

MPS Research Update

December 2019

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Staff mentions in the press, public engagement

Conor Boland has been mentioned considerably in the press for his work on a blueprint that could help scientists in optimising the effectiveness of nanomaterials used in health sensors:

<https://phys.org/news/2019-12-blueprint-nanomaterial-newborns-elderly-busy.html>

https://www.eurekalert.org/pub_releases/2019-12/uos-bfn121119.php

<https://www.nanowerk.com/nanotechnology-news2/newsid=54200.php>

<https://medium.com/@bitnanotech/blueprint-for-nanomaterial-development-offers-hope-to-newborns-elderly-and-busy-doctors-8b40e61a33a4>

<https://bioengineer.org/blueprint-for-nanomaterial-development-offers-hope-to-newborns-elderly-and-busy-doctors/>

https://www.sciencedaily.com/releases/2019/12/191211100319.htm?utm_source=dlvr.it&utm_medium=twitter

<https://nano-magazine.com/news/2019/12/11/blueprint-built-for-wireless-nanosensors-that-track-our-health>

<http://7thspace.com/headlines/1066834/blueprint-for-nanomaterial-development-offers-hope-to-newborns-elderly-and-busy-doctors.html>

<https://www.azonano.com/news.aspx?newsID=37088>

<https://www.longroom.com/discussion/1729552/blueprint-for-nanomaterial-development-offers-hope-to-newborns-elderly-and-busy-doctors>

<https://www.printedelectronicsworld.com/articles/19312/blueprint-for-nanomaterial-offers-hope-to-newborns-elderly-doctors>

<https://advancedtextilesource.com/2020/01/08/blueprint-for-nanomaterials-in-wearable-sensors-published/>

Awards & Recognitions

Seb Oliver has chaired the UKRI Stephen Hawking Fellowship Prioritisation panel (3-4th December 2019).

Areas of Knowledge Exchange

Manoj Tripathi has been working in collaboration with Rice University.

Talks Delivered

Enrico Scalas, Bertram Duering, Nicos Georgiou, Sara Merino Aceituno - *MASS Seminar at Sussex: Functional and thermodynamic limits of a simple stylized model for the distribution of wealth* - (5th December 2019).

Enrico Scalas - 2019-20 London Mathematical Finance Seminar Series - *Stochastic Modelling for High-Frequency Financial Data: A Survey of Results* (12th December 2019).

This is joint work with several co-authors mentioned in the references below:

Chen, J M; Cincotti, S; Hawkes, A G; Kaizoji, T; Leonenko, N; Politi, M; Ponta, L; Raberto, M; Scalas, E; Trinh, M

Bertram Duering was invited to talk at the *Geometry, compatibility and structure preservation in computational differential equations*, at the Isaac Newton Institute for Mathematical Sciences, Cambridge (5th December 2019).

Iacopo Vivarelli - *Low pt b-tagging in ATLAS*, CERN (18th December 2019).

Antony Lewis attended a plenary talk at *Texas Symposium on Relativistic Astrophysics*, in Portsmouth.

Jonathan Loveday attended the Euclid-UK meeting, talking on '*4MOST and Euclid*', London (16th December 2019).

ATLAS Physics workshop "*Run 2 Physics, Reaching New Heights*", CERN, Switzerland, 9-13 December 2019 - Plenary talk given by **Antonella's** student **Fabrizio Trovato**, on work stemming from his PhD thesis research.

Manoj Tripathi gave an oral talk at MRS in Boston.

Chris Byrnes was invited to a plenary workshop talk, *IPMU Primordial Black Hole workshop*, 4 December 2019, Tokyo, Japan.

Antony Lewis attended an invited talk: *Texas@Portsmouth*, and a seminar in Nottingham.

Paul Giles (PDRA) contributed to a talk at *Texas@Portsmouth*.

Jon Loveday contributed to a talk at *Euclid-UK meeting* in London.

Giulio Fabian (PDRA) attended a seminar at MSSL, and Ferrara.

Aswin PV (PGR) attended a talk at the *Virgo meeting*.

Luke C (PGR) attended a talk at *RAS meeting*.

Ilian Iliev spoke at the *First Billion Years meeting* in Indore, India.

Ilian Iliev was invited to a talk at the *21cm meeting* at Sesto, Italy.

Impact

Laura Marian (PDRA) is employed to work on DISCUS and AstroCast December 2019 -March 2020.

Significant Research Outcomes

Iacopo Vivarelli has received 14 days of beam time awarded to test a new design of a dual readout calorimeter in September 2020 at DESY, Germany.

Conor Boland prestigious ACS publication <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 till 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 today 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

Vanessa Styles was a member of the moderating panel for the *"Landscape Decisions Programme's Second Grant Call on Mathematical & Statistical Challenges"*. The Landscape Decisions programme is funded under UKRI's Strategic Priorities Fund (SPF) and is supported by NERC, AHRC, BBSRC, EPSRC and ESRC.

Vanessa also joined the editorial board of the *SIAM Journal on Numerical Analysis*.

Manoj Tripathi submitted an article as co-author in the *Journal of Materials Science & Technology* in collaboration with University of Malaysia.

Grant Report

Submitted

PI/Co-I	Principal Funder	Funder Programme	Project Title	Overall Applied Amount £
Asquith, Lily	Royal Society	Apex	Physorama	40,676
Calmet, Xavier	STFC	STFC Quantum Technologies for Fundamental Physics	Macroscopic Quantum Superpositions (MaQS)	285,175
Garraway, Barry	STFC	STFC Quantum Technologies for Fundamental Physics	Exploiting collective excitations of condensates: new sensors for fundamental physics	1,855,801
Garraway, Barry	STFC	STFC Quantum Technologies for Fundamental Physics	Quantum simulators as disruptive paradigm in quantum fields and materials discovery	1,558,891
Griffith, Clark	STFC	STFC Quantum Technologies for Fundamental Physics	Wide Range Magnetometry for Precision Tests of Fundamental Symmetries (WRM PTFS)	767,779
Hindmarsh, Mark	STFC	STFC Quantum Technologies for Fundamental Physics	Quantum Enhanced Superfluid Technology for Dark Matter and Cosmology	417,361
Keller, Matthias	STFC	STFC Quantum Technologies for Fundamental Physics	PASSNP: Precision Atom Spectroscopy Search for New Physics	951,240
Keller, Matthias	STFC	STFC Quantum Technologies for Fundamental Physics	A network of clocks for measuring the stability of fundamental constants	1,612,176
Verdu, Jose	STFC	STFC Quantum Technologies for Fundamental Physics	Determination of Absolute Neutrino Mass Using Quantum Technologies	532,986

Forecasted

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

Dalton, Alan	Advanced Material Development Ltd	Industrial Research Grant	Towards Citizen Science for Charity	1,066,908
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Kruger, Peter	EPSRC via Birmingham Hub	UK National Quantum Technology Hub in Sensors and Timing	UK National Quantum Technology Hub in Sensors and Timing	510,248
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Department of Mathematics. Publications deposited in SRO during December 2019					
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
Madzvamuse, Anotida	88846	Accepted	Zhang, Jai-Fang; Shi, Hong-Bo; Madzvamuse, Anotida	Characterizing the effects of self- and cross-diffusion on stationary patterns of a predator-prey system	Journal of Bifurcation and Chaos (ijbc)

Department of Physics. Publications deposited in SRO during December 2019					
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	88929	Published	Kogler, Roman; Nachman, Benjamin; Schmidt, Alexander; Asquith, Lily; Winkels, Emma; Campanelli, Mario; Delitzsch, Chris; Harris, Philip; Hinzmann, Andreas; Kar, Deepak; and 5 other(s)	Jet substructure at the Large Hadron Collider	Reviews of Modern Physics
Calmet, Xavier	88695	Published	Calmet, Xavier	Hidden sector and gravity	Physics Letters B
Christoforou, Costas Marios M	88392	Published	Takahashi, Hiroki; Kassa, Ezra; Christoforou, Costas; Keller, Matthias	Strong coupling of a single ion to an optical cavity	Physical Review Letters
Keller, Matthias K	88923	Published	Takahashi, Hiroki; Nevado, Pedro; Keller, Matthias	Mølmer-Sørensen entangling gate for cavity QED systems	Journal of Physics B: Atomic, Molecular and Optical Physics
Lindert, Jonas MR	88336	Published	Lindert, J M; Pozzorini, S; Boughezal, R; Campbell, J M; Denner, A; Dittmaier, S; Gehrmann-De Ridder, A; Gehrmann, T; Glover, N; Huss, A; and 8 other(s)	Precise predictions for V+ jets dark matter backgrounds	European Physical Journal C
Lindert, Jonas MR	88337	Published	Kallweit, S; Lindert, J M; Maierhofer, P; Pozzorini, S; Schonherr, M	NLO electroweak automation and precise predictions for W+ multijet production at the LHC	Journal of High Energy Physics

Lindert, Jonas MR	88339	Published	Jezo, Tomas; Lindert, Jonas M; Nason, Paolo; Oleari, Carlo; Pozzorini, Stefano	An NLO+PS generator for $t\bar{t}$ and Wt production and decay including non-resonant and interference effects	European Physical Journal C
Lindert, Jonas MR	88860	Published	Kallweit, S; Lindert, J M; Maierhöfer, P; Pozzorini, S; Schönherr, M	NLO QCD+EW predictions for $V + jets$ including off-shell vector-boson decays and multijet merging	Journal of High Energy Physics
Oliver, Seb J	88689	Accepted	Krefting, Nick; Sajina, Anna; Lacy, Mark; Nyland, Kristina; Farrah, Duncan; Darvish, Behnam; Duivenvoorden, Steven; Duncan, Ken; Gonzalez-Perez, Violeta; Lagos, Claudia Del P; and 2 other(s)	The role of environment in galaxy evolution in the SERVS survey I: density maps and cluster candidates	The Astrophysical Journal
Thomas, Peter A	88370	Published	Henriques, Bruno M B; Yates, Robert M; Fu, Jian; Guo, Qi; Kauffmann, Guinevere; Srisawat, Chaichalit; Thomas, Peter A; White, Simon D M	L-GALAXIES 2020: spatially resolved cold gas phases, star formation and chemical enrichment in galactic discs	Monthly Notices Of The Royal Astronomical Society
Wilkins, Stephen M	88381	Published	Wilkins, Stephen M; Lovell, Christopher C; Stanway, Elizabeth R	Recalibrating the cosmic star formation history	Monthly Notices Of The Royal Astronomical Society