

# OPSPA-18 Kyoto – 18th Orthogonal Polynomials, Special Functions and Applications

Time	Day 1	Day 2	Day 3	Day 4	Day 5
9:00   10:00		Makiko Sasada	Benjamin Eichinger	María Angeles García-Ferrero	Dan Dai
10:30   12:00		TS 01 TS 09 TS 13 TS 07 TS 16	TS 01 TS 09 TS 14 TS 05 TS 11	TS 02 TS 10 TS 12 TS 05 TS 15	TS 02 TS 08 TS 04 TS 06 TS 15
12:00   13:30		Lunch	Poster & Lunch (12:00-14:30)	Lunch	Lunch
13:30   14:30	OPENING (14:00-14:30)	Kohei Iwaki		Manuela Girotti	Rinat Kedem
15:00   16:30	Jan Felipe van Diejen (14:30-15:30)	TS 01 TS 09 TS 13 TS 07 TS 16	Discussion	TS 02 TS 08 TS 12 TS 05 TS 15	TS 02 TS 08 TS 04 TS 06 TS 15
16:45   18:15	Yasuhiko Yamada (15:45-16:45)	TS 01 TS 09 TS 13 TS 07 TS 16		Discussion	TS 02 TS 08 TS 12 TS 05 TS 15
	Guilherme Silva (17:00-18:00)	TS 01 TS 09 TS 03 TS 07 TS 16			
18:00   20:00	Welcome Party (18:00-20:00) @ Hamac de Paradis	Business Meeting (18:15-19:00)	Banquet (18:00-20:00) @ Hotel Okura Kyoto		

- TS 01** Painlevé and Integrable Systems(11)
- TS 03** Exact WKB Analysis and Related Topics (Topological Recursion, Conformal Blocks, Beta-Ensembles)(2)
- TS 05** Algebraic Combinatorics(11)
- TS 07** Quantum Walks and Quantum Information(9)
- TS 09** Multiple Orthogonal Polynomials(12)
- TS 11** Orthogonal Polynomials on the Unit Circle(2)
- TS 13** Multivariate Special Functions(7)
- TS 15** General Orthogonal Polynomials, Hypergeometric and Special Functions (including Mathieu, Lamé, Heun, etc.)(15)

- TS 02** Random Matrices and Probability(15)
- TS 04** Orthogonal Polynomials, Mathematical Physics, and Interacting Particle Systems(6)
- TS 06** Combinatorics,  $q$ -Series, Partitions, and Number Theory(5)
- TS 08** Asymptotics of Orthogonal Polynomials and Special Functions(12)
- TS 10** Matrix Orthogonal Polynomials(3)
- TS 12** Exceptional Orthogonal Polynomials(7)
- TS 14** Representation Theory and Special Functions(3)
- TS 16** Applications of Orthogonal Polynomials and Special Functions – Interdisciplinary Topics (including Numerical Analysis, Data Science, Machine Learning, etc.)(9)

# List of Thematic Sessions

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- TS 01** Painlevé and Integrable Systems
- TS 02** Random Matrices and Probability
- TS 03** Exact WKB Analysis and Related Topics (Topological Recursion, Conformal Blocks, Beta-Ensembles)
- TS 04** Orthogonal Polynomials, Mathematical Physics, and Interacting Particle Systems
- TS 05** Algebraic Combinatorics
- TS 06** Combinatorics,  $q$ -Series, Partitions, and Number Theory
- TS 07** Quantum Walks and Quantum Information
- TS 08** Asymptotics of Orthogonal Polynomials and Special Functions
- TS 09** Multiple Orthogonal Polynomials
- TS 10** Matrix Orthogonal Polynomials
- TS 11** Orthogonal Polynomials on the Unit Circle
- TS 12** Exceptional Orthogonal Polynomials
- TS 13** Multivariate Special Functions
- TS 14** Representation Theory and Special Functions
- TS 15** General Orthogonal Polynomials, Hypergeometric and Special Functions (including Mathieu, Lamé, Heun, etc.)
- TS 16** Applications of Orthogonal Polynomials and Special Functions – Interdisciplinary Topics (including Numerical Analysis, Data Science, Machine Learning, etc.)

# Day1 (August 17th)

Day 1	Hardy Hall
14:00   14:30	Opening
14:30   15:30	<b>Jan Felipe van Diejen:</b> Spectrum of quantum relativistic Toda molecule via Hall-Littlewood polynomials
15:30   15:45	Break
15:45   16:45	<b>Yasuhiko Yamada:</b> Quantum discrete isomonodromic deformations
16:45   17:00	Break
17:00   18:00	<b>Guilherme Silva:</b> Orthogonal polynomials at finite temperature
18:00   20:00	Welcome Party@Hamac de Paradis

## Day2 (August 18th)

Day 2	Hardy Hall				
9:00   10:00	<b>Makiko Sasada:</b> Stationary distributions and macroscopic behavior of integrable interacting systems				
10:00   10:30	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS01-1	TS09-1	TS13-1	TS07-1	TS16-1
10:30   12:00	<p><b>Deniz Bilman</b> Extreme Superposition: Rogue Waves of Infinite Order, Universality, and Anomalous Temporal Decay</p> <p><b>Amari Jaconelli</b> On Fredholm Pfaffians and Riemann-Hilbert problems</p> <p><b>Hang-Hang Sheng</b> On the Fredholm determinant solution to some integrable systems</p>	<p><b>Hélder Lima</b> Hahn-classical <math>(r + 1)</math>-fold symmetric <math>r</math>-orthogonal polynomials</p> <p><b>Joerge Arvesu</b> On Families of Discrete Multiple Orthogonal Polynomials on a Star-Like Set</p> <p><b>Juan Antonio Villegas</b> Jacobi-Piñeiro Multiple Orthogonal Polynomials on the Simplex</p>	<p><b>Meri Zaimi</b> Bivariate polynomials of Tratnik type</p> <p><b>Misael E. Marriaga</b> Generalized symmetric classical orthogonal polynomials in two variables</p> <p><b>Genki Shibukawa</b> Commutativity, symmetry and Ruijsenaars-type identities</p>	<p><b>Etsuo Segawa</b> Interpolating walk between quantum and random walks on finite graphs</p> <p><b>Hanmeng Zhan</b> Enabling subspace state transfer with quantum coins</p> <p><b>Taisuke Hosaka</b> Behavior of quantum walk with many weak bridges</p>	<p><b>Iván Area</b> On <math>q</math>-orthogonal polynomials: a theoretical tool arising from applications</p> <p><b>Nabiullah Khan</b> New Families of the Parametric Apostol Polynomials and Generalized Voigt Functions</p> <p><b>Mehbub Hassan</b> Convolution and Inversion of the Laplace Transform in Post-Quantum Calculus: Theory and Applications</p>
12:00   13:30	Lunch				
room	Hardy Hall				
13:30   14:30	<b>Kohei Iwaki:</b> Bridging Painlevé equations, topological recursion, and exact WKB analysis				
14:30   15:00	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS01-2	TS09-2	TS13-2	TS07-2	TS16-2
15:00   16:30	<p><b>Roozbeh Gharakhloo</b> Combinatorics of Eulerian Graphs on Riemann Surfaces</p> <p><b>Takahiko Nobukawa</b> A rank 3 linear <math>q</math>-difference equation admitting <math>W(E_8^{(1)})</math>-symmetry</p> <p><b>Kanam Park</b> A <math>q</math>-middle convolution and the <math>q</math>-Painlevé equation of type <math>E_6^{(1)}</math></p>	<p><b>Teresa Laudadio</b> Gaussian quadrature rules for multiple orthogonal polynomials</p> <p><b>Amin Faghih</b> Recurrence Updates and Downdates for Multiple Orthogonal Polynomials</p> <p><b>Rostyslav Kozhan</b> Zeros of Multiple Orthogonal Polynomials</p>	<p><b>Satoshi Tsuchimi</b> A generalization of multivariable <math>\mu</math>-function and <math>q</math>-Borel summations</p> <p><b>Yosuke Kawamoto</b> Transforms between multivariate Laguerre and Meixner polynomials and their applications to intertwining relations for stochastic processes</p> <p><b>Lucas Langen</b> Uniform bounds on the Dunkl kernel</p>	<p><b>Akash Kalita</b> Pretty good fractional revival on abelian Cayley graphs</p> <p><b>Koushik Bhakta</b> Pretty good state transfer in Grover walks on graphs</p> <p><b>Manuel Domínguez de la Iglesia</b> Exact solutions of open quantum Brownian motions on the real line for two-level systems</p>	<p><b>Priyanka Anilkumar Majethiya</b> Approximation of Complex-valued Functions by Rational Interpolation Operators: Theory and Applications</p> <p><b>Manoj Kumar</b> Approximation Properties of Fractional Szász-Kantorovich Operators Involving Hermite Polynomials</p> <p><b>Sanjeev Kumar</b> Jakimovski – Leviatan operators in <math>(q, h)</math>-calculus and their approximation properties</p>
16:30   16:45	Break				
	TS01-3	TS09-3	TS13-3&TS03	TS07-3	TS16-3
16:45   18:15	<p><b>Peter David Miller</b> Infinite order solutions of the AKNS hierarchy</p> <p><b>Percy Deift</b> Applications of a commutation formula II</p>	<p><b>Marcus Vaktás</b> Szegő mapping and Geronimus relations for multiple orthogonal polynomials</p> <p><b>Thomas Lasic Latimer</b> Asymptotics of discrete multiple orthogonal polynomials</p> <p><b>Maxim L. Yattselev</b> Strong Asymptotics of Weighted Orthogonal Polynomials</p>	<p><b>Margit Rösler</b> Littlewood-Paley theory for orthogonal expansions associated with root systems</p> <p><b>Bart Rosenzweig</b> Small-time and large-time Borel analysis of Schrödinger equations with point interactions</p> <p><b>Gergő Nemes</b> Exact Resurgence in Exact WKB Analysis</p>	<p><b>Satoshi Watanabe</b> Analytical asymptotics of quantum spatial search on 2D lattices with regular range-<math>m</math> edges</p> <p><b>Shintaro Yamamura</b> Implementation and Performance Evaluation of CvR-QAOA for Ternary Portfolio Optimization</p>	<p><b>Jose Arcia Manoleskos</b> UL and LU Factorizations of Birth-Death Processes Associated with Classical Orthogonal Polynomials</p> <p><b>Lidia Fernández</b> Approximation and Cubature on planar domains via Zernike-like bases</p> <p><b>Nicola Mastronardi</b> Product integration rules for highly oscillatory integrals</p>
18:15   19:00	Business Meeting				

## Day3 (August 19th)

Day 3	Hardy Hall				
9:00   10:00	<b>Benjamin Eichinger: Universality limits and beyond</b>				
10:00   10:30	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS01-4	TS09-4	TS14	TS05-1	TS11
10:30   12:00	<b>Alexander Stokes</b> Discrete Painlevé equations from orthogonal polynomials: non-conjugate translations, nodal curves and exotic symmetry groups	<b>Adam Doliwa</b> Non-commutative multiple bi-orthogonal polynomials: formal approach and integrability	<b>Luc Lapointe</b> A $q$ -symmetrization Hamiltonian and a family of orthogonal idempotents	<b>Paul Terwilliger</b> Strengthening the balanced set condition for the distance-regular graph of the bilinear forms	<b>Dustin Newland</b> On the Expected Number of Real Level Crossings of Random Polynomials Spanned by OPUC
	<b>Anton Dzhamay</b> Discrete Painlevé Equations With Constraints: Their Geometry and Symmetry	<b>Thomas Wolfs</b> Multiple orthogonal polynomials of derivative type	<b>Plamen Iliev</b> Gaudin models for some classical multivariate distributions	<b>Hirotake Kurihara</b> Imprimitve association schemes and elimination theory	<b>Xiang-Ke Chang</b> Modified Camassa – Holm peakons, extreme degenerations into Toda-type lattices, and interpretations in terms of orthogonality
	<b>Hidehito Nagao</b> Padé Method and Hypergeometric Structures in Discrete Painlevé-Type Systems	<b>Walter Van Assche</b> Multiple orthogonal polynomials with modified Bessel weights	<b>Taiyo S. Terada</b> Proof of the Kresch-Tamvakis Conjecture	<b>Yushan Pan</b> Irreducible Representations of the $S_3$ -symmetric Tridiagonal Algebra: The Complete Graph Case	
12:00   14:30	Lunch Poster Session@lobby				
14:30   18:00	Discussion				
18:30   20:30	Banquet@Hotel Okura Kyoto				

List of Poster Presentations				
<b>Rachel Bailey</b> A Generalization of DEK-Type Orthogonal Polynomials	<b>Yuta Nasuda</b> SWKB Quantization Condition and Solvability via Classical Orthogonal Polynomials	<b>Qian Chen</b> Testing $k$ -block-positivity via semidefinite programs and its complexity	<b>Ichi Fujii</b> Construction of $\mathbb{Z}_2^2$ -Integrable Hierarchy Using $\mathbb{Z}_2^2$ -graded Algebras	<b>Yuichi Ueno</b> On the quantization of higher order Painlevé systems
<b>Subaru Hamada</b> 3-dimensional spin chain model with nearest neighbor couplings derived from 3-variable Krawtchouk polynomials	<b>Kosei Nakamura</b> Quantum walks on the non-binary Johnson scheme	<b>Ryosuke Naganuma</b> Construction and classification of multi-lump solutions of the elliptic two-dimensional Toda lattice equation	<b>Yuki Honda</b> Orthogonal decomposition and mode expansion of gauge fields on $S^2$ in the presence of background gauge fields	<b>Danilo Jr Dela Cruz</b> The Singular Values of Lévy's Area Matrix

# Day4 (August 20th)

Day 4	Hardy Hall				
9:00   10:00	María Angeles García-Ferrero: The taxonomy of exceptional orthogonal polynomials				
10:00   10:30	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS02-1	TS10	TS12-1	TS05-2	TS15-1
10:30   12:00	<p><b>Leslie Molag</b> Local universality of determinantal point processes on <math>\mathbb{C}^d</math></p> <p><b>Joakim Cronvall</b> A direct approach to soft and hard edge universality for random normal matrices</p> <p><b>Sampad Lahiry</b> Birth of a gap: critical phenomena in the normal matrix model.</p>	<p><b>Max van Horssen</b> Shift operators for non-symmetric Heckman-Opdam polynomials and non-symmetric Macdonald-Koornwinder polynomials</p> <p><b>Arno Kuijlaars</b> Matrix valued orthogonal polynomials in random tiling models</p> <p><b>Ines Pacharoni</b> Matrix-valued Laguerre-type orthogonal polynomials, Darboux transformations and differential operators</p>	<p><b>F. Alberto Grunbaum</b> Bispectrality and the ad-conditions</p> <p><b>Ignacio Nahuel ZURRIÁN</b> Equivalences for matrix-valued bispectral polynomials.</p> <p><b>William R Casper</b> Binomial Prolates, Tau Functions, and Point Counting</p>	<p><b>Hideki Matsumura</b> Hausdorff construction and combinatorial polynomials</p> <p><b>Ryutaro Misawa</b> Sharp Bounds for Equichordal Tight Fusion Frames and Grassmann Designs</p> <p><b>Junichiro Matsuda</b> Algebraic quantum graph theory and application to orthogonal polynomials</p>	<p><b>Andrei Martínez-Finkelshtein</b> Hypergeometric and <math>q</math>-Hypergeometric Polynomials with Finite Free Convolutions</p> <p><b>Dmitrii Karp</b> <math>q</math>-Polynomial perturbations of Heine's and Jackson's transformations</p> <p><b>Takao Suzuki</b> An affine Weyl group action on the basic hypergeometric series arising from the Cluster algebra</p>
12:00   13:30	Lunch				
room	Hardy Hall				
13:30   14:30	Manuela Girotti: Random matrices, random particles, random solitons, and soliton gasses				
14:30   15:00	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS02-2	TS08-1	TS12-2	TS05-3	TS15-2
15:00   16:30	<p><b>Chenhao Lu</b> On the eigenvalue rigidity of the Jacobi unitary ensemble</p> <p><b>Teije Johan Kuijper</b> Hermitian Jacobi polynomials on the simplex</p> <p><b>John Jairo Lopez Santander</b> On the asymptotic distribution of the largest eigenvalue of unbalanced complex Jacobi ensembles</p>	<p><b>Vinay Shukla</b> A Riemann-Hilbert problem for Jacobi-Piñeiro orthogonal polynomials</p> <p><b>Vladimir Lysov</b> Bipolar Green function and the asymptotics of Cauchy biorthogonal polynomials</p> <p><b>Gökalp Alpan</b> On a Szegő theorem for extremal polynomials</p>	<p><b>Robert Milson</b> Spectral diagrams and exceptional polynomials</p> <p><b>Antonio J Durán</b> Using quasi-Darboux transformations to construct exceptional matrix polynomials</p> <p><b>Brian Simanek</b> Asymptotic Properties of Exceptional Orthogonal Polynomials</p>	<p><b>Younggwang Cho</b> An explicit formula for Koornwinder moments and Rains' positivity conjecture</p> <p><b>Minho Song</b> Moments and lattice paths for orthogonal polynomials of type <math>R_{II}</math></p> <p><b>Jihyeug Jang</b> Discriminants of Orthogonal Polynomials via Symmetric Functions</p>	<p><b>Chihiro Sato</b> Confluent <math>q</math>-Heun equations based on Newton polygon positivity</p> <p><b>Ayaka Murakami</b> <math>q</math>-integral transformation of <math>q</math>-Heun equation and its applications</p> <p><b>Priyabrata Cochhayat</b> On zeros of some <math>{}_2\phi_1</math> polynomials associated with <math>q</math>-Meixner polynomials</p>
16:30   16:45	Break				
	TS02-3	TS08-2	TS12-3	TS05-4	TS15-3
16:45   18:15	<p><b>Michael Voit</b> Dunkl and Bessel processes with drift: Motivation, an application to noncompact free Brownian motions, and some limit results</p> <p><b>Wangjun Yuan</b> Operator Norm Bounds for Multi-leg Matrix Tensors and Applications to Random Matrix Theory</p> <p><b>Seungjoon Oh</b> Dissipative spectral form factor of the complex elliptic Ginibre ensemble across various non-Hermiticity regimes</p>	<p><b>Jacob Stordal Christiansen</b> Chebyshev Polynomials Related to Jacobi Weights</p> <p><b>Erwin Mina-Diaz</b> Chebyshev and Faber polynomials on curves with corners and cusps</p> <p><b>Benedikt Buchecker</b> Chebyshev polynomials on a Jordan arc</p>	<p><b>David Gómez-Ullate</b> Recurrence relations for exceptional Legendre polynomials</p>	<p><b>Jae-Ho Lee</b> Two bases for the Onsager Lie algebra <math>\mathcal{O}</math> and their action on finite-dimensional irreducible <math>\mathcal{O}</math>-modules</p> <p><b>Hau-Wen Huang</b> Verma modules over the universal Askey-Wilson algebra</p>	<p><b>Taikei Fujii</b> Linear relations for Kajihara's <math>q</math>-hypergeometric series</p> <p><b>Rakesh Kumar Parmar</b> Extended Exton's double hypergeometric functions: Integral forms and functional bounds</p> <p><b>Pirivina S</b> Integral representations and functional bounds for the generalized Horn's function</p>

# Day5 (August 21st)

Day 5	Hardy Hall				
09:00   10:00	Dan Dai: Beyond Tracy-Widom: Fredholm determinants, integrable PDEs, and large gap asymptotics				
10:00   10:30	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS02-4	TS08-3	TS04-1	TS06-1	TS15-4
10:30   12:00	<p><b>Victor Alves</b> Deformations of OP Ensembles at a regular bulk point</p> <p><b>Yeong-Gwang Jung</b> <math>q</math>-deformation of the Marchenko-Pastur law</p> <p><b>Lu Wei</b> Average entropy of Bogoliubov-Kubo-Mori random state ensemble</p>	<p><b>Howard S. Cohl</b> Orthogonality relations for the symmetric polynomials in the <math>q</math>-Askey scheme</p> <p><b>Swaminathan Anbhu</b> Two parameter family of Sobolev type Orthogonal Polynomials on the unit circle</p> <p><b>Lennart Aljoscha Huebner</b> Asymptotics of Weighted Bergman Polynomials</p>	<p><b>Luc Vinet</b> The dynamical algebra of the generic superintegrable model on the two-sphere</p> <p><b>Giovanni Rastelli</b> Symmetry operators and Staeckel separation of Dirac's equation on 3-dimensional spin manifolds</p> <p><b>Kohei Noda</b> Two-dimensional Coulomb gases with rotation-invariant potentials with singularities</p>	<p><b>Soichi Okada</b> Universal rational <math>Q</math>-functions</p> <p><b>Masaki Kato</b> Multiple Polylogarithms, Symmetric Functions and Discrete Integrable Systems</p> <p><b>Stuti Mohanty</b> Characterization of non-singular hyperplanes of <math>\mathcal{H}(s, q^2)</math> in <math>PG(s, q^2)</math></p>	<p><b>Shunya Adachi</b> Asymptotic analysis of the confluent Dotsenko-Fateev equation</p> <p><b>Saiei-Jaeyeong Matsubara-Heo</b> Irregular Complex Hypergeometric Integrals</p> <p><b>Richard Mikael Slevinsky</b> Matrix equations and orthogonal polynomials</p>
12:00   13:30	Lunch				
room	Hardy Hall				
13:30   14:30	Rinat Kedem: $q$ -Whittaker and affine Laumon functions from integrable quiver mutations				
14:30   15:00	Break				
room	Hardy Hall	Room A	KMB211	KMB212	KMB213
	TS02-5	TS08-4	TS04-2	TS06-2	TS15-5
15:00   16:30	<p><b>Karl E Liechty</b> Multiple orthogonal polynomials appearing in the six-vertex model with symmetries</p> <p><b>Eui Yoo</b> Free energy expansion of determinantal Coulomb gases in the quadratic fields with a point charge</p> <p><b>Jiahao Du</b> Asymptotics of the partition function with a one-cut singular potential at the edge</p>	<p><b>Arpad Baricz</b> Infinitely divisible modified Bessel distributions</p> <p><b>Hideshi Yamane</b> Asymptotic expansions of finite Hankel transforms and the surjectivity of convolution operators</p> <p><b>Alexander Dyachenko</b> On vector and branching continued fractions</p>	<p><b>Umme Zainab</b> Integral equations for Sheffer-Bessel functions through umbral operator</p> <p><b>Sarah Post</b> Exceptional orthogonal polynomials, exactly solvable quantum systems and their deformations</p>	<p><b>Nobuhiro Asai</b> A Two-Parameter Deformation of the Charlier Polynomials: Bridging Combinatorics and Probability</p>	<p><b>Kerstin JORDAAN</b> Single-point completed interlacing for orthogonal and non-orthogonal polynomial families</p> <p><b>Vikash Kumar</b> Two-point completed interlacing and cross-family Wronskian inequalities for related polynomial sequences</p> <p><b>Ankit Pal</b> Derivatives of <math>\tau</math>-Gauss Hypergeometric Superhyperbolic Functions with Respect to Their Parameters</p>
16:30   17:00	Closing				