newsletter

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

ISSUE 03
2014/15

SCHOOL OF
Physics

Welcome to the third School of Physics Newsletter. Inside you will find details of education, research and outreach activities lead by our staff and students.

Professor Igor Shvets
Head of School

As Head of School, I would like to wish you a very warm welcome to our third annual School of Physics newsletter. This edition will give you a snapshot into what has been another exciting year for the School's research, education and outreach activities. Our commitment to teaching and learning continues to be the priority.

This year saw the launch of multiple education initiatives, including "The Trinity Walton Club". Led by Dr Arlene O'Neill and a team of multidisciplinary educators, the Trinity Walton Club engages secondary school students with the Schools of Physics, Mathematics and Education. Dr Shane Bergin was acknowledged by the European Commission and American Association for the Advancement of Science for his dedication to public engagement through activities like the DART of Physics campaign and the Trinity Pitch Drop experiment. Our physics undergraduate students did us proud when they took part in the very first Trinity Science Student Review and we reconnected with alumni through our first Junior Sophister GradLink mentoring programme. We would like to sincerely thank all our mentors and look forward to working with them in the future.

Our researchers continue to thrive across multiple high-impact fields, including material science, magnetism, astrophysics and computational physics. The last twelve months saw Prof Jonathan Coleman speaking at TEDxBrussels and the launch of two new spin-out companies - Adama Innovations (Prof Graham Cross) and SelfSense Technologies (Drs Ramesh Babu and James Doyle). In addition, Dr Shaun Bloomfied and Prof Peter Gallagher were awarded one of the first Horizon 2020 research grants in Ireland to develop improved solar flare forecasting techniques.

Further world-wide engagement kept us busy with Brazil Science Week in Dublin and our first-ever international workshop at Soochow University in China. We also lead the way in major Trinity events such as Eclipse 2015 and the Focus on Women in International Light week.

The School of Physics always welcomes support from our alumni and friends. If you would like to connect with us in anyway please contact our Director of Global Relations, Prof Peter Gallagher (peter.gallagher@tcd.ie).

Coin Honours Physics Nobel Laureate Ernest Walton

A €15 limited edition silver proof commemorative coin honouring Nobel Laureate Ernest TS Walton, a graduate and former professor at Trinity, was launched by the Central Bank of Ireland. Designed by Rory Breslin, it is the second in the Central Bank of Ireland's Science and Invention series and gives an artist's impression and explanation to the equation $E=mc^2$. The coin was launched in the School's Fitzgerald Building where Walton worked and researched during his time as the Erasmus Smith's Professor of Natural and Experimental Philosophy (1946-1974). His pioneering work with John Cockcroft on the transmutation of a nucleus by artificially accelerated atomic particles was awarded the Nobel Prize in Physics in 1951.

Ernest Walton generously presented his papers to Trinity in 1993 and his family subsequently donated his Nobel medal, both of which have helped to make Trinity a centre for Walton research. This research includes the significant writings and lectures by Professor Emeritus of Physics, Vincent McBrierty.

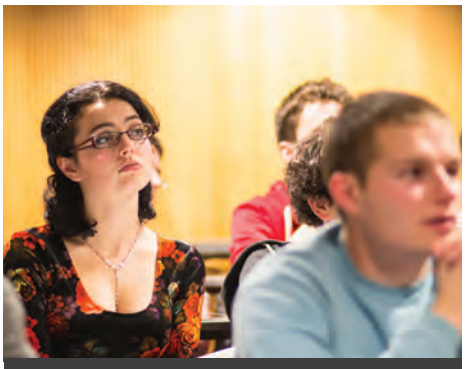
Focus on Women in Light

Prof Julieta Fierro (National University of Mexico) lived up to her reputation as a force of nature when she recently visited the School to help celebrate UNESCO's International Year of Light during Trinity Week. Prof Fierro is credited with encouraging swathes of aspiring scientists to study science both in Mexico and further afield. In her master class entitled "*Shining Light on Women in Optics: Tools for Success*" Julieta suggested that women do less rather than more, that perfection in every single area of life is not a realistic goal for most humans. Her diverse audience included the Mexican Ambassador, Carlos Garcia De Alba, who proved to be an excellent demonstration volunteer!

This event and accompanying public lecture was supported by the School of Physics and Women in Physics with sponsorship and support from the Dean of the Faculty of Engineering, Maths and Science, the Mexican Embassy, Women in Technology and Science (WITS), WiSER, IOP Women in Physics Group committee and the national committee for the International Year of Light 2015.

Prof Julieta Fierro pictured in the Fitzgerald Building during the School's International Year of Light event.

Launch of Wild Geese Gradlink Programme



Junior Sophister Physics students engaging with physics alumni at the Wild Geese Gradlink launch.

In November 2014, the School launched the first GradLink Mentoring Programme for Junior Sophister Physics, Physics & Astrophysics, Theoretical Physics and Nanoscience students. The programme aims to prepare students for careers in physics and related areas by connecting them to physics alumni mentors. Gradlink also builds on the School's existing Junior Sophister Wild Geese programme which encourages science communication and related skills as part of the undergraduate curriculum.

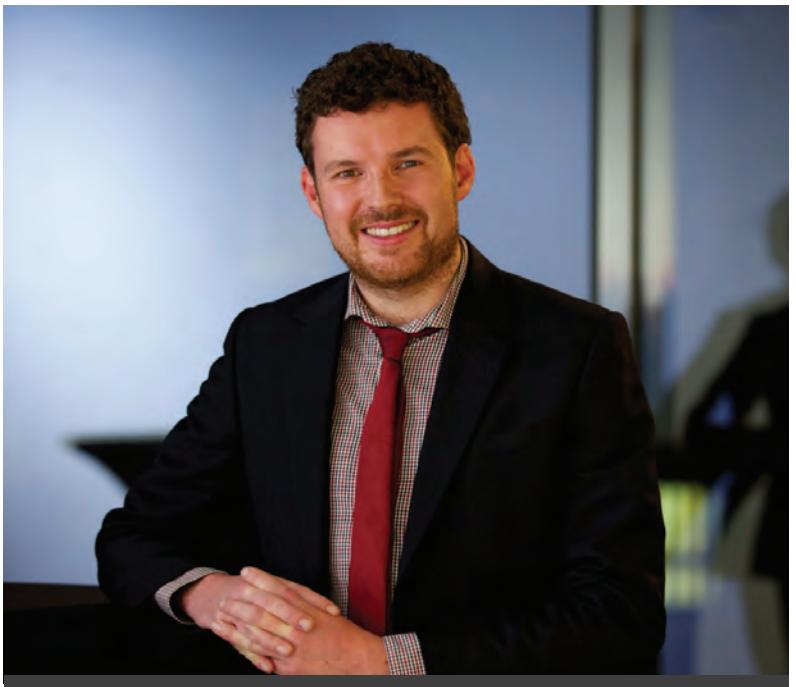
Our inaugural Gradlink mentors covered a broad range of career paths which included research, science communication, finance, medical physics and industry. Mentors and students meet two to three times during the academic year to consider issues such as careers after college, exploring particular roles and sectors, networking and CV preparation. The School of Physics would like to thank all of our Gradlink mentors for volunteering their time and invaluable guidance to our current Junior Sophister students. If you are interested in becoming a mentor in next year's programme please contact our GradLink Coordinator, Dr Niamh McGoldrick (physalum@tcd.ie) or visit www.tcd.ie/alumni/mentoring for more information.

Joint Partnership developed with Soochow University

Trinity's delegates pictured with FUNSOM researchers at Soochow University, China.

In January, delegates from the Schools of Physics, Chemistry and Biochemistry & Immunology participated in the first bilateral TCD-Soochow workshop on Nanotechnology at the Functional Nano & Soft Materials (FUNSOM) Institute in Soochow University, China. Prof Igor Shvets and Prof Hongzhou Zhang travelled on behalf of the School to take part in a four day multidisciplinary visit promoting the School's cutting-edge research. The visit included talks on student exchange, internalisation and research collaborations as well as a tour of the facilities at FUNSOM and the surrounding industrial park. Prof John Boland (School of Chemistry) provided an enthusiastic FUNSOM student audience with a masterclass entitled "*Surprises at Small Dimension – The Field of NanoMechanics*" as well as leading an information session with Prof Hongzhou Zhang and Dr Niamh McGoldrick on study opportunities at TCD. This visit has resulted in the School offering two TCD Senior Sophister nanoscience students the opportunity to conduct research projects at FUNSOM this September, further strengthening this exciting partnership between the two institutions.

Dr Shane Bergin Receives Public Engagement Award



Dr Shane Bergin - A DART of Physics! (Image courtesy of Atlantic Photography Boston)

The American Association for the Advancement of Science (AAAS) has honored Senior Research Fellow Dr Shane Bergin by awarding him the 2014 AAAS Early Career Award for Public Engagement with Science. The award recognizes the achievements of individual early-career scientists and engineers who have demonstrated significant contributions to public engagement activities while simultaneously pursuing a research career.

Dr Bergin was recognized for spearheading a public-engagement campaign through the "DART of Physics" project which sought to change the perception of physics in Ireland by prompting commuters to ponder intriguing questions about physical phenomena. After having their curiosity "zapped," many Dubliners responded by logging onto a website (www.dartofphysics.ie) which featured fun science content, profiles of physicists, and more. The campaign required support from more than 250 undergraduate and postgraduate students, as well as 50 staff members from the Schools of Physics and Education. The team leveraged both social and traditional media to help raise awareness of the importance of physics, and science in general. Dr Bergin was lauded by AAAS for his "remarkable talent for promoting physics to the general public and potential students of physics."

Engaging Secondary Students with STEM: Trinity Walton Club Launches!

The Trinity Walton Club is a new and exciting initiative dedicated to supporting second level students in their pursuit of science, technology, engineering and mathematics (STEM). Each Saturday afternoon, Trinity's SNIAM and Fitzgerald buildings come alive with 14-year-old students eager to learn more about STEM and how to improve their skills through sessions and activities facilitated by Trinity's PhD student educators. The educators prepare and deliver a fun and challenging programme, which is designed to spark their curiosity and encourage individual ownership of their learning. Each year the club will grow, offering students the opportunity to stay on for up to four years, as well as welcoming a new cohort of students each year.

The Trinity Walton Club wishes to acknowledge that it is a not-for-profit, gender neutral club, that offers a range of access routes to interested students. This club came to exist through the concerted effort of Trinity's Schools of Physics, Maths and Education, University seed funding and both internal and external supporters. If you would like to learn more about us, please visit www.tcd.ie/waltonclub.

Astronaut Chris Hadfield Lands in Trinity

In December 2014, Canadian astronaut Commander Chris Hadfield was welcomed by an enthusiastic group of Trinity's staff and students to receive both the Gold Medal of Honorary Patronage of the University Philosophical Society and Law Society's prestigious 'Praeses Elit' award. Commander Hadfield was treated to an exclusive tour of the famous Walton Medal in the Long Room by Prof Peter Gallagher (School of Physics) after which he chatted with members of the Trinity Walton Club. After an inspiring questions and answer session with an audience that included Provost Patrick Prendergast, Commander Hadfield enthralled his delighted listeners with his ever-popular version of David Bowie's Space Oddity.

Commander Chris Hadfield pictured with Sarah Mortell (President, University Philosophical Society), James Ringland (Auditor, TCD Law Society) and Prof Peter Gallagher (School of Physics).

Jessica McKenna (Theoretical Physics), Niamh Byrne (Physics), Prof Daniela Bortoletto (Chair of CUWIP UK) and Katarzyna Siewierska (Theoretical Physics) in the Keble Dining Hall, Oxford.

Spin-out of SelfSense Technologies

Drs James Doyle and Ramesh Babu (School of Physics) pictured with Dr Padraig McAuliffe and Prof Brian O'Connell (Dublin Dental Hospital) at the launch of SelfSense Technologies.

Drs Ramesh Babu and James Doyle, researchers in the School of Physics, announced their new spin-out company SelfSense Technologies Ltd in April 2015. The spin-out uses research on sensor technology to accurately record and monitor teeth grinding. Together with co-founders Dr Padraig McAuliffe and Prof Brian O'Connell (Dublin Dental Hospital), the researchers secured €100k investment from the National Digital Research Centre (NDRC) and unveiled a novel intelligent mouth guard device called SmartSplint, which allows their dentists to help them manage the teeth grinding more effectively.

AMBER's Commercialisation Development Manager Dr James Doyle said: "Having pursued my undergraduate and postgraduate studies in the School of Physics, I am keenly aware of the strong ethos which exists within the School to translate world-class research into commercial products. Our mission statement is perfectly aligned with that of the School - to provide a positive impact on society and the Irish economy."

Students Attend Oxford Conference for Undergraduate Women in Physics

In February 2015, Oxford University held the first ever undergraduate science conference for women in physics (CUWIP). 100 female undergraduates from all over Ireland and Britain were invited to participate in this year's event, including School of Physics students Niamh Byrne, Jessica McKenna and Katarzyna Siewierska.

The CUWIP programme included a welcome address from organiser Prof Daniela Bortoletto, a viewing of the partial solar eclipse and a trip to facilities such as DIAMOND, ISIS and the Rutherford Appleton Laboratory (RAL). The students were treated to panel discussions on the challenges for female scientists today, career and CV writing workshops and seminars from leading female researchers such as Dame Jocelyn Bell Burnell (Pro-Chancellor of the University of Dublin) and Dr Kate Lancaster (University of York). The honesty of all of the speakers and people involved in career and academic panels helped boost the confidence of all of the delegates and giving them a very positive attitude towards achieving their goals in the future. The conference was a great success and the students are eagerly looking forward to next year's event.

Astrophysicists Take Flight to Bring Solar Eclipse to Irish Public

On March 20, 2015, our astrophysicists welcomed the public to Trinity's Front Square to witness Eclipse 2015 - a special event designed to bring the thrilling solar eclipse to the Irish public. At approximately 9:30am, the sky was at its darkest and over 90% of the Sun was covered by the Moon. Despite the inclement weather, hundreds of people were able to glimpse a partial solar eclipse using the high-tech telescopes and specially designed shades which helped to provide an illuminating view of the event. Trinity's contribution to the event was furthered when Prof Peter Gallagher and Senior Experimental Officer, Joe McCauley, took to the skies on an Irish Air Corps Maritime Patrol Aircraft to take high resolution images of the solar atmosphere.

Prof Gallagher said: "We are working with researchers at the University of Hawaii and Aberystwyth University to better understand the fundamental physics of the atmosphere and learn how it affects us here on Earth. The Sun makes life possible on Earth but from time to time it also throws out solar storms in our direction, which can have huge impacts for telecommunications and destabilise electrical power distribution systems. The images gathered during the eclipse are helping us to understand the fundamental physics of the solar atmosphere."

Members of Trinity's School of Physics, Mr Joe McCauley and Prof Peter Gallagher following the path of the total solar eclipse.

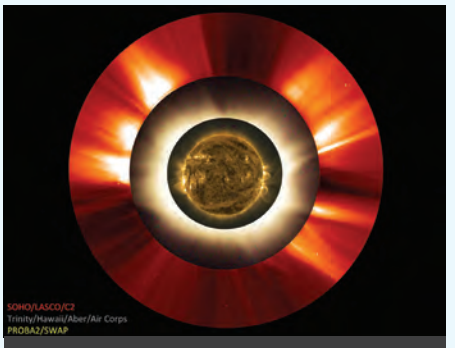


Image of the March 20 total solar eclipse taken by the Trinity-Air Corps eclipse flight compared with European Space Agency (yellow) and NASA images (red).

Trinity Opens Doors to Brazilian Science Week Delegates

Provost Patrick Prendergast hosting the RBI delegates in Provost's House (image courtesy of Paul Sharp).

Research Brazil Ireland (RBI) Science Week took place in February this year at Dublin Castle, bringing together researchers, higher education institutions, funding agencies, policy makers and industry leaders. RBI is an on-going consortium formed by Irish third-level institutions whose goal is to promote both Ireland's scientific and technological reputation in Brazil and to highlight Ireland's attractiveness as an international research partner. The conference programme focused on strengthening existing links between Ireland and Brazil while devising strategies that can facilitate greater future cooperation between the two scientific communities. To further build on the success of the student and researchers mobility programme Science Without Borders, Trinity opened its doors to the RBI attendees to showcase what it has to offer. After a morning reception with Provost Patrick Prendergast, the Brazilian delegates participated in individual research workshops in the Schools of Physics (led by Prof Mauro Ferreira), Engineering and Pharmacy. Delegates attended a research showcase in the Innovation Academy before closing the day with a special dinner at Trinity's famous evening Commons.

Alumni Interview

One-to-One with Prof Yenny Hernandez

Prof Yenny Hernandez,
graduated in 2009 with a PhD in nanoscience

What are you doing these days?

I am currently Assistant Professor of the Physics Department at Universidad de los Andes in Bogota, Colombia where I am head of the Nanomaterials Research Lab, focusing on carbon nanotubes and graphene based projects.

Why did you choose your current career?

I chose to study physics because my mum took me to the physics teaching labs when I was a child. She also brought me to maths conferences which were not as entertaining, there were no objects rolling down inclined planes! I also had a great high-school physics teacher that used to bring his children's toys to class to teach us topics like thermodynamics.

How do you like to spend your free time?

During my spare time I play with my daughter Sofía. When she finally goes to bed, and I'm not too tired, I use Twitter to keep up with interesting news in Physics and things related to Women in Science, another subject that I'm passionate about.

What are your strongest memories of Trinity?

I was once a language school student getting in the way of Trinity students in front square. One day I decided to ask for permission to sit in the introductory physics lectures, which I did for a couple of weeks. In 2005, Prof Coleman gave me the opportunity to do my PhD. I arrived to a vibrant group where senior students would mind the new ones and where 11am coffee was almost mandatory. Over the years we had fun but also did great science. We developed the process to exfoliate graphite in liquid phase which opened many doors for me and the Coleman group. It brought me to where I am now!

Are you still in touch with other TCD alumni?

Most of my best friends are Trinity alumni and we've been really lucky to find ways meet in different parts of the world after we graduated. There is even a TCD Physics alumnus, Dr Ciaran Smith, currently doing postdoctoral work at Universidad de los Andes. His boss keeps him busy but every now and then we find time to say hello on the corridor!

Have you any advice for students or fellow alumni?

What has worked for me is that from the beginning I found an area of research that I love. My advice is keep looking for that thing that gives you the driving force from the inside out. I worked for three years in synthetic chemistry group in Germany which was a tough experience, not only because they spoke a completely different language to me (German, Chinese and chemistry) but also because their project and publication pace was different to the one in physics. I survived and the experience has made a confident scientist. Although change can be frightening, it helps you move to better things.

Undergraduates launch Trinity Student Scientific Review

In March 2015, the first volume of the 'Trinity Student Scientific Review' (TSSR) was launched giving Trinity's very own undergraduate science students the opportunity to submit articles on subjects of their choice across physics, chemistry and biology. Five Junior Sophister physics essays were selected, Jessica Erkal and Brian Ó Ferraigh (Physics & Astrophysics), Katarzyna Siewierska (Theoretical Physics), Andrew Selkirk (Nanoscience) and Oskar Ronan (Physics). Andrew Selkirk and Oskar Ronan were awarded prizes on the night, winning best overall essay and best physics essay respectively.

The speakers at the Dining Hall launch included the Vice-Provost, Linda Hogan, the UCD academic and broadcaster Aoibhinn Ní Shúilleabháin and entrepreneur Paddy Cosgrave. This exciting initiative was sponsored by Provost Patrick Prendergast and the Dean of the Faculty of Engineering, Maths and Science Clive Williams.

The TSSR Physics Editor Dylan Scully (JS Physics) said that TSSR 'provides student scientists with a platform to engage with the research-driven world of academia, possibly for the first time'. He particularly thanked Prof Werner Blau (School of Physics) for his help, guidance and advice. The School of Physics staff and students wish this project continued success.

Five prize-winning authors of the Inaugural Trinity Student Scientific Review.
L-R: Matthew Dorman (Best Biology), Shelley Stafford (Best Chemistry), Oskar Ronan (Best Overall), Kate Reidy (Best Freshman), Andrew Selkirk (Best Physics).

2014-2015 School of Physics Research Highlights and Awards

Congratulations to **Prof Valeria Nicolosi** (Schools of Physics and Chemistry) on her ERC Proof of Concept grant which funds her research project '*Ink-jet printed supercapacitors based on 2D nanomaterials*'. This is the third grant that Prof Nicolosi has received from the ERC to date. Prof Nicolosi's team hope to enable new 2D-based nanomaterials to pioneer ultra-thin, flexible supercapacitors manufacturing for the aerospace and automotive industry.

Prof Michael Coey has won this year's prestigious Gutenberg prize, bringing to €300,000 the total funding awarded to his novel "*Lab on a chip*" technology. This award will help to support a collaborative project with Bernard Doudin of IPCMS, Strasbourg and Thomas Heremans of ISIS, Strasbourg. Together with his French colleagues, Prof Coey has secured a further €250,000 from the University of Strasbourg Institute of Advanced Study for the project '*Microfluidics without walls*' which aims to revolutionize microfluidics, an emerging technology with potential applications in vitro diagnostics and new drug discovery.

Dr Shaun Bloomfield and **Prof Peter Gallagher** are part of an international consortium of solar physics researchers who have secured €2.5 million of E.U. funding for one of the first Horizon 2020 projects awarded to an Irish institution. The Flare Likelihood and Region Eruption Forecasting (www.flarecast.eu) project is studying the origins of solar storms and build an accurate forecasting service. The project kicked-off in January 2015 and involves collaborating institutions in Greece, Italy, France, Switzerland and the United Kingdom.

Dr Elisabetta Arca was one of four Trinity recipients to win this year's prestigious SFI Advance Award which is aimed at encouraging women to return to or stay in a career in Science, Technology, Engineering and Mathematics. Dr Arca's research aims to improve the performance and reliability of p-n junctions, the fundamental building blocks of many electronic devices, including computers, flat screens and LEDs.

Remember. The power of a legacy to Trinity

There's an old saying that the true meaning of life is to plant trees under whose shade one does not expect to sit. When you leave a legacy to Trinity however big or small, you're planting a tree which will grow to provide shelter to many. You're empowering ground-breaking research which will benefit people in Ireland and all over the world. You're supporting students from all backgrounds to access a Trinity education. You're helping preserve our unique campus and heritage for new generations.

When you remember Trinity in your will, you join a tradition of giving that stretches back over 400 years – and reaches far into the future. For more information about leaving a Legacy to Trinity, please contact Eileen Punch.

T. +353 1 896 1714
E. eileen.punch@tcd.ie
www.tcd.ie/development

Social Media

www.tcd.ie/alumni

@tcdalumni

tcdalumni

tcd alumni

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

Support Physics

There are numerous ways you can get involved in supporting the School. If you would like to know more please contact Peter Gallagher:
peter.gallagher@tcd.ie

www.tcd.ie/physics

@TCD_physics | @tcdastro | @npcamtcd

School of Physics
Trinity College Dublin
Dublin 2, Ireland
Ph +353 (0)1 896 1675
Email physics@tcd.ie