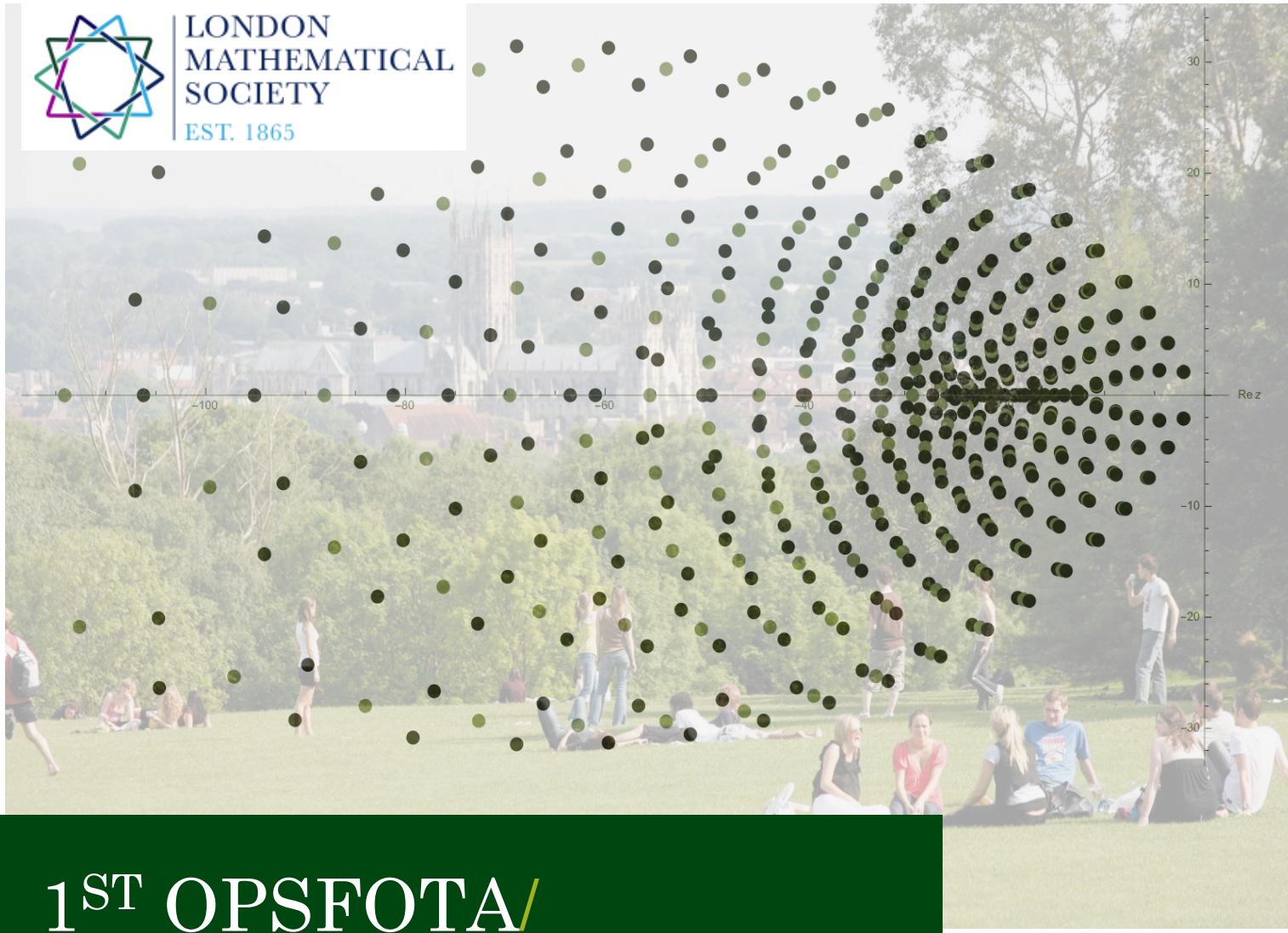

1ST OPSFOTA/ SEMINAR

28th March, 10am-5.30pm
University of Kent, Canterbury

The first meeting of the Research Group on Orthogonal Polynomials, Special Functions and Operator Theory and Applications, supported by a London Mathematical Society Joint Research Groups grant.

Speakers:

- **Marjolein Leurs (Leuven, Belgium)**
- **Sheehan Olver (Imperial, UK)**
- **Alexander Pushnitski (KCL, UK)**
- **Jani Virtanen (Reading, UK)**
- **Ian Wood (Kent, UK)**

Further information

E: A.Loureiro@kent.ac.uk ;
https://blogs.kent.ac.uk/aloureiro/1st-opsfota-seminar/

University of Kent

OPSFOTA'1

University of Kent

The 1st meeting of the Research Group on
Orthogonal Polynomials, Special Functions and Operator Theory and Applications

10.00 - 10.30	Registration and Opening	Darwin BR
10.30 - 11.20	Sheehan **Olver** (Imperial College, London) Title: *Infinite-dimensional linear algebra and spectral problems*	Darwin BR
11.30 -12.20	Jani **Virtanen** (University of Reading) Title: *Open problems related to Toeplitz operators and matrices*	Darwin BR
12.20 - 14.00	Lunch	Sibson cafe
14.00 - 14.50	Alexander **Pushnitski** (King's College of London) Title: *Schmidt subspaces of Hankel operators*	Sibson SR2
15.00 - 15.50	Marjolein **Leurs** (University of Leuven, Belgium) Title: *Jacobi-Angelesco multiple orthogonal polynomials*	Sibson SR2
15.50 - 16.20	Coffee/Tea break	Sibson Staff Room
16.20 - 17.10	Ian **Wood** (University of Kent) Title: *Embedding eigenvalues for periodic Jacobi operators using Wigner-von Neumann-type perturbations*	Sibson SR2

This meeting is supported by

LONDON MATHEMATICAL SOCIETY
EST. 1865

University of Kent

Marjolein Leurs (University of Leuven, Belgium)

Title. **Jacobi-Angelesco multiple orthogonal polynomial**

Abstract. In this talk, we present recent results on the Jacobi-Angelesco multiple orthogonal polynomials. The starting point of this research is a paper by Geronimo, Iliev and Van Assche (2017) where the Legendre-Angelesco polynomials on two intervals are studied. Their main result was a connection between these polynomials and Alpert's multiwavelets. The first step in generalizing these results, is by adding parameters to obtain the Jacobi-Angelesco polynomials on two intervals. In the next step, we consider the Jacobi-Angelesco polynomials on r intervals, which are placed in the shape of a star. In each step, we give explicit expressions of the type I polynomials on and near the diagonal. We also give a differential equation for these polynomials. This equation is used to compute the asymptotic behavior of the zeros of the polynomials. This is joint work in progress with Walter Van Assche.

Sheehan Olver (Imperial College of London, UK)

Title. **Infinite-dimensional linear algebra and spectral problems**

Abstract. We introduce a new methodology of numerical linear algebra applied directly to infinite-dimensional operators – as opposed to finite-dimensional linear algebra applied to discretizations – which is made possible by exploiting structure in the operators, e.g., operators that are perturbations of Toeplitz operators. This allows for the systematic calculation of continuous and discrete spectrum, as well as spectral measures. The benefit over the traditional discretize-and-solve approach is that the algorithm is rigorous (in applications, this translates to reliability), fast and extremely accurate. Having a hands-on representation of the spectral transformation allows for a robust implementation of functional calculus, used for example to solve the time-dependent Schrdinger equation.

Alexander Pushnitski (King's College of London, UK)

Title. **Schmidt subspaces of Hankel operators**

Abstract. A Schmidt subspace of a bounded (not necessarily self-adjoint) operator A in a Hilbert space is an eigenspace of $|A|$. In this talk, I will describe the structure of Schmidt spaces of Hankel operators. This is recent joint work with Patrick Gerard (Orsay).

University of Kent

Jani Virtanen (University of Reading, UK)

Title. **Open problems related to Toeplitz operators and matrices**

Abstract. Toeplitz operators and matrices will be considered from three different viewpoints. The structured pseudospectrum of a finite Toeplitz matrix is known to equal its pseudospectrum. This is also true for block Toeplitz matrices whose blocks are Toeplitz matrices, but the general case remains an open problem. This question is also of interest for other structures (such as Hankel, (centro)symmetric, circular) and may benefit from numerical considerations; cf. EigTool and Structured EigTool. Double-scaling limits (transition asymptotics) of Toeplitz determinants are currently of great interest, and some recent results and related open problems in mathematical physics and analytic number theory will be mentioned. Finally, spectral theory of Toeplitz operators in analytic function spaces will be discussed.

Ian Wood (University of Kent, UK)

Title. **Embedding eigenvalues for periodic Jacobi operators using Wigner-von Neumann-type perturbations**

Abstract. We consider a method of embedding eigenvalues in a band of absolutely continuous spectrum of a periodic Jacobi operator by adding a potential. We first discuss embedding a single eigenvalue and then show that the method can be extended to allow embedding infinitely many eigenvalues into the band.