University of St Andrews — FOUNDED 1413

SARNAK FEST

A Conference in Honour of Professor Peter Sarnak's Honorary Degree

25 June 2016

*Lecture Theatre A
Mathematical Institute,
University of St Andrews
KY16 9SS*

PROGRAMME

09:30 – 10:00	**REGISTRATION & COFFEE**

10:00 – 10:55 — <u>**Professor Jonathan Pila**</u> (University of Oxford)

TITLE: **'Multiplicative and modular diophantine problems'**

<u>**Abstract**</u>
I will describe some diophantine results and conjectures, from the Mordell conjecture of 1922 (theorem of Faltings) to the open and very general Zilber-Pink conjecture. I will describe a recent result and conjecture of similar flavour which are not formally consequences of the Zilber-Pink conjecture.

10:55 – 11:00	**Introduction of Keynote Speaker:** Professor Igor Rivin

11:00 – 11:55 — **KEYNOTE SPEAKER:** <u>**Professor Peter Sarnak**</u> (Princeton University)

TITLE: **'Navigating SU(2)'**

<u>**Abstract**</u>
We discuss some recent developments concerning number theoretic generators of SU(2) and their application to the construction of optimally efficient universal quantum gates.

12:00 – 13:30	**LUNCH BREAK**

13:30 –14:25 — <u>**Professor Igor Rivin**</u> (University of St Andrews)

TITLE: **'Spectral experiments'**

<u>Abstract</u>
I will talk about some experiments on eigenvalues of naturally (geometrically, algebraically, and possibly even biologically) classes of graphs.

14:25 –15:20 — <u>**Dr Igor Wigman**</u> (Kings College London)

TITLE: **'Topologies of nodal sets of random band-limited functions'**

<u>**Abstract**</u>
It is shown that the topologies and nestings of the zero and nodal sets of random (Gaussian) band limited functions have universal laws of distribution. Qualitative features of the supports of these distributions are determined. In particular the results apply to random monochromatic waves and to random real algebraic hyper-surfaces in projective space. This work is joint with Peter Sarnak.

15:20 –15:45	**COFFEE BREAK**

15:45 –16:40	**Dr Péter Varjú** (University of Cambridge)

TITLE: **'Bernoulli convolutions'**

Abstract

The Bernoulli convolution with parameter lambda is the law of the random variable: Sum X_i lambda^i, where X_i are independent unbiased +1/-1 valued random variables. If lambda <1/2, then the Bernoulli convolution is singular and is supported on a Cantor set. If 1> lambda >1/2, the question whether the Bernoulli convolution is singular or a.c. is a very interesting open problem, and I will talk about some recent progress on it. Joint work with Emmanuel Breuillard.

16:40-16:50	**Closing remarks and thanks:** Professor Igor Rivin
16:50-18:00	**WINE RECEPTION**
18:30	**DINNER**

Tony Macaroni, St Andrews - 39 Bell St, KY16 9UR

Register for the Evening Meal at: https://www.st-andrews.ac.uk/maths/sarnak-conference/