

# **MPS School Activity Report**

## **March to September 2019**

### **CONTENTS**

- Staff mentions in the press, public engagement
- Awards & Recognitions
- Areas of Knowledge Exchange
- Talks delivered
- Impact
- Significant research outcomes
- Other news
- Publications deposited in SRO
- Grants – Submitted & Awarded

## Staff mentions in the press, public engagement

### ***Scientific American***

Antony Lewis provided commentary on the article discussing the “Best-Yet Measurements Deepen Cosmological Crisis”. <https://www.scientificamerican.com/article/best-yet-measurements-deepen-cosmological-crisis/>

### ***University of Sussex***

A press release regarding Konstantin Blyuss’ recently published paper in the Frontiers in Plant Science. <https://www.sussex.ac.uk/news/media-centre/press-releases/id/48552>

### ***University of Sussex***

Kathy Romer held a schools outreach session on June 7th 2019, and a public talk at a community festival on June 8th 2019.

### ***BBC Radio Sussex***

Steve Wilkins was featured on BBC Radio Sussex as part of the promotion for the Lewes STEM Fair. Over 800 visitors, mostly families with children aged <11, engaged with STEM related activities including several offering from the Department of Physics and Astronomy.

### ***University of Sussex***

Kathy Romer held a school outreach session on 11<sup>th</sup> July 2019.

### ***Jodrell Bank Observatory***

Stephen Wilkins, PhD student Cairan F, and several other PhD students attended BlueDot Festival.

Stephen Wilkins also ran GuideStars (July 30<sup>th</sup> 2019).

### ***Royal Society Science Book Prize***

John Gribbin’s has been shortlisted for the award.

### ***University of Sussex***

Anastasia Fialkov is working on a press release related to a new paper.

### ***4MOST Press Release***

Physicists at the University of Sussex will be part of a global team of scientists creating a three-dimensional map of ten million galaxies neighbouring our own. The Sussex team includes Dr Jon Loveday, Prof Seb Oliver, Prof Kathy Romer and Dr Robert Smith as well as numerous students and other researchers. (<https://www.sussex.ac.uk/news/all?id=49321>).

### ***University of Sussex***

Stephen Wilkins has announced his new charity Curiosity Sussex, with its first event “Wonderfest” being held in October.

## Awards & Recognitions

**Jose Verdu Galiana** has been awarded a DSTL PhD studentship for the development of "microwave quantum illumination with trapped electrons." The award is a contribution of £ 118,471 from DSTL plus an extra contribution of £ 40000 from Leonardo MW Ltd.

**Dr Alessia Pasquazi and Dr Juan Gongora** have been awarded with the ERC funded project – Proof of Concept.

The EPP group (PI **Simon Peeters**) has been awarded the STFC Consolidated Grant of £1.7M. This award provides the main funding for the group of 11 academics for the next three years. This award represents the same amount of money per year as was awarded previously: In the current funding climate, this is viewed as a great success and a recognition of the high-quality research output by the group.

**Jeff Hartnell** has taken over as one of the two overall physics analysis coordinators for the 200-person NOvA collaboration.

**Mary and John Gribbin's** book *Out of the Shadow of a Giant* has been shortlisted for the British Society of History of Science biennial prize.

**Dr Yuliya Kyrychko and Dr Konstantin Blyuss** were awarded Letters of Gratitude by the Prydniprovsky Scientific Centre of the National Academy of Sciences of Ukraine and of the Ministry of Education and Science of Ukraine. This is the highest award that can be given by the Scientific Centre, and it recognises significant long-standing contribution to a particular branch of science. (The annual Day of Science event in Dnipro, Ukraine, 17th May 2019).

**Simon Peeters** was appointed rapporteur on neutrino physics in the UK Community Meeting, which discussed the input to the European Particle Physics Strategy Update.

### **Areas of Knowledge Exchange**

**Seb Oliver, Steven Duivenvoord, Adam Barrett and Edward Salakpi** had a visit to Kenya with **Pedram Rowhani** (Geography) to visit AstroCast partners in Nairobi (31st May-6th June 2019). The visit was very successful with meetings with the National Drought Management Authority (NDMA), the Regional Centre for Mapping Resources for Development, the Kenya Red Cross Society and an academic from the University of Nairobi. The team returned with clear plans to pilot the implementation of our drought forecasting tools in e.g. the monthly bulletins of the NDMA.

**Seb Oliver** organised the national STFC Data Intensive Science summer school.

**Robert Smith** and PhD student RS Chis Lovell taught the course "*Introduction to MPI*" at the DIS Summer School.

**Dr Conor Boland** gave expert advice on road-mapping activity on the topic "*Graphene-Elastomer Composites*" with a team from Fraunhofer ISI in conjunction with the EU funded Graphene Flagship scheme.

**Iacopo Vivarelli** was one of the four scientific organisers of the workshop, "*Pushing the Boundaries...*" held in Durham.

## Talks Delivered

59 talks delivered.

## Impact

**Dr Anastasia Fialkov** organised a Royal Society outreach event "Scientists Meet the Media" held at the Science Museum, London.

## Significant Research Outcomes

**Konstantin Blyuss** has a paper on practical applications of my theoretical work published in *Frontiers on Plant Science* (world's most cited journal in the research area of Plant Science) on the 17 April: <https://www.frontiersin.org/articles/10.3389/fpls.2019.00483/full>

**Jeff Hartnell et al.** has released new NOvA results using antineutrinos in June. They have detected 27 electron antineutrino candidate events on a background of 10. This is a 4.4 sigma observation of electron antineutrinos appearing in a beam of muon antineutrinos, and is by far the best measurement of this oscillation in the world.

**Iacopo Vivarelli** has had Internal ATLAS approval on soft b tagging, which will become a public result for EPS.

**Iacopo Vivarelli** Public result on Soft b-tagging in ATLAS

<https://atlas.web.cern.ch/Atlas/GROUPS/PHYSICS/CONFNOTES/ATLAS-CONF-2019-027/>

**Anastasia Fialkov** has an exciting new result related to a first of the kind hydrodynamical simulation with ultralight dark matter.

**Roger Fenn** has received acceptance of a paper in the respectable journal *Pacific Journal of Mathematics* after waiting a year! Described as an important and valuable contribution to the area.

## Other news

**Bertram Duering** organised a minisymposium "Recent advances in PDE models describing emergent behaviour and collective dynamics" at the British Applied Mathematics Colloquium 2019, 24-26 April 2019, University of Bath, UK

**Ali Taheri** was an invited guest editor to:

- 1) Orthogonal Polynomials and Special Functions OPSF2019.
- 2) Proceedings of the First International Conference on Orthogonal Polynomials, Special Functions, and Computer Algebra: Applications in Engineering. (To be published by Springer and DE GRUYTER, 2019 respectively.)

Sussex hosted the first ever NOvA collaboration meeting outside the USA in June with 77 people attending in person and many more remotely.

**Enrico Scalas** received a grant from the Italian Istituto Nazionale di Alta Matematica "F. Severi" (INdAM, web page: <https://www.altamatematica.it/en/>) to visit the University of Salerno from 15th June to 15th July to present a series of lectures on "*From Markov chains to semi-Markov processes: The consequences of time change*".

**Bertram Duering** was a research committee member at the 6th Young Finance Scholars Conference, 13-14th June 2019, University of Sussex, see: <https://www.sussex.ac.uk/business-school/yfs/documents/yfs.pdf>

**Antonella De Santo** was one of five international panel members at the "2019 Careers Path Q&A" event organised by the ATLAS Early Career Scientists Board, CERN, Switzerland, 5th June 2019.

**Kathy Romer, Paul Giles, Sunayana Bhargava, and David Turner** went to UPenn DES meeting.

**Dr Anastasia Fialkov** undertook a working visit to Cambridge, UCL, and Heidelberg.

**Jon Loveday** participated in MIAPP workshop in Munich, 1-12th July.

**"Quantum leap forward at Sussex for electric car batteries"** -

. Physicists use quantum sensors to take a live image of the inside of a car battery from outside for first time.

. Breakthrough paves way for speedier development of better electric car batteries.

. New technology could help make electric car batteries more recyclable.

(See article here: <http://www.sussex.ac.uk/staff/newsandevents/?id=49065?ref=email>).

**Bertram Duering** is an invited participant to attend the "*Geometry, compatibility and structure preservation in computational differential equations*" programme, held at the Isaac Newton Institute for Mathematical Sciences, Cambridge, from the 3<sup>rd</sup> July – 19<sup>th</sup> December 2019.

**Nicos Georgiou** attended the Technical University of Munich, Germany for a research collaboration and conference.

**PDRA Paul Giles** organised a successful X-ray cluster session at NAM.

**Paul Giles** also attended the LSST-DESC meeting in Paris.

**Antony Lewis and Christian Byrnes** organised the Benasque cosmology meeting.

**Mark Sargent** attended SKA headquarters opening ceremony (10<sup>th</sup> July 2019).

**Kathy Romer** led a discussion session at Athena UK meeting.

**Stephen Wilkins** is CoI of the 135 orbit COS Legacy Archive Spectroscopic Survey (CLASSY) on the Hubble Space Telescope.

**Marco Peccianti's** ERC-Proof of Concept has started (1<sup>st</sup> August 2019).

**Jonathan Loveday** was a participant in 4MOST all-hands meeting in Potsdam, 16-20<sup>th</sup> September.

**University of Sussex**

*Meet the quantum summer students* – “Over the summer the Quantum Systems and Devices laboratory has been bustling with A-Level and undergraduate summer students working on a range of exciting projects” (<http://www.sussex.ac.uk/staff/newsandevents/?id=49648>).

**University of Sussex**

*Laying the Foundations of excellence for three decades* – “This autumn sees the thirtieth anniversary of our first intake of Foundation Year students. A tremendously important initiative for widening access to Higher Education to students of all backgrounds” (<http://www.sussex.ac.uk/staff/newsandevents/?id=49681>).

**Publications deposited in SRO****Mathematics**

- Accepted: 9
- Published: 31

**Physics and Astronomy**

- Accepted: 14
- Published: 152

**Grants – Submitted & Awarded****Mathematics**

- Submitted: 9
- Awarded: 4
- Total applied amount: £2,502,837

**Physics and Astronomy**

- Submitted: 53
- Awarded: 19
- Total applied amount: £21,366,820