13th International Symposium on Orthogonal Polynomials, Special Functions & Applications

June 1-5, 2015

National Institute of Standards and Technology

Gaithersburg, Maryland, USA

Sponsored by the SIAM Activity Group OPSF, NIST Applied and Computational Mathematics Division and the Orthogonal Polynomials, Special Functions, and Applications Steering Committee.

The activity group promotes basic research in orthogonal polynomials and special functions; furthers the application of this subject in other parts of mathematics, and in science and industry; and encourages and supports the exchange of information, ideas, and techniques between workers in this field and other mathematicians and scientists.

siam ®

Table of Contents

Scientific Committee Co-Chairs

Diego Dominici
State University of New York at New Paltz, USA

Daniel W. Lozier
National Institute of Standards and Technology, USA

Organizing Committee

Richard A. Askey
University of Wisconsin, USA

Howard S. Cohl
National Institute of Standards and Technology, USA

Kathy Driver
University of Cape Town, South Africa

Tom H. Koornwinder
University of Amsterdam, The Netherlands

Robert S. Maier
University of Arizona, USA

Zeinab Mansour
King Saud University, Saudi Arabia

Andrei Martinez-Finkelshtein
Universidad de Almeria, Almeria, Spain

Willard Miller
University of Minnesota, USA

Victor H. Moll
Tulane University, USA

Adri Olde Daalhuis
The University of Edinburgh, United Kingdom

Audrey Terras
University of California San Diego, USA

Walter Van Assche
Katholieke Universiteit Leuven, Belgium

Luc Vinet
University of Montreal, Canada

SIAM Registration Desk

The registration desk is located in the National Institute of Standards and Technology building 101. It is open during the following hours:

Monday, June 1
7:30 AM – 5:00 PM

Tuesday, June 2
8:00 AM – 10:00 AM

Wednesday, June 3
8:00 AM – 10:00 AM

Thursday, June 4
8:00 AM – 10:00 AM

Friday, June 5
8:00 AM – 10:00 AM

Conference Center Address

National Institute of Standards and Technology

100 Bureau Drive, Stop 1070

Gaithersburg, MD 20899-1070

Phone: +1(301) 975-6478

Child Care

For a list of local child care vendors, please visit

https://www.sittercity.com/babysitters/ md/gaithersburg or

http://www.care.com/better-care-starts- here-p1087-q41948647.html?gclid=CNr 35dKPnsQCFYk2gQodficAnw&_qs=1 .

Corporate Members and Affiliates

SIAM corporate members provide their employees with knowledge about, access to, and contacts in the applied mathematics and computational sciences community through their membership benefits. Corporate membership is more than just a bundle of tangible products and services; it is an expression of support for SIAM and its programs. SIAM is pleased to acknowledge its corporate members and sponsors. In recognition of their support, non-member attendees who are employed by the following organizations are entitled to the SIAM member registration rate.

Corporate Institutional Members

The Aerospace Corporation

Air Force Office of Scientific Research

Aramco Services Company

AT&T Laboratories - Research

Bechtel Marine Propulsion Laboratory

The Boeing Company

CEA/DAM

Department of National Defence (DND/CSEC)

DSTO- Defence Science and Technology Organisation

ExxonMobil Upstream Research

Hewlett-Packard

IBM Corporation

IDA Center for Communications Research, La Jolla

IDA Center for Communications Research, Princeton

Institute for Computational and Experimental Research in Mathematics (ICERM)

Institute for Defense Analyses, Center for Computing Sciences

Lawrence Berkeley National Laboratory

Lockheed Martin

Los Alamos National Laboratory

Mathematical Sciences Research Institute

Max-Planck-Institute for Dynamics of Complex Technical Systems

Mentor Graphics

National Institute of Standards and Technology (NIST)

National Security Agency (DIRNSA)

Oak Ridge National Laboratory, managed by UT-Battelle for the Department of Energy

Sandia National Laboratories

Schlumberger-Doll Research

Tech X Corporation

U.S. Army Corps of Engineers, Engineer Research and Development Center

United States Department of Energy

List current April 2015.

Funding Agencies

SIAM and the Conference Organizing Committee wish to extend their thanks and appreciation to the U.S. National Science Foundation and National Institute of Standards and Technology for their support of this conference.

Join SIAM and save!

Leading the applied mathematics community …

SIAM members save up to $130 on full registration for the 13th International Symposium on Orthogonal Polynomials, Special Functions & Applications! Join your peers in supporting the premier professional society for applied mathematicians and computational scientists. SIAM members receive subscriptions to *SIAM Review, SIAM News* and *SIAM Unwrapped,* and enjoy substantial discounts on SIAM books, journal subscriptions, and conference registrations.

If you are not a SIAM member and paid the *Non-Member* rate to attend the conference, you can apply the difference between what you paid and what a member would have paid ($130 for a *Non-Member*) towards a SIAM membership. Contact SIAM Customer Service for details.

If you are a SIAM member, it only costs $10 to join the SIAM Activity Group on the Orthogonal Polynomials and Special Functions (SIAG/OPSF). As a SIAG/OPSF member, you are eligible for an additional $10 discount on this conference, so if you paid the SIAM member rate to attend the conference, you might be eligible for a free SIAG/OPFS membership.

Free Student Memberships are available to students who attend an institution that is an Academic Member of SIAM, are members of Student Chapters of SIAM, or are nominated by a Regular Member of SIAM.

Go to *www.siam.org/joinsiam* to join online or download an application form, or contact SIAM Customer Service:

Telephone: +1-215-382-9800 (worldwide); or 800-447-7426 (U.S. and Canada only)

Fax: +1-215-386-7999

E-mail: *membership@siam.org*

Postal mail:
Society for Industrial and Applied Mathematics
3600 Market Street, 6th floor
Philadelphia, PA 19104-2688 USA

Standard Audio/Visual Set-Up in Meeting Rooms

National Institute of Standards and Technology will provide windows laptops in all lecture rooms. In order to avoid problems, we strongly urge you to email your presentation to daniel.lozier@nist.gov and howard.cohl@nist.gov not later than a week before the conference. If you would like to give your presentation on a laptop with a different operating system, then you will need to bring your own laptop. Presenters can bring their own computers but SIAM and National Institute of Standards and Technology are not responsible for the safety and security of speakers' computers.

The Plenary Session Room and breakout rooms will have one (1) screen and one (1) data projector. Overhead projectors will be provided only if requested. The data projectors support VGA connections only. Presenters requiring an HDMI or alternate connection must provide their own adaptor.

Internet Access

Wireless access will be provided at NIST to conference participants.

Registration Fee Includes

- Admission to all technical sessions
- Business Meeting
  (open to SIAG/OSPF members)
- Coffee breaks daily
- Room set-ups and audio/visual equipment
- Welcome Reception
  (Held at Gaithersburg Marriott Washingtonian Center)

Job Postings

Please check with the SIAM registration desk regarding the availability of job postings or visit *http://jobs.siam.org*.

SIAM Books

Display copies of books are available on site. SIAM books are available at a discounted price during the conference and order forms are available at the display. Orders can be mailed to SIAM (information is on the order form) or books can be ordered online using the coupon code.

Conference Sponsors

OPSFA

Comments?

Comments about SIAM meetings are encouraged! Please send to:

Cynthia Phillips, SIAM Vice President for Programs (*vpp@siam.org*).

Please Note

SIAM and NIST are not responsible for the safety and security of attendees' computers. Do not leave your laptop computers unattended. Please remember to turn off your cell phones, pagers, etc. during sessions.

Get-togethers

*   Welcome Reception
    Sunday, May 31, 4:00 PM – 7:00 PM
    Gaithersburg Marriott
    Washingtonian Center
    9751 Washingtonian Boulevard
    Gaithersburg, MD, 20878-5359

*   Business Meeting
    (open to SIAG/OPSF members)
    Wednesday, June 3, 3:00 PM – 4:00 PM
    Green Auditorium

Recording of Presentations

Audio and video recording of presentations at SIAM meetings is prohibited without the written permission of the presenter and SIAM.

Social Media

SIAM is promoting the use of social media, such as Facebook and Twitter, in order to enhance scientific discussion at its meetings and enable attendees to connect with each other prior to, during and after conferences. If you are tweeting about a conference, please use the designated hashtag to enable other attendees to keep up with the Twitter conversation and to allow better archiving of our conference discussions. The hashtag for this meeting is #OPSFA13.

Invited Plenary Speakers

*** All Invited Plenary Presentations will take place in Green Auditorium ***

Monday, June 1
9:00 AM – 10:00 AM
IP1 Vector-Valued Nonsymmetric and Symmetric Jack and Macdonald Polynomials
Charles F. Dunkl, *University of Virginia, USA*

1:30 PM – 2:30 PM
IP2 Two Variable q-Polynomials
Mourad Ismail, *University of Central Florida, USA*

Tuesday, June 2
9:00 AM – 10:00 AM
IP3 On the Asymptotic Behavior of a Log Gas in the Bulk Scaling Limit
in the Presence of a Varying External Potential
Percy Deift, *Courant Institute of Mathematical Sciences, New York University, USA*

1:30 PM – 2:30 PM
IP4 Hypergeometric Series: On Number Theory's Secret Service
Wadim Zudilin, *University of Newcastle, NSW, Australia*

2:30 PM – 3:30 PM
IP5 Integrable Probability and the Role of Painlevé Functions
Craig A. Tracy, *University of California, Davis, USA*

Invited Plenary Speakers

** All Invited Plenary Presentations will take place in Green Auditorium **

Wednesday, June 3
9:00 AM – 10:00 AM

IP6 Limits of Orthogonal Polynomials and Contractions of Lie Algebras

Sarah Post, *University of Hawaii, Manoa, USA*

Thursday, June 4
9:00 AM – 10:00 AM

IP7 A New Look at Classical Orthogonal Polynomials

Alexei Zhedanov, *Donetsk Institute for Physics and Engineering, Ukraine*

1:30 PM – 2:30 PM

IP8 Asymptotic and Numerical Aspects of Special Functions

Nico M. Temme, *Centrum voor Wiskunde en Informatica, The Netherlands*

2:30 PM – 3:30 PM

IP9 Multivariate Orthogonal Polynomials and Modified Moment Functionals

Teresa E. Pérez, *Universidad de Granada, Spain*

Friday, June 5
9:00 AM – 10:00 AM

IP10 The Laguerre-Polya Class

Olga Holtz, *University of California, Berkeley, USA
and Technische Universitat Berlin, Germany*

1:30 PM – 2:30 PM

IP11 Orthogonal Polynomials and the 2-Species ASEP

Lauren Williams, *University of California, Berkeley, USA*

Prize Lecture

** The Prize Lecture will take place in Green Auditorium **

Wednesday, June 3

1:30 PM - 2:30 PM

SP1 SIAG/OPSF Gábor Szegö Announcement and Lecture

Tacnode Kernels and Lax Systems for the Painlevé II Equation

Karl Liechty, *DePaul University, USA*

SIAM Presents

An audio-visual archive, comprised of more than 1800 presentations posted in 28 searchable topics, including:

- algebraic geometry
- atmospheric and oceanographic science
- computational science
- data mining
- geophysical science
- optimization
- uncertainty quantification
  and more…

The collection, *Featured Lectures from our Archives,* includes audio and slides from 25 conferences since 2008, including talks by invited and prize speakers, select minisymposia, and minitutorials from the 2014 Annual Meeting and four 2014 SIAG meetings.

In addition, you can view brief video clips of speaker interviews and topic overviews from sessions at Annual Meetings starting in 2010, as well as the 2013 SIAM Conference on Computational Science and Engineering and the 2014 SIAM Conference on the Life Sciences.

Plans for adding more content from SIAM meetings abound, including presentations from six meetings in 2015.

New presentations are posted every few months as the program expands with sessions from additional SIAM meetings. Users can search for presentations by category, speaker name, and/or keywords.

The audio, slide, and video presentations are part of SIAM's outreach activities to increase the public's awareness of mathematics and computational science in the real world, and to bring attention to exciting and valuable work being done in the field. Funding from SIAM, the National Science Foundation, and the Department of Energy was used to support this project.

www.siam.org/meetings/presents.php

OPSFA-13 Program

13th International Symposium on Orthogonal Polynomials, Special Functions & Applications

June 1-5, 2015
National Institute of Standards and Technology
Gaithersburg, Maryland, USA

Sunday, May 31

Welcome Reception

(Held offsite at the Gaithersburg Marriott Washingtonian Center 9751 Washingtonian Boulevard)

4:00 PM-7:00 PM

Room:Gaithersburg Marriott Washingtonian Center

Monday, June 1

Registration

7:30 AM-5:00 PM

Room:Green Auditorium Foyer

Opening Remarks

8:45 AM-9:00 AM

Room:Green Auditorium

Monday, June 1

IP1

Vector-Valued Nonsymmetric and Symmetric Jack and Macdonald Polynomials

9:00 AM-10:00 AM

Room:Green Auditorium

For each partition τ of N there are irreducible representations of the symmetric group S_N and the associated Hecke algebra $H_N(q)$ on a real vector space V_τ whose basis is indexed by the set of reverse standard Young tableaux of shape τ. The talk concerns orthogonal bases of $V\tau$-valued polynomials of $x \in R^N$. The bases consist of polynomials which are simultaneous eigenfunctions of commutative algebras of differential-difference operators, which are parametrized by κ and *(q,t)* respectively. These polynomials reduce to the ordinary Jack and Macdonald polynomials when the partition has just one part *(N)*. The polynomials are constructed by means of the Yang-Baxter graph. There is a natural bilinear form, which is positive-definite for certain ranges of parameter values depending on τ, and there are integral kernels related to the bilinear form for the group case, of Gaussian and of torus type. The material on Yang-Baxter graphs and Macdonald polynomials is based on joint work with J.-G. Luque.

Charles F. Dunkl
University of Virginia, USA

Coffee Break

10:00 AM-10:30 AM

Room:Cafeteria

Monday, June 1

MS1

Orthogonal Polynomials of Several Variables - Part I of II

10:30 AM-12:00 PM

Room:Green Auditorium

For Part 2 see MS6

The special session brings researchers on the topic to discuss recent progress on orthogonal polynomials of several variables. The talks will cover both theoretical results and applications in analysis and in mathematical physics.

Organizer: Yuan Xu
University of Oregon, USA

10:30-10:55 Multivariate Orthogonal Polynomials and Integrable Systems

Manuel Manas, Universidad Complutense de Madrid, Spain

11:00-11:25 Orthogonal Polynomials on the Unit Ball and Fourth Order Partial Differential Equations

Miguel Pinar, Universidad de Granada, Spain

11:30-11:55 Algebraic Interpretation of Multivariate *q*-Krawtchouk Polynomials

Vincent Genest, Université de Montréal, Canada; Sarah I. Post, Centre de Recherches Mathématiques, Canada; *Luc Vinet*, Université de Montréal, Canada; Alexei Zhedanov, Donetsk Institute for Physics and Engineering, Ukraine

Monday, June 1

MS2

Orthogonal Polynomials and Special Functions: Computational Aspects - Part I of II

10:30 AM-12:30 PM

Room:Lecture Room B

For Part 2 see MS7

In this minisymposium we focus on topics that are particularly relevant to computation. Both the computation of the orthogonal and special functions themselves and a selected number of numeric applications. Among the latter we mention the numerical evaluation of one-dimensional and high-dimensional integrals, especially by Gauss-type quadrature methods, polynomial least squares approximation, related numerical linear algebra problems and the summation of slowly convergent series.

Organizer: Annie Cuyt
University of Antwerp, Belgium

10:30-10:55 Repeated Integrals of the Coerror Function, Revisited

Walter Gautschi, Purdue University, USA

11:00-11:25 DLMF Standard Reference Tables on Demand (DLMF Tables) (6)

Bonita V. Saunders, Bruce Miller, Marjorie McClain, Daniel Lozier, and Andrew Dienstfrey, National Institute of Standards and Technology, USA; Annie Cuyt, Stefan Becuwe, and Franky Backeljauw, University of Antwerp, Belgium

11:30-11:55 Numerical Multivariate Polynomial Factorization

Wen-shin Lee and Annie Cuyt, University of Antwerp, Belgium

12:00-12:25 Near-Minimal Cubature Rules on the Disk

Irem Yaman, Gebze Institute of Technology, Turkey; Annie Cuyt, University of Antwerp, Belgium; Brahim Benouahmane, Université Hassan II, Morocco

Monday, June 1

MS3

Number Theory and Special Functions

10:30 AM-12:30 PM

Room:Lecture Room D

The theory of numbers has always had an intimate connection with special functions. Perhaps the Riemann zeta function (with its connection to the distribution of primes) is the most spectacular instance of this relationship. Additive number theory, especially the theory of partitions, has been aided by the theory of elliptic functions (now superseded by the theory of modular forms) as well a q-series. Orthogonal polynomials have made important contributions. The speakers have been chosen to address a wide spectrum of these topics.

Organizer: George E. Andrews
Pennsylvania State University, USA

10:30-10:55 Bressoud Polynomials and the Rogers-Ramanujan Identities

George E. Andrews, Pennsylvania State University, USA

11:00-11:25 Monodromy of Hypergeometric Functions in Several Variables

Frits Beukers, Utrecht University, The Netherlands

11:30-11:55 q-Bessel Functions and Rogers-Ramanujan Type Identities

Mourad Ismail, University of Central Florida, USA; Ruimimg Zhang, Northwest A&F University, China

12:00-12:25 Mahler Measures of Hyperelliptic Families

Wadim Zudilin, University of Newcastle, NSW, Australia

Monday, June 1

MS4

Potential Theory and Applications to Orthogonal Polynomials and Minimal Energy - Part I of II

10:30 AM-12:30 PM

Room:Heritage Room

For Part 2 see MS8

Recent applications of Potential Theory to the theory of orthogonal polynomials have allowed for significant advancement of the subject. Methods, such as the Riemann-Hilbert approach, for investigating asymptotic behavior of orthogonal polynomials include prominently the equilibrium measure of a compact set in the complex plane. Another important application of potential theory is to minimal energy problems on the sphere and other manifolds. Seemingly different, both of these areas of analysis explore the convergence properties of discrete potentials. It is the intention of the minisymposium is to provide a common bridge between them and allow for interchanging of ideas.

Organizer: Peter Dragnev
Indiana University - Purdue University Fort Wayne, USA

Organizer: Sergiy Borodachov
Towson University, USA

10:30-10:55 Covering and Separation for Points on the Sphere

Johann Brauchart, Graz University of Technology, Austria

11:00-11:25 Equilibrium Measures and Their Support

David Benko, University of South Alabama, USA

11:30-11:55 Asymptotically d-Energy Minimizing Sequences of Configurations on d-dimensional Conductors

Sergiy Borodachov, Towson University, USA; Douglas Hardin and Edward Saff, Vanderbilt University, USA

12:00-12:25 Characterization of Complex Variable Positive Definite Functions

Jorge C. Buescu, Universidade de Lisboa, Portugal; António Paixão, Instituto Superior de Engenharia de Lisboa, Portugal; Alexandra Symeonides, Universidade de Lisboa, Portugal

Monday, June 1

MS5

Riemann-Hilbert Problems: Applications to Differential Equations - Part I of II

10:30 AM-12:30 PM

Room:Portrait Room

For Part 2 see MS9

Riemann-Hilbert problems give additional representations for nonlinear special functions as well as solutions of integrable nonlinear partial differential equations. Often, when combined the method of nonlinear steepest, this Riemann-Hilbert representation is more amenable to rigorous asymptotic analysis and efficient numerical analysis than other representations. This minisymposium aims to bring together top researchers in this field to display current research at the frontier of pure and applied mathematics.

Organizer: Peter D. Miller
University of Michigan, Ann Arbor, USA

Organizer: Tom Trogdon
Courant Institute of Mathematical Sciences, New York University, USA

10:30-10:55 On Non-Linearizable Boundary Value Problems for the Defocusing Nonlinear Schrödinger Equation on the Half-Line

Peter D. Miller, University of Michigan, Ann Arbor, USA; Zhenyun Qin, Fudan University, China

11:00-11:25 Numerical Inverse Scattering for the Benamin–Ono Equation

Sheehan Olver, University of Sydney, Australia

11:30-11:55 Transition Asymptotics for the Painlevé II Transcendent

Thomas J. Bothner, Université de Montréal, Canada

12:00-12:25 On Perturbations of the Toda Lattice

Deniz Bilman and Irina Nenciu, University of Ilinois at Chicago, USA; Thomas Trogdon, Courant Institute of Mathematical Sciences, New York University, USA

Lunch Break

12:30 PM-1:30 PM

Attendees on their own

Monday, June 1

IP2

Two Variable q-Polynomials

1:30 PM-2:30 PM

Room:Green Auditorium

Abstract not available at time of printing.

Mourad Ismail
University of Central Florida, USA

Coffee Break

2:30 PM-3:00 PM

Room:Cafeteria

Monday, June 1

MS6

Orthogonal Polynomials of Several Variables - Part II of II

3:00 PM-5:00 PM

Room:Green Auditorium

For Part 1 see MS1

The special session brings researchers on the topic to discuss recent progress on orthogonal polynomials of several variables. The talks will cover both theoretical results and applications in analysis and in mathematical physics.

Organizer: Yuan Xu
University of Oregon, USA

3:00-3:25 Some Topics on Basis Function Approximation on the Sphere

Wolfgang zu Castell, Helmholtz Zentrum München, Germany

3:30-3:55 Recent Developments in Hyperinterpolation

Jeremy Wade, Pittsburg State University, USA

4:00-4:25 A New Identity for Gegenbauer Polynomials and Reproducing Kernels for Multivariable Orthogonal Polynomials

Yuan Xu, University of Oregon, USA

4:30-4:55 Multivariate Meixner Polynomials and a Discrete Model of the Two-dimensional Harmonic Oscillator with *su*(2) Symmetry

Julien Gaboriaud and *Vincent Genest*, Université de Montréal, Canada; Jessica Lemieux, University of Ottawa, Canada; Luc Vinet, Université de Montréal, Canada

Monday, June 1

MS7

Orthogonal Polynomials and Special Functions: Computational Aspects - Part II of II

3:00 PM-5:00 PM

Room:Lecture Room B

For Part 1 see MS2

In this minisymposium we focus on topics that are particularly relevant to computation. Both the computation of the orthogonal and special functions themselves and a selected number of numeric applications. Among the latter we mention the numerical evaluation of one-dimensional and high-dimensional integrals, especially by Gauss-type quadrature methods, polynomial least squares approximation, related numerical linear algebra problems and the summation of slowly convergent series.

Organizer: Annie Cuyt
University of Antwerp, Belgium

3:00-3:25 Algorithms for An Interpolation Problem on the Unit Circle Between Lagrange and Hermite Problems

Elias Berriochoa and Alicia Cachafeiro, University of Vigo, Spain; José Garcí A-Amor, Xunta de Galicia, Spain

3:30-3:55 Bernoulli Polynomials As a Base in Numerical Methods

Somayeh Mashayekhi, Mississippi State University, USA

4:00-4:25 Approximation of Periodic Functions in Terms of Moduli of Continuity

Uaday Singh and Soshal Saini, Indian Institute of Technology Roorkee, India

4:30-4:55 A New Way to Compute Sine Integral Function

Evren Yarman, Schlumberger, United Kingdom; Garret Flagg, Schlumberger, USA

Monday, June 1

MS8

Potential Theory and Applications to Orthogonal Polynomials and Minimal Energy - Part II of II

3:00 PM-5:00 PM

Room:Heritage Room

For Part 1 see MS4

Recent applications of Potential Theory to the theory of orthogonal polynomials have allowed for significant advancement of the subject. Methods, such as the Riemann-Hilbert approach, for investigating asymptotic behavior of orthogonal polynomials include prominently the equilibrium measure of a compact set in the complex plane. Another important application of potential theory is to minimal energy problems on the sphere and other manifolds. Seemingly different, both of these areas of analysis explore the convergence properties of discrete potentials. It is the intention of the minisymposium is to provide a common bridge between them and allow for interchanging of ideas.

Organizer: Peter Dragnev
Indiana University - Purdue University Fort Wayne, USA

Organizer: Sergiy Borodachov
Towson University, USA

3:00-3:25 Asymptotics for Maximal Polarization Configurations

Edward Saff, Vanderbilt University, USA

3:30-3:55 Asymptotics of Minimal Discrete Periodic Energy Problems

Douglas Hardin, Vanderbilt University, USA

4:00-4:25 Universal Lower Bounds for Potential Energy of Spherical Codes

Peter Dragnev, Indiana University - Purdue University Fort Wayne, USA; Peter Boyvalenkov, Institute for Mathematics and Informatics, Sofia, Bulgaria; Douglas Hardin and Edward Saff, Vanderbilt University, USA; Maya Stoyanova, Sofia University, Bulgaria

4:30-4:55 Boundary Integrals and Approximations of Harmonic Functions

Giles Auchmuty and *Manki Cho*, University of Houston, USA

Monday, June 1
MS9

Riemann-Hilbert Problems: Applications to Differential Equations - Part II of II

3:00 PM-5:00 PM

Room:Portrait Room

For Part 1 see MS5

Riemann-Hilbert problems give additional representations for nonlinear special functions as well as solutions of integrable nonlinear partial differential equations. Often, when combined the method of nonlinear steepest, this Riemann-Hilbert representation is more amenable to rigorous asymptotic analysis and efficient numerical analysis than other representations. This minisymposium aims to bring together top researchers in this field to display current research at the frontier of pure and applied mathematics.

Organizer: Peter D. Miller
University of Michigan, Ann Arbor, USA

Organizer: Tom Trogdon
Courant Institute of Mathematical Sciences, New York University, USA

3:00-3:25 Saturated Bands in Many-Pole Riemann-Hilbert Problems

Robert J. Buckingham, University of Cincinnati, USA; Peter D. Miller, University of Michigan, Ann Arbor, USA; David A. Smith, University of Cincinnati, USA; Megan Stone, University of Arizona, USA

3:30-3:55 Long Time Asymptotics and Stability of Finite Density Solutions of the Defocusing NLS Equation

Robert Jenkins, University of Arizona, USA

4:00-4:25 Long-Time Asymptotics for a Discrete-Discrete Integrable Equation

David A. Smith, University of Cincinnati, USA

4:30-4:55 Direct Scattering and Small Dispersion for the Benjamin-Ono Equation with Rational Initial Data

Alfredo N. Wetzel and Peter D. Miller, University of Michigan, Ann Arbor, USA

Monday, June 1
CP2

3:00 PM-5:00 PM

Room:Lecture Room D

3:00-3:25 On the Study of Solution of Lorenz System Using Generalized Mittag-Leffler Function

Ranjan K. Jana, Sardar Vallabhbhai National Institute of Technology, India

3:30-3:55 Approximate Controllability of An Impulsive Neutral Differential Equation with Deviating Argument and Bounded Delay

Sanjukta Das and Dwijendra Pandey, Indian Institute of Technology Roorkee, India

4:00-4:25 Hypergeometric Functions and Chebyshev Polynomials: Explicit Solutions of 2-D Free Boundary Problems in Groundwater Hydrology

Anvar Kacimov, Sultan Qaboos University, Oman; Yurii Obnosov, Kazan Federal University, Russia

4:30-4:55 Special Functions As Non-Uniform Steady-State Solutions of a Mathematical Model Describing Fluid-Solute Transport in Peritoneal Dialysis

Roman Cherniha, University of Nottingham, United Kingdom; Jacek Waniewski, Polish Academy of Sciences, Poland

Monday, June 1
CP3

3:00 PM-5:00 PM

Room:Dining Room A&B

3:00-3:25 Integrals Involving Powers of K

James G. Wan, Singapore University of Technology & Design, Singapore

3:30-3:55 Reproducing Kernels of Spherical Monogenics

Michael Wutzig, Hendrik De Bie, and Frank Sommen, Ghent University, Belgium

4:00-4:25 New Index Transforms with the Product of Bessel Functions.

Semyon Yakubovich, University of Porto, Portugal

4:30-4:55 Approximation by a Generalization of the Jakimovski-Leviatan Operators

Didem Aydin Ari, Kirikkale University, Turkey; Sevilay Kirci Serenbay, Baskent University, Turkey

Tuesday, June 2

Registration

8:00 AM-10:00 AM

Room:Green Auditorium Foyer

Announcements

8:45 AM-9:00 AM

Room:Green Auditorium

IP3

On the Asymptotic Behavior of a Log Gas in the Bulk Scaling Limit in the Presence of a Varying External Potential

9:00 AM-10:00 AM

Room:Green Auditorium

The speaker will present joint work together with T. Bothner, A.Its and I. Krasovsky on the determinant det ($I - \gamma\, K_S$), $0 < \gamma < 1$, of the integrable Fredholm operator K_S acting on the interval (-1,1) with kernel $K_S(\lambda, \mu) = \frac{\sin s\,(\lambda - \mu)}{\pi(\lambda - \mu)}$.

This determinant arises in the analysis of a log-gas of interacting particles in the bulk-scaling limit, at inverse temperature $\beta = 2$, in the presence of an external potential $v = -1/2 \ln (1 - \gamma)$ supported on an interval of length $2 s/\pi$. We evaluate, in particular, the double scaling limit of det ($I - \gamma\, K_S$) as $s \to \infty$ and $\gamma \uparrow 1$, in the region $0 \le X = v/s = -\frac{1}{2s} \ln (1-\gamma) \le 1 - \delta$, for any fixed $0 < \delta < 1$. This problem was first considered by Dyson.

Percy Deift
Courant Institute of Mathematical Sciences, New York University, USA

Coffee Break

10:00 AM-10:30 AM

Room:Cafeteria

Tuesday, June 2

MS10

Sobolev Orthogonal Polynomials - Part I of III

10:30 AM-12:30 PM

Room:Green Auditorium

For Part 2 see MS15

Orthogonal polynomials with respect to Sobolev inner products have known an increasing interest during the last twenty years. The one variable case has been deeply studied in the framework of the analytic theory (asymptotic properties, distribution of zeros, Fourier expansions, spectral properties of differential operators, among others). More recently, the multivariate case has been studied in the framework of boundary value problems for partial differential operators. The aim of this minisymposium is to join people working in different topics related to Sobolev orthogonal polynomials in order to give an overview as well as some future research directions in this topic.

Organizer: Francisco Marcellan
University of Carlos III of Madrid, Spain

10:30-10:55 An Historical Approach to Sobolev Orthogonal Polynomials

Francisco Marcellan, University of Carlos III of Madrid, Spain

11:00-11:25 $W^{(1,p)}$ - Convergence of Fourier-Sobolev Expansions Associated to (M,N) Coherent Pairs of Measures

Alejandro J. Urieles, Universidad del Atlantico, Colombia

11:30-11:55 Linearly Related Sequences of Continuous and Discrete Derivatives of Orthogonal Polynomial Sequences. Connections with Sobolev Orthogonal Polynomial Sequences

Jose Carlos S. Petronilho, Universidade de Coimbra, Portugal

12:00-12:25 (M,N)-Coherent Pairs of Linear Functionals and Jacobi Matrices

Natalia C. Pinzón-Cortés, Universidad Nacional de Colombia, Colombia; Francisco Marcellan, University of Carlos III of Madrid, Spain

---

Tuesday, June 2

MS11

Symbolic Computation and Special Functions - Part I of III

10:30 AM-12:30 PM

Room:Lecture Room B

For Part 2 see MS16

Computer algebra plays an increasingly important role in the investigation of special functions. For large classes of special functions we now have strong algorithmic theories. Software packages based on these theories successfully solve interesting problems that are not accessible by other means and they also routinely and reliably solve tedious subproblems that frequently arise in day-to-day calculations. The purpose of this minisymposium is to join computer algebra people interested in special functions with special functions people interested in computer algebra, in order to share recent trends, new techniques, and open problems at the intersection of these two areas.

Organizer: Veronika Pillwein
Johannes Kepler Universität, Linz, Austria

Organizer: Manuel Kauers
RISC, Austria

10:30-10:55 Positive Rational Functions and their Diagonals

Wadim Zudilin, University of Newcastle, NSW, Australia

11:00-11:25 Divisibility Properties of Sporadic Apéry-like Numbers

Armin Straub, University of Illinois at Urbana-Champaign, USA

11:30-11:55 Fast Arbitrary-precision Evaluation of Special Functions in the Arb Library

Fredrik Johansson, Institut de Mathématiques de Bordeaux, France

12:00-12:25 Pushing Forward the Dimension of fcc Lattices

Christoph Koutschan, Austrian Academy of Sciences, Austria

Tuesday, June 2

MS12

Legacy of Ramanujan - Part I: Mock Theta Functions and Mock Modular Forms

10:30 AM-12:30 PM

Room:Lecture Room D

For Part 2 see MS17

In the past few decades, the influence of Ramanujan's work on contemporary mathematics has been enormous. More precisely, mock theta functions and mock modular forms, q-series and partitions, and classical analytic number theory and analysis are three areas in which Ramanujan's results have driven considerable research. The minisymposium that I propose to organize will feature four speakers in each of these three areas. An initial list of possible speakers is given for each area.

Organizer: Bruce Berndt
University of Illinois at Urbana-Champaign, USA

10:30-10:55 Partition Identities and Mock Theta Functions

George E. Andrews, Pennsylvania State University, USA

11:00-11:25 Mock Theta Functions, Partial Theta Functions, and Their Ghosts - Rhoades

Robert Rhoades, Stanford University, USA

11:30-11:55 Mock Modular Forms of Weight 5/2 and Partitions

Nickolas Andersen, University of Illinois at Urbana-Champaign, USA

12:00-12:25 Mock Theta Functions and Quantum Modular Forms

Larry Rolen, University of Cologne, Germany

Tuesday, June 2

MS13

Aspects of Painlevé Equations - Part I of III

10:30 AM-12:30 PM

Room:Heritage Room

For Part 2 see MS18

The Painleve equations are six nonlinear second-order ordinary differential equations whose general solutions are transcendental and may be thought of as nonlinear special functions. The Painleve equations have a plethora of interesting properties (e.g. Hamiltonian structure, rational solutions, special function solutions, Backlund transformations), are integrable equations solvable by the isomonodromy deformation method, and arise in a variety of Mathematical and Physical applications. In this minisymposium, speakers will describe some of the special properties that the Painleve equations, numerical studies of the Painleve equations and applications to orthogonal polynomials and random matrix theory.

Organizer: Peter Clarkson
University of Kent, United Kingdom

10:30-10:55 Painleve Equations - Nonlinear Special Functions

Peter Clarkson, University of Kent, United Kingdom

11:00-11:25 Explorations of the Solution Space of the Fourth Painlevé Equation

Jonah A. Reeger, Air Force Institute of Technology, USA; Bengt Fornberg, University of Colorado Boulder, USA

11:30-11:55 Numerics for Classical Applications of Riemann-Hilbert Problems

Sheehan Olver, University of Sydney, Australia

12:00-12:25 Uniformly Accurate Computation of Painlevé II Transcendents

Thomas Trogdon, Courant Institute of Mathematical Sciences, New York University, USA

Tuesday, June 2

MS14

Riemann-Hilbert Problems: Orthogonal Polynomials and Random Matrix Theory - Part I of III

10:30 AM-12:30 PM

Room:Portrait Room

For Part 2 see MS19

Riemann--Hilbert problems give a powerful representation for orthogonal polynomials. When combined with the method of nonlinear steepest descent, precise asymptotics and numerics for the polynomials can be determined. In this minisymposium we explore applications of this idea to orthogonal polynomials themselves, random matrix theory, numerical analysis and beyond.

Organizer: Thomas Trogdon
Courant Institute of Mathematical Sciences, New York University, USA

Organizer: Sheehan Olver
University of Sydney, Australia

10:30-10:55 The Condition Number of the Critically--Scaled Laguerre Unitary Ensemble

Thomas Trogdon, Courant Institute of Mathematical Sciences, New York University, USA

11:00-11:25 Discrete Toeplitz Determinants and Their Applications

Zhipeng Liu, Courant Institute of Mathematical Sciences, New York University, USA

11:30-11:55 The Statistical Behaviour of the Low-end Spectra of Several Coupled Matrices and the Meijer-G random Point Field

Marco Bertola and Thomas Bothner, Concordia University, Canada

12:00-12:25 The Normal Matrix Model in the Supercritical Regime, and Asymptotics of the Associated Orthogonal Polynomials

Arno Kuijlaars, Katholieke Universiteit Leuven, Belgium; Alexander Tovbis, University of Central Florida, USA

Lunch Break

12:30 PM-1:30 PM

Attendees on their own

Tuesday, June 2

IP4

Hypergeometric Series: On Number Theory's Secret Service

1:30 PM-2:30 PM

Room:Green Auditorium

A natural outcome of the theory of generalized hypergeometric functions are rational approximations to the values of Riemann's zeta functions and alike mathematical constants. In my talk I plan to outline the way it goes (hypergeometric series, hypergeometric Barnes- and Euler-type integrals) and stress on some recent achievements—the current best irrationality measures of π(due to Salikhov), of log2 (due to Marcovecchio) and of~δ(2). The final part of the talk will discuss some linear and algebraic independence results that make use of generalized hypergeometric functions.

Wadim Zudilin
University of Newcastle, NSW, Australia

Tuesday, June 2

IP5

Integrable Probability and the Role of Painlevé Functions

2:30 PM-3:30 PM

Room:Green Auditorium

We will review various models in probability that are integrable in the sense that various distribution functions can be explicitly evaluated in terms of Painleve´ functions and their generalizations. We develop in more detail a class of stochastic growth models that belong to the Kardar-Parisis-Zhang (KPZ) uni- versality class such as the asymmetric simple exclusion process and the KPZ equation. In addition, the experiments of Takeuchi and Sano will be briefly discussed.

Craig A. Tracy
University of California, Davis, USA

Coffee Break

3:30 PM-4:00 PM

Room:Cafeteria

Tuesday, June 2

MS15

Sobolev Orthogonal Polynomials - Part II of III

4:00 PM-6:00 PM

Room:Green Auditorium

For Part 1 see MS10
For Part 3 see MS20

Orthogonal polynomials with respect to Sobolev inner products have known an increasing interest during the last twenty years. The one variable case has been deeply studied in the framework of the analytic theory (asymptotic properties, distribution of zeros, Fourier expansions, spectral properties of differential operators, among others). More recently, the multivariate case has been studied in the framework of boundary value problems for partial differential operators. The aim of this minisymposium is to join people working in different topics related to Sobolev orthogonal polynomials in order to give an overview as well as some future research directions in this topic.

Organizer: Francisco Marcellan
University of Carlos III of Madrid, Spain

4:00-4:25 Laguerre Polynomials and Sobolev Orthogonality

Lance L. Littlejohn, Baylor University, USA

4:30-4:55 Differential Equations for Discrete Sobolev Orthogonal Polynomials

Manuel Dominguez de la Iglesia, Universidad Nacional Autónoma de México, Mexico; Antonio Duran, Universidad de Sevilla, Spain

5:00-5:25 A Study of the Exceptional X_m-Jacobi Expression for Extreme Parameter Choices

Jessica Stewart, Goucher College, USA

5:30-5:55 Orthogonal Polynomials for Learning

Richard Wellman, Westminster College, USA

Tuesday, June 2

MS16

Symbolic Computation and Special Functions - Part II of III

4:00 PM-6:00 PM

Room:Lecture Room B

For Part 1 see MS11
For Part 3 see MS21

Computer algebra plays an increasingly important role in the investigation of special functions. For large classes of special functions we now have strong algorithmic theories. Software packages based on these theories successfully solve interesting problems that are not accessible by other means and they also routinely and reliably solve tedious subproblems that frequently arise in day-to-day calculations. The purpose of this minisymposium is to join computer algebra people interested in special functions with special functions people interested in computer algebra, in order to share recent trends, new techniques, and open problems at the intersection of these two areas.

Organizer: Veronika Pillwein
Johannes Kepler Universität, Linz, Austria

Organizer: Manuel Kauers
RISC, Austria

4:00-4:25 The Positive Part of Multivariate Infinite Series

Manuel Kauers, Johannes Kepler Universität, Linz, Austria

4:30-4:55 Computing the Probability of Collision for Short-term Space Encounters: a Symbolic-Numeric Approach

Mioara Joldes, LAAS-CNRS, Toulouse, France

5:00-5:25 About Some Identities by Bayad and Beck Involving Bernoulli-Barnes Numbers, Barnes Zeta Functions and Fourier Dedekind Sums

Christophe Vignat, Tulane University, USA

5:30-5:55 Transformations of Hypergeometric Functions

Petr Blaschke, Silesian University in Opava, Czech Republic

Tuesday, June 2

MS17

Legacy of Ramanujan - Part II: q-Series and Partitions

4:00 PM-6:00 PM

Room:Lecture Room D

For Part 1 see MS12
For Part 3 see MS22

In the past few decades, the influence of Ramanujan's work on contemporary mathematics has been enormous. More precisely, mock theta functions and mock modular forms, q-series and partitions, and classical analytic number theory and analysis are three areas in which Ramanujan's results have driven considerable research. The minisymposium that I propose to organize will feature four speakers in each of these three areas. An initial list of possible speakers is given for each area.

Organizer: Bruce Berndt
University of Illinois at Urbana-Champaign, USA

4:00-4:25 Partitions Associated with the Ramanujan/Watson Mock Theta Functions omega(q) and nu(q)

Ae Ja Yee and George E. Andrews, Pennsylvania State University, USA; Atul Dixit, Tulane University, USA

4:30-4:55 Rogers-Ramanujan Type Identities

Andrew V. Sills, Georgia Southern University, USA

5:00-5:25 A Generalized Lebesgue Identity in Ramanujan's Lost Notebook

Krishnaswami Alladi, University of Florida, USA

5:30-5:55 Exotic Bailey-Slater Spt-Functions and Hecke-Rogers Double Series

Frank Garvan and Chris Jennings-Shaffer, University of Florida, USA

Tuesday, June 2

MS18

Aspects of Painlevé Equations - Part II of III

4:00 PM-6:00 PM

Room:Heritage Room

For Part 1 see MS13
For Part 3 see MS23

The Painleve equations are six nonlinear second-order ordinary differential equations whose general solutions are transcendental and may be thought of nonlinear special functions. The Painleve equations have a plethora of interesting properties (e.g. Hamiltonian structure, rational solutions, special function solutions, Backlund transformations), are integrable equations solvable by the isomonodromy deformation method, and arise in a variety of Mathematical and Physical applications. In this minisymposium, speakers will describe some of the special properties that the Painleve equations, numerical studies of the Painleve equations and applications to orthogonal polynomials and random matrix theory.

Organizer: Peter Clarkson
University of Kent, United Kingdom

4:00-4:25 Asymptotics of Large-Degree Rational Painleve-IV Functions

Robert Buckingham, University of Cincinnati, USA

4:30-4:55 On Large Degree Rational Solutions of Painlevé II

Peter D. Miller, University of Michigan, Ann Arbor, USA; Robert Buckingham, University of Cincinnati, USA

5:00-5:25 Zeros of Large Degree Vorobév-Yablonski Polynomials Via a Hankel Determinant Identity

Thomas Bothner, Concordia University, Canada

5:30-5:55 Painlevé I in the Cubic Random Matrix Model

Alfredo Deaño, Universidad Carlos III de Madrid, Spain; Pavel Bleher, Indiana University-Purdue University Indianapolis (IUPUI), USA

Tuesday, June 2
MS19

Riemann-Hilbert Problems: Orthogonal Polynomials and Random Matrix Theory - Part II of III

4:00 PM-6:00 PM

Room:Portrait Room

For Part 1 see MS14
For Part 3 see MS24

Riemann—Hilbert problems give a powerful representation for orthogonal polynomials. When combined with the method of nonlinear steepest descent, precise asymptotics and numerics for the polynomials can be determined. In this minisymposium we explore applications of this idea to orthogonal polynomials themselves, random matrix theory, numerical analysis and beyond.

Organizer: Thomas Trogdon
Courant Institute of Mathematical Sciences, New York University, USA

Organizer: Sheehan Olver
University of Sydney, Australia

4:00-4:25 Asymptotics in the Complex Plane for Multiple Laguerre Polynomials

Walter van Assche, Katholieke Universiteit Leuven, Belgium

4:30-4:55 Asymptotics of Orthogonal Polynomials with Complex Varying Weight: Critical Point Behaviour and the Painleve Equations

Alex Tobvis, University of Central Florida, USA; Marco Bertola, Concordia University, Canada

5:00-5:25 The Riemann-Hilbert Approach to Polynomials Orthogonal with Respect to Complex Weight Functions

Alfredo Deaño, Universidad Carlos III de Madrid, Spain

5:30-5:55 The Riemann-Hilbert Approach to Critical Phenomena in the Two Matrix Model

Maurice Duits, Royal Institute of Technology, Stockholm, Sweden

Tuesday, June 2
CP1

4:00 PM-6:00 PM

Room:Lecture Room A

4:00-4:25 An Explicit Family of Askey-Wilson Type Matrix-Valued Orthogonal Polynomials

Erik Koelink and Noud Aldenhoven, Radboud University, The Netherlands; Pablo Román, Universidad Nacional de Cordoba, Argentina

4:30-4:55 Jacobi Polynomial Moments and Products of Random Matrices

Thorsten Neuschel, Katholieke Universiteit Leuven, Belgium

5:00-5:25 A Matrix Approach for the Semiclassical and Coherent Orthogonal Polynomials

Lino G. Garza and Francisco Marcellán, Universidad Carlos III de Madrid, Spain; Luis E. Garza and Natalia C. Pinzón-Cortés, Universidad Nacional de Colombia, Colombia

5:30-5:55 Killip-Simon Problem and Jacobi Flow on Gsmp Matrices

Benjamin Eichinger, Johannes Kepler Universität, Linz, Austria

Tuesday, June 2
CP4

4:00 PM-5:30 PM

Room:Dining Room A&B

4:00-4:25 Sums of Squared Baskakov Functions

Wolfgang Gawronski, University of Trier, Germany; Ulrich Abel, Technical University of Applied Sciences Mittelhessen, Germany; Thorsten Neuschel, Katholieke Universiteit Leuven, Belgium

4:30-4:55 On the Horizontal Monotonocity of the Gamma Function

Gopala Krishna Srinivasan, Indian Institute of Technology-Bombay, India

5:00-5:25 Representations for the Parameter Derivatives of Orthogonal Polynomials in Two Variables

Rabia Aktas, Ankara University, Turkey

Wednesday, June 3

Registration
8:00 AM-10:00 AM

Room:Green Auditorium Foyer

Announcements
8:45 AM-9:00 AM

Room:Green Auditorium

IP6
Limits of Orthogonal Polynomials and Contractions of Lie Algebras
9:00 AM-10:00 AM

Room:Green Auditorium

In this talk, I will discuss the connection between superintegrable systems and classical systems of orthogonal polynomials in particular in the expansion coefficients between separable coordinate systems, related to representations of the (quadratic) symmetry algebras. This connection allows us to extend the Askey scheme of classical orthogonal polynomials and the limiting processes within the scheme. In particular, for superintegrable systems in 3D, the polynomial representations of quadratic algebras are given in terms of two-variable polynomials and the two-variable analog of the Askey scheme, including the quadratic Racah algebra, will be discussed along with the limiting processes within the scheme.

Sarah Post
University of Hawaii, Manoa, USA

Coffee Break
10:00 AM-10:30 AM

Room:Cafeteria

Wednesday, June 3
MS20
Sobolev Orthogonal Polynomials - Part III of III
10:30 AM-12:30 PM

Room:Green Auditorium

For Part 2 see MS15
Orthogonal polynomials with respect to Sobolev inner products have known an increasing interest during the last twenty years. The one variable case has been deeply studied in the framework of the analytic theory (asymptotic properties, distribution of zeros, Fourier expansions, spectral properties of differential operators, among others). More recently, the multivariate case has been studied in the framework of boundary value problems for partial differential operators. The aim of this minisymposium is to join people working in different topics related to Sobolev orthogonal polynomials in order to give an overview as well as some future research directions in this topic.

Organizer: Francisco Marcellan
University of Carlos III of Madrid, Spain

10:30-10:55 Orthogonal Polynomials with Respect to a Sobolev Inner Product on the Unit Circle
Alagacone S. Ranga, Universidade Estadual Paulista, Brazil

11:00-11:25 On Asymptotic Properties of Sobolev Orthogonal Polynomials on the Unit Circle
Luis E. Garza, Universidad Nacional de Colombia, Colombia; Francisco Marcellan, and Kenier Castillo, Universidad Carlos III de Madrid, Spain

11:30-11:55 A Particular Case of a Higher Order Sobolev-Type Inner Product of Orthogonal Polynomials in Several Variables
Herbert Dueñas, Universidad Nacional de Colombia, Colombia; Wilmer M. Gómez, Universidad Pedagógica y Tecnológica de Colombia, Columbia

12:00-12:25 Sobolev Orthogonal Polynomials on the Unit Ball via Outward Normal Derivatives
Lidia Fernandez, Antonia Delgado, Teresa E. Pérez, and Miguel Pinar, Universidad de Granada, Spain

---

Wednesday, June 3
MS21
Symbolic Computation and Special Functions - Part III of III
10:30 AM-12:30 PM

Room:Lecture Room B

For Part 2 see MS16
Computer algebra plays an increasingly important role in the investigation of special functions. For large classes of special functions we now have strong algorithmic theories. Software packages based on these theories successfully solve interesting problems that are not accessible by other means and they also routinely and reliably solve tedious subproblems that frequently arise in day-to-day calculations. The purpose of this minisymposium is to join computer algebra people interested in special functions with special functions people interested in computer algebra, in order to share recent trends, new techniques, and open problems at the intersection of these two areas.

Organizer: Manuel Kauers
RISC, Austria

Organizer: Veronika Pillwein
Johannes Kepler Universität, Linz, Austria

10:30-10:55 Numerical Evaluation of Contour Integrals for Computation of Stirling Numbers
Rob Corless, David Jeffrey, and Yang Wang, University of Western Ontario, Canada

11:00-11:25 Utility Maximization and Symbolic Computation
Stefan Gerhold, Vienna University of Technology, Austria

11:30-11:55 On $_2F_1$-type Solutions of Second Order Linear Differential Equations
Erdal Imamoglu and Mark van Hoeij, Florida State University, USA

12:00-12:25 A Human Proof of Gessel's Lattice Path Conjecture
Alin Bostan, INRIA Saclay Ile-de-France, France

Wednesday, June 3

MS22

Legacy of Ramanujan - Part III: Classical Analytic Number Theory and Classical Analysis

10:30 AM-12:30 PM

Room:Lecture Room D

For Part 2 see MS17

In the past few decades, the influence of Ramanujan's work on contemporary mathematics has been enormous. More precisely, mock theta functions and mock modular forms, q-series and partitions, and classical analytic number theory and analysis are three areas in which Ramanujan's results have driven considerable research. The minisymposium that I propose to organize will feature four speakers in each of these three areas. An initial list of possible speakers is given for each area.

Organizer: Bruce Berndt
University of Illinois at Urbana-Champaign, USA

10:30-10:55 Ramanujan, Voronoi Summation Formula, Circle and Divisor Problems and Some Modular Transformations

Atul Dixit, Tulane University, USA; Bruce Berndt, Arindam Roy, and Alexandru Zaharescu, University of Illinois at Urbana-Champaign, USA

11:00-11:25 Cubic Modular Equations in Two Variables

Dan Schultz, Pennsylvania State University, USA

11:30-11:55 Special Values of Trigonometric Dirichlet Series

Armin Straub, University of Illinois at Urbana-Champaign, USA

12:00-12:25 On Theta Quotients Generating Graded Algebras of Modular Forms

Tim Huber, University of Texas - Pan American, USA

Wednesday, June 3

MS23

Aspects of Painlevé Equations - Part III of III

10:30 AM-12:00 PM

Room:Heritage Room

For Part 2 see MS18

The Painleve equations are six nonlinear second-order ordinary differential equations whose general solutions are transcendental and may be thought of nonlinear special functions. The Painleve equations have a plethora of interesting properties (e.g. Hamiltonian structure, rational solutions, special function solutions, Backlund transformations), are integrable equations solvable by the isomonodromy deformation method, and arise in a variety of Mathematical and Physical applications. In this minisymposium, speakers will describe some of the special properties that the Painleve equations, numerical studies of the Painleve equations and applications to orthogonal polynomials and random matrix theory.

Organizer: Peter Clarkson
University of Kent, United Kingdom

10:30-10:55 Determinantal Representations of Exceptional Orthogonal Polynomials

Constanze Liaw, Baylor University, USA

11:00-11:25 On the Alternative Discrete Painleve I

Ana Loureiro and Peter Clarkson, University of Kent, United Kingdom; Walter van Assche, Katholieke Universiteit Leuven, Belgium

11:30-11:55 Painleve Equations and Orthogonal Polynomials

Peter Clarkson, University of Kent, United Kingdom

Wednesday, June 3

MS24

Riemann-Hilbert Problems: Orthogonal Polynomials and Random Matrix Theory - Part III of III

10:30 AM-12:00 PM

Room:Portrait Room

For Part 2 see MS19

Riemann--Hilbert problems give a powerful representation for orthogonal polynomials. When combined with the method of nonlinear steepest descent, precise asymptotics and numerics for the polynomials can be determined. In this minisymposium we explore applications of this idea to orthogonal polynomials themselves, random matrix theory, numerical analysis and beyond.

Organizer: Thomas Trogdon
Courant Institute of Mathematical Sciences, New York University, USA

Organizer: Sheehan Olver
University of Sydney, Australia

10:30-10:55 Asymptotics for the Partition Function in Two-cut Random Matrix Models

Tom Claeys, Université Catholique de Louvain, Belgium

11:00-11:25 Recent Developments in the Large-N Analysis of Correlation Functions in the Quantum Separation of Variables Method

Karol K. Kozlowski, Institut de Mathématiques de Bourgogne, France

11:30-11:55 Orthogonal Polynomials for a Class of Measures with Discrete Rotational Symmetries in the Complex Plane

Ferenc Balogh, Concordia University, Canada

Lunch Break

12:30 PM-1:30 PM

Attendees on their own

Wednesday, June 3

SP1

SIAG/OPSF Gábor Szegö Prize Announcement and Lecture:

Tacnode Kernels and Lax Systems for the Painlevé II Equation

1:30 PM-2:30 PM

Room:Green Auditorium

The tacnode process is a determinantal process which was first studied by three separate groups of authors around 2010. One of those groups, Delvaux, Kuijlaars, and Zhang, described the kernel defining the process in terms of a new Lax system for the Painlevé II equation (PII) of size 4×4. I will discuss how this Lax system is related to the 2×2 Lax pair for PII studied by Flaschka and Newell in 1980. As a result, we find new formulas for various tacnode kernels and related kernels in random matrix theory. This is joint work with Dong Wang.

Karl Liechty, DePaul University, USA

OPSFA Steering Committee (invitation only)

2:30 PM-3:00 PM

Room:Small Room #1

Coffee Break

2:30 PM-3:00 PM

Room:Cafeteria

SIAG OPSF Business Meeting

3:00 PM-4:00 PM

Room:Green Auditorium

Conference Banquet

6:00 PM-9:00 PM

Separate fees apply for this. Pre-registration is required to attend.

(Event held offsite at the Gaithersburg Marriott Washingtonian Center - 9751 Washingtonian Boulevard., Washingtonian Ballroom, Salons F and G)

Thursday, June 4

Registration

8:00 AM-10:00 AM

Room:Green Auditorium Foyer

Announcements

8:45 AM-9:00 AM

Room:Green Auditorium

IP7

A New Look at Classical Orthogonal Polynomials

9:00 AM-10:00 AM

Room:Green Auditorium

There are two possible definitions of classical orthogonal polynomials:(i) they satisfy a second order differential or difference equation;(ii) (generalized) derivative of them gives again orthogonal polynomials. Both definitions are related with concrete forms of corresponding operators. We propose a new approach dealing with some abstract umbral operators. This gives a wide generalization of a notion of classical orthogonal polynomials.

Alexei Zhedanov
Donetsk Institute for Physics and Engineering, Ukraine

Coffee Break

10:00 AM-10:30 AM

Room:Cafeteria

Thursday, June 4

MS25

Semiclassical Orthogonal Polynomials

10:30 AM-12:30 PM

Room:Green Auditorium

In the last years there has been tremendous interest in new families of orthogonal polynomials that extend the so call "classical" polynomials (Hermite, Laguerre, Jacobi, Charlier, Meixner, etc). Their moment functionals satisfy a Pearson equation that determines their class, classical polynomials corresponding to the 0 class. In this minisymposium we will explore some new developments in the area.

Organizer: Diego Dominici
State University of New York, New Paltz, USA

10:30-10:55 "Abstract" Classical Polynomials: Open Problems
Alexei Zhedanov, Donetsk Institute for Physics and Engineering, Ukraine

11:00-11:25 Deformed Semi-classical Discrete Orthogonal Polynomials
Amílcar Branquinho, Universidade de Coimbra, Portugal

11:30-11:55 The Correspondence between the Askey Table of Orthogonal Polynomial Systems and the Sakai Scheme of Discrete Painlevé Equations
Nicholas Witte, University of Melbourne, Australia

12:00-12:25 Integral Transforms of d-orthogonal Polynomial Sequences
Ana Loureiro, University of Kent, United Kingdom

Thursday, June 4

MS26

Inequalities and Special Functions - Part I of II

10:30 AM-12:30 PM

Room:Lecture Room B

For Part 2 see MS31

Although many topics in special functions involve inequalities in one way or another, this minisymposium will concentrate on presentations that present unified treatments of inequalities for special functions

Organizer: Martin E. Muldoon
York University, Canada

10:30-10:55 Interlacing and Bounds for Zeros of Quasi-Orthogonal Laguerre Polynomials

Kathy A. Driver, University of Cape Town, South Africa; Martin E. Muldoon, York University, Canada

11:00-11:25 Interlacing of Zeros of General Laguerre Polynomials

Martin E. Muldoon, York University, Canada; Kathy A. Driver, University of Cape Town, South Africa

11:30-11:55 Weighted Norm Inequalities for Some Special Functions

Arcadii Grinshpan, University of South Florida, USA

12:00-12:25 Meijer's *G* Function and Fox's *H* Function Near a Regular Singularity

Dmitry Karp, Russian Academy of Sciences, Russia

Thursday, June 4

MS27

Symmetry and Special Functions - Part I of II

10:30 AM-12:30 PM

Room:Lecture Room D

For Part 2 see MS32

Mathematical functions become "special" when they occur frequently in solvable problems in the sciences. A principal reason for solvability of these problems is their symmetry. The corresponding functions are characterized by transformation under symmetries, but these are often "hidden", not just standard group symmetries. This minisymposium will explore ways that special functions arise and their properties are determined by symmetry algebra structures. In addition to Lie groups and discrete groups, topics include special functions related to exactly solvable and quasi-exactly solvable systems, integrable, superintegrable and supersymmetric systems, the Askey scheme and its multivariable generalizations, exceptional orthogonal polynomials, and q-functions.

Organizer: Willard Miller Jr
University of Minnesota, USA

10:30-10:55 Separation of Variables, Superintegrability and Bôcher Contractions

Willard Miller Jr, University of Minnesota, USA

11:00-11:25 Exceptional Orthogonal Polynomials, Wronskians, and the Darboux Transformation

Robert Milson, Dalhousie University, Canada; David Gomez-Ullate, Complutense University of Madrid, Spain

11:30-11:55 The Quantum Superalgebra $osp_q(1|2)$ and a *q*-generalization of the Bannai-Ito Polynomials

Vincent Genest and Luc Vinet, Université de Montréal, Canada; Alexei Zhedanov, Donetsk Institute for Physics and Engineering, Ukraine

12:00-12:25 Doubling-up Hahn Polynomials: Classification and Applications

Roy Oste and Joris Van Der Jeugt, Ghent University, Belgium

Thursday, June 4

MS28

Digital Mathematics Libraries - Part I of II

10:30 AM-12:30 PM

Room:Heritage Room

For Part 2 see MS33

In the modern era, more and more, mathematicians have come to rely on digital tools to obtain mathematical information. This symposium focuses on the development and implementation of online tools such as digital mathematical libraries and interactive resources for obtaining mathematically related information. These tools provide a mechanism for management of knowledge related to mathematical concepts, ideas, realizations, and developments.

Organizer: Howard Cohl
National Institute of Standards and Technology, USA

10:30-10:55 Overview of Digital Mathematics Libraries (DML) and the NIST Digital Repository of Mathematical Formulae (DRMF)

Howard Cohl, National Institute of Standards and Technology, USA

11:00-11:25 Building DLMF

Bruce Miller, National Institute of Standards and Technology, USA

11:30-11:55 The Mathematica Computable Library of Special Function Identities

Eric Weisstein, Wolfram Research Inc., USA

12:00-12:25 Steps Toward Realizing a World Information System for Digitally Organized Mathematics

Patrick Ion, American Mathematical Society, USA

Thursday, June 4

MS29

Exponential Asymptotics - Part I of II

10:30 AM-12:30 PM

Room:Portrait Room

For Part 2 see MS34
Exponentially small phenomena play an important role in many parts of applied mathematics. In this mini symposium we discuss exponentially-improved asymptotic approximations for special functions. The tools are Borel transforms, differential and difference equations, and integral representations.

Organizer: Adri B. Olde Daalhuis
University of Edinburgh, United Kingdom

10:30-10:55 Resurgence and Special Functions

Eric Delabaere, Université d'Angers, Angers, France

11:00-11:25 Accelerating the Computation of Special Functions Using Hybrid Hyper-Borel-Pad\'e Approximations

Chris Howls, University of Southampton, United Kingdom

11:30-11:55 The Resurgence Properties of the Bessel and Hankel Functions of Large Order and Argument

Gergo Nemes, Central European University, Hungary

12:00-12:25 Exponentially Small Difference Between the Eigenvalues a_m and b_{m+1} of Mathieu's Equation

Karen Ogilvie, University of Edinburgh, United Kingdom

Thursday, June 4

MS38

Asymptotics of Orthogonal Polynomials - Part I of II

10:30 AM-12:30 PM

Room:Lecture Room A

For Part 2 see MS40
The minisymposium will include all aspects of asymptotics of orthogonal polynomials, and related quantities such as reproducing kernels, Jacobi matrices, recurrence coefficients.

Organizer: Doron S. Lubinsky
Georgia Institute of Technology, USA

10:30-10:55 Orthogonal Dirichlet Polynomials

Doron S. Lubinsky, Georgia Institute of Technology, USA

11:00-11:25 Analytic Continuation of S-property for Multiple Orthogonal Polynomials

Guilherme Silva, Katholieke Universiteit Leuven, Belgium; Pavel Bleher, Indiana University-Purdue University Indianapolis (IUPUI), USA

11:30-11:55 Universality of Mesoscopic Fluctuations in Orthogonal Polynomial Ensembles

Jonathan Breuer, Hebrew University of Jerusalem, Israel

12:00-12:25 Nuttall's Theorem on Algebraic S-contours

Maxim Yattselev, Indiana University - Purdue University Indianapolis, USA

Thursday, June 4

CP5

10:30 AM-12:30 PM

Room:Dining Room A&B

10:30-10:55 Associated Polynomials, Markov's Theorem, and First-Hitting Times of Birth-Death Processes

Erik A. Van Doorn, University of Twente, The Netherlands

11:00-11:25 Extension of Generalized Mittag-Leffler Density and Processes

Pratik V. Shah, C.K Pithawalla College of Engineering and Technology, India; Ajay Shukla, Sardar Vallabhbhai National Institute of Technology, India

11:30-11:55 State of the Art Visualizations of Complex Function Data

Bonita V. Saunders, Brian Antonishek, Qiming Wang, and Bruce Miller, National Institute of Standards and Technology, USA

12:00-12:25 Orthogonal Polynomial Interpretation of Δ-Toda and Volterra Lattices

Ana Foulquie, Universidade de Aveiro, Portugal; Ivan Area, Universidad de Vigo, Spain; Amilcar Branquinho, Universidade de Coimbra, Portugal; Eduardo Godoy, Universidad de Vigo, Spain

Lunch Break

12:30 PM-1:30 PM

Attendees on their own

Thursday, June 4

IP8

Asymptotic and Numerical Aspects of Special Functions

1:30 PM-2:30 PM

Room:Green Auditorium

For the numerical evaluation of special functions, asymptotic expansions are an important tool. The standard expansions can be used rather straightforwardly. The so-called uniform expansions need more attention, especially for critical values of secondary parameters in the asymptotic problem. For example, the Airy-type expansion of the Bessel function $J_v(z)$ can be used for large domains of the argument and order, but for the transition value $z=v$ special methods are needed for computing the coefficients. We mention several methods for handling this type of problem. We start with a few examples for which Maple and Mathematica have problems in the evaluation of well-known special functions, like the Kummer U-function, for medium-sized values of the parameters. We discuss recent activities in the Santander-Amsterdam project on the evaluation of special functions, in particular for certain cumulative distribution functions. We start with the incomplete gamma functions, and we give recent results for the non central chi-squared or the non central gamma distribution, also called Marcum Q-function in radar detection and communication problems. This is joint work with Amparo Gil and Javier Segura (University of Cantabria, Santander, Spain).

Nico M. Temme
Centrum voor Wiskunde en Informatica, The Netherlands

Thursday, June 4

IP9

Multivariate Orthogonal Polynomials and Modified Moment Functionals

2:30 PM-3:30 PM

Room:Green Auditorium

Multivariate orthogonal polynomials can be defined by means a measure defined on a domain on R^d. A very important class of multivariate orthogonal polynomials is called classical because the measure satisfies a matrix analogue of the Pearson differential equation as well as the orthogonal polynomials are the eigenfunctions of a partial second order differential operator. In this talk, we present old and new results on classical multivariate orthogonal polynomials. In particular, some classical multivariate orthogonal polynomials and some useful modifications will be studied, as well as their impact into the useful properties of the orthogonal polynomials. We study the so-called Uvarov modification obtained by adding to the measure one or a finite set of mass points. Recently, Christoffel modification in several variables, that is, the modification obtained by multiplying the measure times a polynomial, has been studied in the frame of linear relations.

Teresa E. Pérez
Universidad de Granada, Spain

Coffee Break

3:30 PM-4:00 PM

Room:Cafeteria

Thursday, June 4

MS30

Orthogonal Polynomials and Moment Problems

4:00 PM-5:30 PM

Room:Green Auditorium

For a given orthogonal polynomial sequence (OPS), there is an associated Hamburger moment problem. Since a solution of this moment problem provides an orthogonality measure for the OPS, there is naturally a great significance to investigating this moment problem. An important question is the status (determinate or indeterminate?) of the Hamburger and Stieltjes moment problems which are involved with a given sequence of orthogonal polynomials. For the special functions experts, with an indeterminate moment problem, there is a great deal of interest in finding explicitly the Nevanlinna matrix and then determining extremal solutions of the moment problem.

Organizer: Theodore S. Chihara
Purdue University, USA

4:00-4:25 Recurrence Relations and Hamburger and Stieltjes Moment Problems

Theodore Chihara, Purdue University, USA

4:30-4:55 From Indeterminate to Determinate

Jacob S. Christiansen, Lund University, Sweden

5:00-5:25 Spectral Properties of Unbounded Jacobi Matrices and Chihara's Problem

Grzegorz Swiderski, Uniwersytet Wroclawski, Poland

Thursday, June 4

MS31

Inequalities and Special Functions - Part II of II

4:00 PM-5:30 PM

Room:Lecture Room B

For Part 1 see MS26

Although many topics in special functions involve inequalities in one way or another, this minisymposium will concentrate on presentations that present unified treatments of inequalities for special functions

Organizer: Martin E. Muldoon
York University, Canada

4:00-4:25 Inequalities and Bounds for Some Cumulative Distribution Functions

Javier Segura, Universidad de Cantabria, Spain

4:30-4:55 Computer Algebra and Special Functions Inequalities

Veronika Pillwein, Johannes Kepler Universität, Linz, Austria

5:00-5:25 Turán Type Inequalities for Struve Functions

Sanjeev Singh, Indian Institute of Technology Madras, India; Árpád Baricz, Babes-Bolyai University, Romania; Saminathan Ponnusamy, Indian Statistical Institute, India

---

Thursday, June 4

MS32

Symmetry and Special Functions - Part II of II

4:00 PM-6:00 PM

Room:Lecture Room D

For Part 1 see MS27

Mathematical functions become "special" when they occur frequently in solvable problems in the sciences. A principal reason for solvability of these problems is their symmetry. The corresponding functions are characterized by transformation under symmetries, but these are often "hidden", not just standard group symmetries. This minisymposium will explore ways that special functions arise and their properties are determined by symmetry algebra structures. In addition to Lie groups and discrete groups, topics include special functions related to exactly solvable and quasi-exactly solvable systems, integrable, superintegrable and supersymmetric systems, the Askey scheme and its multivariable generalizations, exceptional orthogonal polynomials, and q-functions.

Organizer: Willard Miller Jr
University of Minnesota, USA

4:00-4:25 Ladder Operators for Rationally-Extended Potentials Connected with Exceptional Orthogonal Polynomials and Superintegrability

Ian Marquette, University of Queensland, Australia

4:30-4:55 Coupling Coefficients for Quantum SU(2) Representations

Wolter Groenevelt, Technische Universität Delft, Germany

5:00-5:25 BC_1 Lamé Polynomials

Alexander Turbiner, Instituto de Ciencias Nucleares, UNAM, Mexico

5:30-5:55 A Dirac-Dunkl Equation on S^2 and the Bannai-Ito Algebra

Hendrik De Bie, Ghent University, Belgium; Vincent Genest and *Luc Vinet*, Université de Montréal, Canada

---

Thursday, June 4

MS33

Digital Mathematics Libraries - Part II of II

4:00 PM-6:00 PM

Room:Heritage Room

For Part 1 see MS28

In the modern era, more and more, mathematicians have come to rely on digital tools to obtain mathematical information. This symposium focuses on the development and implementation of online tools such as digital mathematical libraries and interactive resources for obtaining mathematically related information. These tools provide a mechanism for management of knowledge related to mathematical concepts, ideas, realizations, and developments.

Organizer: Howard Cohl
National Institute of Standards and Technology, USA

4:00-4:25 An Overview of the Dynamic Dictionary of Mathematical Functions (http://ddmf.msr-inria.inria.fr)

Frédéric Chyzak, INRIA and École Normale Supérieure de Lyon, France

4:30-4:55 An Introduction to Recent Algorithms Behind the DDMF

Bruno Salvy, INRIA Paris-Rocquencourt, France

5:00-5:25 Semantics, Formula Search, Mathematical Software - How the zbMATH Database extends Beyond Publications

Olaf Teschke, Zentralblatt MATH, Germany

5:30-5:55 MathSciNet: Digital Guide to the Mathematical Literature

Edward Dunne, American Mathematical Society, USA

Thursday, June 4
MS34
Exponential Asymptotics - Part II of II
4:00 PM-6:00 PM

Room:Portrait Room

For Part 1 see MS29
Exponentially small phenomena play an important role in many parts of applied mathematics. In this mini symposium we discuss exponentially-improved asymptotic approximations for special functions. The tools are Borel transforms, differential and difference equations, and integral representations.

Organizer: Adri B. Olde Daalhuis
University of Edinburgh, United Kingdom

4:00-4:25 Rigorous Borel Summability Methods and Applications to Integrable Models
Ovidiu Costin, Rutgers University, USA

4:30-4:55 Some Recursive Techniques in the Approximation of Special Functions
Jose L. Lopez, University of Navarra, Spain; Chelo Ferreira and Ester Perez Sinusia, Universidad de Zaragoza, Spain

5:00-5:25 Uniform Asymptotics of Orthogonal Polynomials Arising from Coherent States
Dan Dai and Weiying Hu, City University of Hong Kong, Hong Kong; Xiang-Sheng Wang, Southeast Missouri State University, USA

5:30-5:55 Uniform Asymptotic Approximations for Linear Differential Equations with a Bounded Uniformity Parameter
Adri B. Olde Daalhuis, University of Edinburgh, United Kingdom

Thursday, June 4
MS40
Asymptotics of Orthogonal Polynomials - Part II of II
4:00 PM-5:30 PM

Room:Lecture Room A

For Part 1 see MS38
The minisymposium will include all aspects of asymptotics of orthogonal polynomials, and related quantities such as reproducing kernels, Jacobi matrices, recurrence coefficients.

Organizer: Doron S. Lubinsky
Georgia Institute of Technology, USA

4:00-4:25 Christoffel-Darboux-type Formulae for Orthonormal Rational Functions and Asymptotics
Karl Deckers, University of Lille, France

4:30-4:55 Recent Asymptotic Expansions for Legendre Polynomial Expansions and Gauss-Legendre Quadrature
Avram Sidi, Technion - Israel Institute of Technology, Israel

5:00-5:25 Singular Linear Statistics of the Laguerre Unitary Ensemble and Painleve III: Double Scaling Analysis
Yang Chen, University of Macau, China

Friday, June 5

Registration
8:00 AM-10:00 AM

Room:Green Auditorium Foyer

Announcements
8:45 AM-9:00 PM

Room:Green Auditorium

IP10
The Laguerre-Polya Class
9:00 AM-10:00 AM

Room:Green Auditorium

The Laguerre-Polya class is a 'natural' closure of the class of polynomials with real roots. I will survey its history, connections with other fields, and various challenges, old and new.

Olga Holtz
University of California, Berkeley, USA and Technische Universitat Berlin, Germany

Coffee Break
10:00 AM-10:30 AM

Room:Cafeteria

Friday, June 5

MS35

Orthogonal Polynomials of the Discrete Variables on Lattices

10:30 AM-12:30 PM

Room:Green Auditorium

Polynomials of more than one variable, that are orthogonal of finite discrete point sets derived from lattices, appeared in the literature only very recently. More about them is yet in the pipeline and will be undoubtedly published or reported within a year or two. The mini symposium is intended to bring together what is, or soon will be, available in the literature about the subject, including applications in dimensions exceeding two.

Organizer: Marzena Szajewska
University of Bialystok, Poland

10:30-10:55 Lattices of Any Dimension and Their Refinement to Any Density

Marzena Szajewska, University of Bialystok, Poland

11:00-11:25 Orthogonality of Macdonald Polynomials with Unitary Parameters

Jan Felipe van Diejen, Universidad de Talca, Chile

11:30-11:55 Discrete Orthogonality of Four Types of Orthogonal Polynomials of Weyl Groups

Jiri Hrivnak, Czech Technical University, Prague, Czech Republic

12:00-12:25 Generalizations of Generating Functions for Meixner and Krawtchouk Polynomials

Howard Cohl, National Institute of Standards and Technology, USA; *Roberto S. Costas-Santos*, Universidad de Alcalá, Spain; Wenqing Xu, Montgomery Blair High School, USA

Friday, June 5

MS36

Numerical Methods for Special Functions

10:30 AM-12:30 PM

Room:Lecture Room B

Recent activities in the numerical computation of special functions will be reviewed. New methods will be discussed for computing certain integrals, special transforms and solutions of differential equations which can be expressed in terms of special functions. These methods find their application in a variety of problems of mathematical physics, applied mathematics and statistics.

Organizer: Amparo Gil
Universidad de Cantabria, Spain

Organizer: Javier Segura
Universidad de Cantabria, Spain

Organizer: Nico M. Temme
Centrum voor Wiskunde en Informatica, The Netherlands

10:30-10:55 Computation and Inversion of Certain Cumulative Distribution Functions

Amparo Gil and Javier Segura, Universidad de Cantabria, Spain; Nico M. Temme, Centrum voor Wiskunde en Informatica, The Netherlands

11:00-11:25 Precise and Fast Computation of Elliptic Functions and Elliptic Integrals

Toshio Fukushima, National Astronomical Observatory of Japan, Japan

11:30-11:55 On the Evaluation of Prolate Spheroidal Wave Functions and Some Associated Quantities

Andrei Osipov, Yale University, USA

12:00-12:25 A Fast Chebyshev-Legendre Transform Using An Asymptotic Formula

Alex Townsend, Massachusetts Institute of Technology, USA; Nick Hale, Stellenbosch University, South Africa

Friday, June 5

MS37

Szegö's Theorem and its Generalizations

10:30 AM-12:30 PM

Room:Lecture Room D

Szego's theorem is a remarkable result connecting the asymptotic spectral distribution of Toeplitz matrices to their coefficients. Applications occur in orthogonal polynomials, spectral theory, and statistical mechanics. Since Szego proved what is known as the First Szego Limit Theorem in 1915, this theorem has been extended in a number of ways. The last few decades, in particular, have seen an explosion of activity in areas where Szego's theorem arises. The purpose of this mini- symposium is to present new results of extensions and generalizations of Szego's Theorem, with new applications to orthogonal polynomials and spectral theory.

Organizer: Tyler McMillen
California State University, Fullerton, USA

Organizer: Alain Bourget
California State University, Fullerton, USA

10:30-10:55 The First Szego's Limit Theorem with Varying Coefficients

Alain Bourget, California State University, Fullerton, USA

11:00-11:25 The Second Szego's Limit Theorem for a Class of non-Toeplitz Matrices

Tyler McMillen, California State University, Fullerton, USA

11:30-11:55 Ratio Asymptotics and Weak Asymptotic Measures

Brian Simanek, Vanderbilt University, USA

12:00-12:25 Newman-Rivlin Asymptotics for Partial Sums of Power Series

Antonio R. Vargas, Dalhousie University, Canada

Friday, June 5
CP6

10:30 AM-12:30 PM

Room:Lecture Room A

10:30-10:55 A Classification of the Lowering-Raising Triples.

Paul M. Terwilliger, University of Wisconsin, Madison, USA

11:00-11:25 Stable Regions of Tur\'an Expressions

Matthew Chasse, Rochester Institute of Technology, USA

11:30-11:55 New Characterizations of Leonard Pairs

Edward Hanson, State University of New York, New Paltz, USA

12:00-12:25 Ring of Integrals Operators

Miloud Assal, Institut Supérieur des Mathématiques Appliquées, Tunisia

Lunch Break
12:30 PM-1:30 PM

Attendees on their own

Friday, June 5
IP11
Orthogonal Polynomials and the 2-Species ASEP
1:30 PM-2:30 PM

Room:Green Auditorium

The asymmetric exclusion process (ASEP) is a model of particles hopping on a 1-dimensional lattice with open boundaries. The partition function of this model is related to moments of Askey-Wilson polynomials. Askey-Wilson polynomials are at the top of the hierarchy of orthogonal polynomials, and are also a limiting case of Koornwinder polynomials, which are multivariate orthogonal polynomials. Recently Eric Rains defined moments of Koornwinder polynomials at q=t, which appear to be polynomials with positive coefficients when written appropriately in the parameters of the ASEP. I'll explain joint work with Sylvie Corteel in which we show that Koornwinder moments at q=t are related to the 2-species ASEP, an exclusion process involving two different types of particles. I'll also describe complementary work of Olga Mandelshtam and Xavier Viennot providing a combinatorial description of the stationary distribution of the 2-species ASEP.

Lauren Williams
University of California, Berkeley, USA

Coffee Break
2:30 PM-3:00 PM

Room:Cafeteria

Friday, June 5
MS39
Multiple Orthogonal Polynomials
3:00 PM-5:00 PM

Room:Green Auditorium

Multiple orthogonal polynomials are polynomialks of one variable for which the orthogonality conditions are distributed over r positive measures. These polynomials first appeared in simultaneous rational approximation (Hermite-Padé approximation) as the common denominator of rational functions approximating *r* different Markov functions. The past decade they also appeared in random matrix theory and in various other determinantal processes. The minisymposium will deal with various aspects of multiple orthogonal polynomials, such as the recurrence relations, asymptotics of Hermite-Padé approximation, discrete integrable systems associated with multiple orthogonal polynomials and L_p extremal multiple polynomials.

Organizer: Walter van Assche
Katholieke Universiteit Leuven, Belgium

3:00-3:25 Geometry of Hermite-Padé Approximants for a Pair of Cauchy Transforms with Interlacing Symmetric Supports

Alexander I. Aptekarev, Russian Academy of Sciences, Russia

3:30-3:55 Difference Operators on Lattices and Multiple Orthogonal Polynomials

Maxim Derevyagin, University of Mississippi, USA

4:00-4:25 On the Convergence of Mixed Type Hermite-Padé Approximants

Sergio M. Medina Peralta and Guillermo López Lagomasino, Universidad Carlos III de Madrid, Spain

4:30-4:55 Weak and Strong Asymptotics for the Pollaczek Multiple Orthogonal Polynomials

Andrei Martinez-Finkelshtein, University of Almeria, Spain

Friday, June 5
CP7

3:00 PM-4:00 PM

Room:Lecture Room A

3:00-3:25 Some Q-Continued Fractions and Their Connections with Lambert Series and Mock Theta Functions

Mohan Rudravarapu, Government Polytechnic,Srikakulam, Andhra Pradesh,India; Pankaj Srivastava, Motilal Nehru National Institute of Technology, India

3:30-3:55 A Q-Extension of a Reduction Formula of Watson

Zeinab Mansour and *Maryam AL Towaileb*, King Saud University, Saudia Arabia

Friday, June 5
CP8

3:00 PM-5:00 PM

Room:Lecture Room B

3:00-3:25 On Verblunsky Coefficients Related to a Particular Class of Caratéodary Functions

Swaminathan Anbhu, Indian Institute of Technology Roorkee, India

3:30-3:55 Discrete Orthogonal and q-Orthogonal Polynomial Sequences in the Extended Hahn Classes with Simple Recurrence Coefficients

Luis Verde-Star, Universidad Autonoma Metropolitana, Mexico

4:00-4:25 Orthogonal Polynomials with As Their Weight Functions

Maitree Podisuk, Kasem Bundit University, Thailand

4:30-4:55 On Zeros of a Class of Real Self-Reciprocal Polynomials

Cleonice F. Bracciali, Vanessa Botta, and Junior Pereira, Universidade Estadual Paulista, Brazil

Friday, June 5
CP9

3:00 PM-5:00 PM

Room:Lecture Room D

3:00-3:25 Generalized Hurwitz Matrices: Criteria of Total Positivity

Olga Y. Kushel, Technische Universitaet Berlin, Germany; Olga Holtz, University of California, Berkeley, USA; Sergey Khrushchev, Kazakh-British Technical University, Kazakhstan; Mikhail Tyaglov, Shanghai Jiao Tong University, China

3:30-3:55 Some Applications of Determninants to Orthogonal Polynomials

Mikhail Tyaglov, Shanghai Jiao Tong University, China

4:00-4:25 Canonical Vector-Polynomials for Complex Order Modified Bessel Functions

Juri M. Rappoport, Russian Academy of Sciences, Russia

4:30-4:55 Products of Truncated Unitary Matrices

Dries Stivigny, Katholieke Universiteit Leuven, Belgium

OPSFA-13 Abstracts

13th International Symposium on Orthogonal Polynomials, Special Functions & Applications

June 1-5, 2015
National Institute of Standards and Technology
Gaithersburg, Maryland, USA

Abstracts are printed as submitted by the authors.

Notes

Organizer and Speaker Index

13th International Symposium on Orthogonal Polynomials, Special Functions & Applications

June 1-5, 2015

National Institute of Standards and Technology

Gaithersburg, Maryland, USA

A

Aktas, Rabia, CP4, 5:00 Tue

AL Towaileb, Maryam, CP7, 3:30 Fri

Alladi, Krishnaswami, MS17, 5:00 Tue

Anbhu, Swaminathan, CP8, 3:00 Fri

Andersen, Nickolas, MS12, 11:30 Tue

Andrews, George E., MS3, 10:30 Mon

Andrews, George E., MS3, 10:30 Mon

Andrews, George E., MS12, 10:30 Tue

Aptekarev, Alexander I., MS39, 3:00 Fri

Assal, Miloud, CP6, 12:00 Fri

Aydin Ari, Didem, CP3, 4:30 Mon

B

Balogh, Ferenc, MS24, 11:30 Wed

Benko, David, MS4, 11:00 Mon

Berndt, Bruce, MS12, 10:30 Tue

Berndt, Bruce, MS17, 4:00 Tue

Berndt, Bruce, MS22, 10:30 Wed

Berriochoa, Elias, MS7, 3:00 Mon

Bertola, Marco, MS14, 11:30 Tue

Beukers, Frits, MS3, 11:00 Mon

Bilman, Deniz, MS5, 12:00 Mon

Blaschke, Petr, MS16, 5:30 Tue

Borodachov, Sergiy, MS4, 10:30 Mon

Borodachov, Sergiy, MS4, 11:30 Mon

Borodachov, Sergiy, MS8, 3:00 Mon

Bostan, Alin, MS21, 12:00 Wed

Bothner, Thomas J., MS5, 11:30 Mon

Bothner, Thomas, MS18, 5:00 Tue

Bourget, Alain, MS37, 10:30 Fri

Bourget, Alain, MS37, 10:30 Fri

Bracciali, Cleonice F., CP8, 4:30 Fri

Branquinho, Amílcar, MS25, 11:00 Thu

Brauchart, Johann, MS4, 10:30 Mon

Breuer, Jonathan, MS38, 11:30 Thu

Buckingham, Robert J., MS9, 3:00 Mon

Buckingham, Robert, MS18, 4:00 Tue

Buescu, Jorge C., MS4, 12:00 Mon

C

Chasse, Matthew, CP6, 11:00 Fri

Chen, Yang, MS40, 5:00 Thu

Cherniha, Roman, CP2, 4:30 Mon

Chihara, Theodore, MS30, 4:00 Thu

Chihara, Theodore S., MS30, 4:00 Thu

Cho, Manki, MS8, 4:30 Mon

Christiansen, Jacob S., MS30, 4:30 Thu

Chyzak, Frédéric, MS33, 4:00 Thu

Claeys, Tom, MS24, 10:30 Wed

Clarkson, Peter, MS13, 10:30 Tue

Clarkson, Peter, MS13, 10:30 Tue

Clarkson, Peter, MS18, 4:00 Tue

Clarkson, Peter, MS23, 10:30 Wed

Clarkson, Peter, MS23, 11:30 Wed

Cohl, Howard, MS28, 10:30 Thu

Cohl, Howard, MS28, 10:30 Thu

Cohl, Howard, MS33, 4:00 Thu

Corless, Rob, MS21, 10:30 Wed

Costas-Santos, Roberto S., MS35, 12:00 Fri

Costin, Ovidiu, MS34, 4:00 Thu

Cuyt, Annie, MS2, 10:30 Mon

Cuyt, Annie, MS7, 3:00 Mon

D

Dai, Dan, MS34, 5:00 Thu

Das, Sanjukta, CP2, 3:30 Mon

Deaño, Alfredo, MS19, 5:00 Tue

Deaño, Alfredo, MS18, 5:30 Tue

Deckers, Karl, MS40, 4:00 Thu

Deift, Percy, IP3, 9:00 Tue

Delabaere, Eric, MS29, 10:30 Thu

Derevyagin, Maxim, MS39, 3:30 Fri

Dixit, Atul, MS22, 10:30 Wed

Dominguez de la Iglesia, Manuel, MS15, 4:30 Tue

Dominici, Diego, MS25, 10:30 Thu

Dragnev, Peter, MS4, 10:30 Mon

Dragnev, Peter, MS8, 3:00 Mon

Dragnev, Peter, MS8, 4:00 Mon

Driver, Kathy A., MS26, 10:30 Thu

Dueñas, Herbert, MS20, 11:30 Wed

Duits, Maurice, MS19, 5:30 Tue

Dunkl, Charles F., IP1, 9:00 Mon

Dunne, Edward, MS33, 5:30 Thu

E

Eichinger, Benjamin, CP1, 5:30 Tue

F

Fernandez, Lidia, MS20, 12:00 Wed

Foulquie, Ana, CP5, 12:00 Thu

Fukushima, Toshio, MS36, 11:00 Fri

G

Garvan, Frank, MS17, 5:30 Tue

Garza, Lino G., CP1, 5:00 Tue

Garza, Luis E., MS20, 11:00 Wed

Gautshi, Walter, MS2, 10:30 Mon

Gawronski, Wolfgang, CP4, 4:00 Tue

Genest, Vincent, MS6, 4:30 Mon

Genest, Vincent, MS27, 11:30 Thu

Gerhold, Stefan, MS21, 11:00 Tue

Gil, Amparo, MS36, 10:30 Fri

Gil, Amparo, MS36, 10:30 Fri

Grinshpan, Arcadii, MS26, 11:30 Thu

Groenevelt, Wolter, MS32, 4:30 Thu

H

Hanson, Edward, CP6, 11:30 Fri

Hardin, Douglas, MS8, 3:30 Mon

Holtz, Olga, IP10, 9:00 Fri

Howls, Chris, MS29, 11:00 Thu

Hrivnak, Jiri, MS35, 11:30 Fri

Huber, Tim, MS22, 12:00 Wed

I

Imamoglu, Erdal, MS21, 11:30 Wed

Ion, Patrick, MS28, 12:00 Thu

Ismail, Mourad, IP2, 1:30 Mon

Ismail, Mourad, MS3, 11:30 Mon

J

Jana, Ranjan K., CP2, 3:00 Mon

Jenkins, Robert, MS9, 3:30 Mon

Johansson, Fredrik, MS11, 11:30 Tue

Joldes, Mioara, MS16, 4:30 Tue

Italicized names indicate session organizers.

K

Kacimov, Anvar, CP2, 4:00 Mon
Karp, Dmitry, MS26, 12:00 Thu
Kauers, Manuel, MS11, 10:30 Tue
Kauers, Manuel, MS16, 4:00 Tue
Kauers, Manuel, MS16, 4:00 Tue
Kauers, Manuel, MS21, 10:30 Wed
Koelink, Erik, CP1, 4:00 Tue
Koutschan, Christoph, MS11, 12:00 Tue
Kozlowski, Karol K., MS24, 11:00 Wed
Kuijlaars, Arno, MS14, 12:00 Tue
Kushel, Olga Y., CP9, 3:00 Fri

L

Lee, Wen-shin, MS2, 11:30 Mon
Liaw, Constanze, MS23, 10:30 Wed
Liechty, Karl, SP1, 1:30 Wed
Littlejohn, Lance L., MS15, 4:00 Tue
Liu, Zhipeng, MS14, 11:00 Tue
Lopez, Jose L., MS34, 4:30 Thu
Loureiro, Ana, MS23, 11:00 Wed
Loureiro, Ana, MS25, 12:00 Thu
Lubinsky, Doron S., MS38, 10:30 Thu
Lubinsky, Doron S., MS38, 10:30 Thu
Lubinsky, Doron S., MS40, 4:00 Thu

M

Manas, Manuel, MS1, 10:30 Mon
Marcellan, Francisco, MS10, 10:30 Tue
Marcellan, Francisco, MS10, 10:30 Tue
Marcellan, Francisco, MS15, 4:00 Tue
Marcellan, Francisco, MS20, 10:30 Wed
Marquette, Ian, MS32, 4:00 Thu
Martinez-Finkelshtein, Andrei, MS39, 4:30 Fri
Mashayekhi, Somayeh, MS7, 3:30 Mon
McMillen, Tyler, MS37, 10:30 Fri
McMillen, Tyler, MS37, 11:00 Fri
Medina Peralta, Sergio M., MS39, 4:00 Fri
Miller, Bruce, MS28, 11:00 Thu
Miller, Peter D., MS5, 10:30 Mon

Miller, Peter D., MS5, 10:30 Mon
Miller, Peter D., MS9, 3:00 Mon
Miller, Peter D., MS18, 4:30 Tue
Miller Jr, Willard, MS27, 10:30 Thu
Miller Jr, Willard, MS27, 10:30 Thu
Miller Jr, Willard, MS32, 4:00 Thu
Milson, Robert, MS27, 11:00 Thu
Muldoon, Martin E., MS26, 10:30 Thu
Muldoon, Martin E., MS26, 11:00 Thu
Muldoon, Martin E., MS31, 4:00 Thu

N

Nemes, Gergo, MS29, 11:30 Thu
Neuschel, Thorsten, CP1, 4:30 Tue

O

Ogilvie, Karen, MS29, 12:00 Thu
Olde Daalhuis, Adri B., MS29, 10:30 Thu
Olde Daalhuis, Adri B., MS34, 4:00 Thu
Olde Daalhuis, Adri B., MS34, 5:30 Thu
Olver, Sheehan, MS5, 11:00 Mon
Olver, Sheehan, MS14, 10:30 Tue
Olver, Sheehan, MS13, 11:30 Tue
Olver, Sheehan, MS19, 4:00 Tue
Olver, Sheehan, MS24, 10:30 Wed
Osipov, Andrei, MS36, 11:30 Fri
Oste, Roy, MS27, 12:00 Thu

P

Pérez, Teresa E., IP9, 2:30 Thu
Petronilho, Jose Carlos S., MS10, 11:30 Tue
Pillwein, Veronika, MS11, 10:30 Tue
Pillwein, Veronika, MS16, 4:00 Tue
Pillwein, Veronika, MS21, 10:30 Wed
Pillwein, Veronika, MS31, 4:30 Thu
Pinar, Miguel, MS1, 11:00 Mon
Pinzón-Cortés, Natalia C., MS10, 12:00 Tue
Podisuk, Maitree -., CP8, 4:00 Fri
Post, Sarah, IP6, 9:00 Wed

R

Ranga, Alagacone S., MS20, 10:30 Wed
Rappoport, Juri M., CP9, 4:00 Fri
Reeger, Jonah A., MS13, 11:00 Tue
Rhoades, Robert, MS12, 11:00 Tue
Rolen, Larry, MS12, 12:00 Tue
Rudravarapu, Mohan, CP7, 3:00 Fri

S

Saff, Edward, MS8, 3:00 Mon
Salvy, Bruno, MS33, 4:30 Thu
Saunders, Bonita V., MS2, 11:00 Mon
Saunders, Bonita V., CP5, 11:30 Thu
Schultz, Dan, MS22, 11:00 Wed
Segura, Javier, MS31, 4:00 Thu
Segura, Javier, MS36, 10:30 Fri
Shah, Pratik V., CP5, 11:00 Thu
Sidi, Avram, MS40, 4:30 Thu
Sills, Andrew V., MS17, 4:30 Tue
Silva, Guilherme, MS38, 11:00 Thu
Simanek, Brian, MS37, 11:30 Fri
Singh, Sanjeev, MS31, 5:00 Thu
Singh, Uaday, MS7, 4:00 Mon
Smith, David A., MS9, 4:00 Mon
Srinivasan, Gopala Krishna, CP4, 4:30 Tue
Stewart, Jessica, MS15, 5:00 Tue
Stivigny, Dries, CP9, 4:30 Fri
Straub, Armin, MS11, 11:00 Wed
Straub, Armin, MS22, 11:30 Wed
Swiderski, Grzegorz, MS30, 5:00 Thu
Szajewska, Marzena, MS35, 10:30 Fri
Szajewska, Marzena, MS35, 10:30 Fri

T

Temme, Nico M., IP8, 1:30 Thu
Temme, Nico M., MS36, 10:30 Fri
Terwilliger, Paul M., CP6, 10:30 Fri
Teschke, Olaf, MS33, 5:00 Thu
Tobvis, Alex, MS19, 4:30 Tue
Townsend, Alex, MS36, 12:00 Fri
Tracy, Craig A., IP5, 2:30 Tue
Trogdon, Thomas, MS14, 10:30 Tue

Italicized names indicate session organizers.

Trogdon, Thomas, MS14, 10:30 Tue
Trogdon, Thomas, MS13, 12:00 Tue
Trogdon, Thomas, MS19, 4:00 Tue
Trogdon, Thomas, MS24, 10:30 Wed
Trogdon, Tom, MS5, 10:30 Mon
Trogdon, Tom, MS9, 3:00 Mon
Turbiner, Alexander, MS32, 5:00 Thu
Tyaglov, Mikhail, CP9, 3:30 Fri

U

Urieles, Alejandro J., MS10, 11:00 Tue

V

van Assche, Walter, MS19, 4:00 Tue
van Assche, Walter, MS39, 3:00 Fri
van Diejen, Jan Felipe, MS35, 11:00 Fri
Van Doorn, Erik A., CP5, 10:30 Thu
Vargas, Antonio R., MS37, 12:00 Fri
Verde-Star, Luis, CP8, 3:30 Fri
Vignat, Christophe, MS16, 5:00 Tue
Vinet, Luc, MS1, 11:30 Mon
Vinet, Luc, MS32, 5:30 Thu

W

Wade, Jeremy, MS6, 3:30 Mon
Wan, James G., CP3, 3:00 Mon
Weisstein, Eric, MS28, 11:30 Thu
Wellman, Richard, MS15, 5:30 Tue
Wetzel, Alfredo N., MS9, 4:30 Mon
Williams, Lauren, IP11, 1:30 Fri
Witte, Nicholas, MS25, 11:30 Thu
Wutzig, Michael, CP3, 3:30 Mon

X

Xu, Yuan, MS1, 10:30 Mon
Xu, Yuan, MS6, 3:00 Mon
Xu, Yuan, MS6, 4:00 Mon

Y

Yakubovich, Semyon, CP3, 4:00 Mon
Yaman, Irem, MS2, 12:00 Mon
Yarman, Evren, MS7, 4:30 Mon
Yattselev, Maxim, MS38, 12:00 Thu
Yee, Ae Ja, MS17, 4:00 Tue

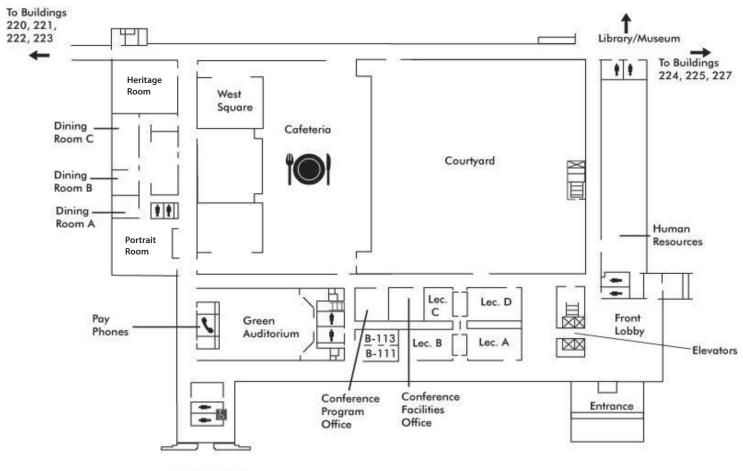*Italicized names indicate session organizers.*

Z

Zhedanov, Alexei, IP7, 9:00 Thu
Zhedanov, Alexei, MS25, 10:30 Thu
zu Castell, Wolfgang, MS6, 3:00 Mon
Zudilin, Wadim, IP4, 1:30 Tue
Zudilin, Wadim, MS3, 12:00 Mon
Zudilin, Wadim, MS11, 10:30 Tue

OPSFA-13 Budget

Conference Budget
13th International Symposium on Orthogonal Polynomials, Special Functions and Applications
June 1-5, 2015
Gaithersburg, Maryland, USA

Expected Paid Attendance 190

Revenue

Registration Income		$77,100
	Total	$77,100

Expenses

Printing		$1,200.00
Organizing Committee		$1,900.00
Invited Speakers		$15,400.00
Food and Beverage		$22,700.00
AV Equipment and Telecommunication		$0.00
Advertising		$1,500.00
Conference Labor (including benefits)		$40,565.00
Other (supplies, staff travel, freight, misc.)		$7,500.00
Administrative		$12,439.00
Accounting/Distribution & Shipping		$6,633.00
Information Systems		$11,960.00
Customer Service		$4,517.00
Marketing		$7,095.00
Office Space (Building)		$4,488.00
Other SIAM Services		$4,739.00
	Total	$142,636

Net Conference Expense		($65,536)
Support Provided by SIAM		$65,536
		$0

Estimated Support for Travel Awards not included above:

Early Career and Students	12	$8,100

NIST Floor Plan

To Buildings
220, 221,
222, 223

Library/Museum

To Buildings
224, 225, 227

Heritage Room

West Square

Cafeteria

Courtyard

Dining Room C

Dining Room B

Dining Room A

Portrait Room

Human Resources

Pay Phones

Green Auditorium

Lec. C

Lec. D

B-113
B-111

Lec. B

Lec. A

Front Lobby

Elevators

Conference Program Office

Conference Facilities Office

Entrance

Red Auditorium

FSC logo text box indicating size & layout of logo. Conlins to insert logo.