
Program of the Sessions

Toronto, ON Canada, September 23–24, 2000

Saturday, September 23

Meeting Registration

8:00 AM – 4:30 PM Foyer, Sandford Fleming Building

AMS Exhibit and Book Sale

8:00 AM – 4:30 PM Room 1013, Sandford Fleming Building

Special Session on Commutative Algebra and Algebraic Geometry, I

8:30 AM – 11:20 AM Room 4171, Medical Sciences Building

Organizers: **Anthony Geramita**, Queens University
William Traves, United States Naval Academy

- 8:30AM (1) *Uniform behavior of symbolic powers of ideals.*
Lawrence Ein, University of Illinois, Chicago,
Robert Lazarsfeld, University of Michigan,
and **Karen E Smith***, University of Michigan (957-13-131)
- 9:00AM (2) *Applications of pseudocanonical covers to tight closure problems.* Preliminary report.
Florian Enescu, Department of Mathematics, University of Michigan (957-13-99)
- 9:30AM (3) *Closed formulas for the core of an ideal.* Preliminary report.
Claudia Polini, University of Oregon (957-13-20)
- 10:00AM (4) *The Conductor of Submonoids of \mathbb{N}^n .*
Leslie G Roberts*, Queen's University, and **Les Reid**, Southwest Missouri State University (957-13-119)
- 10:30AM (5) *D-modules on Smooth Toric Varieties.*
Mircea Mustata, **Gregory G Smith***, University of California, Berkeley, **Harrison Tsai**, Cornell University, and **Uli Walther**, Purdue University (957-14-223)
- 11:00AM (6) *How to compute associated primes of D-modules.* Preliminary report.
Harrison K Tsai, Cornell University (957-13-110)

Special Session on Representation Theory of Infinite Dimensional Lie Algebras, I

8:30 AM – 11:15 AM Room 3163, Medical Sciences Building

Organizer: **Yun Gao**, York University

- 8:30AM (7) *Radicals of vertex operator algebras.*
Chongying Dong, University of California, Santa Cruz (957-17-152)
- 9:30AM (8) *Down-up algebras and two-parameter quantum groups.*
Sarah Witherspoon*, University of Massachusetts, and **Georgia Benkart**, University of Wisconsin (957-16-213)
- 10:30AM (9) *On Modules of Bounded Multiplicities.* Preliminary report.
Daniel J. Britten* and **Francis W. Lemire**, University of Windsor (957-17-339)

Special Session on Discrete and Applied Geometry, I

8:30 AM – 11:20 AM Room 3171, Medical Sciences Building

Organizers: **Asia Ivic Weiss**, York University
Walter Whiteley, York University

- 8:30AM (10) *Triangles that tile the sphere: some new results.*
Robert J Dawson, Saint Mary's University (957-52-293)
- 9:00AM (11) *Matroidally rigid polytopes.*
Ted Bisztriczky, University of Calgary (957-51-81)
- 9:30AM (12) *Separation in Totally-Sewn 4-Polytopes (Part 1).* Preliminary report.
Wendy A Finbow-Singh* and **Deborah Oliveros-Braniff**, University of Calgary (957-52-264)
- 10:00AM (13) *Separation in Totally-Sewn 4-Polytopes (Part 2).* Preliminary report.
Wendy A Finbow-Singh and **Deborah Oliveros-Braniff***, University of Calgary (957-52-263)
- 10:30AM Discussion

The time limit for each contributed paper in the sessions is ten minutes. In the Special Sessions the time limit varies from session to session and within sessions. To maintain the schedule, time limits will be strictly enforced.

For papers with more than one author, an asterisk follows the name of the author who plans to present the paper at the meeting.

Papers flagged with a solid triangle (▶) have been designated by the author as being of possible interest to undergraduate students.

Abstracts of papers presented in the sessions at this meeting will be

found in Volume 21, Issue 3 of *Abstracts of papers presented to the American Mathematical Society*, ordered according to the numbers in parentheses following the listings. The middle two digits, e.g., 897-20-1136, refer to the Mathematical Reviews subject classification assigned by the individual author. Groups of papers for each subject are listed chronologically in the *Abstracts*. The last one to four digits, e.g., 897-20-1136, refer to the receipt number of the abstract; abstracts are further sorted by the receipt number within each classification.

11:00AM *Shapes that do well in covering, tiling and packing problems.*
 ► (14) **T.Y. Lee*** and **Doug Szajda**, University of Maryland (957-52-14)

10:30AM *A R-D model for age-structured population on unbounded domain—traveling wave fronts.*
 ► (25) Preliminary report.
Xingfu Zou, Memorial University of Newfoundland (957-35-62)

Special Session on Ergodic Theory and Dynamical Systems, I

9:00 AM – 11:20 AM Room 1105, Sandford Fleming Building

Organizers: **Andres del Junco**, University of Toronto
Blair Madore, SUNY, Potsdam

9:00AM *Dynamics of measure preserving homeomorphisms.*
 (15) **Vidhu S Prasad**, University of Massachusetts Lowell (957-37-34)

9:30AM *The T, T^{-1} -process, finitary codings and weak Bernoulli.* Preliminary report.
 (16) **Jeffrey E Steif**, Georgia Institute of Technology (957-37-100)

10:00AM Discussion

10:30AM *Centralizers and Factors of Products of Nonsingular Chacon Transformations.*
 (17) **Andres del Junco**, University of Toronto, and **Cesar E. Silva***, Williams College (957-37-301)

11:00AM *Some questions on squarefunctions and subsequence theorems.*
 (18) **Mate Wierdl**, University of Memphis (957-37-209)

Special Session on Nonabsolute Integration, I

9:00 AM – 11:20 AM Room 120, Galbraith Building

Organizers: **Patrick Muldowney**, University of Ulster
Erik Talvila, University of Illinois, Urbana

9:00AM *Non-absolute Integration in the Twentieth Century.*
 ► (19) **Peter Bullen**, University of British Columbia (957-26-83)

10:00AM *The Construction of Major and Minor Functions Using Gauges and Riemann Sums.*
 (20) **John Coffey*** and **Robert Merkovsky**, Purdue University Calumet (957-26-09)

10:30AM *Impulsive retarded differential equations in Banach spaces via Bochner-Lebesgue and Henstock integrals.* Preliminary report.
 (21) **Márcia Federson*** and **Plácido Táboas**, Universidade de São Paulo / ICMC (957-34-10)

11:00AM *Covering Theorems and Lebesgue Integration.*
 (22) **Peter A Loeb***, University of Illinois, Champaign-Urbana, and **Erik Talvila**, University of Alberta (957-26-48)

Special Session on Functional Differential Equations and Applications, I

9:00 AM – 10:50 AM Room 244, Galbraith Building

Organizers: **Anatoli F. Ivanov**, Pennsylvania State University
Jianhong Wu, York University

9:00AM *Contracting return maps for monotone delayed feedback.*
 (23) **Hans-Otto Walther**, Universitaet Giessen (957-34-28)

10:00AM *Structured Population on Two Patches: Modeling Dispersal and Delay.* Preliminary report.
 ► (24) **Joseph So***, University of Alberta, **Jianhong Wu**, York University, and **Xingfu Zou**, Memorial University (957-92-161)

Special Session on Pseudo-differential Operators, Wavelet Transforms and Related Topics, I

9:00 AM – 11:30 AM Room 220, Galbraith Building

Organizer: **M. W. Wong**, York University

9:00AM *On the Berezin-Toeplitz Calculus.*
 (26) **Lewis A Coburn**, SUNY at Buffalo (957-47-06)

10:00AM *The Plancherel Transform, Square-integrability and Wigner functions.*
 (27) **Syed T Ali**, Concordia University, Montreal (957-20-246)

11:00AM *Operator-Theoretic Interpolation of Wavelets and Frames.* Preliminary report.
 (28) **David R. Larson**, Texas A&M University (957-46-277)

Special Session on Set Theory and Set-Theoretic Topology, I

9:00 AM – 11:20 AM Room 4102, Sandford Fleming Building

Organizer: **Franklin D. Tall**, University of Toronto

9:00AM *Another covering property proof via elementarysubmodels.* Preliminary report.
 (29) **Zoltan T. Balogh**, Miami University, Oxford, OH 45056 (957-54-58)

9:30AM *CH and the Moore-Mrowka Problem.*
 (30) **Erick Todd Eisworth**, University of Northern Iowa (957-54-331)

10:00AM *Polyadic spaces of tightness τ .*
 (31) **Murray Bell**, University of Manitoba (957-54-343)

10:30AM *Locally compact Dowker spaces.* Preliminary report.
 (32) **Peter J Nyikos**, University of South Carolina (957-54-309)

11:00AM *On spaces related to w_μ -metrizable spaces.*
 (33) **Jerry E Vaughan**, University of North Carolina at Greensboro (957-54-314)

Special Session on Computational Wavelet Analysis, I

9:00 AM – 11:25 AM Room 221, Galbraith Building

Organizers: **Sebastian Ferrando**, Ryerson Polytechnic University
Larry Kolasa, Ryerson Polytechnic University

9:00AM *Wavelet analysis of seasonal long-memory time series.* Preliminary report.
 ► (34) **Brandon J Whitcher**, EURANDOM (957-62-35)

9:30AM *Wavelet Analysis of Raman Spectral Data.*
 (35) **Tony T Cai**, Department of Statistics/Purdue University (957-62-237)

10:00AM *Multiple Components Representation of Functional MR images for Human Brain Mapping.*
 (36) **Francois G. Meyer**, university of colorado (957-92-307)

10:30AM *Anisotropic wavelet smoothing of functional Magnetic Resonance Imaging.* Preliminary report.
 ► (37) **Bradley j Lucier**, Purdue University (957-65-286)

11:00AM Discussion

Special Session on Applied Categorical Structures, I

9:00 AM – 11:25 AM Room 2173, Medical Sciences Building

Organizers: **Joan Wick Pelletier**, York University

Walter Tholen, York University

- 9:00AM (38) *Higher category theory*. Preliminary report.
Andre Joyal, UQAM Université du Québec à Montréal (957-18-235)
- 9:30AM (39) *Some absolute pullbacks and pushouts in Δ* .
Myles Tierney, Rutgers University (957-18-76)
- 10:00AM (40) *Nerves of Bicategories: Morphisms and Simplicial Maps*.
John W Duskin, State University of New York at Buffalo (957-18-198)
- 10:30AM (41) *Higher fundamental functors in some categories of presheaves*. Preliminary report.
Marco Grandis, Dipartimento di Matematica, Univ. di Genova, I (957-18-39)
- 11:00AM (42) *A higher dimensional homotopy sequence*.
Marco Grandis, Università di Genova, and **Enrico Vitale***, Université catholique de Louvain (957-18-77)

Special Session on Modern Schubert Calculus, I

9:00 AM – 11:20 AM Room 119, Galbraith Building

Organizers: **Nantel Bergeron**, York University
Frank Sottile, University of Wisconsin

- 9:00AM (43) *Stratified spaces formed by totally positive varieties*.
Sergey Fomin*, University of Michigan, and **Michael Z Shapiro**, KTH Stockholm (957-14-239)
- 9:30AM (44) *Connected components of real double Bruhat cells*.
Andrei Zelevinsky, Northeastern University (957-14-247)
- 10:00AM (45) *Connections between singular loci and cohomology of Schubert Varieties*.
Sara C Billey, M.I.T. (957-05-302)
- 10:30AM (46) *Smooth Schubert varieties in partial flag manifolds*.
Vesslin Gasharov, Cornell University, and **Victor Reiner***, University of Minnesota (957-05-173)
- 11:00AM (47) *Isotropic Schubert calculus and polytopes*.
Nantel Bergeron, **Stefan Mykytiuk**, York University, **Frank Sottile**, University of Massachusetts at Amherst, and **Stephanie van Willigenburg***, Cornell University (957-05-206)

Special Session on Analytic Number Theory, I

9:00 AM – 11:20 AM Room 2172, Medical Sciences Building

Organizers: **John Friedlander**, University of Toronto
Steve Gonek, University of Rochester

- 9:00AM (48) *Zeta functions of an infinite family of $K3$ surfaces*.
Scott D Ahlgren*, Colgate University, **Ken Ono**, University of Wisconsin, and **David Penniston**, Furman University (957-11-220)
- 9:30AM (49) *Extensions of the Chowla-Selberg formula*. Preliminary report.
Kenneth S Williams, Carleton University (957-11-150)
- 10:00AM (50) *Class Numbers of Binary Cubic Forms*. Preliminary report.
Michael A Bennett*, University of Illinois, Urbana-Champaign, and **Trevor D Wooley**, University of Michigan (957-11-127)
- 10:30AM (51) *Monochromatic Unit Fractions*.
Ernest S Croot, The University of Georgia (957-11-170)
- 11:00AM (52) *Subconvexity bounds for Artin L-functions*.
William Duke, Rutgers University, **John B Friedlander**, University of Toronto, and **Henryk Iwaniec***, Rutgers University (957-11-145)

Special Session on Nonlinear Functional Analysis, I

9:00 AM – 11:20 AM Room 248, Galbraith Building

Organizers: **Sankatha Singh**, Memorial University of Newfoundland
Bruce Watson, Memorial University of Newfoundland

- 9:00AM (53) *Simultaneous interpolation and approximation by a class of multivariate positive operators*.
Giampietro Allasia, University of Turin (957-47-47)
- 9:30AM (54) *On some singularity concept for kernels of nonlinear integral operators*.
Carlo Bardaro, Dipartimento di Matematica e Informatica, Università degli Studi di Perugia (957-47-85)
- 10:00AM (55) *The attainable order of collocation solutions for weakly singular nonlinear Volterra integral equations with nonvanishing delays*. Preliminary report.
Hermann Brunner, Memorial University of Newfoundland (957-45-138)
- 10:30AM (56) *Recent progress on iterative methods for nonlinear pseudocontractions*.
Charles Chidume, International Centre for Theoretical Physics, Trieste, Italy (957-47-43)
- 11:00AM (57) *Constrained saddle point theorems and eigenvalues of nonlinear operators*.
Raffaele Chiappinelli, Dipartimento di Matematica, Università di Siena (957-47-68)

Special Session on Noncommutative Geometry, I

9:00 AM – 11:20 AM Room 3202, Sandford Fleming Building

Organizers: **Ryszard Nest**, University of Copenhagen
Victor Nistor, Pennsylvania State University
Boris Tsygan, Pennsylvania State University

- 9:00AM (58) *Homology of complete symbols and non-commutative geometry*.
Moulay-Tahar Benameur, Institut Desargues, Lyon, France (957-58-243)
- 9:30AM (59) *Secondary Characteristic Classes and Cyclic Cohomology of Hopf Algebras and Algebroids*.
Alexander Gorokhovsky, University of Michigan (957-53-287)
- 10:00AM Break
- 10:30AM (60) *Cyclic Cohomology of Quantum Groups*. Preliminary report.
Masoud Khalkhali, Western Ontario (957-18-249)
- 11:00AM (61) *On the index of perturbed Dirac Operators on Manifolds with Corners*.
Paul A Loya*, Boston University, and **Richard B Melrose**, MIT (957-58-84)

Special Session on Probability, I

9:00 AM – 11:25 AM Room 305, Galbraith Building

Organizers: **Neal Madras**, York University
George L. O'Brien, York University
Thomas Salisbury, York University
Donna Salopek, York University

- 9:00AM (62) *On the volume of the intersection of two Wiener sausages*.
Frank den Hollander, EURANDOM (957-60-191)

- 9:45AM (63) *Idempotent probability and large deviations.*
Preliminary report.
Anatolii A. Puhalskii, University of Colorado at Denver (957-60-332)
- 10:30AM (64) *Coalescents with simultaneous multiple collisions.*
Jason R Schweinsberg, U.C. Berkeley (957-60-188)
- 11:00AM (65) *Incipient infinite clusters.*
Antal Járai, Jr., The University of British Columbia, Vancouver BC (957-60-325)

Special Session on Operator Algebras and Operator Theory, I

9:00 AM – 11:20 AM Room 3201, Sandford Fleming Building

Organizers: **Man-Duen Choi**, University of Toronto
George Elliott, University of Toronto

- 9:00AM (66) *Commutators of Idempotents and Invariant Subspaces.*
Peter Rosenthal, University of Toronto (957-47-180)
- 9:30AM (67) *Hankel operators on the Bergman space and Schatten p -classes: the case where p is strictly between 1 and 2.*
Jingbo Xia, SUNY at Buffalo (957-47-196)
- 10:00AM (68) *Weak Reflexivity for Operators.* Preliminary report.
Deguang Han, McMaster University and University of Central Florida (957-47-184)
- 10:30AM (69) *The Brown-Douglas-Fillmore theorem revisited.*
Peter Friis, University of Waterloo (957-46-251)
- 11:00AM (70) *Normal dilations of operators.* Preliminary report.
Man-Duen Choi, University of Toronto (957-47-179)

Special Session on Hamiltonian Systems, I

9:30 AM – 11:20 AM Room 1101, Sandford Fleming Building

Organizers: **Lisa Jeffrey**, University of Toronto
Velimir Jurdjevic, University of Toronto
Boris Khesin, University of Toronto

- 9:30AM (71) *Symplectic Structures and Hamiltonian Dynamics on Cross Products of Lie Groups.*
Anthony M Bloch*, University of Michigan, **Peter E Crouch**, Arizona State University, **Jerrold E Marsden**, California Institute of Technology, and **Tudor S Ratiu**, Ecole Polytechnique Federale de Lausanne (957-70-149)
- 10:00AM (72) *Reconstruction phase formulas.*
Anthony D Blaom, Vienna, Virginia (957-70-71)
- 10:30AM (73) *Mechanisms of chaos in Hamiltonian systems: hyperbolicity and astigmatism.*
Leonid Bunimovich, Georgia Institute of Technology (957-37-269)
- 11:00AM (74) *Lagrangian Hydrodynamics.*
Steve Shkoller, University of California, Davis (957-35-210)

Invited Address

11:40 AM – 12:30 PM Room 3154, Medical Sciences Building

- (75) *Group actions and Helly's Theorem.*
Benson Farb, University of Chicago (957-20-02)

Invited Address

2:00 PM – 2:50 PM Room 3154, Medical Sciences Building

- (76) *A brief survey of structure and classification theory for amenable C^* -algebras.*
George Elliott, University of Toronto

Special Session on Commutative Algebra and Algebraic Geometry, II

3:00 PM – 5:20 PM Room 4171, Medical Sciences Building

Organizers: **Anthony Geramita**, Queens University
William Traves, United States Naval Academy

- 3:00PM (77) *Local equations for the toric Hilbert scheme.*
Michael Stillman, Cornell University (957-13-120)
- 3:30PM (78) *Mod p Invariants of the Cyclic group, C_p , of order p .*
H. E. A. Eddy Campbell, Queen's University (957-13-341)
- 4:00PM (79) *Cartier Isomorphism for Toric Varieties.*
Manuel Blickle, University of Michigan (957-14-176)
- 4:30PM (80) *Vector bundle vanishing and approximation theory.* Preliminary report.
Hal Schenck*, Northeastern University, and **Peter Stiller**, Texas A&M University (957-14-33)
- 5:00PM (81) *On Equations Defining Coincident Root Varieties.*
Jaydeep V Chipalkatti, Queen's University (957-14-112)

Special Session on Ergodic Theory and Dynamical Systems, II

3:00 PM – 5:20 PM Room 1105, Sandford Fleming Building

Organizers: **Andres del Junco**, University of Toronto
Blair Madore, SUNY, Potsdam

- 3:00PM (82) *Ergodicity and exactness of real and complex analytic maps of manifolds.* Preliminary report.
Jane M Hawkins, University of North Carolina at Chapel Hill (957-37-91)
- 3:30PM (83) *Some open problems and conjectures.*
Vitaly Bergelson, Ohio State University (957-37-296)
- 4:00PM Discussion
- 4:30PM (84) *Oscillation and variation inequalities for singular integrals.* Preliminary report.
James Campbell, University of Memphis, **Roger L Jones**, De Paul University, **Karin Reinhold***, University at Albany, SUNY, and **Mate Wierdl**, University of Memphis (957-42-260)
- 5:00PM (85) *The Exact Rate of Approximation in Ulam's Method.*
Chris J Bose*, University of Victoria, and **Rua D Murray**, University of Waikato (957-37-65)

Special Session on Nonabsolute Integration, II

3:00 PM – 5:20 PM Room 120, Galbraith Building

Organizers: **Patrick Muldowney**, University of Ulster
Erik Talvila, University of Illinois, Urbana

- 3:00PM (86) *Nuclear mappings and a Riemann approach to vector valued integration.* Preliminary report.
Shizu Nakanishi, Osaka Prefecture University (957-28-13)
- 3:30PM (87) *On the dual of Henstock-Kurzweil integrable functions in n dimensions.*
Tepper L. Gill and **Woodford W Zachary***, Howard University (957-28-18)
- 4:00PM (88) *Existence Conditions for Feynman Path Integrals.*
Patrick Muldowney, University of Ulster (957-28-56)
- 4:30PM (89) *On Continuous Major and Minor functions for the Henstock-Kurzweil integral.*
Tuo-Yeong Lee* and **Peng-Yee Lee**, National Institute of Education, Singapore (957-26-93)

- 5:00PM *The Refinement Integral*. Preliminary report.
 (90) **Isidore Fleischer**, CRM, Université de Montréal
 (957-28-143)

Special Session on Functional Differential Equations and Applications, II

3:00 PM – 5:50 PM Room 244, Galbraith Building

Organizers: **Anatoli F. Ivanov**, Pennsylvania State University
Jianhong Wu, York University

- 3:00PM *Delayed feedback and oscillations in a model for the regulation of platelet production*. Preliminary report.
 (91) **Jacques Bélair**, Université de Montréal (957-92-340)
- 4:00PM *Singularities and Normal Forms for Semilinear Functional Differential Equations in Banach Spaces*.
 (92) **Teresa Faria**, University of Lisbon, Portugal (957-34-95)
- 4:30PM *Stability and dissipativity of semilinear time-variant functional differential equations in a Banach space*.
 (93) **M. I. Gil'**, Ben Gurion University of the Negev (957-34-190)
- 5:00PM *Exponential Dichotomies and the Fredholm Alternative for Partial Functional Differential Equations*. Preliminary report.
 ▶ (94) **Shigui Ruan**, Dalhousie University (957-34-256)
- 5:30PM Discussion

Special Session on Representation Theory of Infinite Dimensional Lie Algebras, II

3:00 PM – 5:45 PM Room 3163, Medical Sciences Building

Organizer: **Yun Gao**, York University

- 3:00PM *Principal homogeneous spaces and conjugacy Theorems*. Preliminary report.
 (95) **Arturo Pianzola**, University of Alberta (957-17-169)
- 4:00PM *Generalized Witt type Lie algebras in characteristic 0*.
 (96) **Kaiming Zhao**, Chinese Academy of Sciences (957-17-295)
- 5:00PM Discussion

Special Session on Pseudo-differential Operators, Wavelet Transforms and Related Topics, II

3:00 PM – 5:20 PM Room 220, Galbraith Building

Organizer: **M. W. Wong**, York University

- 3:00PM *Wavelet-based methods in image processing*.
 (97) **James S Walker**, Univ. of Wisconsin-Eau Claire (957-42-32)
- 4:00PM *Traces of Localization Operators with Two Admissible Wavelets*.
 (98) **Mah Wah Wong** and **Zhaohui Zhang***, York University (957-47-151)
- 4:30PM *Parametrizations of paraunitary matrices associated with symmetric tight wavelet frames*. Preliminary report.
 (99) **Qingtang Jiang**, University of Alberta (957-42-261)
- 5:00PM *Microlocal Analysis with Multiwavelets*. Preliminary report.
 (100) **Ryuichi Ashino**, Prof. Osaka Kyoiku University, **Christopher Heil**, Prof., Georgia Institute of Technology, **Michihiro Nagase**, Prof., Osaka University, and **Rémi Vaillancourt***, Prof., Université d'Ottawa (957-42-259)

Special Session on Set Theory and Set-Theoretic Topology, II

3:00 PM – 5:20 PM Room 4102, Sandford Fleming Building

Organizer: **Franklin D. Tall**, University of Toronto

- 3:00PM *Forcing Many Positive Polarized Partition Relations Below the Continuum*.
 (101) **Saharon Shelah**, Hebrew University, and **Lee J Stanley***, Lehigh University (957-03-322)
- 3:30PM *A partition relation for triples for non-special partial orders*.
 (102) **Albin L Jones**, Kenyon College (957-05-304)
- 4:00PM *Which spaces have a coarser connected Hausdorff topology?* Preliminary report.
 (103) **William Fleissner**, **Jack Porter** and **Judith Roitman***, University of Kansas (957-54-102)
- 4:30PM *Variations of topological spaces due to Steve Watson*.
 (104) **Koichi Tsuda**, Ehime University (957-54-36)
- 5:00PM *Combinatorics of games on ω* . Preliminary report.
 ▶ (105) **Christopher C. Leary**, SUNY Geneseo (957-03-345)

Special Session on Computational Wavelet Analysis, II

3:00 PM – 5:25 PM Room 221, Galbraith Building

Organizers: **Sebastian Ferrando**, Ryerson Polytechnic University

Larry Kolasa, Ryerson Polytechnic University

- 3:00PM *Non-uniform sampling in multiply generated shift-invariant subspaces of $L_p(\mathbb{R}^d)$* .
 (106) **Akram Aldroubi***, Vanderbilt University, **Qiyu Sun** and **Wai-Shing Tang**, University of Singapore (957-42-175)
- 3:30PM *Wavelet in Integral Equation and Finite Difference Time Domain Methods*.
 (107) **Jaideva C Goswami***, Schlumberger Oilfield Services, **Richard E Miller** and **Robert D Nevels**, Texas A&M University (957-41-232)
- 4:00PM *The Design of Smooth Wavelet Tight Frames with Zero Moments*.
 (108) **Ivan W Selesnick**, Polytechnic University, New York (957-65-224)
- 4:30PM *On a perturbed Haar wavelet*. Preliminary report.
 (109) **Richard A. Zalik**, Auburn University (957-42-276)
- 5:00PM *A Characterization of Wavelet Convergence in Sobolev Spaces*.
 (110) **Louise A. Raphael***, Howard University, and **Mark A. Kon**, Boston University (957-42-338)

Special Session on Applied Categorical Structures, II

3:00 PM – 5:25 PM Room 2173, Medical Sciences Building

Organizers: **Joan Wick Pelletier**, York University
Walter Tholen, York University

- 3:00PM *Relating realizability using sheaves*.
 (111) **Steve Awodey***, **Andrej Bauer** and **Dana S Scott**, Carnegie Mellon University (957-18-59)
- 3:30PM *Relative and Modified Relative Realizability*.
 (112) **Lars Birkedal***, The IT University of Copenhagen, and **Jaap van Oosten**, Dept. of Mathematics, Utrecht University (957-18-51)
- 4:00PM *Certain spans of sketches model problems of complexity NP*. Preliminary report.
 (113) **David B Benson**, Washington State University (957-68-123)
- 4:30PM *Monads and Structure*.
 (114) **John L. MacDonald**, University of British Columbia (957-18-61)

5:00PM *Modelling a sketch in an object in a 2-category.*
(115) Preliminary report.
Michael Johnson, Macquarie University, **Robert Rosebrugh**, Mount Allison University, and **R. J. Wood***, Dalhousie University (957-18-214)

Special Session on Modern Schubert Calculus, II

3:00 PM – 5:20 PM Room 119, Galbraith Building

Organizers: **Nantel Bergeron**, York University
Frank Sottile, University of Wisconsin

3:00PM *Descent-cycling in Schubert calculus.*
(116) **Allen I Knutson**, U. C. Berkeley (957-05-236)
3:30PM *A Littlewood-Richardson rule for multiplying Schur polynomials by certain Schubert polynomials.*
(117) **Mikhail Kogan**, Northeastern University (957-05-297)
4:00PM Break
4:30PM *Pieri's Formula for the T-Equivariant Cohomology of the Flag Variety.* Preliminary report.
(118) **Shawn A Robinson**, University of North Carolina at Chapel Hill (957-22-312)
5:00PM *A Littlewood-Richardson rule for the K-theory of Grassmannians.*
(119) **Anders S Buch**, MIT (957-14-197)

Special Session on Discrete and Applied Geometry, II

3:00 PM – 5:20 PM Room 3171, Medical Sciences Building

Organizers: **Asia Ivic Weiss**, York University
Walter Whiteley, York University

3:00PM *Spaces of affine configurations of flats; their polyhedral structure.* Preliminary report.
▶ (120) **Javier Bracho**, Instituto de Matematicas, UNAM (957-52-317)
3:30PM *"Open Questions in Tiling".*
▶ (121) **Chaim Goodman-Strauss**, University of Arkansas (957-52-310)
4:00PM *Minimal generically rigid subgraphs of grid-like triangulated tori.* Preliminary report.
▶ (122) **Camille C Mittermeier**, York University (957-52-284)
4:30PM *First-Order Rigidity in Cayley-Klein Geometries.*
▶ (123) Preliminary report.
Franco V Saliola* and **Walter J Whiteley**, York University (957-52-290)
5:00PM *A Partial Extension of the Maxwell-Cremona Correspondence to Spatial Frameworks.* Preliminary report.
▶ (124) **Robert M Erdahl**, Queen's, and **Konstantin Rybnikov***, Cornell (957-52-318)

Special Session on Hamiltonian Systems, II

3:00 PM – 5:20 PM Room 1101, Sandford Fleming Building

Organizers: **Lisa Jeffrey**, University of Toronto
Velimir Jurdjevic, University of Toronto
Boris Khesin, University of Toronto

3:00PM *Bending flows of polygonal linkages in E^3 , H^3 , and S^3 .*
(125) **Thomas I Treloar**, University of Maryland (957-53-245)
3:30PM *Convex functions on symmetric spaces and the geometric invariant theory of configuration spaces of weighted points of flag manifolds.*
(126) **John James Millson**, University of Maryland (957-53-212)

4:00PM *Euler angles and time-optimal factorizations in $SO(3)$.*
(127) **Dirk Mittenhuber**, TU Darmstadt (957-49-244)

4:30PM *Connections along curves, parallel translations, and the nonsmooth maximum principle of optimal control theory.* Preliminary report.
(128) **Hector J. Sussmann**, Rutgers, the State University of New Jersey (957-49-171)

5:00PM *The Hamiltonian Seifert Conjecture.*
(129) **Viktor L Ginzburg**, UC Santa Cruz (957-37-137)

Special Session on Analytic Number Theory, II

3:00 PM – 5:20 PM Room 2172, Medical Sciences Building

Organizers: **John Friedlander**, University of Toronto
Steve Gonek, University of Rochester

3:00PM *Computing Maass forms.* Preliminary report.
(130) **David W Farmer***, Bucknell University, and **Stefan Johansson**, IAS (957-11-203)
3:30PM *Systems of Additive Forms over p -Adic Fields.* Preliminary report.
(131) **Michael P Knapp**, University of Rochester (957-11-211)
4:00PM *An Asymptotic Estimate Related to Selberg's Sieve II.* Preliminary report.
(132) **Dan A. Goldston**, San Jose State University, and **Sidney W. Graham***, Central Michigan University (957-11-230)
4:30PM *A special type of Diophantine equation and its application.*
(133) **Gang Yu**, Department of Mathematics, University of Michigan (957-11-303)
5:00PM *Simple arithmetic methods which give good (and effective) elementary prime number estimates simultaneous with equivalents to the P.N.T.* Preliminary report.
▶ (134) **Edward A Bertram**, Mathematics Dept., University of Hawaii at Manoa, Honolulu, Hawaii (957-11-178)

Special Session on Nonlinear Functional Analysis, II

3:00 PM – 5:20 PM Room 248, Galbraith Building

Organizers: **Sankatha Singh**, Memorial University of Newfoundland
Bruce Watson, Memorial University of Newfoundland

3:00PM *Application of Baire Category Techniques in Approximation Theory.*
(135) **Francesco de Blasi**, Department of Mathematics, Universita di Roma 2 (957-47-139)
3:30PM *Birkhoff Interpolation on Some Perturbed Roots of Unity.*
(136) **Hanuman Prasad Dikshit**, Madhya Pradesh Bhoj (Open) University (957-41-141)
4:00PM Discussion
4:30PM *Functions without exceptional family of elements and the solvability of variational inequalities on unbounded sets.*
(137) **Gheorghe Isac***, Royal Military College of Canada, and **M. G. Cojocaru**, Queen's University (957-49-37)
5:00PM *On Some Complementarity Problems.*
(138) **Jinlu Li**, Department of Mathematics, Shawnee State University (957-47-142)

Special Session on Noncommutative Geometry, II

3:00 PM – 5:20 PM Room 3202, Sandford Fleming Building

Organizers: **Ryszard Nest**, University of Copenhagen

- Victor Nistor**, Pennsylvania State University
Boris Tsygan, Pennsylvania State University
- 3:00PM *A descent theorem in the K-theory of Banach algebras.* (139)
Max Karoubi, University Paris 7 (957-19-126)
- 3:30PM *Equivariant Chern Character.* (140)
Paul Frank Baum, Penn State University (957-19-134)
- 4:00PM Break
- 4:30PM *On the Baum-Connes conjecture.* (141)
Nigel Higson, Penn State (957-19-285)

Special Session on Probability, II

3:00 PM – 5:10 PM Room 305, Galbraith Building

Organizers: **Neal Madras**, York University
George L. O'Brien, York University
Thomas Salisbury, York University
Donna Salopek, York University

- 3:00PM *Interacting particle systems modelling epidemics.* (142)
Rinaldo B Schinazi, University of Colorado at Colorado Springs (957-60-87)
- 3:45PM *Hitting properties of the random string.* Preliminary report. (143)
Carl E Mueller*, University of Rochester, and **Roger Tribe**, University of Warwick (957-60-147)
- 4:30PM *Critical Phenomena for Hierarchical Random Walks.* Preliminary report. (144)
Donald A. Dawson, Carleton University (957-60-193)

Special Session on Operator Algebras and Operator Theory, II

3:00 PM – 5:20 PM Room 3201, Sandford Fleming Building

Organizers: **Man-Duen Choi**, University of Toronto
George Elliott, University of Toronto

- 3:00PM *Extremely amenable groups.* Preliminary report. (145)
Thierry Giordano*, University of Ottawa, and **Vladimir Pestov**, Victoria University of Wellington (957-22-288)
- 3:30PM *Cyclic homology of convolution algebras of p-adic groups.* (146)
Victor Nistor, Penn State (957-19-136)
- 4:00PM *Differential Calculus on Quantum Groups and Cyclic Cohomology.* Preliminary report. (147)
Masoud Khalkhali, Western Ontario (957-47-250)
- 4:30PM *Continuous fields of C*-algebras, boundary value problems and index theorems.* Preliminary report. (148)
Ryszard Nest, Copenhagen University (957-58-280)
- 5:00PM *The Non-commutative Curvature Invariant.* Preliminary report. (149)
David Kribs, University of Waterloo (957-47-326)

Session for Contributed Papers

3:00 PM – 4:40 PM Room 304, Galbraith Building

- 3:00PM *Laplace Transforms and American Call Options.* (150)
Roland Mallier* and **Ghada Alobaidi**, University of Western Ontario (957-44-57)
- 3:15PM *Random walks on wreath products of groups.* (151)
Clyde H Schoolfield, Harvard University (957-60-222)
- 3:30PM *Minimum Feedback Arc Sets of Tournaments.* (152)
Darren A. Narayan, Rochester Institute of Technology (957-05-234)

- 3:45PM *Geometry of modulus spaces.* (153)
Roshdi R. Khalil*, University of Jordan, **Deeb m Hussein**, Univ. of Jordan, and **Wael m Amin**, Univ. of Jordan (957-46-08)
- 4:00PM *The changing role of discrete mathematics in the undergraduate curriculum. Preliminary report.* (154)
Diane M Spresser, National Science Foundation (957-97-153)
- 4:15PM *Stimulating classroom interaction in required courses for non-majors.* Preliminary report. (155)
Dana S Fine, UMass Dartmouth (957-97-258)
- 4:30PM *Some Results On Splitting The Powers Of Integers.* (156)
Susil K. Jena, Bhubaneswar, Orissa, India (957-11-321)

Erdos Memorial Lecture

6:00 PM – 6:50 PM Auditorium, Convocation Hall

- (157) *New ways to look at quadratic forms.*
John H. Conway, Princeton University (957-00-05)

Sunday, September 24

Registration

8:00 AM – NOON Foyer, Sandford Fleming Building

AMS Exhibit and Book Sale

8:00 AM – NOON Room 1013, Sandford Fleming Building

Special Session on Commutative Algebra and Algebraic Geometry, III

8:30 AM – 11:20 AM Room 4171, Medical Sciences Building

Organizers: **Anthony Geramita**, Queens University
William Traves, United States Naval Academy

- 8:30AM *Level Artin algebras: components of LEVALG(T).* (158)
Anthony A. Iarrobino, Jr., Mathematics Department, Northeastern University (957-13-168)
- 9:00AM *Gorenstein Ideals of Embedding Codimension Four.* Preliminary report. (159)
Anthony Iarrobino, Northeastern University, and **Hema Srinivasan***, University of Missouri-Columbia (957-13-299)
- 9:30AM *Conjectures on the Hilbert function of multiple points.* Preliminary report. (160)
Karen A. Chandler, University of Notre Dame (957-14-306)
- 10:00AM *Polarization and Syzygies of Multigraded modules.* (161)
Hara Charalambous, University at Albany, SUNY (957-13-160)
- 10:30AM *Resolutions of subsets of finite sets of points in projective space.* (162)
Steven P. Diaz*, Syracuse University, **Geramita V. Anthony**, Queen's University, and **Migliore C. Juan**, University of Notre Dame (957-14-103)
- 11:00AM *Syzygies, Euclidean Algorithm and Fractals.* Preliminary report. (163)
Ragnar-Olaf Buchweitz, Dept. of Math., Univ. of Toronto (957-13-281)

Special Session on Representation Theory of Infinite Dimensional Lie Algebras, III

8:30 AM – 11:15 AM Room 3163, Medical Sciences Building

Organizer: **Yun Gao**, York University

- 8:30AM *Root multiplicities of the indefinite Kac-Moody algebra* $HA_n^{(1)}$. (164)
Kailash C. Misra, North Carolina State University (957-17-79)
- 9:30AM *Irreducible modules for the generalized Virasoro-toroidal Lie algebras.* (165)
Shaobin Tan, Department of Mathematics, Xiamen University (957-17-242)
- 10:30AM *Kac-Moody groups and prescribed Gauss decompositions.* (166)
Jun Morita, University of Tsukuba (957-17-228)

Special Session on Pseudo-differential Operators, Wavelet Transforms and Related Topics, III

8:30 AM – 11:20 AM Room 220, Galbraith Building

Organizer: **M. W. Wong**, York University

- 8:30AM *Gabor Expansions in L^p .* Preliminary report. (167)
Karlheinz Gröchenig, University of Connecticut, and **Christopher Heil***, Georgia Tech (957-42-229)
- 9:30AM *Localization operators on the Weyl-Heisenberg group and the Bargmann transform.* Preliminary report. (168)
Sid C Scull, York University (957-43-195)
- 10:00AM *Weyl-Heisenberg dual frames and operator algebras.* (169)
Jean-Pierre Gabardo* and **Deguang Han**, McMaster University (957-42-192)
- 10:30AM *A Collection of Frames.* (170)
Keith F Taylor, University of Saskatchewan (957-43-27)
- 11:00AM *Classifying certain irregular Weyl-Heisenberg frames.* (171)
Peter G. Casazza*, University of Missouri, and **Ole Christensen**, Technical University of Denmark (957-43-104)

Special Session on Discrete and Applied Geometry, III

8:30 AM – 11:20 AM Room 3171, Medical Sciences Building

Organizers: **Asia Ivic Weiss**, York University
Walter Whiteley, York University

- 8:30AM *Minimum-Turn Milling.* (172)
Erik D Demaine, University of Waterloo (957-52-300)
- 9:00AM *Recent Results on Reconfiguring Polygonal Chains in Space.* Preliminary report. (173)
Michael Soss and **Godfried T Toussaint***, McGill University (957-51-257)
- 9:30AM *Flattening Polyhedra.* Preliminary report. (174)
Erik D Demaine, **Martin L Demaine** and **Anna Lubiw***, University of Waterloo (957-52-292)
- 10:00AM *Rigidity of pseudo-triangulations.* (175)
Ileana Streinu, Smith College (957-52-124)
- 10:30AM *Daisy Structure in Desarguesian Projective Planes.* Preliminary report. (176)
Gabriela Araujo-Pardo, Instituto de Matematicas, UNAM. (957-05-72)
- 11:00AM *Priority Scheduling: an Application for the Permutahedron.* Preliminary report. (177)
Ethan D. Bolker, University of Massachusetts - Boston (957-52-207)

Special Session on Analytic Number Theory, III

8:30 AM – 11:20 AM Room 2172, Medical Sciences Building

Organizers: **John Friedlander**, University of Toronto
Steve Gonek, University of Rochester

- 8:30AM *Properties of certain character analogues of the Dedekind sum.* Preliminary report. (178)
Jeffrey L Meyer, Syracuse University (957-11-116)
- 9:00AM *On the second moment of symmetric square L functions.* (179)
Philippe G. Michel, IUF and Univ. Montpellier II (957-11-166)
- 9:30AM *q-series identities and certain L-functions.* Preliminary report. (180)
Ken Ono, University of Wisconsin (957-11-41)
- 10:00AM *Dedekind cotangent sums.* Preliminary report. (181)
Matthias Beck, SUNY Binghamton (957-11-07)
- 10:30AM *Slimmer exceptional sets in Waring's problem.* Preliminary report. (182)
Trevor D Wooley, University of Michigan (957-11-162)
- 11:00AM *Zeta Spirals.* Preliminary report. (183)
Steve M. Gonek, University of Rochester, and **Hugh L. Montgomery***, University of Michigan (957-11-248)

Special Session on Ergodic Theory and Dynamical Systems, III

9:00 AM – 11:20 AM Room 1105, Sandford Fleming Building

Organizers: **Andres del Junco**, University of Toronto
Blair Madore, SUNY, Potsdam

- 9:00AM *Equipartition of interval partitions and an application to number theory.* (184)
Karma Dajani, Utrecht University, and **Adam Fieldsteel***, Wesleyan University (957-28-202)
- 9:30AM *Positive operators in L^1 , cocycles, and the mean ergodic theorem.* Preliminary report. (185)
Isaac Kornfeld, North Dakota State University (957-37-122)
- 10:00AM Discussion
- 10:30AM Discussion
- 11:00AM *T, T^{-1} -endomorphisms entropy and Kakutani equivalence.* Preliminary report. (186)
Deborah Heicklen, UC Berkeley, **Christopher Hoffman**, U. of Washington, and **Daniel Rudolph***, U. of Maryland (957-37-283)

Special Session on Nonabsolute Integration, III

9:00 AM – 11:20 AM Room 120, Galbraith Building

Organizers: **Patrick Muldowney**, University of Ulster
Erik Talvila, University of Illinois, Urbana

- 9:00AM *The use on non-absolute integration in the theory of stochastic processes.* (187)
Ralph Henstock, University of Ulster (957-28-64)
- 9:30AM *Nonabsolutely convergent Poisson integrals.* Preliminary report. (188)
Erik O Talvila, University of Alberta (957-26-315)
- 10:00AM *Non-absolute integration in Black-Scholes pricing.* (189)
Patrick Muldowney, University of Ulster, and **Wojciech Wojdowski***, Technical University of Lodz (957-28-73)

- 10:30AM *Abstract Derivation Bases*. Preliminary report.
(190) **Brian S Thomson**, Simon Fraser University (957-28-187)
- 11:00AM *A nonabsolutely convergent PU-integral*.
(191) **Giuseppa Riccobono**, UNIVERSITA' DI PALERMO (957-26-227)

Special Session on Functional Differential Equations and Applications, III

9:00 AM – 10:50 AM Room 244, Galbraith Building

Organizers: **Anatoli F. Ivanov**, Pennsylvania State University
Jianhong Wu, York University

- 9:00AM *On the merits of a diagram from functional differential equations*. Preliminary report.
(192) **John Haddock**, University of Memphis (957-34-337)
- 10:00AM *A generalized Lefschetz fixed point theorem and symbolic dynamics in delay equations*.
(193) **Bernhard Lani-Wayda***, Mathematical Institute, University of Giessen (Germany), and **Roman Szrednicki**, Institute of Mathematics, Jagiellonian University (957-34-15)
- 10:30AM *Monotone Iteration from discontinuous super-sub solutions and travelling waves*. Preliminary report.
(194) **Q. Lan**, York University (957-34-335)

Special Session on Set Theory and Set-Theoretic Topology, III

9:00 AM – 11:20 AM Room 4102, Sandford Fleming Building

Organizer: **Franklin D. Tall**, University of Toronto

- 9:00AM *The Topology of the Uniform Ultrafilters*.
(195) **Kenneth Kunen**, University of Wisconsin (957-54-254)
- 9:30AM *Normal Subspaces of Products of Ordinals*.
(196) Preliminary report.
William G Fleissner, University of Kansas (957-54-181)
- 10:00AM *Generalizations of Totally Paracompact Spaces*.
(197) Preliminary report.
John E Porter* and **Gary Gruenhage**, Auburn University (957-54-63)
- 10:30AM *Covering ω^ω by special Cantor sets*. Preliminary report.
(198) **Gary Gruenhage***, Auburn University, and **Ronnie Levy**, George Mason University (957-03-298)
- 11:00AM *Ladder systems and subsets of $\omega_1 \times \omega_1$* .
(199) **Paul J. Szeptycki***, York University, and **Erick Todd Eisworth**, University of Northern Iowa (957-54-344)

Special Session on Computational Wavelet Analysis, III

9:00 AM – 11:25 AM Room 221, Galbraith Building

Organizers: **Sebastian Ferrando**, Ryerson Polytechnic University
Larry Kolasa, Ryerson Polytechnic University

- 9:00AM *Wavelets in some biological problems*.
(200) **Carlos E D'Atellis***, **Vladimir D Flores**, Univ. Favaloro and Buenos Aires, **Silvia V Gigola**, **Gustavo A Hirchoren**, Univ. Favaloro-UTN and Buenos Aires, **Melina Rapacioli**, Universidad Favaloro, **Alicia Tinnirello** and **Raquel Voget**, Universidad Tecnológica Nacional-Rosario (957-92-98)

- 9:30AM *Analysis of the edge effects in local Fourier and brushlet dictionaries*. Preliminary report.
(201) **Brons M Larson** and **Naoki Saito***, Department of Mathematics, University of California, Davis (957-42-316)

- 10:00AM *Vibration Analysis and Modelling Using Gaussian Wavelet Algorithm*.
▶ (202) **Gaoyong Luo***, **David Osypiw** and **Mark Irle**, Buckinghamshire Chilterns University College (957-65-121)

- 10:30AM *An adaptive wavelet method for calculating turbulent flow in complex geometries*. Preliminary report.
(203) **Nicholas K-R Kevlahan***, Department of Mathematics and Statistics, McMaster University, **Oleg Vasilyev**, Department of Mechanical Engineering, University of Missouri at Columbia, and **Abdessadek Cherhabili**, Department of Mathematics and Statistics, McMaster University (957-65-221)

- 11:00AM *Multiwavelets on the interval with applications*.
(204) Preliminary report.
David K Ruch*, Metro State College of Denver, and **Patrick Van Fleet**, University of St. Thomas (957-42-38)

Special Session on Applied Categorical Structures, III

9:00 AM – 11:25 AM Room 2173, Medical Sciences Building

Organizers: **Joan Wick Pelletier**, York University
Walter Tholen, York University

- 9:00AM *Dominances and Spread Completions*. Preliminary report.
(205) **Marta C Bunge**, McGill University, Department of Mathematics and Statistics (957-18-140)
- 9:30AM *A summary report on the state of our knowledge of weak higher dimensional categories*. Preliminary report.
(206) **Michael Makkai**, McGill University (957-18-157)
- 10:00AM *Game theory revisited: categorical proof theories for games*.
(207) **J. Robin B. Cockett**, University Of Calgary (957-18-30)
- 10:30AM *Open problems on finiteness and their counting measures*. Preliminary report.
(208) **Mbila-Mambu Mawanda**, Roma, LESOTHO (957-18-204)
- 11:00AM *Toposes and Continuum Microphysics*. Preliminary report.
(209) **F. William Lawvere**, SUNY Buffalo (957-18-19)

Special Session on Modern Schubert Calculus, III

9:00 AM – 11:20 AM Room 119, Galbraith Building

Organizers: **Nantel Bergeron**, York University
Frank Sottile, University of Wisconsin

- 9:00AM *Equivariant cohomology and regular \mathfrak{B} -actions*.
(210) **James B. Carrell***, Univ. of B. C., and **Michel Brion**, Univ. de Grenoble (957-14-215)
- 9:30AM *On Schubert Calculus in Symplectic Geometry*.
(211) **Rebecca F Goldin**, University of Maryland (957-51-262)
- 10:00AM Break
- 10:30AM *Positivity in equivariant Schubert calculus*.
(212) **William Graham**, University of Georgia (957-14-311)

11:00AM *Gröbner geometry of formulae for (double) Schubert polynomials.* Preliminary report.
(213) **Allen I. Knutson**, UC Berkeley, and **Ezra N. Miller***, MIT (957-14-270)

Special Session on Hamiltonian Systems, III

9:00 AM – 11:20 AM Room 1101, Sandford Fleming Building

Organizers: **Lisa Jeffrey**, University of Toronto
Velimir Jurdjevic, University of Toronto
Boris Khesin, University of Toronto

9:00AM *Persistence of extremal relative equilibria in symmetric hamiltonian systems.*
(214) **Eugene Lerman**, University of Illinois at Urbana-Champaign, **James Montaldi**, Institut Non Lineaire de Nice, and **Tadashi Tokieda***, Universite du Quebec a Montreal (957-37-253)

9:30AM *Exact solutions to plasma equilibrium equations.*
▶ (215) **Oleg I Bogoyavlenskij**, Queen's University, Kingston, Canada (957-76-294)

10:00AM *The Transversal Relative Equilibria of a Hamiltonian System with Symmetry.*
(216) **George W Patrick***, University of Saskatchewan, and **Mark Roberts**, University of Warwick (957-70-238)

10:30AM *Gauge conservation laws in nonholonomic systems.*
(217) **Larry Bates**, University of Calgary (957-58-327)

11:00AM *Almost Poisson Spaces in Mechanics.*
(218) **Jedrzej Sniatycki**, University of Calgary (957-70-144)

Special Session on Nonlinear Functional Analysis, III

9:00 AM – 11:20 AM Room 248, Galbraith Building

Organizers: **Sankatha Singh**, Memorial University of Newfoundland
Bruce Watson, Memorial University of Newfoundland

9:00AM *Recent results on fixed points of multivalued contractive maps and isometries.*
(219) **Teck C Lim**, George Mason University (957-47-23)

9:30AM *Transversality Conditions for Bifurcation: an Elementary Approach.* Preliminary report.
(220) **Mario Martelli***, Claremont McKenna College, **Gareguin Mikaelian**, University of California Irvine, and **Suzanne Sindi**, California State University Fullerton (957-47-167)

10:00AM *HAUSDORFF STRONG UNIQUENESS OF BEST SIMULTANEOUS APPROXIMATION.*
(221) **D. V. Pai*** and **Indira K. Pai**, Indian Institute of Technology (957-47-201)

10:30AM *The KKM Principle Implies Many Known Fixed Point Theorems.* Preliminary report.
(222) **Sehie Park**, Seoul National Univ., Seoul 151-742, KOREA (957-47-46)

11:00AM *Finding common fixed points of a family of nonexpansive mappings by iteration.*
▶ (223) **Billy E Rhoades**, Indiana University (957-47-133)

Special Session on Noncommutative Geometry, III

9:00 AM – 11:20 AM Room 3202, Sandford Fleming Building

Organizers: **Ryszard Nest**, University of Copenhagen
Victor Nistor, Pennsylvania State University
Boris Tsygan, Pennsylvania State University

9:00AM *Quantum String Topology.* Preliminary report.
(224) **Alexander A Voronov**, Michigan State University (957-58-282)

9:30AM *A-infinity constraint and classical Yang-Baxter equation.* Preliminary report.
(225) **Alexander Polishchuk**, Boston University (957-14-89)

10:30AM *Some recent applications of operads.*
(226) **Dmitry Tamarkin**, Harvard University (957-53-279)

11:00AM *String Topology of Manifolds.*
(227) **Dennis Sullivan**, Graduate School at CUNY (957-54-342)

Special Session on Probability, III

9:00 AM – 11:25 AM Room 305, Galbraith Building

Organizers: **Neal Madras**, York University
George L. O'Brien, York University
Thomas Salisbury, York University
Donna Salopek, York University

9:00AM *Dynamical sensitivity of randomness.* Preliminary report.
(228) **Itai Benjamini**, The Weizmann Institute of Science, **Olle Haggstrom**, Chalmers University of Technology, **Yuval Peres**, UC Berkeley and Hebrew University, and **Jeffrey E Steif***, Georgia Institute of Technology (957-60-101)

9:45AM *Isoperimetric Constants and Percolation.*
(229) **Russell D Lyons**, Indiana University (957-60-80)

10:30AM *On the Critical Behavior of Long-Range Percolation and Ising Model.*
(230) **Noam Berger**, Hebrew university/U.C. Berkeley (957-60-113)

11:00AM Discussion

Special Session on Operator Algebras and Operator Theory, III

9:00 AM – 11:20 AM Room 3201, Sandford Fleming Building

Organizers: **Man-Duen Choi**, University of Toronto
George Elliott, University of Toronto

9:00AM *Operator versions of the Cauchy-Schwarz inequality.*
(231) **Chandler Davis**, University of Toronto (957-47-252)

9:30AM *The structure of free semigroup algebras.*
(232) **Kenneth R. Davidson***, University of Waterloo, **Elias Katsoulis**, East Carolina University, and **David R. Pitts**, University of Nebraska (957-47-148)

10:00AM *Projective Operator Spaces in Harmonic Analysis.*
(233) **Brian Forrest**, University of Waterloo (957-43-189)

10:30AM *On the $\mathcal{O}L_\infty$ structure of nuclear C^* -algebras.*
(234) **Marius Junge**, University of Illinois at Urbana-Champaign, **Narutaka Ozawa**, Texas A&M University, and **Zhong-Jin Ruan***, University of Illinois at Urbana-Champaign (957-46-158)

11:00AM *First and Second Order Arithmetic Means, Operator Ideals and a Solution to a Problem of Wodzicki.* Preliminary report.
▶ (235) **Victor Kaftal** and **Gary Weiss***, University of Cincinnati (957-47-308)

Invited Address

11:40 AM – 12:30 PM Room 3154, Medical Sciences Building

(236) *Index theorems, formality theorems, and homotopy algebras.* Preliminary report.
Boris Tsygan, Pennsylvania State University (957-58-03)

Special Session on Ergodic Theory and Dynamical Systems, IV

2:00 PM – 3:20 PM Room 1105, Sandford Fleming Building

Organizers: **Andres del Junco**, University of Toronto

Blair Madore, SUNY, Potsdam

2:00PM *Limit Measures for Affine Cellular Automata.*
(237) Preliminary report.

Reem A Yassawi*, Trent University, and **Marcus Pivato**, University of Toronto (957-28-291)

2:30PM *On the general convergence of Halley's Method and other superquadratic root-finding algorithms.*
(238) Preliminary report.

Kyle E Kneisl, University of North Carolina at Chapel Hill (957-37-53)

3:00PM *Asymptotics for the Jumps of Ergodic Averages.*
(239)

Pedro J Catuogno, Mar del Plata National University. Mar del Plata, Argentina., and **Sebastian E Ferrando***, Ryerson Polytechnic University. Toronto, Canada. (957-37-50)

Special Session on Nonabsolute Integration, IV

2:00 PM – 4:20 PM Room 120, Galbraith Building

Organizers: **Patrick Muldowney**, University of Ulster

Erik Talvila, University of Illinois, Urbana

2:00PM *On the C-integral.*
(240) **Benedetto Bongiorno**, University of Palermo (957-26-330)

2:30PM *On some nonabsolute convergent integrals of Banach valued functions.*

Luisa Di Piazza, Universita' di Palermo (957-28-328)

3:00PM *On weak convergence of Banach valued stochastic processes of Pettis and McShane integrable functions.*
(242)

Valeria Marraffa, Universita' di Palermo (957-26-329)

4:00PM *On tensor products of AC_* charges and Radon measures.* Preliminary report.

Zoltán Buczolich, Eötvös University (957-26-109)

Special Session on Functional Differential Equations and Applications, IV

2:00 PM – 5:20 PM Room 244, Galbraith Building

Organizers: **Anatoli F. Ivanov**, Pennsylvania State University

Jianhong Wu, York University

2:00PM *Mathematical Models of bilingualism and biculturalism.* Preliminary report.

Herb I. Freedman, University of Alberta (957-34-333)

3:00PM *A Non-Local Delayed and Diffusive Predator-Prey Model.* Preliminary report.

Xiaoqiang Zhao, Memorial University of Newfoundland (957-35-60)

3:30PM *On perturbations of delay-differential equations with periodic orbits.*
(246)

Jack K Hale, Georgia Institute of Technology, and **Marion Weedermann***, University of Wisconsin - Green Bay (957-39-241)

4:00PM *Stability of Stochastic Differential Delay Equations with Jumps with Applications to Finance and Insurance.* Preliminary report.

Anatoliy V Swishchuk, Intern. Mathem. Center (957-60-106)

4:30PM *Chaos and asymptotical stability in discrete time recurrent neural networks with generalized input-output function.* Preliminary report.

Zhu-jun Jing, Academy of Science (957-34-334)

5:00PM *A Class of Differential Equations Arising from Modulation Theory.* Preliminary report.

Bathi Kasturiarachi, Kent State University - Stark Campus (957-34-313)

Special Session on Representation Theory of Infinite Dimensional Lie Algebras, IV

2:00 PM – 5:45 PM Room 3163, Medical Sciences Building

Organizer: **Yun Gao**, York University

2:00PM *Down-up Algebras, Their Structure and Representations.* Preliminary report.

Georgia Benkart, University of Wisconsin, Madison (957-16-267)

3:00PM *Quantum general affine algebras and symmetric polynomials.*

Naihuan Jing, North Carolina State University (957-17-208)

4:00PM *Crystal bases for quantum affine algebras and combinatorics of Young walls.*

Seok-Jin Kang, Seoul National University (957-17-226)

5:00PM *Covering Algebras of Extended Affine Lie Algebras.* Preliminary report.

Stephen Berman, Univ. of Sask. (957-17-78)

Special Session on Pseudo-differential Operators, Wavelet Transforms and Related Topics, IV

2:00 PM – 4:50 PM Room 220, Galbraith Building

Organizer: **M. W. Wong**, York University

2:00PM *Hodge theory in the Sobolev topology.*

Steven G Krantz, Washington University in St. Louis (957-35-305)

3:00PM *Construction of wavelets using special functions.* Preliminary report.

Ahmed I Zayed, University of Central Florida (957-33-74)

4:00PM *Time-Frequency Analysis of Pseudodifferential Operators.*

Demetrio Labate, Washington University (957-42-205)

4:30PM *Cauchy Transforms and Hilbert Problems in Weighted Spaces of Integrable distributions.* Preliminary report.

Christiane Carton-Lebrun, Universite de Mons-Hainaut (957-46-69)

Special Session on Applied Categorical Structures, IV

2:00 PM – 4:55 PM Room 2173, Medical Sciences Building

Organizers: **Joan Wick Pelletier**, York University

Walter Tholen, York University

2:00PM *Injective hulls of partially ordered monoids.*
(258)

J. Lambek, McGill University (957-06-218)

2:30PM *Monoreflections in categories of ordered rings.*

James J Madden, Wesleyan Univ. & Louisiana State Univ. (957-18-199)

- 3:00PM *Finitely productive classes of uniform spaces which generate cartesian-closed categories.*
(260) **Gloria Tashjian**, Worcester, MA (957-18-132)
- 3:30PM *Free Double Categories and the Word Problem for Groups.*
(261) **Robert Paré***, Dalhousie University, and **Robert MacG. Dawson**, Saint Mary's University (957-18-90)
- 4:00PM *Flat covers and factorizations.*
(262) **Jiri Rosicky**, Masaryk University (957-18-107)
- 4:30PM *On the pivotal, symmetric case of involutory Hopf objects.*
(263) **Fernando J. O. Souza**, Theoretical Division, T6, Los Alamos National Lab. (957-18-265)

Special Session on Modern Schubert Calculus, IV

2:00 PM – 4:50 PM Room 119, Galbraith Building

- Organizers: **Nantel Bergeron**, York University
Frank Sottile, University of Wisconsin
- 2:00PM *Quantum Cohomology of Flag Manifolds.*
(264) **Linda Chen**, Columbia University (957-14-255)
- 2:30PM *Standard conjectures for the arithmetic Grassmannian $G(2, n)$.*
(265) **Andrew Kresch*** and **Harry Tamvakis**, University of Pennsylvania (957-14-52)
- 3:00PM Break
- 3:30PM *Embeddings of Schur functions into types $B/C/D$.*
(266) **Michael Kleber**, MIT (957-05-172)
- 4:00PM *Honeycombs and Facets of the Littlewood Richardson cone.*
(267) **Allen Knutson**, Berkeley, **Terry Tao**, UCLA, and **Chris Woodward***, Rutgers (957-05-278)
- 4:30PM *Eigenvalues of majorized Hermitian matrices and Schubert calculus.*
▶ (268) **William Fulton**, University of Michigan (957-15-194)

Special Session on Discrete and Applied Geometry, IV

2:00 PM – 3:20 PM Room 3171, Medical Sciences Building

- Organizers: **Asia Ivic Weiss**, York University
Walter Whiteley, York University
- ▶ 2:00PM *Colored Frieze Patterns.* Preliminary report.
(269) **Heidi L Burgiel***, University of Illinois, Chicago, **John H Conway**, Princeton University, and **Chaim Goodman-Strauss**, University of Arkansas (957-52-266)
- 2:30PM *Symmetric Tessellations on Euclidean Space-forms.*
(270) **Egon Schulte**, Northeastern University (957-51-273)
- 3:00PM *A structure theorem for Voronoi polytopes for lattices.*
(271) **Robert Erdahl**, Queen's University (957-52-324)

Special Session on Hamiltonian Systems, IV

2:00 PM – 3:50 PM Room 1101, Sandford Fleming Building

- Organizers: **Lisa Jeffrey**, University of Toronto
Velimir Jurdjevic, University of Toronto
Boris Khesin, University of Toronto
- 2:00PM *A unified geometrical approach to the problem of integrability of Hamiltonian systems by separation of variables.* Preliminary report.
(272) **Roman Smirnov***, **Raymond G McLenaghan** and **Aaron T Bruce**, University of Waterloo (957-58-24)
- 2:30PM *Periodic orbits of a particle in a magnetic field.*
(273) **Ely Kerman**, Fields Institute (957-37-135)
- 3:30PM Discussion

Special Session on Analytic Number Theory, IV

2:00 PM – 4:20 PM Room 2172, Medical Sciences Building

- Organizers: **John Friedlander**, University of Toronto
Steve Gonek, University of Rochester
- 2:00PM *On a variant of quantum ergodicity.*
(274) **Wenzhi Luo**, The Ohio State University (957-11-154)
- 2:30PM *On the mean lattice point discrepancy of a convex disc.*
(275) **Werner Georg Nowak**, Universität für Bodenkultur, Vienna (957-11-114)
- 3:00PM *On the greatest prime factor of shifted products.*
(276) **Cameron L Stewart**, University of Waterloo (957-11-233)
- 3:30PM *Biases in the Shanks-Rényi Prime Number Race.*
(277) **Andrey Feuerverger** and **Greg Martin***, University of Toronto (957-11-163)
- 4:00PM *$Z[\sqrt{14}]$ is Euclidean.* Preliminary report.
(278) **Malcolm Harper**, McGill University, and **Ram Murty***, Queen's University (957-11-155)

Special Session on Nonlinear Functional Analysis, IV

2:00 PM – 4:20 PM Room 248, Galbraith Building

- Organizers: **Sankatha Singh**, Memorial University of Newfoundland
Bruce Watson, Memorial University of Newfoundland
- 2:00PM *Local Solvability for semi-linear partial differential equations with constant strength.*
(279) **Luigi Rodino**, Università di Torino (957-47-29)
- 2:30PM *Ky Fan's Best Approximation and Applications.*
(280) **Antonio Carbone**, Univ. of Calabria, and **S P Singh***, Memorial University (957-47-108)
- 3:00PM *Tauberian Theorems and its Applications.*
(281) **Vikramaditya Singh**, Mehta Research Institute of Mathematics and Mathematical Physics (957-40-159)
- 3:30PM *Iterative Methods for Approximation of Fixed Points and Applications.*
(282) **Wataru Takahashi**, Tokyo Institute of Technology (957-47-86)
- 4:00PM *Approximation results by nonlinear integral operators and applications to signal processing.*
(283) **Gianluca Vinti**, Dipartimento di Matematica e Informatica, Università degli Studi di Perugia (957-47-97)

Special Session on Probability, IV

2:00 PM – 4:10 PM Room 305, Galbraith Building

- Organizers: **Neal Madras**, York University
George L. O'Brien, York University
Thomas Salisbury, York University
Donna Salopek, York University
- 2:00PM *Dominating edge property for a class of reinforced random walks.* Preliminary report.
(284) **Vlada Limic**, Cornell University (957-60-272)
- 2:45PM Discussion
- 3:30PM Discussion

Special Session on Operator Algebras and Operator Theory, IV

2:00 PM – 4:20 PM Room 3201, Sandford Fleming Building

- Organizers: **Man-Duen Choi**, University of Toronto
George Elliott, University of Toronto

- 2:00PM *Finite approximations and physics over unconventional fields and rings.* Preliminary report.
(285) **Trond Digernes**, The Norwegian University of Science and Technology (957-81-274)
- 2:30PM *q-Circular elements and non-commutative tori.* Preliminary report.
(286) **James A. Mingo***, Queen's University, and **Alexandru Nica**, University of Waterloo (957-46-231)
- 3:00PM *R-cyclic matrices in free probability.* Preliminary report.
(287) **Alexandru M Nica***, University of Waterloo, **Roland Speicher**, Queen's University, and **Dimitri Shlyakhtenko**, U.C.L.A. (957-46-216)
- 3:30PM *Maximization problems for free entropy.*
(288) **Roland Speicher**, Queen's University, Kingston (957-46-75)
- 4:00PM Discussion

Special Session on Commutative Algebra and Algebraic Geometry, IV

2:30 PM – 5:20 PM Room 4171, Medical Sciences Building

Organizers: **Anthony Geramita**, Queens University
William Traves, United States Naval Academy

- 2:30PM *Desingularization Algorithms.*
(289) **Edward Bierstone*** and **Pierre Milman**, University of Toronto (957-14-225)
- 3:00PM *Monomialization of Morphisms.*
(290) **Steven D Cutkosky**, University of Missouri (957-14-130)
- 3:30PM *Equations of modular curves.* Preliminary report.
(291) **Sorin E Popescu**, Columbia University (957-14-174)
- 4:00PM *Quot schemes and effective base point freeness on moduli spaces of vector bundles.* Preliminary report.
(292) **Mihnea Popa**, University of Michigan (957-14-185)
- 4:30PM *Weighted projective planes and automorphisms of \mathbb{C}^3 .*
(293) **Peter Russell**, McGill University (957-14-115)
- 5:00PM *Branched covers of the sphere and the geometry and topology of the moduli space of curves.*
(294) **Ravi Vakil**, M.I.T. (957-14-289)

Special Session on Noncommutative Geometry, IV

3:00 PM – 3:50 PM Room 3202, Sandford Fleming Building

Organizers: **Ryszard Nest**, University of Copenhagen
Victor Nistor, Pennsylvania State University
Boris Tsygan, Pennsylvania State University

- 3:00PM Discussion
- 3:30PM *Classification of Symplectic Leaves of Complex Reductive Poisson-Lie Groups.*
(295) **Milen T Yakimov**, University of California at Berkeley (957-22-268)

Susan J. Friedlander
Associate Secretary
Chicago, Illinois