



University College Dublin

SPIE Student Chapter

Annual Report

June 2015 - September 2016



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UCD SPIE Student Chapter

Elected Officers

Title	Name	E-Mail	Member ID
President	Inbarasan Muniraj	inbarasan.muniraj@ucdconnect.ie	3657961
Vice President	Ra'ed Malallah	raed.malallah@ucdconnect.ie	3644552
Treasurer	Ismail Ibrahim	ismail.ibrahim@ucdconnect.ie	3774606
Education Officer	Ashammari Rusul	rusul.al-shammari@ucdconnect.ie	1300295
Advisor	Prof. John T Sheridan	john.sheridan@ucd.ie	

Current Chapter Members

Rusul **Alshammari**

Abhishek **Anchal**

Xin **Fan**

Vivek **Govindaraj**

Ismail **Ibrahim**

Gaurav **Kaila**

Juan Pablo **La Torre**

Ra'ed **Malallah**

Inbarasan **Muniraj**

Yanting **Shen**

ZHENGYUAN **Tang**

Laura **Tobin**

Sathya **Velayutham**

Qin **Yu**

Members Update

The UCD SPIE Student Chapter congratulates Dr. Changliang Guo (former Vice President) on his successful viva-defense and graduation. The UCD SPIE Student Chapter is overwhelmed with new family members and we heartily welcome them. We also welcome Miss. Min Wan from Beijing University of Technology (BJUT) on her 3 months internship within our group.

UCD SPIE Student Chapter Grant

The UCD SPIE Student Chapter was awarded an SPIE International Year of Light (IYL) Activity Grant in November 2014. The IYL Activity Grant was in the amount of \$1535 (€1200) for “the development of a traveling mobile darkroom to conduct optical experiments at science festivals”. This grant was spent on buying materials for Light & Shadow, InspireFest and Dublin Makers 2016.

Chapter Activities 2015 – 2016

International Year of Light in Ireland

The UN has declared 2015 the International Year of Light and Light based Technologies (IYL2015). The Patron for IYL Ireland is the Irish President, Michael D. Higgins. The UCD SPIE / OSA Student Chapter has taken part in a number of activities and events to help promote the International Year of Light (IYL) and STEM throughout 2015.

Ms. Laura Tobin joined the national committee in Ireland and represents the Irish SPIE and OSA Student Chapters and Prof John T. Sheridan is the Vice-Chair.

Dublin Makers (July 2015, 2016)



Dublin Maker is a one-day, hands-on, family-friendly, free, outdoor celebration of making on the Physics Lawn at Trinity College Dublin. Dublin Maker 2016 took place from 10am to 6pm on Saturday 23rd July. It's a chance for the entire family to try their hand at making everything from paper planes to crafty circuits. Dublin Maker takes the form of a 'show and tell' experience where makers demonstrate what they are making, and share what they are learning.

The festival event itself is a culmination of 'hack, craft and make' activities. Makers range from tech enthusiasts to crafters, educators, tinkerers, hobbyists, engineers, artists, science clubs, students, authors, and commercial exhibitors. They are of all ages and backgrounds, coming from all over Ireland and beyond. Dublin Maker featured over forty groups of makers from across the country and had over 10,000 visitors.

Science Includes Me: TY Mentoring Week (September, 2015)

Student Chapter President, Laura Tobin took part in the Science Gallery Transition Year Mentoring Week. The Science Gallery received funding from the SFI Discover Program to increase the mentoring weeks offered in the Science Gallery from 4 a year to 9.



Figure 1: Laura demonstrating the effect of light diffraction

Laura gave two introductory presentations into optics and photonics and highlighted that 2015 is the International Year of Light. The presentations on the 23rd and 30th of September which emphasized on the role of light in our everyday lives and that it encompasses everything from art and nature to science and technology. Laura brought along many props and included a number of hands on demonstrations. The students were able to make their own LED badges and UV bracelets.



Figure 2: Laura demonstrating numerous different optical properties using props.

Science Week - Midlands Science Festival (November, 2015)

Ms. Laura Tobin was asked to take part in the Midlands Science Festival during Science Week 2015. Laura gave two talks about STEM and Women in STEM on the 11th November 2015. The first talk was to 5th and 6th class in St Cremins NS, Multyfarnham, Co Westmeath which had a class of 31 students. The second presentation was in Laura's former secondary school, Loreto College, Mullingar where over 130 students from TY, 5th and 6th year attended.



Figure 3: Students from St Cremins NS getting involved in the optics experiments.



Figure 4: Laura talking to the students of St Cremins NS, Multyfarnham.

SPIE Optics + Photonics, Optical Engineering + Applications (September, 2016)

Mr. Inbarasan Muniraj, Ms. Sathya Velayutham and Ms. Laura Tobin attended and presented their research at Optics & Photonics 2016.



Figure 5: Student Leadership Workshop Group in SPIE Optics & Photonics 2016

Mr. Inbarasan Muniraj attended the SPIE Leadership Workshop via officer travel grant and presented his research paper. Also, he recently won the SPIE travel scholarship-Cycle 1 award.



Figure 6: Mr. Inbarasan Muniraj at Student Leadership Workshop, taken at Spot the DOT board (left); at San Diego convention center (Right)



Figure 7: Ms. Sathya Velayutham enjoying the talks at Student Leadership Workshop, 2016.



Figure 8: Ms. Laura Tobin having lunch at Student Leadership Workshop, 2016.

Invited Lectures (September 2016)

On 8th September, we hosted Prof. David Boas (the director of the Martinos Optics Division in the Department of Radiology at Massachusetts General Hospital, full professor of Radiology at Harvard Medical School) and Dr. Larina Irina (Assistant Professor at the Department of Molecular Physiology and Biophysics at the Baylor College of Medicine and a co-director of the Optical Imaging and Vital Microscopy Core). Prof. Boas's talk titled: "Neuroimaging with light - from human to rodent and back" in where he discussed in detail about non-invasive diffuse optical measurements of the brain through the intact scalp and skull. Followed by questions and discussion session Dr. Larina given a talk about "Uncovering the miracle of life through optical imaging." She discussed about the interface of developmental and reproductive biology, optical engineering, and computational modeling and analysis to understand mechanisms regulating normal and abnormal developmental processes in mouse models of human disorders. With the numerous discussions that Professor Boas and Dr. Larina had with our professors at UCD, we also hope that the visit was helpful to initiate scientific collaborations.

More recently, we had an opportunity to host eminent scientist Prof. Collin Sheppard, who gave an intuitive talk about confocal microscopy. In his seminar, he discussed a lot about confocal microscopy which has made a dramatic impact on biomedical imaging, in particular, but also in other areas such as industrial inspections. He also gave us an insight about the future developments of microscopic imaging which draws people's attention and increases curiosity.



Figure 9: UCD SPIE Student chapter with Prof. Collin Sheppard.

Fundamentals and versatile applications of a photopolymerizable nanoparticle- polymer composite (NPC) in light and neutron optics are described. In NPC, consisting of either inorganic or organic nanoparticles that are uniformly dispersed in photopolymer, the statistical thermodynamic interaction between monomer and nanoparticles facilitates the mutual diffusion and phase separation processes during holographic exposure. This non-equilibrium process leads to the light-induced formation of periodic structure of formed polymer and nanoparticle densities, creating photonic lattice structures with large refractive index modulation amplitudes in NPC. In this talk some results such as holographic digital data storage, diffractive optical elements for AR/MR, cascading high order optical nonlinearities and slow-neutron beam control are briefly described.



Figure 10: UCD SPIE Student chapter with Prof. Yasuo Tomita.

Upcoming Events

InspireFest 2017

Inspirefest 2017 is a two day international event that connects professionals interested in the future of science, technology, engineering, and mathematics with new perspectives on innovation, leadership and success. Plus unique networking at our exciting Fringe Festival taking place from 6th -8th July 2017.

SPIE UCD Student Chapter has planned a coordinated an optics stand, for the InspireFest Fringe Festival. There will be hands on activities that showcase optics and photonics and will have volunteers from the SPIE UCD Student Chapter. It is expected that there will be high numbers in attendance at this fringe festival in Dublin.



INSPIREfest2017

Dublin Makers 2017

UCD SPIE Student Chapter has planned a coordinated an optics and Photonics stand for the Dublin Makers Festival 2017.

Financial Report

Financial Notes:

Any items bought outside of Europe and imported into Ireland is subjected to a 23% VAT rate and a 6.5% import duty rate which is calculated on the cost of the items plus shipping.

As 2015 has been declared the International Year of Light, the SPIE UCD Student Chapter decided to purchase large quantities of materials to sustain outreach activities throughout 2015. The three large events planned (Light and Shadow, InspireFest and Dublin Maker) will have large attendance rates from members of the public. Unfortunately it was found (after exhaustive efforts) that the cheapest suppliers for many of the materials came from outside of Europe and this incurred extra costs due to VAT and import duty. Therefore it was decided to split the types of purchases - purchase materials that can be reused and disposable materials such as giveaways. The disposable materials were mainly materials that were used on hands on activities such as create your own LED badge or design a UV bracelet. The giveaways were the Rainbow Symphony diffraction glasses¹⁹ which we bought in bulk (1500) to avail of the cheaper price. These glasses were/will be handed out to members of the public during Light and Shadow, InspireFest and Dublin Maker. Diffraction Glasses are not common in Ireland and they are impossible to purchase in Europe, despite an exhaustive search. These glasses were also handed out to science communicators, educators and teachers to help them teach and promote the International Year of Light. We received a number of thank you e-mails and tweets for providing materials²⁰.

Acknowledgements

The SPIE UCD Student Chapter extremely grateful for the support from volunteers throughout our events. In particular, we would like to convey our sincere thanks to Ms. Victoria Bunny (ISEN Lille), Mr. Sudharsan Rajasekaran (Intel Ireland), Mr. Nithish Deepankar (DBS) and Ms. Min Wan (BJUT).

The SPIE UCD Student Chapter wishes to acknowledge the support from SPIE for the IYL Activity Grant which allowed us to purchase materials for Light and Shadow, InspireFest and Dublin Maker.

The SPIE UCD Student Chapter wishes to thank Ellen Byrne from the Festival of Curiosity for gifting the Chapter 10 pots of Bare Conductive paint.

Inbarasan Muniraj and Sathya Velayutham acknowledges the full-financial supports from SPIE to attend Student Leadership Conference, San Diego 2016.

We would also like to acknowledge the support from Karen McCarthy and the Tyndall Institute, Cork in providing us with an EU Photonics Explorer kit that was used at Light and Shadow and will be used at other upcoming outreach events.