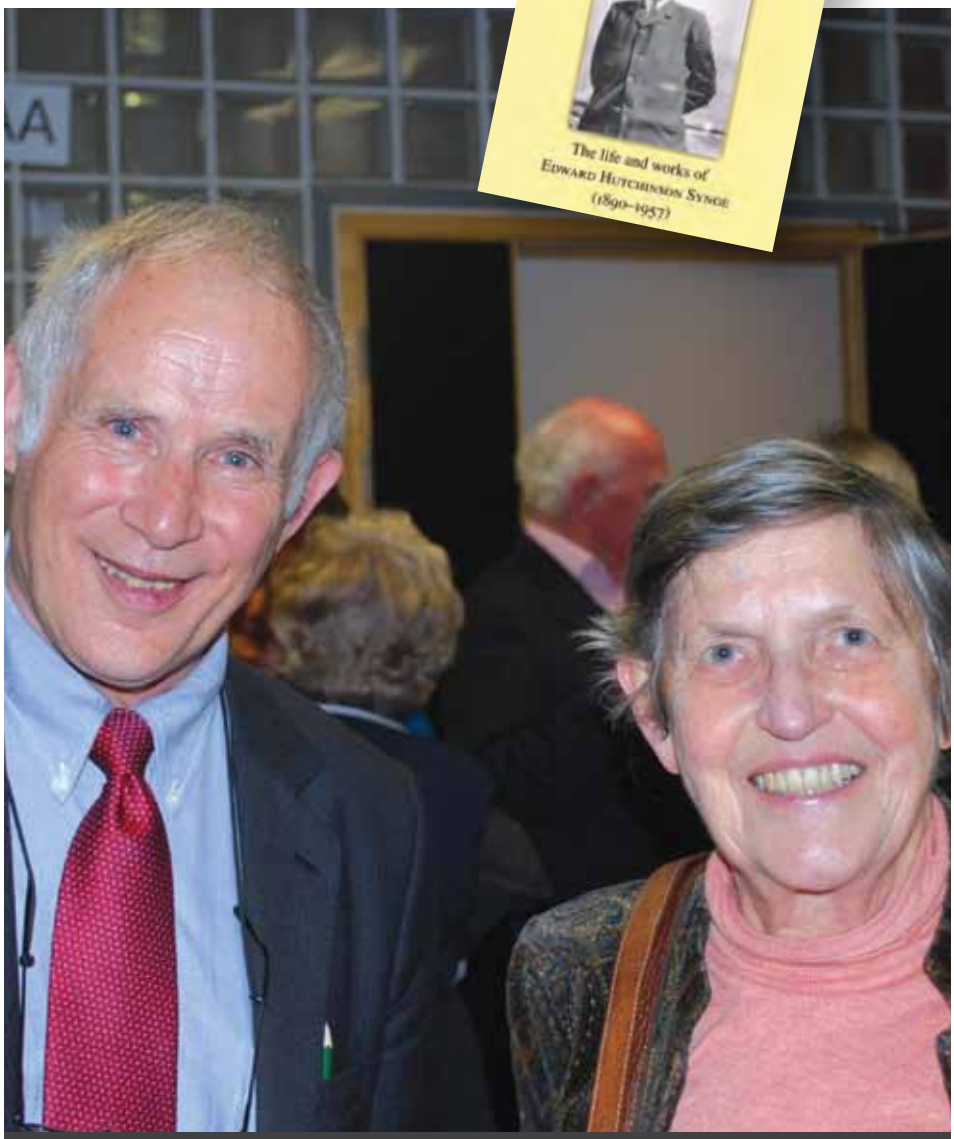
Schroedinger & Synge

The 2012 Annual Schroedinger Lecture *Carbon Nano-Materials for Energy Harvesting* was given by Professor Sigmar Roth. The lecture series is a collaboration involving the School of Physics, the Dublin Institute of Advanced Studies and the Austrian Embassy. Honoured guests included Frau Ruth Braunitzer, daughter of Erwin Schroedinger, and other family members.

The Schroedinger Theatre was also host to a day-long seminar devoted to Edward Hutchinson "Hutchie" Synge. He was a nephew of dramatist John Millington Synge and the older brother of John Lighton Synge, the outstanding mathematician and theoretical physicist.

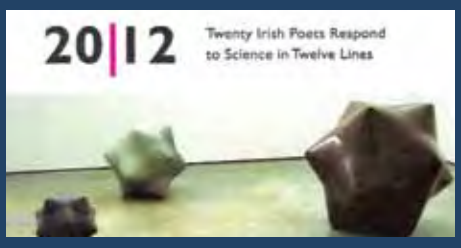
Edward Hutchinson's own highly original conceptions in physics were fifty years ahead of his time. These have since found application in the invention of the near-field optical microscope that allows imaging below the diffraction limit, in LiDAR (Light Detection And Ranging) where he outlines a scheme for studies of the atmosphere, and in astronomy where he invented a new type of telescope.

Copies of the commemorative publication Hutchie; *The Life and Works of Edward Hutchinson Synge* are available from the School Office, price €10 post free. Please contact Sandra Ellis by phone on 01 896 2019 or c/o School of Physics, Trinity College Dublin.



Featured in photo:
Professor Roth and Frau Braunitzer

A Very Special Offer



As part of ESOF 2012, Professor Iggy McGovern edited an anthology of poetry *2012: Twenty Irish Poets Respond to Science in Twelve Lines.* The School of Physics is pleased to offer a token copy of the anthology to all donors to the Walton Sculpture Project. To receive a copy of the book a donation of €20 or more is required, but all donations are welcome – large and small. Payment can be made by cheque or cash to Sandra Ellis c/o School of Physics, credit card via the 'Make a Donation' button on www.tcd.ie/physics/alumni/projects and please advise of postal address to receive your copy.

Stay in Touch

Get connected with Front Gate Online. Update your details, search and contact fellow alumni, register for events, join the career network and other groups, all in one place!

Register today!

www.tcd.ie/alumni/frontgateonline

Feedback

Your comments on this issue are welcome at physics@tcd.ie

www.tcd.ie/physics

School of Physics,
Trinity College,
Dublin 2, Ireland.
Phone +353 (0)1 896 2024
Email physics@tcd.ie