

GradPost

The Quarterly Newsletter of the Postgraduate Institute for Measurement Science

Spring Edition 2018

NPL Open House

by Gill Coggins

Holding the NPL Open Day the same week as Mental Health Awareness Week (14–20 May 2018) was ironic to say the least, but in fact it couldn't have been further from it.

On Thursday 17 May, NPL opened its doors once again to the world, and I do mean the world! It was nice to see so many of our students get involved, and I hope that those of you who managed to attend got a chance to visit other areas of NPL outside of your own lab.

The event was truly diverse and we had many pop in from all over the UK to see what we get up to. There was even attendance from overseas visitors, including those from the United States, Germany, France, Denmark, Netherlands, Spain, Poland, Malta, Canada, Ireland, Hong Kong and Belgium.

It is hard to tell exactly how many people visited, but a rough estimate is 2,022 adults, 1,000 children, and 300 from schools, scouts and clubs; helping raise an amazing total of £8,169 for CRUK.

The whole event was vibrant and fun, and I think we even convinced a few that metrology is a cool subject to get interested in.

So thanks to all of you who helped out. I'm sure I'm not alone in saying that as fabulous as it was, I am glad it only happens every other year!



UK map of our Open House visitors

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THE
MEASURE
OF ALL THINGS

Events

Defence and Security Doctoral Symposium

13-14 November 2018

STEAM, Museum of the Great Western Railway, Swindon

www.symposiaatshivenham.com/doc

4th Postgraduate Experimental Mechanics (PGEM) Conference

6-7 December 2018

University of Glasgow

www.bssm.org

For the Postgraduates

Director's Message

by Richard Burguete

Things really seem to be getting warmer in the PGI, and that is not just due to the excellent weather we have been having over the past few weeks. It was great to welcome back not one, but two PGI alumni to give Celebrating Science talks in Teddington. Greg Rigas and Flaviu Cipcigan have both gone on to do great things and I hope they all serve as inspiration to all of you who are at all stages of your PhD.

Our PGRs have been busy showcasing their work and their labs to members of the public during NPL's Open day on 17 May. They have also been active elsewhere presenting their work at the highest levels in government and I would like to say well done to Michael Woodley and Ainsley Miller for beating off the usually stiff competition to win a place and present their work at the STEM for Britain in Westminster on 12 March.

There is also lots of great work going on with preparations for the PGI conference which will be held on 23–24 October. I encourage you all to support your fellow PGRs to make this a great event. Last year it was clear that as postgraduate students your influence and ideas regarding the conference format and its execution really suited everyone and allowed all of our PGRs to showcase their work effectively and with purpose, not to mention how it was done with great energy and enthusiasm. Let's build on this great effort and make it even more enjoyable this year.

Finally, I would like to offer special congratulations to Leonardo del Bino for being one of the recipients of NPL's Rayleigh Award in 2018 for co-authoring the winning paper. This is a great achievement and demonstrates how important and integral PGRs are to the development of cutting-edge research at NPL as part of the overall research community.

All in all, I think it is clear how much you are contributing, making the PGI flourish, and getting a great return for all your effort in the short and the long term. Thank you to all who are contributing as Ambassadors, or otherwise, and especially to those so deeply involved in the conference organising committee. I encourage you all to join in and make the PGI even better!

Engaging in Scotland

by Linden Fradet

'Measurement Matters: Engage with NPL' took place in April at the Technology and Innovation Centre at Strathclyde. The PGI featured for the first time, in the line-up of Strathclyde's week of annual engagement activities, workshops and events. The day, which brought together nearly 80 students, academics and industrialists, was designed to encourage greater collaboration and promote the PGI.

The morning was kicked off to a flying start by PGI Director, Richard Burguete, who provided an update on the PGI vision before breaking the group into supervisor and student workshops. Paula Knee from the Strategy team ran a training session on communicating the impact of research, whilst supervisors discussed ways to increase engagement with the PGI. Our PGRs created a buzz in the room as they pitched their research projects to one another and a few willing volunteers shared their examples of work in the fields of aerospace, instruments and energy.

The afternoon was opened up to Industry and non-PGI delegates, starting with networking over lunch and posters. Later, talks from companies Keysight, Adaptix, Fraunhofer UK and Power Networks Demonstrator Centre highlighted real-life measurement challenges, opportunities for working at the academic industrial interface and the different models of engagement employed in those companies. It was interesting to note the differences, and the similarities across different sectors and also to learn about NPL's involvement in addressing specific challenges.

The afternoon closed with more of an NPL focus through training, case studies and pitching the PGI to the wider audience. Feedback on the event shows that there is demand and interest in engaging with NPL and the PGI. Measurement clearly matters, with delegates citing: "Excellent talks and lots to build on"; "Great conversations with Keysight and the students and supervisors"; "Definitely do this [event] again." Definitely, but perhaps next time with more than seven weeks' notice!



Lunchtime poster session at the Strathclyde Innovation Centre

From the Postgraduates

NPL scientists present their research at Parliament



Three NPL scientists, including two PGRs, were selected from hundreds of applicants to present their research to politicians and a panel of expert judges as part of STEM for BRITAIN on 12 March 2018. First established in 1997, STEM for BRITAIN is a poster competition in the House of Commons which involves approximately 180 early stage or early career researchers.

Michael Woodley, a Research Engineer from NPL and Heriot-Watt University, presented his physics research poster about microresonators as an enabling technology. On presenting his research in Parliament, he said: "One of the reasons I applied to STEM for Britain was because I wanted an opportunity to talk to an audience that perhaps isn't yet aware of this field of research. I hope that it will allow me to raise awareness and to learn more about what researchers in completely different fields have been working on."

Ainsley Miller, a Research Scientist at NPL and Strathclyde University, presented her maths research on using the temperature to make robot sensors better at measuring, inspecting and positioning objects. On being shortlisted to present her work at Parliament, she said: "For many people, maths is a subject they find boring and difficult, but research on robots is a hot topic within manufacturing, and will be of interest to many. I hope it will encourage more young people to pursue maths and would also be great to see more young women having an active role in a STEM subject."

Find out more about [STEM for BRITAIN](#) and [NPL's career opportunities](#).

Modified from original story at <http://www.npl.co.uk/news/npl-scientists-present-their-research-at-parliament>.

Training

Instrumentation and Sensors
20 June, Strathclyde University

Fundamentals of Metrology
w/c 26 November, Teddington

We are putting together further training courses for you to attend:

- What makes a good thesis?
- Public speaking for scientists
- Measurement Uncertainty
- LabVIEW

The dates will be placed on the [website](#) once confirmed, and of course will be included in the monthly Bulletin which you receive.

If you know of a training course that you think would help you in your studies, and would appeal to a few students, please get in touch on the normal address (pgi@npl.co.uk).

NPL and the Royal Society of Chemistry Symposium on Nanoparticle Measurement

The outcomes of the Innanopart project (Metrology for Innovative Nanoparticles) were disseminated at a symposium in London. Innanopart is a project of the European Metrology Programme for Research and Innovation (EMPIR) led by Alex Shard of the Surface Technology Group. The event was organised and chaired by Caterina Minelli, also of the Surface Technology Group, in collaboration with the Royal Society of Chemistry (RSC). Over 120 national and international guests participated with attendees including instrument manufacturers, nanomaterial producers and regulators, as well as those from National Measurement Institutes, industry, academia and standardisation bodies.

The symposium highlighted the need for further standardisation in the field, including the pressing requirement for nanoparticle reference materials with known number concentration. This is vital to calibrate instruments, underpin reproducibility and develop new technologies such as nanoscale drug delivery vehicles in a safe and reliable manner.

Sony Chandi Shrestha, a PhD researcher from London Metropolitan University and Surface Technology Group at NPL, was awarded the runner-up poster prize in a competition among 31 participants. Sony is one of the continuing ambassadors of the PGI Institute for 2018/19.



Sony receiving her runner-up poster prize. Well done Sony!

Congratulations!

Rayleigh Award Winner 2018

The Rayleigh Award is NPL's longest-running and most prestigious internal award, given to the authors of the best published paper each year. Papers are judged by a jury panel of NPL Fellows on factors including creativity, novelty, potential impact and clarity.

The winner this year is the paper on spontaneous symmetry breaking in microresonators by the PGI student Leonardo Del Bino together with Jonathan Silver, Sarah Stebbings and Pascal Del'Haye, published in *Nature Scientific Reports*.

The paper presents and explains the discovery that, above a certain power threshold, light can circulate in a nonlinear resonator only in the clockwise or counter-clockwise direction, but not both simultaneously. This discovery drew a new research direction for the whole group that is now working on many potential applications such as small-scale optical diodes, optical memories, logic gates and highly accurate chip-scale sensors for rotation and single-molecule detection.

The paper has already had a significant impact with numerous citations, invited talks, funding grants, and also has a patent pending.

You can read the article at: <https://www.nature.com/articles/srep43142>.

Quantum Industrial Engagement Programme

by Michael Woodley

A number of NPL-based PGRs have expressed interest in helping to develop NPL's Quantum Industrial Engagement Programme. The material goal of this programme is to produce a White Paper that will inform the UK government about the ways in which quantum technologies may be taken up by a variety of industries, for societal and economic benefit. The PGRs successfully organised a brainstorming event on 25 April to generate a number of interesting (and, in some cases, bizarre!) ideas to this end. Interested PGRs will continue to give their support by contributing further ideas to the discussion and by attending certain events and manning stalls relating to the programme, such as at the Cheltenham Science Festival next month. Let one of the Ambassadors know if you'd like to take part!

PGI Web Challenge

In the coming weeks you will see significant changes to the NPL external website. The design will be more interactive and feature lots of case studies. We'd like to promote the PGI as much as possible and showcase your amazing work. Can you tell us about your measurement or research challenge, your solution and the impact of your research in 250 words? We will work on it with you and before you know it your name will be in lights! Well, on the NPL website for starters...

Please send through your initial draft to [Linden](#) by 14 June.

Get more from your PhD!

Becoming a Student Ambassador will give you a leadership opportunity and a chance to represent the PGI community, ensuring the delivery of the best cohort experience. Student Ambassadors will lead on communication, events, welfare and training and be the face of the PGI. You are probably thinking: "I don't have time for this!" but be assured that actual time commitment is minimal and flexible and the benefits are huge.

As a Student Ambassador you will develop a wide range of transferable skills that you use throughout your career. Employers, colleges and universities are looking for more than just good grades; they want community involvement and service! Being an Ambassador will help build your resumé, university and scholarship applications. You will earn letters of recommendation, get connected to and serve your peers, and get others to know about us.

Interested? Or, just want to find more? Please contact one of the student Ambassadors, or the PGI at pgi@npl.co.uk.

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