

ISOP2023

Integrable Systems and Orthogonal Polynomials

Numerical and Analytical Perspectives

11-15 April 2023

African Institute for Mathematical Sciences
6 Melrose Road
Muizenberg Cape Town
South Africa

Programme



This event is organised by Peter Clarkson and Kerstin Jordaan and
funded by the Royal Society Newton Advanced Fellowship NAF\R2\180669

Tuesday 11 April

- 08:00–08:45 *Breakfast* (Dining Hall)
- 08:45–09:00 Opening of Workshop (Main Lecture Hall)
Ulrich Paquet (Director of AIMS South Africa)
Simukai Utete (Academic Director of AIMS South Africa)
Kerstin Jordaan (University of South Africa, RSA)
Chair: Kerstin Jordaan (University of South Africa, RSA)
- 09:00–10:00 **Plenary lecture** (Main lecture Hall)
Cleonice Bracciali (Universidade Estadual Paulista, Brazil)
“Two variable Freud orthogonal polynomials and matrix Painlevé-type difference equations”
- 10:00–10:30 **Invited talk** (Main Lecture Hall)
Boitumelo Moletsane (University of the Witwatersrand, RSA)
“Lumer-Phillips on linear relations”
- 10:30–11:00 *Coffee & tea break* (Foyer)
- 11:00–11:45 **Invited talk** (Main Lecture Hall)
Christian Berg (University of Copenhagen, Denmark)
“Orthogonal polynomials and the associated Jacobi operator”
- 11:45–12:30 **Invited talk** (Main Lecture Hall)
Henrik Pedersen (University of Copenhagen, Denmark)
“Asymptotic behaviour of quartiles in the gamma distribution”
- 12:30–13:00 Informal Discussions
- 13:00–14:00 *Lunch* (Dining Hall)
Chair: Erik Koelink (Radboud Universiteit Nijmegen, The Netherlands)
- 14:00–14:45 **Invited talk** (Online)
Galina Filipuk (University of Warsaw, Poland)
“On the quasi-Painlevé equations”
- 14:45–15:30 **Invited talk** (Main Lecture Hall)
Jacob Christiansen (Lund University, Sweden)
“Uniform approximation and polynomial preimages”
- 15:30–16:00 *Coffee & tea break* (Foyer)
- 16:00–16:30 **Invited talk** (Main Lecture Hall)
Alma van der Merwe (University of the Witwatersrand, RSA)
“Realization formulas for involutions of matrix-valued positive real odd functions”
- 16:30–17:00 **Invited talk** (Main Lecture Hall)
Sameerah Jamal (University of the Witwatersrand, RSA)
“Symmetries and some recent integrability applications”
- 18:00–19:00 *Welcome Reception* (Foyer)

Wednesday 12th April

- 08:00–09:00 *Breakfast* (Dining Hall)
Chair: Walter Van Assche (University of Leuven, Belgium)
- 09:00–10:00 **Plenary lecture** (Main lecture Hall)
Ana Loureiro (University of Kent, UK)
“Special function positive solutions of the first discrete Painlevé hierarchy”
- 10:00–10:30 **Invited talk** (Main Lecture Hall)
Hélder Lima (University of Leuven, Belgium)
“Lattice paths, branched continued fractions, and multiple orthogonal polynomials”
- 10:30–11:00 *Coffee & tea break* (Foyer)
- 11:00–11:45 **Invited talk** (Main Lecture Hall)
Daniel Tcheutia (AIMS, Cameroon)
“A finite sequence of hypergeometric discrete orthogonal polynomials with four free parameters extending the Hahn tableau”
- 11:45–12:30 **Invited talk** (Main Lecture Hall)
Erik Koelink (Radboud University, Netherlands)
“Matrix exceptional polynomials: general set-up and Laguerre case”
- 12:30–13:00 Informal Discussions
- 13:00–14:00 *Lunch* (Dining Hall)
Chair: Ana Loureiro (University of Kent, UK)
- 14:00–14:45 **Invited talk** (Main Lecture Hall)
Arno Kuijlaars (University of Leuven, Belgium)
“Planar orthogonal polynomials as multiple orthogonal polynomials”
- 14:45–15:30 **Invited talk** (Main Lecture Hall)
Antonio Moro (Northumbria University, UK)
“Random matrices, orthogonal polynomials and integrable hydrodynamic equations”
- 15:30–16:00 *Coffee & tea break* (Foyer)
- 16:00–16:30 **Invited talk** (Main Lecture Hall)
Marta Dell’Atti (University of Portsmouth, UK)
“Reduction of the Pfaff lattice via the map Toda-Pfaff”
- 16:30–17:00 **Invited talk** (Main Lecture Hall)
Leslie Molag (University of Sussex, UK)
“Edge universality of random normal matrices generalizing to higher dimensions”
- 18:00–19:00 *Dinner* (Dining Hall)

Thursday 13th April

- 08:00–09:00 *Breakfast* (Dining Hall)
Chair: Clare Dunning (University of Kent, UK)
- 09:00–09:45 **Invited talk** (Online)
Sarah Post (University of Hawai'i at Mānoa, USA)
“*Racah algebras and superintegrable systems*”
- 09:45–10:30 **Invited talk** (Main Lecture Hall)
Walter Van Assche (University of Leuven, Belgium)
“*Discrete Painlevé I and II for orthogonal polynomials*”
- 10:30–11:00 *Coffee & tea break* (Foyer)
- 11:00–12:00 **Plenary lecture** (Online)
Peter Clarkson (University of Kent, UK)
“*Rational solutions of Painlevé equations*”
- 12:00–12:30 **Invited talk** (Main Lecture Hall)
Chris Lustrì (Macquarie University, Australia)
“*Stokes phenomenon and discrete integrability*”
- 12:30–13:00 Informal Discussions
- 13:00–14:00 *Lunch* (Dining Hall)
- 14:00–19:00 Free afternoon
- 18:00–19:00 *Dinner* (Dining Hall)

Friday 14th April

- 08:00–09:00 *Breakfast* (Dining Hall)
Chair: Arno Kuijlaars (University of Belgium, Leuven)
- 09:00–10:00 **Plenary lecture** (Main lecture Hall)
Clare Dunning (University of Kent, UK)
“Polynomials and partitions”
- 10:00–10:30 **Invited talk** (Main Lecture Hall)
Dieudonne Mbouna (University of Leuven, Belgium)
“Coherent pair of measures on lattices”
- 10:30–11:00 *Coffee & tea break* (Foyer)
- 11:00–11:45 **Invited talk** (Online)
Beatrice Pelloni (Heriot-Watt University, UK)
“Dispersive quantisation, strong and weak”
- 11:45–12:30 **Invited talk** (Online)
David Gómez-Ullate (IE University, Spain)
“Classification of rational solutions to higher order Painlevé systems”
- 12:30–13:00 Informal Discussions
- 13:00–14:00 *Lunch* (Dining Hall)
Chair: Cleonice Bracciali (Universidade Estadual Paulista, Brazil)
- 14:00–14:45 **Invited talk** (Main Lecture Hall)
Mafoya Landry Dassoundo (AIMS, South Africa)
“Nonassociative algebras in integrable systems”
- 14:45–15:30 **Invited talk** (Online)
Maria das Neves Rebocho (Universidade da Beira Interior, Portugal)
“The direct problem for a large class of orthogonal polynomials on the real line”
- 15:30–16:00 *Coffee & tea break* (Foyer)
- 16:00–16:30 **Invited talk** (Online)
Christian Budde (University of the Free State, RSA)
“Quantum dynamical semigroups and its generators”
- 18:00–19:00 *Dinner* (Dining Hall)

Saturday 15th April

- 08:00–09:00 *Breakfast* (Dining Hall)
Chair: Peter Clarkson (University of Kent, UK)
- 09:00–10:00 **Plenary lecture** (Online)
Maurice Kenfack Nangho (University of Dschang, Cameroon)
“On properties of Askey-Wilson polynomials system and its r^{th} -associate”
- 10:00–10:30 **Invited talk** (Main Lecture Hall)
André Weideman (Stellenbosch University, RSA)
“The pole field solver and the Painlevé equations”
- 10:30–11:00 *Coffee & tea break* (Foyer)
- 11:00–11:45 **Invited talk** (Main Lecture Hall)
Sanne Ter Horst (North-West University, RSA)
“The inverse problem associated with the two-sided Ellis-Gohberg identities for orthogonal Wiener-class functions”
- 11:45–12:30 **Invited talk** (Main Lecture Hall)
Alta Jooste (University of Pretoria, RSA)
“On the zeros of Meixner polynomials”
- 12:30–13:00 Informal Discussions
- 13:00–14:00 *Lunch* (Dining Hall)