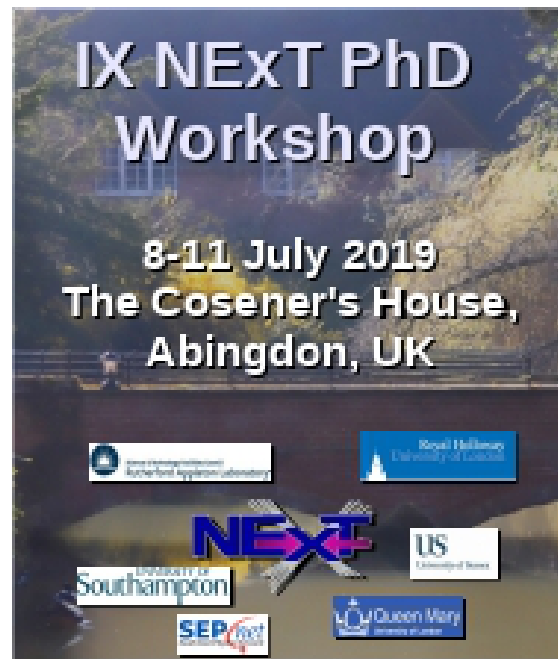


# Decoding new physics from data: connecting theory and signatures

Monday 08 July 2019 - Thursday 11 July 2019

Cosener's House



## Book of Abstracts



# Contents

Lecture 1 . . . . .	1
Joe Smith (Cambridge): Quantum mechanics in magnetic backgrounds with manifest symmetry and locality . . . . .	1
Yannick Kluth (Sussex): Asymptotic Safety of f(Ric) Gravity . . . . .	1
Charles Cresswell-Hogg (Sussex): Four-fermion interactions and the origin of mass . . . . .	1
Muyuan Song (Southampton): Light Charged Higgs boson with dominant decay to quarks, and its search at the LHC and future colliders . . . . .	1
Jack Holguin (Manchester): Parton Branching at Amplitude Level . . . . .	1
Daniel Locke (Southampton): Minimal Consistent Fermion Dark Matter . . . . .	1
Michael Soughton (Sussex): On finding collider-stable particles using Machine Learning	2
Welcome . . . . .	2
”Dark matter from a vector field in the fundamental representation of SU(2)L” . . . . .	2
Higgs and BSM Phenomenology: 2 (Chair: A. Akeroyd) . . . . .	2
Higgs and BSM Phenomenology: 3 (Chair: A. Akeroyd) . . . . .	2
Flavour physics and BSM test at the LHC: 3 (Chair: A. Belyaev) . . . . .	2
Search for BSM at the LHC: 2 (Chair: J. Linacre) . . . . .	2
Introduction to statistical analysis: 1 (Chair: J. Linacre) . . . . .	3
Introduction to statistical analysis: 2 (Chair: J. Linacre) . . . . .	3
Search for BSM at the LHC: 3 (Chair: A. Akeroyd) . . . . .	3
Higgs and BSM Phenomenology: 4 (Chair: E. Accomando) . . . . .	3
Introduction to statistical analysis: 3 (Chair: A. Belyaev) . . . . .	3
Search for BSM at the LHC: 1 (Chair: S. Moretti) . . . . .	3
SEPnet Employer Panel Session . . . . .	3



1

## Lecture 1

Student session / 2

**Joe Smith (Cambridge): Quantum mechanics in magnetic backgrounds with manifest symmetry and locality**

Student session / 3

**Yannick Kluth (Sussex): Asymptotic Safety of  $f(\text{Ric})$  Gravity**

Student session / 4

**Charles Cresswell-Hogg (Sussex): Four-fermion interactions and the origin of mass**

Student session / 5

**Muyuan Song (Southampton): Light Charged Higgs boson with dominant decay to quarks, and its search at the LHC and future colliders**

**Corresponding Author:** ms32g13@soton.ac.uk

Student session / 6

**Jack Holguin (Manchester): Parton Branching at Amplitude Level**

**Corresponding Author:** jack.holguin@manchester.ac.uk

Student session / 7

**Daniel Locke (Southampton): Minimal Consistent Fermion Dark Matter**

**Corresponding Author:** d.locke@soton.ac.uk

**Student session / 8**

**Michael Soughton (Sussex): On finding collider-stable particles using Machine Learning**

**Corresponding Author:** michaeloughton@gmail.com

9

**Welcome**

**Corresponding Author:** belyaev1967@gmail.com

**Felipe Rojas (Chair: A.Belyaev) / 10**

**”Dark matter from a vector field in the fundamental representation of SU(2)L”**

**Corresponding Author:** astrofis.rojas@gmail.com

**Higgs and BSM Phenomenology / 11**

**Higgs and BSM Phenomenology: 2 (Chair: A. Akeroyd)**

**Corresponding Author:** sven.heinemeyer@cern.ch

**Higgs and BSM Phenomenology / 12**

**Higgs and BSM Phenomenology: 3 (Chair: A. Akeroyd)**

**Corresponding Author:** sven.heinemeyer@cern.ch

**Flavour physics and BSM test at the LHC / 13**

**Flavour physics and BSM test at the LHC: 3 (Chair: A. Belyaev)**

**Corresponding Author:** nazila.mahmoudi@cern.ch

**Search for BSM at the LHC / 14**

## **Search for BSM at the LHC: 2 (Chair: J. Linacre)**

**Corresponding Author:** albert.de.roeck@cern.ch

**Introduction to statistical analysis / 15**

## **Introduction to statistical analysis: 1 (Chair: J. Linacre)**

**Corresponding Author:** g.cowan@rhul.ac.uk

**Introduction to statistical analysis / 16**

## **Introduction to statistical analysis: 2 (Chair: J. Linacre)**

**Corresponding Author:** g.cowan@rhul.ac.uk

**Search for BSM at the LHC / 17**

## **Search for BSM at the LHC: 3 (Chair: A. Akeroyd)**

**Corresponding Author:** albert.de.roeck@cern.ch

**Higgs and BSM Phenomenology / 18**

## **Higgs and BSM Phenomenology: 4 (Chair: E. Accomando)**

**Corresponding Author:** sven.heinemeyer@cern.ch

**Introduction to statistical analysis / 19**

## **Introduction to statistical analysis: 3 (Chair: A. Belyaev)**

**Corresponding Author:** g.cowan@rhul.ac.uk

**Search for BSM at the LHC / 20**

## **Search for BSM at the LHC: 1 (Chair: S. Moretti)**

**Corresponding Author:** albert.de.roeck@cern.ch

**SEPnet Employer Panel Session / 21****SEPnet Employer Panel Session**

**Corresponding Authors:** caterina.minelli@npl.co.uk, v.benson@surrey.ac.uk, sellahewa@deloitte.co.uk, alys.brett@ukaea.uk, careers@awe.co.uk, stewart.martin-haugh@stfc.ac.uk, aquila.mavalankar@adpatiximaging.com

The SEPnet employer panel is aimed at raising awareness of career opportunities outside academia for physics doctorates. Panel representatives, all with physics or PhD backgrounds, will spend a few minutes outlining their role, what their organisation does, what skills/knowledge they are looking for and why they might be interested in physicists. The panel session will be followed by a Q&A session and an opportunity for students to talk to employers in small groups.

Caterina Minelli (UK National Physical Laboratory (NPL) )

Alys Brett (UKAEA)

Rosh Sellahewa (Manager at the Deloitte's audit and assurance arm)

Cassie Hill (AWE)

Stewart Martin-Haugh (Staff Scientist in the Particle Physics Department at Rutherford Appleton Laboratory.)

Gil Travish (Chief Science Officer (CSO) and Founder at Adaptix Ltd)

Chair: Veronica Benson (Employer Liaison Director - SEPnet)