

MPS Research Update

January 2020

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Staff mentions in the press, public engagement

Sunayana B (PGR) took part in a Radio3 programme - poem about dark energy and discussion about poetry and science <https://www.bbc.co.uk/programmes/m000dj1d>

Istvan Kiss spoke to @BBCSussex (live on the Danny Pike morning show on the 31st of January 2020) about what mathematical modelling can tell us about how the virus is spreading. Listen here <https://www.bbc.co.uk/sounds/play/p07zq4jf> (from 44 minutes in).

Alan Dalton and the Material Physics group “have created an alternative to metal tags on clothing and food by developing antennas based on graphene inks which can be printed onto paper creating a sustainable solution to an essential part of the retail supply chain”. See article: <http://www.sussex.ac.uk/staff/newsandevents/?id=51240>

Awards & Recognitions

Seb Oliver has chaired the STFC Ernest Rutherford Fellowship (ERF) Interview panel (11-13th January 2020), and has oversaw the STFC Ernest Rutherford Fellowship (ERF) Sifting panels (14-15th January 2020).

Seb has participated as a roving panel member at the UKRI Stephen Hawking interviews and has chaired the merger meeting of panel chairs and rovers (Claudia Eberlein is other roving panel member!) (21-22nd January 2020).

Mark Sargent was nominated as external member for the University of Manchester/JCBA lectureship appointment panel (panel to meet in March).

Kathy Romer has been appointed as an external reviewer for a Royal Society URF proposal.

Areas of Knowledge Exchange

No news reported in this area.

Talks Delivered

Barry Garraway gave talks in Utah, USA, and in Puebla, Mexico.

2020 ATLAS-UK meeting (8th-10th Jan, Cambridge, UK)

Plenary talks by 5 Sussex group members:

- * PDRA **Mark Sutton** (on *Parton Density Functions at ATLAS*)
- * Antonella's PhD student **Fabrizio Trovato** (on *Electroweak SUSY searches at ATLAS*)
- * Three other PhD students in the group (1st supervisor name in brackets): **Mario Grandi** (Fabrizio Salvatore), **Ioannis Xiotidis** (Alex Cerri), **Meirin Evans** (Kate Shaw).

PhD student **Mario Spina** (Iacopo Vivarelli) and **Meirin Evans** (Kate Shaw) presented a poster each at the same meeting. Meirin was one of three recipients of the prize for best poster at the meeting.

Mark Sargent gave the *Granada-IAA colloquium* on January 23rd 2020.

Steve Wilkins was invited to a talk at Sesto, Italy (21st January 2020).

Michaela Lawrence (PGR) was invited to a seminar at QMUL on the 15th January, and contributed to a talk at *Texas@ICG*.

Impact

Seb Oliver's The FacyNation paper "*An empirical, Bayesian approach to modelling the impact of weather on crop yield: maize in the US*" has been accepted to Environmental Research Communications; (Shirley et al. 2020).

Seb Oliver's AstroCast have a draft MOU with the Regional Centre for Mapping Resources for Development (RCMRD), the Kenya National Drought Management Authority (NDMA), and the Kenya Red Cross Society (KRCS) to implement the AstroCast methods in the NDMA Early Warning System.

Seb Oliver was awarded £74,100 from the Agriculture and Horticulture Development Board for a PhD student project "*Sim Farm 2030: An empirical, data-driven, model for wheat cultivars and optimisation for future climate scenarios*".

Significant Research Outcomes

Philip Harris & Clark Griffith are part of a collaboration that has just released a new world record in precision of measurement of the electric dipole moment of the neutron - a key parameter in particle physics related to the question of why the universe is dominated by matter rather than antimatter. The Sussex group has been a world leader in this field for some decades, and has held the world record continuously since 1999. There will be a press release shortly, to coincide with publication.

Astronomy STFC Consolidated Grant outcome is stronger than last time (full details will be included in the next DRaKE report once the award letter arrives).

Conor Boland - <https://pubs.acs.org/doi/10.1021/acsnano.9b06847>

How to make these flexible materials both more sensitive and to stretch further has been an issue that has stumped researchers until now. In breakthrough work by a Sussex physicist "*Stumbling Through the Research Wilderness, Standard Methods to Shine Light on Electrically Conductive Nanocomposites for Future Healthcare Monitoring*" published 8th January 2020 in the prestigious journal ACS Nano, for the first time a blueprint to help scientists understand how to optimise the performances of these flexible electronics has been presented.

Other news

Paul Giles (PDRA) allocated XMM time (C grade) for up to 283 ks for 14 clusters (core to DES cluster cosmology work); on another one we are co-I (C grade again, up to 130ks for 6 clusters).

Paul Giles (PDRA) - XMM observation of a cluster from previous AO.

Grant Report

Submitted

PI/Co-I	Principal Funder	Funder Programme	Project Title	Overall Applied Amount £
Dalton, Alan	European Union	H2020 - Marie Curie ITN	2D-Liquids — 2D Liquid interfaces for sustainable green energy production and portable storage	481,226
Kiss, Istvan	Innovate UK	Smart Grant	Freight Trading Risk Management (FTRM)	329,252
Lakkis, Omar	European Union	H2020 - Marie Curie ITN	Data Assisted Computational Modelling for Singular and Multi-scale Phenomena (DACOM)	240,598
Madzvamuse, Anotida	The Health Foundation	THF - Advancing Applied Analytics	Predicting Length of Stay on NHS Mental Health Adult Inpatient Wards Using Machine Learning	20,852
Peccianti, Marco	European Union	H2020 - Marie Curie ITN	MIMOSAE — Multifunctional Meta-Optics for SmAll footprint reconfigurable systEms	481,226
Peeters, Simon	RAPISCAN SYSTEMS	Studentship	Optimising scintillators for fast CT systems	75,600
Thomas, Peter	European Union	H2020 - Marie Curie ITN	COSMO2020 - Cosmology with Galaxy Clusters: Present and Future	0

Forecasted

Kruger, Peter	Innovate UK	Innovate - Commercialising quantum tech: large collaborative projects round 1	Quantum sensors for end-of-line battery testing	520,710
Oliver, Seb	AGRICULTURE AND HORTICULTURE DEVELOPMENT BOARD	Studentship	An empirical, data-driven, model for wheat cultivars and optimisation for future climate scenarios	74,100

Salvatore, Fabrizio	STFC	Research Grant	Support for the ATLAS Inner Detector Trigger	45,450
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Awarded

N/A

Department of Mathematics. Publications deposited in SRO during January 2020					
To view the publication, enter the five-digit SRO ID number as http://sro.sussex.ac.uk/nnnnn					
Sussex Author	SRO ID	Status	Author(s)	Output Title	Volume Title
Giesl, Peter	89330	Accepted	Giesl, Peter; Osborne, Conor; Hafstein, Sigurdur	Automatic determination of connected sublevel sets of CPA Lyapunov functions	SIAM Journal on Applied Dynamical Systems (SIAD)

Department of Physics. Publications deposited in SRO during January 2020					
To view the publication, enter the five-digit SRO ID number as http://sro.sussex.ac.uk/nnnnn					
Sussex Author	SRO ID	Status	Author(s)	Output Title	Volume Title
Asquith, Lily	89647	Published	Asquith, L; Cerri, A; DeSanto, A; Potter, C J; Salvatore, F; Sutton, M R; Vivarelli, I; Atlas Collaboration, ; others	A search for new physics in dijet mass and angular distributions in pp collisions at $\sqrt{s}=7$ TeV measured with the ATLAS detector	New Journal of Physics
Gow, Andrew	89474	Published	Gow, Andrew D; Byrnes, Christine T; Hall, Alex; Peacock, John A	Primordial black hole merger rates: distributions for multiple LIGO observables	Journal of Cosmology and Astroparticle Physics
Hindmarsh, Mark	89272	Published	Hindmarsh, Mark; Hijazi, Mulham	Gravitational waves from first order cosmological phase transitions in the Sound Shell Model	Journal of Cosmology and Astroparticle Physics
Nation, Charlie	89275	Published	Nation, Charlie; Porras, Diego	Ergodicity probes: using time-fluctuations to measure the Hilbert space dimension	Quantum
Oliver, Seb J	88925	Published	Shirley, Raphael; Pope, Edward; Bartlett, Myles; Oliver, Seb; Quadrianto, Novi; Hurley, Peter; Duivenvoorden, Steven; Rooney, Phil; Barrett, Adam B; Kent, Chris	An empirical, Bayesian approach to modelling crop yield: Maize in USA	Environmental Research Communications
Olivieri, Luana	89491	Accepted	Olivieri, Luana; Totero Gongora, Juan Sebastian; Peters, Luke; Cecconi, Vittorio; Cutrona, Antonio; Tunesi, Jacob; Tucker, Robyn; Pasquazi, Alessia; Peccianti, Marco	Hyperspectral terahertz microscopy via nonlinear ghost-imaging	Optica

Rubio Jimenez, Jesus	89459	Published	Rubio Jimenez, Jesus	Non-asymptotic quantum metrology: extracting maximum information from limited data	
Sargent, Mark	89167	Accepted	Ellison, Sara L; Thorp, Mallory D; Lin, Lihwai; Pan, Hsi-An; Bluck, Asa F L; Scudder, Jillian M; Teimoorinia, Hossen; Sanchez, Sebastian F; Sargent, Mark	The ALMaQUEST survey: III. Scatter in the resolved star forming main sequence is primarily due to variations in star formation efficiency	Monthly Notices of the Royal Astronomical Society