

IOP Institute of Physics

HIGHER EDUCATION GROUP

NEWSLETTER March 2019

UPCOMING EVENTS

Next Community Meeting-
Wednesday 15 May 2019

The IoP HE group is now organising regular community meetings for anyone interested in Physics Higher Education. The format is six short talks with a short time for questions after each talk. These are a great opportunity to meet other University teachers in your area and share experiences and possibly start collaborative projects. The next Community meeting will be on 15 May 2019 at the School of Physics, University of Bristol from 2pm. If you would like to present something please send an abstract to the group secretary Helen Heath (helen.heath@bristol.ac.uk).



Save the date for VICE/PHEC on the 22 & 23 August 2019 in Bristol

#vicephec19

FROM THE CHAIR

Welcome to this new edition of the newsletter of the Higher Education Group (or HEG for short)! Why yet another newsletter in your inbox? There is a feeling among the HEG Committee members that we need to connect with our group members, and that we need to revive a sense of community. This Higher Education Group is for everyone who has an interest in Physics and Higher Education! By all accounts, this *could* be a very lively group if anyone with a role in supporting learning and teaching of Physics at all levels in UK & Ireland universities (junior or senior academics, technicians, postgraduate students and postdocs, etc) would join to discuss the challenges that we face, to share ideas, and to promote good practice and innovation. This newsletter is a step in that direction. We hope it will encourage you to attend some of our events, to share information with others, and to connect with a community of like-minded physicists who want to make the higher education world a better place to live / work in!

Welcome to the Newsletter!

To make sure you are not missing any important information, you can

- Follow @IOPHEG on Twitter
- Subscribe to one of our mailing lists (see <http://www.iop.org/activity/groups/subject/hed/> for details)
- And read this newsletter in full!

UPDATE ON HEG ACTIVITY

In the past year or so, a lot has happened within the Higher Education Group. To start with, a good number of new individuals joined the committee after elections in Autumn 2017, and more recently in September 2018. As a result, all HEG committee members now in place started their

term either in 2017 or in 2018. We are extremely thankful to the previous committee members for all they've done over the past years and we are looking forward to expanding their work.

Some events of interest that took place in 2018 are listed below. Slides for all recent events organised by HEG are available at http://www.iop.org/activity/groups/subject/hed/eventsresources/page_55385.html

- Meeting at IOP of the Higher Education Network (23 May): Topics included degree accreditation review, TEF, non-completion rates in physics degrees, improving gender balance, and future IOP strategy.
- Following a HEG Committee meeting, a community meeting was organised in Glasgow on 12 June. The community meeting had presentations on “looking inside the black box of lectures”, mature student access to physics & engineering degrees, a modified concept inventory, online team investigations in astronomy, science

outreach to promote physics to female school students, and on spaced repetitions.

- Another community meeting was organised in London on 26 November (again coupled with an HEG committee meeting). We hope to continue to hold regional meetings coupled with our committee meetings.
- VICEPHEC was in Sheffield, 23-24 August 2018 (<https://vicepheci8.wordpress.com>). This is perhaps the most important meeting for the Physics Higher Education community and is held jointly with the Chemistry Higher Education community. There was a very good balance this year between physics and chemistry talks. That meeting was preceded on the 22nd of August by a HEG satellite meeting on Demographic gaps in recruitment, retention and attainment, followed by our HEG Annual General Meeting.
- The Methods Of Research in Science Education (MORSE, <https://morseportal.wordpress.com>) meeting took place in Dublin on 2 November. HEG supported this event to give reduced fees to IOP members.

Committee members are also engaging with the IOP to respond to consultations. For instance, we contributed input to IOP's response to the post-18 review of education and funding, and to the consultation on the draft panel criteria and working methods for REF 2021.

Finally, we have set up a new network to support PhD physics supervisors. The way PhD students are being taught is changing more quickly now than ever, with the development of doctoral training partnerships and examples of good practice highlighting these changes. Universities are adapting their regulations to address these concerns, but changes in university regulations are broadly focused, addressing the needs of a wide range of academic fields. This network aims to address the growing need for a place to discuss these recent changes, by providing supervisors with a forum to discuss their own approach to physics student supervision.

COMMUNITY MEETING NOVEMBER 2018

The November Community meeting was held at the new IoP HQ building. The IT systems were, not surprisingly, having a few teething troubles but with a little ingenuity we managed to even have a remote presentation. There were six presentations on varying topics, some rather practical information and some giving food for thought.

Gareth Jones from Imperial College started by challenging us to think about "The Pros and Cons of Active Learning in Physics". Among the advantages are the mental stimulation arising from rapid feedback on ideas; among the risks are that sessions may be dominated by overconfident students and that those wanting quiet individual contemplation may be discouraged. He encouraged us to base learning on the findings of cognitive neuro-science.

Alex Crombie asked "Why are scientists afraid of employability". He argued that employability and good learning are closely related and developing employability involves more innovative teaching. Alex pointed out that many of the skills regarded as "employability skills" are good for research. He did confess that "sometimes my research into employability makes me feel a little dirty".

Gráinne Walshe discussed the Minerva Project which looks at student's mathematical preparedness for studying science and engineering with the aim of addressing the high dropout rates in Ireland in Science and Engineering Degrees. She presented the methodology for the study and some early results from the first phase of the project.

MEET THE COMMITTEE

I am Helen Heath and I am the Higher Education Group Secretary. I am based at Bristol University where I am a Reader in the School of Physics and currently work two days a week for the Bristol Institute of Teaching and Learning where I am an Academic Fellow looking into Programme Level Assessment. This year I started the Physics Education Group (PEG) at Bristol as a focus for the Teaching Pathway Staff in the School of Physics.



Charles Tracy from the Institute of Physics gave us an overview of the IoP projects relevant to the work of the Group. Core Projects include degree accreditation and the Juno work. There are a number of specific teaching projects, including ECUIP, which is looking at conceptual understanding in electromagnetism and SPHERE, which is investigating possible funding streams for research into Higher Education.

Olivia Flemming joined us remotely to promote OneHE “a global network for educators who share a passion for learning and teaching in higher education.” For more details about this (and all the other presentations) see http://www.iop.org/activity/groups/subject/hed/eventsresources/page_55385.html that contains all the resources from the event.

SURVEY OPEN

Calling university science educators who engage their undergraduate students in open-ended investigative work.

Researchers at the University of York, with the support of the Gatsby Charitable Foundation, are interested in hearing from university science educators who engage their undergraduate students in open-ended investigative work, for example student-led investigations or similar project work. If you carry out this sort of work with your students, please consider sharing your thoughts and letting us know if you would be willing to be interviewed by completing the brief form here:

<https://goo.gl/forms/oayolXQhwk2KvqvL2>. Alternatively, you may get in touch by emailing kerry.knox@york.ac.uk. With thanks for your time and attention, and apologies for cross-postings.

NB: The HEG Committee is not responsible / not involved in this study, although HEG members may be interested to take part.

Finally, Helen Heath presented straw person model for year level assessment in Physics programmes as a step on the way to programme level assessment. Attendees were invited to bring matches but as the afternoon reached its conclusion the audience had to make its way home without starting a conflagration.

FUNDING OPPORTUNITY FOR MEETINGS

The Institute of Physics Higher Education Group (HEG) Committee invites applications from the community to organise a Physics Higher Education meeting. Up to £500 support will be awarded to the selected bid. In order to submit an application, please follow the below:

1. Give a brief description of your event, including possible date(s) and venue(s) (~250 words)
2. Give an outline budget for your event indicating the overall costs, the support requested from the HEG, and an approximate breakdown of how the HEG support would be used.
3. Have you requested financial support from other sources (or do you plan to do so)? If yes, indicate how much, and if a decision has been obtained.
4. Do you request any other support from HEG?
5. If relevant, give any other information on why the HEG should support your event, including any potential benefit for the Physics HEG community. (~250 words max)

To be eligible, the meeting should be organised by 31st December 2019. Applications must be emailed to Dr Helen Heath (helen.heath@bristol.ac.uk) by 8th May 2019. Informal enquiries can be sent to Dr Nicolas Labrosse (nicolas.labrosse@glasgow.ac.uk) or Dr Thomas Stallard (tss8@leicester.ac.uk).

METHODS OF RESEARCH IN SCIENCE EDUCATION NOVEMBER 2018 DUBLIN INSTITUTE OF TECHNOLOGY

Whenever I used to hear the word MORSE it brought to mind two things: Morse Code and Inspector Morse (the fictional crime investigator). Now there is a third, the Methods Of Research in Science Education conference. This was instigated by Michael Seery and Barry Ryan and held in Dublin in November 2018. I had the pleasure to attend this event, and it not only lived up to what was promised, but delivered so much more. It was more ‘workshop’ than ‘conference’ with the 80 or so delegates very much welcomed and part of the activities and discussion.



The venue, the converted St. Lawrences church on the Grangegorman campus of the Dublin Institute of Technology, was spectacular, and gave a lovely feeling of ‘retreat’ allowing us to focus on best practice in science education in HE and how we can investigate and evidence it, away from the hustle and bustle of our daily academic lives.

The invited speakers were all chosen for their experience and diverse interests. We heard about research methods from Suzanne Fergus, Gavin Duffy and Majella Dempsey. We learned about thematic coding and analysis using Excel from Ronan Bree and about the use of research in inquiry-based education from Paul van Kampen. And providing us with methods of evaluation were Veronica McCauley, Diogo Martins Gomes and Dina Brazil.

The delegates came from a range of science disciplines, with a strong physics contingent, but we were all united with each other and with the speakers in being practitioners (teachers of science in higher education) who previously, or currently, undertook pure scientific research, but all with a passion to learn and develop our education practice and research.

I am excited that plans for MORSE 2019 are already underway, and I look forward to learning about new research methods. So now whenever I hear the word MORSE, the previous connotations of ‘code’ and ‘investigator’ resonate with thematic coding and investigations into effective student learning. MORSE for me now means Methods Of Research in Science Education. *Dr Alison Voice*

SOPHIA – SCIENCE OUTREACH TO PROMOTE PHYSICS TO FEMALE STUDENTS RECEIVES FUNDING UNDER THE SCIENCE FOUNDATION IRELAND DISCOVER PROGRAMME.

The SOPHia Project has just been awarded €31,561.00 by Science Foundation Ireland (SFI), under its Discover Programme call 2019. The SOPHia project was developed by the Department of Physics and the Science Learning Centre at the University of Limerick with the support of the Institute of Physics in Ireland, and is led by Dr Gráinne Walshe. There is a three to one ratio of male to female students taking physics at Leaving Certificate level (upper second-level at school) in Ireland. This has a knock-on effect on the number of women taking physics in higher education, and ultimately



Dublin, Feb 2019: Minister for Training, Skills, Innovation, Research and Development, John Halligan TD, with the Principal Investigators for projects receiving SFI Discover funding specifically targeted towards engaging girls and women in STEM Pictured (l-r): Dr Sinéad McNally (DCU), Dr Gráinne Walshe (UL) PI for SOPHia, Prof Merrilyn Goos (UL), Minister Halligan, Margie McCarthy (SFI), Judith Harford (UCD); and Brendan Tangney (TCD).

in senior roles in academia and industry. SOPHia was developed by the Department of Physics in order to address this gender imbalance, starting as a small pilot in 2017/18. The main activity was a school visit programme to encourage female students to study physics for the Irish Leaving Certificate. Undergraduate physics students visit schools and deliver a workshop to female lower-second level students. The workshop consists of demonstrations and information about physics, and emphasises a sense of belonging, endorses effort and hard work over brilliance, and combats the stereotypes of who does physics. Students’ awareness is raised about gender stereotypes, and of the contribution physics makes to their lives. The undergraduate facilitators tell their own story of how they came to study physics, and serve as role models for the school students.

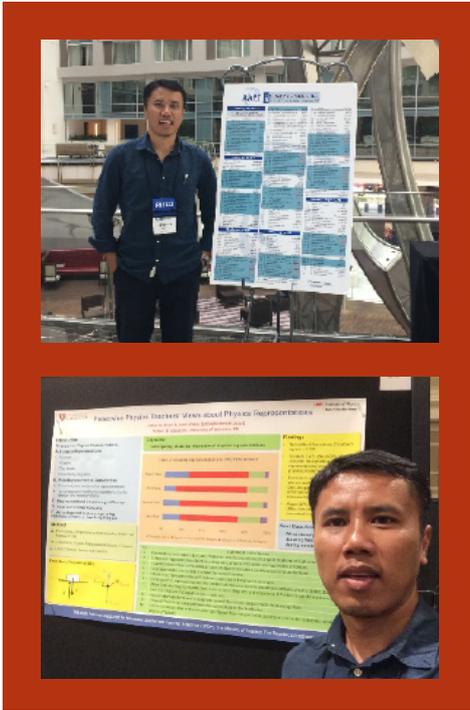
School student feedback indicated that the pilot school visits had a positive impact on their perceptions of physics. The SFI Discover Programme award means that SOPHia can build and expand upon on this initial success. The funding will be used to develop a more ambitious school visit programme, with training for undergraduate facilitators.

Additionally, there will be a number of new elements to the project, including a student competition for projects researching famous physicists/important physics discoveries/local physics, and a showcase event to inform teachers of the issues with regards to gender in physics. An interactive website for parents, teachers and students will be launched in September 2019 to supplement the school visit programme, with curriculum-linked activities. *Dr Gráinne Walshe*

WE NEED YOU!

Do you have an interesting higher education project? Attracted some funding? Have examples of good practice to share? We need you to tell us! We would love to include your stories in the next edition of the newsletter later this year. Submissions of around 400 words with images are encouraged. Please contact Emily Brunsten (emily.brunsten@york.ac.uk).

ATTENDING THE AMERICAN ASSOCIATION OF PHYSICS TEACHERS (AAPT) SUMMER MEETING 2018



The AAPT summer meeting 2018 was held in Washington, DC (Renaissance Hotel and Marriott Marquis Hotel) from 28th of July until 2nd of August. The guest speakers in the physics education research area were Rosemary S. Russ from the University of Wisconsin - Madison and Benedikt W. Harrer from San Jose State University. Both keynote speakers presented concerning how teachers scaffold students to think “wonderful ideas” while learning sciences such as physics. I presented a paper titled “Investigating of Pre-service Physics Teachers’ Views about Physics Representations” in the session of Assessment in Physics Teacher Preparation. The audience asked a couple of questions about my study, such as the participants involved in the study, the items of the survey, and the differences in the forms of free body diagrams (FBD). Those questions gave me feedback in deeply analysing my findings.

Besides giving my talk, I also made a poster related to the paper presented. The title of the poster was “Pre-service Physics Teachers’ Views about Physics Representation”. This poster was intended to give the audience lots of chances to ask many questions that were not covered during the talk session. During the poster session, the audience (professor, post-doctoral students, PhD students) asked questions about the purpose of conducting individual and paired interviews. Interestingly, a professor who is an expert in students’ epistemology in physics education came to see my poster. I was glad because we had the chance to discuss my findings and to discuss the next data analysis, as I am going to analyse students’ interviews and find out students’ epistemology in drawing free body diagrams. He will be ready to discuss my finding via email, and he will also be ready to invite me as a visiting scholar to talk about my study.

I attended an interesting session that discussed using simple mathematics in physics problem solving. This session gave me other perspectives about how mathematical equations can affect students’ performance while solving physics problems. The presenters covered various physics topics such as mechanics, electricity and magnetism, energy, and even thermodynamics. Another interesting session was how to teach physics content to make sense for students.

Overall, the AAPT summer meeting 2018 was fascinating and it gave me chance to meet other PhD students and physics instructors sharing our project, and to meet physics education researchers (experts) discussing specific research topic in physics education. I thank Institute of Physics (IOP) for the support to attend AAPT Summer Meeting 2018 through Research Student Conference Fund. *Judyanto Sirait*

IOP HIGHER EDUCATION GROUP

Chair: Nicolas Labrosse (nicolas.labrosse@glasgow.ac.uk)

Secretary: Helen Heath (helen.heath@bristol.ac.uk)

Treasurer: Thomas Stallard (tss8@leicester.ac.uk)

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Website: <http://www.iop.org/activity/groups/subject/hed/index.html> (please note this site is under deconstruction)

The contents of this newsletter do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

For content submissions (news, upcoming events, research stories...) please email Emily Brunsten (emily.brunsten@york.ac.uk).