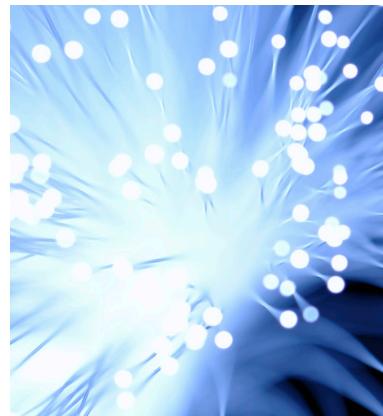


The INTERNATIONAL CONFERENCE on  
APPLIED MATHEMATICS,  
MODELING and COMPUTATIONAL SCIENCE



# AMMCS2013

Interdisciplinary AMMCS Conference Series

AUGUST 26–30  
WATERLOO, ONTARIO, CANADA

Mathematics and Computation in the Physical Sciences

Partial Differential and Integral Equations in Mathematical Physics

Applications of Dynamical Systems and Discrete Mathematics

Computational Physics and Chemistry

Computational Algebra, Combinatorics and Number Theory

Mathematical Models in Social Sciences

Computational Mechanics and Engineering

Financial Mathematics and Computational Finance

Statistical Modeling in Environmental Sciences

Computational Methods for Hyperbolic Problems

Applied Problems and Methods in Research and Education

## CONFERENCE PROGRAM

Program Chair

Monica Gabriela Cojocaru

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**Registration:**

The AMMCS-2013 registration desk is located in the 1st floor of the Bricker Academic building. It will be staffed at the following times:

Sunday, August 25	15:00 - 18:00 and 19:00 - 21:00 (Science Courtyard)
Monday, August 26	7:30 - 11:30 and 13:30 - 16:00
Tuesday August 27	8:30 - 10:30 and 13:30 - 15:30
Wednesday, August 28	8:30 - 10:30
Thursday, August 29	8:30 - 10:30 and 13:30 - 15:30
Friday, August 30	8:30 - 10:30

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# 1 Acknowledgements

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## Organizing Committee

Monica G. Cojocaru (Conference Program Chair, Guelph)  
Manuele Santoprete (Student Prize Committee Chair, WLU)  
Hasan Shodiev (Local Organizing Committee Chair, WLU)  
Robert Jerrard (Global Organizing Committee, UofT)  
Herb Kunze (Global Organizing Committee, U of Guelph)  
Roman Makarov (Conference Treasurer)  
Brian West (Conference Program Chair, till April 22)  
Ilias Kotsireas (General Co-chair)  
Roderick Melnik (General Co-chair, SIAM Representative)

## Technical Support Committee

Cameron Davidson-Pilon (Web Coordinator)  
Dalibor D. Dvorski (Electronic Publishing Coordinator)  
Jeanette Haas (Administrative Support)  
Sanjay Prabhakar (Computer Support)

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Anatoli Ivanov (Pennsylvania State University) Konstantinos E. Parsopoulos (University of Ioannina)  
Peter Kuchment (Texas A & M University) Olof Runborg (KTH Royal Institute of Technology)  
Michael Vrahatis (University of Patras)

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## Student Volunteers Team

David Abdelmaseeh	Mary Huang	Safia Athar	Anisha Mahant
Ayesha Banerjee	Andrei Malinovski	Jasmine Clement	Rania Masood
Sherry Cheng,	Sylvia Nguyen	Rakesh Dhote	Nynke Prins
Nguyen Hoang	Monika Roerig	Harold Hodgins	Anidip Sengupta
Amina Khan	Stephen Tully	Nida Khan	Chi Zhang
Cressanne Lang			

## **2 Conference Events**

### **Welcoming Reception**

Sunday, August 25 - 19:00 - 21:00 Science Courtyard

Join your fellow AMMCS-2013 attendees for an informal get-together with food and drinks.

The welcoming reception is included as part of your registration fees; a conference registration table will be set up at the event.

(See Section 10 for directions)

### **Conference Banquet**

Thursday, August 29 - 19:00 - 22:00 St. George Hall, 665 King St. N, Waterloo - [www.stgeorgehall.com](http://www.stgeorgehall.com)

Those of you who have already purchased banquet tickets will receive them upon check-in. For others, \$50 tickets will be sold at the registration desk until 15:30 on Tuesday, August 27.

For those requiring transportation, a bus will be provided.

(See Section 10 for directions)

### **Student Prize Competition and Young Researcher Awards**

Friday, August 30, 17:30 - 17:50 BA102

At the conclusion of the conference, the winners of the AMMCS-2013 Student Prize Competition will be announced. Three separate competitions will be held for undergraduate and graduate students:

1. Best AMMCS-2013 Poster. To be eligible, the student must be a co-author of the work presented and a designer of the poster. This competition will include a 10 minute discussion with a judging panel, related to the content of the poster. The poster presentations are scheduled for Thursday, August 29.

2. Best AMMCS-2013 Student Paper in a Special Session. To be eligible, the student must be a co-author of the work and present it during one of the Special Sessions or Minisymposia.

3. Best AMMCS-2013 Student Paper in a Contributed Session. To be eligible, the student must be a co-author of the work and present it during one of the Contributed Sessions.

The AMMCS-2013 Kolmogorov-Wiener Prize for Young Researchers will also be awarded. The competition for this award is open to young researchers in the category of recent PhD graduates and postdoctoral fellows under the age of 35.

### 3 Information for Visitors

#### Wireless Networking

AMMCS-2013 is pleased to provide free wireless internet service on the Wilfrid Laurier University campus. For connection information and to obtain a password, please go to the registration desk.

#### Computer Terminals

Rooms BA206 and BA207 contain computers that are available for use by AMMCS-2013 attendees. In particular, you may use these rooms to check your email or edit your presentations (on PowerPoint). For login information, please go to the registration desk.

#### Parking

AMMCS-2013 attendees may purchase parking passes for \$7 per day. These can be purchased (using cash only) from 8:00 to 16:00 at the parking kiosk, which is located at the main entrance to the campus, off of University Ave. They can also be purchased at the AMMCS-2013 registration desk on Monday and Tuesday. Finally, there are two Pay and Display lots. These also cost \$7 per day, payable by cash or credit card. Parking permits allow you to park in the white permit lots only. Parking is free on weekends and after 16:30 on weekdays.

#### Public Transit

The WLU campus can be reached by city bus (routes 7C, 7D, 7E, 8, 9, and 12, and the iXpress route). Route maps are available at the registration desk or at [www.grt.ca](http://www.grt.ca). For a taxi, call 519-888-7777.

AMMCS-2013 thanks the following sponsors and cooperating organizations for their generous support:



## 4 Welcoming Remarks

### Welcome to AMMCS-2013

On behalf of the Organizing, Scientific and Technical Committees of the International Conference on Applied Mathematics, Mathematical Modeling and Computational Science, we would like to welcome you to the conference held from August 26 through 30, 2013 on the Waterloo Campus of the Wilfrid Laurier University, Canada.

The previous conference in this Interdisciplinary AMMCS Conference Series took place two years ago in the year of the 100th anniversary of Wilfrid Laurier University. The AMMCS-2011 was a satellite meeting of the International Congress on Industrial and Applied Mathematics held on Canadian soil for the first time.

This year the AMMCS conference has an even more exciting scientific program featuring over 50 special and contributed sessions in several parallel tracks, 11 one-hour talks given by distinguished scientists and mathematicians, as well as 8 semi-plenary speakers. Each day of the conference, the scientific program starts with a plenary session that features one of the conference plenary speakers. The scientific program of the conference provides a unique opportunity for in-depth technical discussions and exchange of ideas in applied mathematics, computational science and mathematical modeling with their applications in natural and social sciences, engineering and technology, industry and finance.

We are proud that the conference is again held this year on the campus of Wilfrid Laurier University. It is the oldest university in the Cambridge-Kitchener-Waterloo-Guelph area, a beautiful part of Southwestern Ontario located in a comfortable driving distance from some of North America's major tourist destinations, including the Niagara Escarpment, a UNESCO World Biosphere Reserve, Toronto and Niagara Falls.

On behalf of the Organizing, Scientific and Technical Committees, we would like to thank all people involved in this event. In particular we would like to express our sincere thanks to special session organizers, to all the authors who submitted valuable results forming the basis of conference, and to our sponsors. Thanks to all for your hard work to ensure a dynamic, enjoyable and professionally fulfilling conference. We also hope that you will enjoy this beautiful part of the world and will take home with you an intellectually inspiring and socially satisfying experience.

Ilias Kotsireas and Roderick Melnik,

Conference Chairs



## 5 Plenary Speakers

**Plenary Speaker Wednesday, Aug 28, 15:15–16:15 Room BA 201**

**Peter Carr** *Managing Director Morgan Stanley*

**Models, Mathematics, and Markets - Is the Intersection an Empy Set?**

Dr. Peter Carr is a Managing Director at Morgan Stanley with over 15 years of experience in the financial industry. He is currently the Global Head of Market Modeling, overseeing several quantitative teams spread over three continents. He also presently serves as the Executive Director of the Math Finance program at NYU's Courant Institute, the Treasurer of the Bachelier Finance Society, and a trustee for the Museum of Mathematics in New York. Prior to joining the financial industry, Dr. Carr was a finance professor for 8 years at Cornell University, after obtaining his PhD from UCLA in 1989. He has over 75 publications in academic and industry-oriented journals and serves as an associate editor for 8 journals related to mathematical finance. He was selected as Quant of the Year by Risk Magazine in 2003 and Financial Engineer of the Year by IAFE/Sungard in 2010. For the last two years, Dr. Carr has served on the CFTC's Technology Advisory Committee and was listed in Institutional Investor's Tech 50, an annual listing of the 50 most influential people in financial technology.



### *Abstract*

Did Albert Einstein ever write that compound interest is the most powerful force in the universe? I have my doubts, but the financial crisis of 2007-8 has left little doubt that mathematical models matter for markets. In this high-level talk, I will provide a historical overview of how mathematics has been used to model markets.

## **Plenary Speaker**

Tuesday, Aug 27, 9:00–10:00 Room BA 201

**Emily A. Carter** *Princeton University*

### **How Quantum Mechanics Can Help Solve the World's Energy Problems**

Professor Carter is the Founding Director of the Andlinger Center for Energy and the Environment at Princeton University and the Gerhard R. Andlinger Professor in Energy and the Environment, as well as Professor of Mechanical and Aerospace Engineering and Applied and Computational Mathematics. Her current research is focused entirely on enabling discovery and design of molecules and materials for sustainable energy, including converting sunlight to electricity and fuels, providing clean electricity from solid oxide fuel cells, clean and efficient combustion of biofuels, optimizing lightweight metal alloys for fuel-efficient vehicles, and characterizing hydrogen isotope incorporation into plasma facing components of fusion reactors.

Professor Carter received her B.S. in Chemistry from UC Berkeley in 1982 (graduating Phi Beta Kappa) and her Ph.D. in Chemistry from Caltech in 1987. After a year as a postdoctoral researcher at the University of Colorado, Boulder, she spent the next 16 years on the faculty of UCLA as a Professor of Chemistry and later of Materials Science and Engineering. She moved to Princeton University in 2004. She holds courtesy appointments in Chemistry, Chemical Engineering, and three interdisciplinary institutes (PICSciE, PRISM, and PEI). The author of over 260 publications, she has delivered more than 400 invited lectures all over the world and serves on numerous international advisory boards spanning a wide range of disciplines. Her scholarly work has been recognized by a number of national and international awards and honors from a variety of entities, including the American Chemical Society (ACS), the American Vacuum Society, the American Physical Society, the American Association for the Advancement of Science, and the International Academy of Quantum Molecular Science. She received the 2007 ACS Award for Computers in Chemical and Pharmaceutical Research, was elected in 2008 to both the American Academy of Arts and Sciences and the National Academy of Sciences, in 2009 was elected to the International Academy of Quantum Molecular Science, in 2011 was awarded the August Wilhelm von Hoffmann Lecture of the German Chemical Society, and in 2012 received a Doctor Honoris Causa from the Ecole Polytechnique Federale de Lausanne.

#### *Abstract*

If we are to survive as a species on this planet, we must make major science and engineering breakthroughs in the way we harvest, store, transmit, and use energy. An overview of my own research efforts in this direction will be given, including: optimizing materials to improve efficiency of turbine engines used for power generation and aircraft propulsion, characterizing combustion of biofuels and tritium incorporation in fusion reactor walls, optimizing mechanical properties of lightweight metal alloys for fuel-efficient vehicles, optimizing ion and electron transport in solid oxide fuel cell cathodes, and designing novel materials from abundant elements for photovoltaics and photoelectrodes to convert sunlight into electricity and fuels.

Fast and accurate quantum mechanics methods enabling the treatment of large biofuel molecules and mesoscale defects in metals that control mechanical properties will be briefly discussed. Then examples of key metrics we calculate to help design efficient new materials for photovoltaics, photocatalysts, and solid oxide fuel cells will be presented. These metrics point toward which dopants or alloys are likely to provide the most efficient energy conversion materials.



## **Plenary Speaker**

Monday, Aug 26, 9:00–10:00 **Room BA 201**

**Ronald R. Coifman** *Yale University*

**Information Integration/Organization and Numerical Harmonic Analysis.**

Ronald R. Coifman is Phillips professor of mathematics at Yale University. He received his Ph.D. from the University of Geneva in 1965. Prior to coming to Yale in 1980, he was a professor at Washington University in St Louis. Prof. Coifman's recent publications have been in the areas of nonlinear Harmonic Analysis , Fourier Analysis, wavelet theory, numerical analysis and scattering theory. Professor Coifman is currently leading a research program to develop new mathematical tools for efficient transcription and organization of data, with applications to feature extraction, learning classification and denoising. He was chairman of the Yale mathematics department 1986-89. He is a member of the National Academy of Sciences, American Academy of Arts and Sciences, and the Connecticut Academy of Sciences and Engineering. He received the DARPA Sustained Excellence Award in 1996, and the 1996 Connecticut Science Medal. The 1999 Pioneer award from the International Society for Industrial and applied Mathematics , the National Science Medal 1999, And the Wavelet Pioneer award 2009.



### *Abstract*

We provide an overview of recent developments in methodologies for empirical organization of data. We present a geometric/analytic mathematical framework for learning, which revolves around building a network or a graph whose nodes are observations. In our framework, connections between observations are constantly reconfigured in order to achieve learning for specific tasks. In particular we will provide a synthesis of a range of ideas from mathematics and machine learning, which address the transition from a local similarity model to a global configuration. This is analogous to Newtonian Calculus, which from a local linear model of variability, calculates a global solution to a differential, or partial differential equation. We apply these fundamentals to jointly organize the rows and columns of a matrix, viewed either as the matrix of a linear operator, or as a Database. Here the rows are viewed as functions on the columns and the columns as functions of the rows, a dual geometry is built to optimize prediction and processing. We relate these methods to ideas from classical Harmonic Analysis and indicate tools to measure success of information extraction. In particular we introduce methodologies that resemble "signal processing" on data matrices, enabling functional regression, prediction, denoising, compression fast numerics, and so on. We illustrate these ideas to organize and map out in an automatic and purely data driven fashion on music databases of audio segments, text documents, psychological questionnaires, medical profiles, physical sensor data, financial data.

**Plenary Speaker**

Friday, Aug 30, 14:00–15:00 **Room BA 201**

**Martin Golubitsky** *Ohio State University*

**Patterns of Synchrony**

Martin Golubitsky is Distinguished Professor of Natural and Mathematics Sciences at the Ohio State University, where he serves as Director of the Mathematical Biosciences Institute. He works in the fields of nonlinear dynamics and bifurcation theory studying the role of symmetry in the formation of patterns in physical systems and the role of network architecture in the dynamics of coupled systems. He has co-authored four graduate texts, one undergraduate text, and two nontechnical trade books.

Dr. Golubitsky is a Fellow of the American Academy of Arts and Sciences, AAAS, and SIAM. He is also the 2001 corecipient of the Ferran Sunyer i Balaguer Prize for The Symmetry Perspective and the recipient of the 2009 Moser Lecture Prize of the SIAM Dynamical Systems Activity Group. He has been elected to the Councils SIAM, AAAS, and AMS. Dr. Golubitsky was the founding Editor-in-Chief of the SIAM Journal on Applied Dynamical Systems and has served as President of SIAM.

*Abstract*

This talk will survey recent results on rigid phase-shift synchrony in periodic solutions of coupled systems of differential equations. The mathematical questions were motivated by previous work on quadrupedal gaits and will be interpreted in terms of a generalized model for binocular rivalry.

**Plenary Speaker**

Wednesday, Aug 28, 14:00–15:00 **Room BA 201**

**Vaughn Jones** *Vanderbilt University*

**Computer involvement in the classification of small index subfactors**

Sir Vaughn F. R. Jones (KNZM FRS FRSNZ) is a New Zealand mathematician, known for his work on von Neumann algebras and Knot Theory. He was awarded a Fields Medal in 1990 at the ICM in Kyoto. Jones is currently a distinguished professor of mathematics at Vanderbilt University. He previously served as a professor at the University of California, Berkeley and a Distinguished Alumni Professor at the University of Auckland.

*Abstract*

A subfactor of index  $k$  is a generalisation of a permutation group on a set of size  $k$ . Except that the number  $k$  is no longer required to be an integer- it is a real number. While the listing of all transitive permutation groups on a set of size 5 would be covered in a first class in group theory, the subfactor result has only recently been completed thanks to Morrison, Peters, Snyder and many other authors. And their computers. The classification begins with the enumeration of all possible "Principal graphs", which in index less than or equal to 4 are the usual singly laced Coxeter graphs. Ten more subfactors exist with index between 4 and 5, some of which are only accessible via computer computations. I will present these results and the local blend of computer calculation and theory, and the extent to which the computer calculations may or may not be necessary.

## **Plenary Speaker**

Thursday, Aug 29, 9:00–10:00 **Room BA 201**

**Lila Kari** *Western University*

### **Nanocomputations by DNA Self-Assembly**

Lila Kari is Professor in the Department of Computer Science at The University of Western Ontario. She received her M.Sc. in 1987 from the University of Bucharest, Romania, and her Ph.D. in 1991 for her thesis "On Insertions and Deletions in Formal Languages", for which she received the Nevanlinna Prize for the best mathematics thesis in Finland. Author of more than 170 peer reviewed articles, Professor Kari is regarded as one of the world's experts in the area of biomolecular computation, that is using biological, chemical and other natural systems to perform computations. She has served as Steering Committee Chair for the DNA Computing conference series, as Steering Committee member for the Unconventional Computation conference series, as well as on the Scientific Advisory Committee of the International Society for Nano-Scale Science and Engineering.

Lila Kari serves on the editorial boards of the journals Theoretical Computer Science, Natural Computing and Universal Computer Science, and as section editor for molecular computing for the Natural Computing Handbook (Springer). She has additionally served as a member of the Board of Directors of the FIELDS Institute for Research in Mathematical Sciences, the UK EPSRC peer review college, on the NSERC grant selection committee on computing and information systems and the NSERC Herzberg-Brockhouse-Polanyi Prize joint selection committee. At the University of Western Ontario she has received numerous awards, including the Florence Bucke Science Prize and the Faculty of Science Award for Excellence in Undergraduate Teaching. From 2002 to 2011 she was Canada Research Chair in Biocomputing, and her current research focusses on theoretical aspects of bioinformation and biocomputation, including models of cellular computation, nanocomputation by DNA self-assembly and Watson-Crick complementarity in formal languages.



### *Abstract*

Self-assembly, the process by which objects autonomously come together to form complex structures, is ubiquitous in the physical world: Atoms bind to each other to form molecules, molecules may form crystals or macromolecules, cells interact to form biological organisms. Recent experimental research in DNA self-assembly demonstrated its potential for the parallel creation of a large number of nanostructures, including some encoding computations. This suggests exciting applications of self-assembly to circuit fabrication, nanorobotics, DNA computation, smart-drug design, and amorphous computing.

A systematic study of self-assembly as a computational process has been initiated by Adleman and Winfree. The individual components are therein modelled as square tiles on the infinite two-dimensional plane. Each side of a tile is covered by a specific "glue", and two adjacent tiles will bind to each other if they have matching glues on their abutting edges. Tiles that stick to each other may form various two-dimensional structures such as squares, rectangles, counters, or may cover the entire plane. In this talk I will describe the potential of the self-assembly of "DNA tiles" for nanocomputations. In addition, I will explore generalizations of the original model that add the possibility of having negative, "repelling", glues, as well as compare the computational power of deterministic versus non-deterministic self-assembly.

## Plenary Speaker

Tuesday, Aug 27, 14:00–15:00 Room BA 201

Dimitrios Giannakis / Andrew Majda *The Courant Institute, New York University*

Data-driven methods for dynamical systems: Quantifying predictability and extracting spatiotemporal patterns

Dimitrios Giannakis is an Assistant Professor of Mathematics at the Courant Institute of Mathematical Sciences, NYU. He is also affiliated with Courant's Center for Atmosphere Ocean Science (CAOS). He received BA and MSci degrees from the University of Cambridge in 2001, and a PhD degree from the University of Chicago in 2009. Prior to joining Courant and CAOS as faculty he was a postdoctoral researcher there from 2009-2012. Giannakis' research work is at the interface between applied mathematics and climate atmosphere ocean science. His primary research interests are in geometrical data analysis algorithms and statistical modeling of complex systems. He has applied these tools in topics including idealized dynamical systems, ocean and sea ice variability on seasonal to interannual timescales, and organized atmospheric convection.



### Abstract

Large-scale datasets generated by dynamical systems arise in many applications in science and engineering. Two research topics of current interest in this area involve using data collected through observational networks or output by numerical models to quantify the uncertainty in long-range forecasting, and improve understanding of the operating dynamics. In this talk we discuss applied mathematics techniques to address these topics blending ideas from machine learning, delay-coordinate embeddings of dynamical systems, and information theory. We illustrate these techniques with applications to climate atmosphere ocean science.

### This is a joint talk with Prof. Andrew Majda, Courant Institute, New York University

Andrew J. Majda is the Morse Professor of Arts and Sciences at the Courant Institute of New York University. Majda's primary research interests are modern applied mathematics in the broadest possible sense merging asymptotic methods, numerical methods, physical reasoning, and rigorous mathematical analysis.

Majda is a member of the National Academy of Sciences and has received numerous honors and awards including the National Academy of Science Prize in Applied Mathematics, the John von Neumann Prize of the Society of Industrial and Applied Mathematics, and the Gibbs Prize of the American Mathematical Society. He is also a member of the American Academy of Arts and Science. He has been awarded the Medal of the College de France, twice, and is a Fellow of the Japan Society for the Promotion of Science. He has received an honorary doctorate from his undergraduate alma mater, Purdue University.

In the past several years at the Courant Institute, Majda has created the Center for Atmosphere Ocean Science with a multi-disciplinary faculty to promote cross-disciplinary research with modern applied mathematics in climate modeling and prediction. Majda's current research interests include multi-scale multi-cloud modeling for the tropics, reduced stochastic and statistical modeling for climate, and novel mathematical strategies for prediction and data assimilation in complex multi-scale systems.



## **Plenary Speaker**

Wednesday, Aug 28, 9:00–10:00 **Room BA 201**

**George C. Papanicolaou** *Stanford University*

**Systemic Risk**

George C. Papanicolaou is currently the Robert Grimmett Professor in Mathematics at Stanford University. Besides his former focus on the analysis of waves and diffusion in inhomogeneous or random media, his recent research interests also include financial mathematics, especially the use of asymptotics for stochastic equations in analyzing complex models of financial markets and in data analysis. In 1987, the University of Athens conferred an Honorary Doctor of Science on Papanicolaou. In 2000, he became a Fellow of the American Academy of Arts and Sciences and he was elected to the U.S. National Academy of Sciences. Papanicolaou was invited plenary speaker at multiple international congresses, among others at the SIAM 50th anniversary meeting in 2002 and at the International Congress of Industrial and Applied Mathematics in 2003. In 2006, he received the SIAM von Neumann Prize in recognition of his wide-ranging work on analytic and stochastic methods and their application to the modeling of phenomena in the physical, geophysical, and financial sciences. In 2010 he received the Willard Benter Prize in Applied Mathematics. In 2011 he was the Gibbs lecturer of the American Mathematical Society. The University of Paris Diderot conferred on him the degree Doctor Honoris Causa in 2011.



### *Abstract*

The quantification and management of risk in financial markets is at the center of modern financial mathematics. But until recently, risk assessment models did not consider seriously the effects of inter-connectedness of financial agents and the way risk diversification impacts the stability of markets. I will give an introduction to these problems and discuss the implications of some mathematical models for dealing with them.

**Plenary Speaker**

Thursday, Aug 29, 14:00–15:00 **Room BA 201**

**Panos M. Pardalos** *University of Florida*

**Optimization and Modeling in Energy Systems**

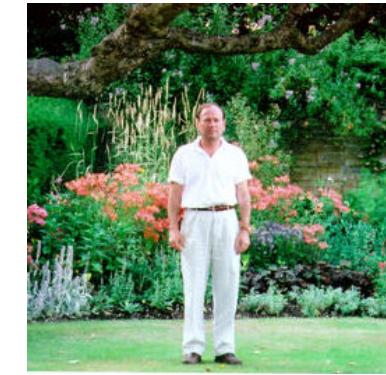
Panos M. Pardalos serves as Distinguished Professor of Industrial and Systems Engineering at the University of Florida. He is also an affiliated faculty member of the Computer and Information Science Department, the Hellenic Studies Center, and the Biomedical Engineering Program. He is also the Director of the Center for Applied Optimization. Dr. Pardalos is a world leading expert in global and combinatorial optimization. His recent research interests include network design problems, optimization in telecommunications, e-commerce, data mining, biomedical applications, and massive computing.

*Abstract*

For decades, power systems have been playing an important role in humanity. Industrialization has made energy consumption an inevitable part of daily life. Due to our dependence on fuel sources and our large demand for energy, power systems have become interdependent networks rather than remaining independent energy producers. This talk will focus on the problems arising in energy systems as well as recent advances in optimization and modeling to address these problems. Among the topics to be discussed are emission constrained hydrothermal scheduling, electricity and gas networks expansion, as well as reliability analysis of power grid.

**Plenary Speaker**Monday, Aug 26, 14:00–15:00 **Room BA 201****Israel Michael Sigal** *University of Toronto***Superconductivity and automorphic functions**

Israel Michael Sigal is the Norman Stuart Robertson Chair in Applied Mathematics and University Professor at the University of Toronto. He works in several areas of mathematical physics. Among his results are the proof (jointly with Avy Soffer) of asymptotic completeness of the quantum many-body scattering for short-range potentials and the development of a mathematical framework (jointly with Volker Bach and Jurg Frohlich) of the theory of emission and absorption of quantum radiation by non-relativistic quantum systems such as atoms and molecules, as well as several important results on the nonlinear Schrodinger, Ginzburg-Landau, mean-curvature and wave equations. Professor Sigal was an invited speaker at several International Congresses of Mathematical Physics and at an International Congress of Mathematicians.

*Abstract*

Macroscopic theory of superconductivity is based on the celebrated Ginzburg - Landau equations. First developed to explain and predict properties of superconductors, these equations had a profound influence on physics well beyond their original designation area. These are a pair of coupled nonlinear equations for a complex function (called order parameter or Higgs field) and a vector field (magnetic potential or gauge field). They are the simplest representatives of a large family of equations appearing in physics and mathematics. (The latest variant of these equations is the Seiberg - Witten equations.) Besides of importance in physics, they contain beautiful mathematics (some of the mathematics was discovered independently by A. Turing in his explanation of patterns of animal coats). In this talk I will review recent results involving key solutions of these equations - the magnetic vortices and vortex lattices, their existence, stability and dynamics, and how they relate to the modified theta functions appearing in number theory. Some automorphic functions play a key role in this theory.

## **Plenary Speaker**

Friday, Aug 30, 9:00–10:00 **Room BA 201**

**Godfried T. Toussaint NYUAD/M.I.T./McGill**

### **Phylogenetic Analysis of the Musical Rhythms of the World**

Godfried T. Toussaint is a Research Professor of Computer Science at New York University Abu Dhabi in Abu Dhabi, United Arab Emirates. He is also an affiliate researcher in the Computer Science and Artificial Intelligence Laboratory at the Massachusetts Institute of Technology in Cambridge, MA, USA. For many years he taught and did research in the School of Computer Science at McGill University in Montreal, in the areas of information theory, pattern recognition, textile-pattern analysis and design, computational geometry, machine learning, music information retrieval, and computational music theory. In 2005 he became a researcher in the Centre for Interdisciplinary Research in Music Media and Technology, in the Schulich School of Music at McGill University, in Montreal, Canada.

Dr. Toussaint is a founder and co-founder of several annual international conferences and workshops, including the ACM Symposium on Computational Geometry, and the Canadian Conference on Computational Geometry. He is an editor of several journals, including Computational Geometry: Theory and Applications, the International Journal of Computational Geometry and Applications, ISRN Geometry, and the Journal of Mathematics and the Arts. He is the recipient of several distinguished awards including a Killam Fellowship from the Canada Council for the Arts, and a Radcliffe Fellowship from Harvard University, where he spent one year at the Radcliffe Institute for Advanced Study, and one year in the Music Department. His research on the phylogenetic analysis of musical rhythms has been reported in several media, and was the focus of two Canadian television programs. He is the author of more than 390 publications.

Latest Book: *The Geometry of Musical Rhythm*, Chapman-Hall/CRC Press, January, 2013.



#### *Abstract*

The application of computational-mathematical tools to the analysis of symbolically notated musical rhythms of the world informs musicological issues such as whether one group of rhythms is more complex than another, whether one family of rhythms possesses an underlying metrical hierarchy, or how an evolutionary phylogeny of musical rhythms may be constructed. Recent results on these problems will be illustrated with examples. To submit rhythms to a phylogenetic analysis, a measure of similarity between rhythms is usually employed.

Two fundamental approaches to measuring the similarity between rhythms are compared: a feature-based technique and a transformation method. In the former procedure, statistical and/or structural features are computed from a suitable representation of the rhythms, thus representing them as points in a feature space. Two rhythms are considered to be similar if the distance between their corresponding points in this feature space is small. In the latter strategy a rhythm is represented as a binary sequence of symbols denoting onsets (sounds) and rests (silences), and a distance measure called the edit-distance is used. The edit distance between two rhythms is the minimum number of mutations required to transform one rhythm to the other. Here the mutations consist of insertions, deletions, and substitutions of onsets and rests. A phylogenetic analysis using the BioNJ algorithm from the SplitsTree-4 software package, incorporating the edit distance, applied to several collections of the musical rhythms practiced in several cultures around the globe, yields new insights into the paradigmatic roles played by the most salient rhythms.

## 6 Semi-Plenary Speakers

Wednesday, Aug 28, 16:50–17:50 Room BA 202

**Julien Arino** *University of Manitoba*

**The spatio-temporal spread of drug-resistant tuberculosis**

Julien Arino received his PhD in 2001 from Université Joseph Fourier in Grenoble, France in affiliation with INRIA Sophia Antipolis and the Villefranche-sur-mer Oceanological Observatory. He held postdoctoral fellowships at the University of Victoria (Jan 2001-Dec 2002) and McMaster University (Jan 2003-Jun 2005).

Since 2005, he has been a faculty member at the University of Manitoba. He is currently a member of the Bio.Diaspora Project, which is based at St Michael's Hospital (Toronto), and the Centre for Disease Modelling, which is hosted at York University.



### *Abstract*

Tuberculosis is, after HIV/AIDS, the second largest cause of infectious disease induced death. It is estimated that in 2011, it killed 1.4 million people worldwide. Tuberculosis is also a disease of poverty, as contributing factors to its spread include poor and overcrowded living conditions, poor health conditions, etc. As a consequence, over 95% of new infections and deaths by tuberculosis occur in developing countries.

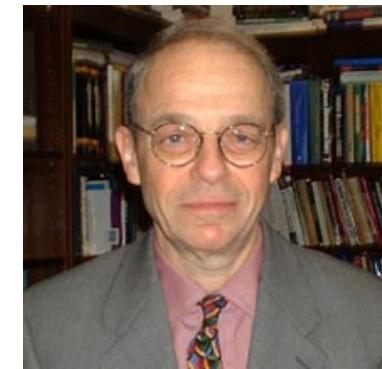
We formulate a model for tuberculosis in a single population that includes three strains: a drug-sensitive strain, MDR-TB and XDR-TB. We study the model mathematically and show, in particular, that the bifurcation structure of the whole model is governed by the behaviour of the XDR-TB strain. We then extend the model to a metapopulation setting, in which each country is a vertex in a multi-digraph, endowed with a system for the single population case. Weighted arcs between the vertices represent the rate of travel of individuals between the countries. We study the resulting large-scale system. Finally, we proceed to numerical experiments with realistic travel and population data.

This is a joint work with K. Khan (University of Manitoba) and I. Soliman (St Michael's Hospital, Toronto).

**Semi-Plenary Speaker**Monday, Aug 26, 15:30–16:30 **Room BA 110****Steven Brams** *New York University***Fair Division**

Steven J. Brams is Professor of Politics at New York University and the author, co-author, or co-editor of 18 books and more than 250 articles. His books include *Theory of Moves* (Cambridge, 1994) and, co-authored with Alan D. Taylor, *Fair Division: From Cake-Cutting to Dispute Resolution* (Cambridge, 1996) and *The Win-Win Solution: Guaranteeing Fair Shares to Everybody* (Norton, 1999). His newest books are *Mathematics and Democracy: Designing Better Voting and Fair-Division Procedures* (Princeton, 2008) and *Game Theory and the Humanities: Bridging Two Worlds* (MIT, 2011). He holds two patents for fair-division algorithms and is chairman of the advisory board of Fair Outcomes, Inc.

Brams has applied game theory and social-choice theory to voting and elections, bargaining and fairness, international relations, and the Bible, theology, and literature. He is a former president of the Peace Science Society (1990-91) and of the Public Choice Society (2004-2006). He is a Fellow of the American Association for the Advancement of Science (1986), a Guggenheim Fellow (1986-87), and was a Visiting Scholar at the Russell Sage Foundation (1998-99).

*Abstract*

Over the past 20 years, there has been burgeoning interest in the subject of fair division — how one divides a single divisible good (e.g., a cake), or multiple indivisible goods (e.g., the marital property in a divorce), to satisfy such properties as efficiency, envy-freeness, and equitability. Some of the major possibility and impossibility results – relating to both the existence of such a division and algorithms for producing it – will be reviewed. How these results apply to dividing land, allocating items in a family estate to heirs, determining which rooms housemates get and how much of the rent each pays for its room, and matching applicants to colleges will be among the applications discussed.

## Semi-Plenary Speaker

Monday, Aug 26, 15:50–16:50 **Room BA 101**

**Bernd Hofmann** *Technical University of Chemnitz*

### On an Inverse and Ill-Posed Problem of Autoconvolution Type in Ultrashort Laser Pulse Characterization

Dr. Bernd Hofmann is professor for Analysis and Inverse Problems at the Chemnitz University of Technology, Germany, in the Department of Mathematics since 1993, where he served as Dean of the Faculty from 2006 to 2009. He established an interdisciplinary research group on inverse problems with applications in natural sciences, engineering and finance, organizing the annual ‘Chemnitz Symposium on Inverse Problems’, sometimes on tour (in Linz 2009, Canberra 2012, and Shanghai 2013).

Dr. Hofmann’s research focus is on regularization theory and practice as well as on studies concerning the nature of ill-posedness and appropriate tools for the treatment of ill-posedness phenomena. He works as a member of the Editorial Board of the journals ‘Inverse Problems’ and ‘Journal of Inverse and Ill-Posed Problems’.



#### *Abstract*

In the early 1990s motivated by applications from spectroscopy and stochastics contributions to the mathematical analysis of deautoconvolution problems as a class of inverse problems in spaces of continuous or quadratically integrable real functions were made. Such deautoconvolution problems were mostly aimed at finding non-negative functions with compact support from observations of its autoconvolution. Since the autoconvolution operator is nonlinear and smoothing, the deautoconvolution problem is ill-posed in the sense that the solutions need not be uniquely determined and mainly small perturbations in the data may lead to arbitrarily large errors in the solution. To overcome the negative consequences of ill-posedness some kind of regularization is required. Recently, the research group ‘Solid State Light Sources’ of the Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, hit on the autoconvolution problem in the context of a new approach in ultrashort laser pulse characterization called Self-Diffraction SPIDER. For phase reconstruction as an auxiliary problem the solution of an autoconvolution equation is needed, but now for complex functions to be determined from complex observations. Moreover, a device-related kernel function must be added. The ill-posedness phenomenon arises in the complex case, too, but a thorough analysis of the complex case in deautoconvolution was missing in the literature. The talk presents analytical and numerical results on the character of ill-posedness of the equation occurring as a part of the SD SPIDER approach. Moreover, an iterative regularization approach is suggested for the problem when only noisy data of are given.

**Semi-Plenary Speaker**

Tuesday, Aug 27, 15:50–16:50 **Room BA 202**

**Eili Klein** *John Hopkins University*

**Ecological and Epidemiological Drivers of Viral Evolution**

Dr. Eili Klein is an assistant professor at John Hopkins University in the Centre for Advanced modeling in the Social, Behavioural and Health Sciences; Dr. Klein also holds a fellow position at the Center for Disease Dynamics, Economics and Policy, in Washington, D.C. He received his PhD in ecology and evolutionary biology from Princeton University and has held research associate positions at the Center for Disease Dynamics, Economics and Policy and Resources for the Future.

Dr. Klein's interdisciplinary research involves ecology, epidemiology, economics, and human behaviour. His scientific interests include: factors that drive antimicrobial drug resistance; economic epidemiology; how human behaviour influences ecology/epidemiological dynamics; and how human behaviour influences evolution of an infectious disease.

*Abstract*

While it has long-been recognized that disease transmission is impacted by human behavior, the consequences of human behavior on the ecology of directly transmitted pathogens has been understudied. Using a biophysical model of virus stability, we examine how much of virus evolution is driven by epidemiological factors, such as contact rates and protective behavior, and how much is driven by biological characteristics of the virus, such as its growth rate. We use agent-based models, which scale from local to planetary to elucidate the driving factors for both endemic and epidemic directly transmitted viruses.

**Semi-Plenary Speaker**

Monday, Aug 26, 10:30 – 11:30 Room BA 111

**Mel Levy** Duke University

**Variational Principles in Wave-Functional and Density- Functional Formulations of Quantum Mechanics**

Born 1941, in Brooklyn, New York.

Professor Emeritus, Tulane University and North Carolina A&T State University. Visiting Professor, Duke University (2007-). Professor, North Carolina Agricultural and Technical State University, 2002-2007. Professor, Tulane University, 1976-2002 (presently, Professor Emeritus). Visiting Professor or Visiting Scientist: Oak Ridge National Laboratory; Quantum Theory Project, University of Florida; Instituto Venezolano de Investigaciones Cientificas (I.V.I.C.), Caracas, Venezuela; Institute for Theoretical Physics, University of California at Santa Barbara; Institute of Theoretical Physics, Kossuth Lajos University, Debrecen, Hungary; Department of Physics and Theory Center Cornell University; Lecturer, Department of Chemistry, the University of North Carolina at Chapel Hill, 7/74-7/76.

International Academy of Quantum Molecular Science; International Academy of Mathematical Chemistry; Fellow of The American Physical Society; Editorial Board, Advances in Quantum Chemistry; Advisory Editorial Board, Theoretical Chemistry Accounts; Advisory Editorial Board, Progress in Theoretical Chemistry; Guest Editor: The International Journal of Quantum Chemistry; Tulane Liberal Arts and Sciences, Faculty Research Award, 1998.

**Abstract**

Variational theorems are important for obtaining approximate solutions to the Schrödinger equation. With this in mind, fundamental variational principles will first be discussed within the wave-functional formulation of quantum mechanics. Then the corresponding variational principles for ground states in density and density-matrix functional theories will be reviewed briefly for the non-degenerate and degenerate situations. Based on these variational principles, properties of the exact functionals will be presented that are difficult to satisfy with approximate functionals. Special emphasis will be given to degeneracies, coordinate scaling, and potentials (functional derivatives). Then, a new time-independent density-functional theory for excited states will be presented for Coulomb systems. The lecture will conclude with a description of certain relevant unsolved mathematical problems, such as one involving an ionization energy convexity property.

## Semi-Plenary Speaker

Thursday, Aug 29, 15:50–16:50 **Room BA 101**

**Silvina Matysiak** *University of Maryland*

### Role of dipolar interactions in protein folding

Dr. Silvina Matysiak is an assistant professor in the Fischell Department of Bioengineering at the University of Maryland College Park. She received her B.S. in Chemical Engineering from the Instituto Tecnológico de Buenos Aires in 2001 and her PhD in Chemistry from Rice University in 2007. Before joining Maryland, she was a postdoctoral fellow at the University of Texas at Austin.

Matysiak's primary area of interest is the characterization of protein dynamics and function at the molecular level. Her work includes using computer simulations to study the mechanism of protein folding and misfolding associated with neurodegenerative diseases, development of multiscale simulation approaches to bridge different time- and length-scales and how solvent organization affects cooperative transitions in biomolecular systems.



#### *Abstract*

The role of dipole interactions in protein folding A generic coarse-grained (CG) protein model will be presented to characterize the driving forces behind protein folding. The change in orientation of the atoms in the coarse-grained unit is captured by the addition of Drude oscillators inside each polar coarse-grained bead. The addition of dummy sites inside the polar beads introduces structural polarization into the coarse-grained model.

Realistic alpha/beta content is achieved *de novo* without any biases in the force-field toward a particular secondary structure. The dipoles created by the Drude oscillators interact with each other and drive the protein models to fold into unique structures depending on the amino acid patterning and presence of capping residues. In this talk, we will show the role of dipole-dipole and dipole-charge interactions in shaping the secondary and tertiary structure of proteins. In particular, we will focus on the folding of beta-hairpins and single helices and in helix bundles and multiple beta-sheet strands. In the folded ensemble, dipoles along a helix are found aligned parallel and stabilized by the presence of charged capping residues. On the other hand, beta-sheets exhibit antiparallel neighboring dipoles.

**Semi-Plenary Speaker**Tuesday, Aug 27, 15:50–16:50 **Room BA 208****Nicolae Tarfulea** *Purdue University Calumet***Boundary Conditions for Constrained Hyperbolic Systems: Mathematical and Numerical Analysis**

Dr Nicolae Tarfulea is Associate Professor in the Department of Mathematics, Computer Science & Statistics, Purdue University Calumet. He received his PhD from the University of Minnesota and his M.S. in Mathematics from the Penn State University in 2004 and 2001, respectively. His main research Interests are in Partial Differential Equations; Numerical Analysis; General Relativity. More precisely: boundary conditions for hyperbolic formulations of Einstein's equations, nonlinear elliptic equations, reaction diffusion systems, compressed sensing, and finite element methods. He has published 23 papers on these subjects in some of the most prestigious journals of mathematics, and gave over 20 invited talks in the last five years, and been a part of six research grants.

*Abstract*

Many applications in sciences and technology lead to first order symmetric hyperbolic (FOSH) systems of differential equations supplemented by constraint equations. The Cauchy problem for many such FOSH systems is constraint-preserving, i.e., the solution satisfies certain spatial differential constraints whenever the initial data does (e.g., Maxwell's equations or Einstein's field equations in various FOSH formulations). Frequently, artificial space cut offs are performed for such evolution systems, usually out of the necessity for finite computational domains. However, it may easily happen that boundary conditions at the artificial boundary for such a system lead to an initial boundary value problem which, while well-posed, does not preserve the constraints. Therefore, boundary conditions have to be posed in such a way that the numerical solution of the cut off system approximates as best as possible the solution of the original problem on infinite space, and this includes the preservation of constraints. It has become increasingly clear that in order for constraints to be preserved during evolution, the boundary conditions have to be chosen in an appropriate way. Here we consider the problem of finding constraint-preserving boundary conditions for constrained FOSH systems in the well-posed class of maximal nonnegative boundary conditions. Based on a characterization of maximal nonnegative boundary conditions, we discuss a systematic technique for finding such boundary conditions that preserve the constraints, pending that the constraints satisfy a FOSH system themselves. We exemplify this technique by presenting a few relevant applications (e.g., for FOSH formulations of Einstein's equations and for systems of wave equations in FOSH formulation subject to divergence constraints).

## Semi-Plenary Speaker

Wednesday, Aug 28, 16:50–17:50 **Room BA 101**

Peter Tielemans *University of Calgary*

### Martini coarse-grained and atomistic simulations of lipids

Peter Tielemans studied physical chemistry at the University of Groningen in the Netherlands, where he obtained his PhD under the supervision of Herman Berendsen, one of the pioneers of biomolecular simulation. After a year as a European Molecular Biology Organization fellow at the University of Oxford in Mark Sansom's research group, Tielemans joined the University of Calgary. Since 2005, he has been a Professor in the Department of Biological Sciences. His research interests are in biomolecular simulation and computational biology, with an emphasis on biochemical and biophysical problems involving cell membranes. Among his distinctions are an Alfred P. Sloan Foundation Fellowship, the Royal Society of Canada's Rutherford Memorial Medal in Chemistry, and a Natural Sciences and Engineering Research Council of Canada (NSERC) Steacie Memorial Fellowship.



#### *Abstract*

Computer simulations have been widely used to study properties of lipid aggregates. Over the past twenty years simulations have progressed from small models of lipid bilayers composed of one type of lipid at length scales of 5–8 nanometer and time scales of nanoseconds to very complex models at length scales of tens of nanometers and time scales of microseconds. The development of realistic coarse-grained models such as the MARTINI model has brought simulations of lipids to mesoscale scales where particle-based simulation and continuum models overlap and simulations can be compared to measurable mechanical parameters of lipid aggregates. MARTINI is parameterized primarily based on experimental data, but for many systems of biological importance there is limited experimental data that can be used in parameterization and validation. I will discuss recent progress in linking atomistic simulations, experimental results, and parameters from continuum models to MARTINI simulations, illustrated with examples on lipid mixtures, membrane tethers, and lipid-protein systems.

## **Special Invited Speaker**

Thursday, Aug 29, 15:50–16:50 **Room BA 208**

**Catherine Mavriplis** *University of Ottawa*

### **Fifteen years of funded programs to advance women in science and engineering: progress and persistent challenges**

Catherine Mavriplis, PhD, PE is an Associate Professor of Mechanical Engineering at the University of Ottawa and the NSERC Chair for Women in Science and Engineering (Ontario region). Dr. Mavriplis has been a professor of Mechanical and Aerospace Engineering since 1991, primarily at the George Washington University in the United States. She has also worked at the US National Science Foundation (NSF) in Mathematics and the University of Oklahoma in Meteorology. Her specialization is in Computational Fluid Dynamics and through application of her numerical modeling skills she has been involved in a number of interdisciplinary projects.

She maintains a strong collaboration with several U.S. researchers and the Royal Institute of Technology in Sweden. She currently serves on the Board of Directors of the Computational Fluid Dynamics Society of Canada. Dr. Mavriplis has worked under NSF funding to advance women since 1996, notably through the FORWARD to Professorship workshops under the NSF ADVANCE program, reaching up to 1,300 science and engineering doctoral women by 2013.



#### *Abstract*

I will discuss my work in advancing women in science and engineering through US National Science Foundation funding since 1997 and, more recently, since 2011, Canadas Natural Sciences and Engineering Research Council Chair for Women in Science and Engineering program. The FORWARD to Professorship program, in particular, has been a successful vehicle to empowering doctoral women who consider academic careers. Results of a survey of all 1300 FORWARD participants since 2003 will be presented, giving a picture of how this group of talented and motivated women are advancing and how the climate is changing. My work in Canada has also included women in industry, in particular with the Chair sponsor, Pratt & Whitney Canada, an aircraft engine manufacturer based in Montreal. I will discuss activities designed for mid-career professional women in industry as well as some initiatives for boosting numbers of women in computing.

## 7 Special Symposia and Organizers

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<b>SS-AAIP</b>	Applied Analysis and Inverse Problems	Herb Kunze ( <i>Math and Stats, Guelph</i> ) Kimberly Levere ( <i>School of Engineering, Guelph</i> )
<b>SS-ADS</b>	Canada-China Session on Applied Dynamic Systems	Yuming Chen ( <i>WLU</i> ) Fengqin Zhang ( <i>Yuncheng University</i> ) Xingfu Zou ( <i>Western University</i> )
<b>SS-ANMPDE</b>	Advanced Numerical Methods for PDEs and Applications	Christina C. Christara ( <i>University of Toronto</i> ) Peter A. Forsyth ( <i>University of Waterloo</i> ) Dong Liang ( <i>York University</i> )
<b>SS-CDPB</b>	Complex Dynamics of Population Behaviour	Stephen Tully ( <i>Guelph</i> ) Scott Greenhalgh ( <i>Yale</i> ) Chad Wells ( <i>Yale</i> ) Chris Pagnutti ( <i>Guelph</i> )
<b>SS-CF</b>	Numerical Methods for Computationally Intensive Problems in Mathematical Finance	Duy-Minh Dang ( <i>UW</i> )
<b>SS-CFDRA</b>	Computational Fluid Dynamics for Real Applications	Ken Jackson ( <i>University of Toronto</i> ) Lakhdar Remaki ( <i>BCAM, Spain</i> ) Stéphane Moreau ( <i>Sherbrooke</i> ) Abdelkader Baggag ( <i>Laval</i> )
<b>SS-CMAIS</b>	Control Methods for Advanced Industrial Systems	Behzad Samadi ( <i>Maplesoft</i> ) Jürgen Gerhard ( <i>Maplesoft</i> )
<b>SS-CMS</b>	Computational Materials Science	Haipeng Wang ( <i>NPU and University of Toronto</i> ) Ziad Saghir ( <i>Ryerson University</i> )
<b>SS-CPH</b>	Computational Photonics	Marek Wartak ( <i>WLU</i> ) Harry E. Ruda ( <i>University of Toronto</i> )
<b>SS-CSB</b>	Computations in Systems Biology	Hin Hark Gan ( <i>NYU</i> ) Gaurav Arya ( <i>UCSD</i> )
<b>SS-DBCNDE</b>	Dynamics and Bifurcations in Coupled Networks of Differential Equations: Theory and Applications	Luciano Buono ( <i>UOIT</i> )
<b>SS-DFT</b>	Density Functional Theory	Ian Hamilton ( <i>WLU</i> ) Paul Ayers ( <i>McMaster</i> ) Viktor Staroverov ( <i>Western</i> )
<b>SS-DG</b>	Decisions and Games	D. Marc Kilgour ( <i>Wilfrid Laurier University</i> ) Marcus Pivato ( <i>Trent University</i> )
<b>SS-EGT</b>	Evolutionary Game Theory	Joe Apaloo ( <i>St. Francis Xavier</i> ) Ross Cressman ( <i>WLU</i> )
<b>SS-GLS</b>	Geocomputational Landscapes and Spaces	Steven A. Roberts ( <i>WLU</i> ) Colin Robertson ( <i>WLU</i> )

# Special Symposia and Organizers

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<b>SS-HOMCFD</b>	Higher-Order Methods in Computational Fluid Dynamics	Lilia Krivodonova ( <i>UW</i> ) Hans De Sterck ( <i>UW</i> )
<b>SS-HPTC</b>	Recent Progress in Hyperbolic Problems: Theory and Computation	Jae-Hun Jung ( <i>SUNY University at Buffalo</i> ) Lilia Krivodonova ( <i>University of Waterloo</i> ) Allen Tesdall ( <i>CUNY College of Staten Island</i> )
<b>SS-IM</b>	Industrial Mathematics	Sean Bohun ( <i>UOIT</i> )
<b>SS-LSNE</b>	Lie Symmetry and Other Approaches in Theory and Applications of Nonlinear Equations	C.M. Khalique ( <i>North-West University, RSA</i> )  M. Abudiab ( <i>Texas A&amp;M University, USA</i> )
<b>SS-MACBE</b>	Modeling Approaches and Challenges in the Built Environment	Ryan Danks ( <i>RWDI</i> ) Michael Carl ( <i>RWDI</i> )
<b>SS-MCMBBM</b>	Modeling and Computational Methods for Mathematical Biology and Medicine	Suzanne Shontz ( <i>Mississippi State</i> )  Corina Drapaca ( <i>Penn State</i> ) Siv Sivaloganathan ( <i>WLU</i> )
<b>SS-ME</b>	Mathematical Epidemiology	Connell McCluskey ( <i>WLU</i> )
<b>SS-MFMCR</b>	Theory and Applications in Finance	Joe Campolieti ( <i>WLU</i> ) Adam Metzler ( <i>WLU</i> )
<b>SS-MHP</b>	Mathematics of Human Placenta: a Window into Fetal Origins of Adult Disease	C.M. Salafia ( <i>Placental Analytics, LLC</i> )  O. Shlakhter ( <i>Alberta Health Services</i> ) C.M. Salafia ( <i>M. Yampolsky (Mathematics Department, University of Toronto)</i> )
<b>SS-MIPD</b>	Mathematical Immunology and Pathogen Dynamics	Jane Heffernan ( <i>CDM, Math &amp; Stats, York U</i> ) Cameron Browne ( <i>University of Ottawa</i> ) Stanca Ciupe ( <i>Virginia Tech University</i> ) Jonathan Forde ( <i>Hobart and William Smith Colleges</i> )
<b>SS-MMNN</b>	Mathematical Models for Nanoscience and Nanotechnology	Z.L. Miskovic ( <i>University of Waterloo</i> ) A.H. Majedi ( <i>University of Waterloo</i> )
<b>SS-MSEPSW</b>	Multitaper Spectrum Estimation Prolate Spheroidal Wave Functions, Quadratic-Inverse, and Related Problems	Wesley Burr ( <i>Queen's University</i> )  Charlotte Haley ( <i>Queen's University</i> ) David J. Thomson ( <i>Queen's University</i> )
<b>SS-NCTAP</b>	New Computational Techniques for Applied Problems in Science and Engineering	Ludwig Kohaupt ( <i>Beuth University of Technology Berlin</i> )  Yan Wu ( <i>Georgia Southern University</i> )

# Special Symposia and Organizers

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<b>SS-NMDAEA</b>	Numerical Methods for Differential-Algebraic Equations and Applications	Andreas Griewank ( <i>Humboldt University, Germany</i> ) Ned Nedialkov ( <i>Cardiff University, UK</i> ) John Pryce ( <i>Cardiff University, UK</i> )
<b>SS-QCTA</b>	Quantum Control: Theory and Application	Lian-Ao Wu ( <i>IKERBASQUE, Basque Foundation of Science and University of the Basque Country, Spain</i> )
<b>SS-RPSETS</b>	Recent Progress in Spintronics: Experiment and Dynamical Systems	Jingrun Chen ( <i>UC Santa Barbara</i> ) Xu Yang ( <i>UC Santa Barbara</i> )
<b>SS-RTDEDS</b>	Recent Trends in Differential Equations and Dynamical Systems	Xinzhi Liu ( <i>UW</i> ) Mohamad Alwan ( <i>UW</i> ) Hongtao Zhang ( <i>UW</i> )
<b>SS-RWFDDNO</b>	Continuous-time Random Walks, Fractional Diffusion and Non-local Operators: Applications to Physics, Finance, and Engineering	Mark M. Meerschaert ( <i>Michigan State University, USA</i> ) Enrico Scalas ( <i>University of Eastern Piedmont, Italy and BCAM - Basque Center for Applied Mathematics, Basque Country, Spain</i> )
<b>SS-SAEEM</b>	Statistical Aspects of Environmental and Ecological Modeling	Vyacheslav Lyubchich ( <i>University of Waterloo</i> ) Yulia R. Gel ( <i>University of Waterloo</i> )
<b>SS-SCT</b>	Social Choice Theory	D. Marc Kilgour ( <i>Wilfrid Laurier University</i> ) Marcus Pivato ( <i>Trent University</i> )
<b>SS-SDAG</b>	Statistical Data Analysis and Geometry	Shoja Chenouri ( <i>University of Waterloo</i> ) Paul Marriott ( <i>University of Waterloo</i> )
<b>SS-SGT</b>	Structured Graph Theory	Chinh Hoang ( <i>WLU</i> ) Kathie Cameron ( <i>WLU</i> )
<b>SS-SNDTA</b>	Symmetry in Nonlinear Dynamics: Theory and Applications	Manuele Santoprete ( <i>WLU</i> ) McLenaghan ( <i>University of Waterloo</i> )
<b>SS-SSMMBP</b>	Simulations in Soft Matter and Molecular Bio-Physics	Cristiano L. Dias ( <i>New Jersey Institute of Technology</i> )
<b>SS-VPPO</b>	Variational Problems of Physical Origin	Robert Jerrard ( <i>University of Toronto</i> ) Andrew Lorent ( <i>University of Cincinnati</i> )
<b>SS-WSM</b>	Women in Science and Mathematics	Shohini Ghose ( <i>WLU</i> ) Hind Al-Abadleh ( <i>WLU</i> )

## 8 Conference Schedule

### 8.1 Monday, August 26, 2013

	Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
08:30-09:00			<b>AMMCS Conference Opening BA201</b> <i>Max Blouw President and Vice-Chancellor, Wilfrid Laurier University</i> <i>Paul Jessop Dean, Faculty of Science, Wilfrid Laurier University</i>		
09:00-10:00			<b>Plenary Talk BA 201 - Chair: R. Melnik</b> <b>Information Integration/Organization and Numerical Harmonic Analysis.</b> <i>Ronald Coifman Yale University - Abstract and Biography - p 7</i>		
10:00-10:30			<b>Coffee Break: BA Hallways</b>		
10:30-12:30	<b>SS-AAIP - 1</b> Applied Analysis & Inverse Problems	<b>SS-HPTC - 1</b> Recent progress in hyperbolic problems: Theory and Computation	<b>SS-DG+SCT - 1</b> Decision Games and Social Choice Theory	<b>SS-DFT - 1</b> Density Functional Theory	<b>SS-SDAG</b> Statistical Data Analysis and Geometry
12:30-14:00			<b>Lunch</b>		
14:00-15:00			<b>Plenary Talk BA 201 - Chair: R. Melnik</b> <b>Dynamics of Magnetic Vortices and Decoherence</b> <i>Israel Michael Sigal The University of Toronto - Abstract and Biography - p 14</i>		
15:00-15:30			<b>Coffee Break BA Hallways</b>		
15:30-17:50	<b>SS-AAIP - 2</b> Applied Analysis & Inverse Problems	<b>SS-HPTC - 2</b> Recent progress in hyperbolic problems: Theory and Computation	<b>SS-DG+SCT - 2</b> Decision Games and Social Choice Theory	<b>SS-DFT - 2</b> Density Functional Theory	<b>SS-RWFDNO</b> Continuous-time random walks, fractional diffusion and non-local operators: Applications

Monday, August 26, 2013

	Room BA202	Room BA208	Room BA209	Room BA210	Room BA211
08:30-09:00			<b>AMMCS Conference Opening</b> <b>Max Blouw President and Vice-Chancellor, Wilfrid Laurier University</b> <b>Paul Jessop Dean, Faculty of Science, Wilfrid Laurier University</b>		
09:00-10:00			<b>Plenary Talk BA 201 - Chair: R. Melnik</b> <b>Information Integration/Organization and Numerical Harmonic Analysis.</b> <b>Ronald Coifman Yale University - Abstract and Biography - p 7</b>		
10:00-10:30			<b>Coffee Break: BA Hallways</b>		
10:30-12:30	<b>CS-Model 1</b> Partial Differential and Integral Equations in Mathematical Modeling	<b>SS-MHP-1</b> Mathematics of human placenta: a window into fetal origins of adult disease	<b>SS-MCMMBM-1</b> Modeling and Computational Methods for Mathematical Biology and Medicine	<b>SS-MACBE-1</b> Modeling approaches and challenges in the built environment	<b>CS-DSDE-1</b> Applications of Dynamical Systems and Differential Equations
12:30-14:00			<b>Lunch</b>		
14:00-15:00			<b>Plenary Talk BA 201 - Chair: R. Melnik</b> <b>Dynamics of Magnetic Vortices and Decoherence</b> <b>Israel Michael Sigal The University of Toronto - Abstract and Biography - p 14</b>		
15:00-15:30			<b>Coffee Break BA Hallways</b>		
15:30-17:50	<b>SS-CSB</b> Computations in Systems Biology	<b>SS-MHP-2</b> Mathematics of human placenta: a window into fetal origins of adult disease	<b>SS-MCMMBM-2</b> Modeling and Computational Methods for Mathematical Biology and Medicine	<b>SS-MACBE-2</b> Modeling approaches and challenges in the built environment	<b>CS-DSDE-2</b> Applications of Dynamical Systems and Differential Equations

## 8.2 Tuesday, August 27, 2013

	Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
09:00-10:00			Plenary Talk BA 201 - Chair: M. Levy  How Quantum Mechanics Can Help Solve the World's Energy Problems  Emily Carter Princeton University - Abstract and Biography - p 6		
10:00-10:30			Coffee Break: BA Hallways		
10:30-12:30	<b>SS-AAIP-3</b>  Applied Analysis & Inverse Problems	<b>SS-HPTC-3</b>  Recent progress in hyperbolic problems: Theory and Computation	<b>SS-DG+SCT-3</b>  Decision Games and Social Choice Theory	<b>CS-CACO-1</b>  Computational Algebra, Combinatorics and Optimization	<b>SS-MSEPSW-1</b>  Multitaper Spectrum Estimation, Prolate Spheroidal Wave Functions, Quadratic-Inverse, and Related Problems
12:30-14:00			Lunch		
14:00-15:00			Plenary Talk BA 201 - Chair: I. Kotsireas  Dimitrios Giannakis / Andrew Majda, Courant Institute, New York University - Abstract and Biography - p 11		
15:00-15:30			Coffee Break BA Hallways		
15:30-17:30	<b>SS-AAIP-4</b>  Applied Analysis & Inverse Problems	<b>SS-HPTC-4</b>  Recent progress in hyperbolic problems: Theory and Computation		<b>SS-DFT-3</b>  Density Functional Theory	<b>SS-MSEPSW-2</b>  Multitaper Spectrum Estimation, Prolate Spheroidal Wave Functions, Quadratic-Inverse, and Related Problems

Tuesday, August 27, 2013

	Room BA202	Room BA208	Room BA209	Room BA210	Room BA211	Room BA305
09:00-10:00				Plenary Talk BA 201 - Chair: M. Levy <b>How Quantum Mechanics Can Help Solve the World's Energy Problems</b> Emily Carter Princeton University - Abstract and Biography - p 6		
10:00-10:30				Coffee Break: BA Hallways		
10:30-12:30	<b>SS-CDPB-1</b> Complex Dynamics of Population Behaviour	<b>SS-NCTAP-1</b> New Computational Techniques for Applied Problems in Science and Engineering	<b>SS-CPH</b> Computational Photonics	<b>CS-Finance-1</b> Financial Mathematics and Computation	<b>CS-DSDE-3</b> Applications of Dynamical Systems and Differential Equations	<b>CS-Model-2</b> Partial Differential and Integral Equations in Mathematical Modeling
12:30-14:00				Lunch		
14:00-15:00				Plenary Talk BA 201 - Chair: I. Kotsireas  Dimitrios Giannakis / Andrew Majda, Courant Institute, New York University - Abstract and Biography - p 11		
15:00-15:30				Coffee Break BA Hallways		
15:30-17:30	<b>SS-CDPB-2</b> Complex Dynamics of Population Behaviour	<b>SS-NCTAP-2</b> New Computational Techniques for Applied Problems in Science and Engineering		<b>CS-Finance-2</b> Financial Mathematics and Computation	<b>CS-BSM-1</b> Mathematics and Computation in Biological Sciences and Medicine	<b>CS-Model-3</b> Partial Differential and Integral Equations in Mathematical Modeling

### 8.3 Wednesday, August 28, 2013

	Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
09:00-10:00			Plenary Talk BA 201 - Chair: R. Melnik  Systemic Risk  George Papanicolaou Stanford University - Abstract and Biography - p 12		
10:00-10:30			Coffee Break: BA Hallways		
10:30-12:30	<b>SS-SSMBP-1</b>  Simulations in soft matter and molecular Bio-Physics	<b>SS-HPTC-5</b>  Recent progress in hyperbolic problems: Theory and Computation	<b>SS-MFMCR-1</b>  Mathematical Finance - Modeling, Computation and Risk Management	<b>SS-LSNE-1</b>  Lie symmetry and other approaches in theory and applications of nonlinear equations	<b>SS-GLS</b>  Geocomputational landscapes and spaces
12:30-13:00			Conference Photo Shoot <i>Meet in front of BA</i>		
13:00-14:00			Lunch		
14:00-15:00			Plenary Talk BA 201 - Chair: I. Kotsireas  Computer involvement in the classification of small index subfactors  Vaughn Jones Vanderbilt University - Abstract and Biography - p 9		
15:00-15:15			Coffee Break BA Hallways		
15:15-16:15			Plenary Talk BA 201 - Chair: J. Campolieti  Models, Mathematics, and Markets - Is the Intersection an Empty Set?  Peter Carr Morgan Stanley - Abstract and Biography - p 5		
16:15-16:30			Coffee Break BA Hallways		
16:30-18:30	<b>SS-SSMBP-2</b>  Simulations in soft matter and molecular Bio-Physics	<b>SS-HPTC-6</b>  Recent progress in hyperbolic problems: Theory and Computation	<b>SS-MFMCR-2</b>  Mathematical Finance - Modeling, Computation and Risk Management	<b>SS-LSNE-2</b>  Lie symmetry and other approaches in theory and applications of nonlinear equations	<b>SS-EGT</b>  Evolutionary Game Theory

Wednesday, August 28, 2013

	Room BA202	Room BA208	Room BA209	Room BA210	Room BA211
09:00-10:00	<b>Plenary Talk BA 201 - Chair: R. Melnik</b> <b>Systemic Risk</b> <b>George Papanicolau</b> Stanford University - Abstract and Biography - p 12				
10:00-10:30	<b>Coffee Break: BA Hallways</b>				
10:30-12:30	<b>SS-CDPB-3</b> Complex Dynamics of Population Behaviour	<b>SS-NCTAP-3</b> New Computational Techniques for Applied Problems in Science and Engineering	<b>SS-RTDEDS-1</b> Recent trends in differential equations and dynamical systems	<b>CS-Finance-3</b> Financial Mathematics and Computation	<b>CS-BSM-2</b> Mathematics and Computation in Biological Sciences and Medicine
12:30-13:00	<b>Conference Photo Shoot</b> Meet in front of BA				
13:00-14:00	<b>Lunch</b>				
14:00-15:00	<b>Plenary Talk BA 201 - Chair: I. Kotsireas</b> <b>Computer involvement in the classification of small index subfactors</b> <b>Vaughn Jones</b> Vanderbilt University - Abstract and Biography - p 9				
15:00-15:15	<b>Coffee Break BA Hallways</b>				
15:15-16:15	<b>Plenary Talk BA 201 - Chair: J. Campolieti</b> <b>Models, Mathematics, and Markets - Is the Intersection an Empty Set?</b> <b>Peter Carr</b> Morgan Stanley - Abstract and Biography - p 5				
16:15-16:30	<b>Coffee Break BA Hallways</b>				
16:30-18:30	<b>SS-ME1</b> Mathematical Epidemiology	<b>SS-NCTAP-4</b> New Computational Techniques for Applied Problems in Science and Engineering	<b>SS-RTDEDS-2</b> Recent trends in differential equations and dynamical systems		<b>CS-BSM3</b> Mathematics and Computation in Biological Sciences and Medicine

#### 8.4 Thursday, August 29, 2013

	Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
09:00-10:00			<b>Plenary Talk BA 201 - Chair: I. Kotsireas</b> <b>Nanocomputations by DNA Self-Assembly</b> <b>Lila Kari</b> Western University - Abstract and Biography - p 10		
10:00-10:30			<b>Coffee Break &amp; Poster Session*: BA 110 &amp; 111</b>		
10:30-12:30	<b>SS-SSMBP-3</b> Simulations in soft matter and molecular Bio-Physics	<b>SS-SNDTA-1</b> Symmetry in Nonlinear Dynamics: Theory and Applications	<b>SS-MFMCR-3</b> Mathematical Finance - Modeling, Computation and Risk Management	<b>SS-SGT</b> Structured Graph Theory	<b>SS-CMS-1</b> Computational Materials Science
12:30-14:00			<b>Lunch</b>		
14:00-15:00			<b>Plenary Talk BA 201 - Chair: M. Cojocaru</b> <b>Optimization and Modeling in Energy Systems</b> <b>Panos Pardalos</b> University of Florida - Abstract and Biography - p 13		
15:00-15:30			<b>Coffee Break &amp; Poster Session*: BA 110 &amp; 111</b>		
15:30-18:00	<b>SS-SSMBP-4</b> Simulations in soft matter and molecular Bio-Physics	<b>SS-SNDTA-2</b> Symmetry in Nonlinear Dynamics: Theory and Applications	<b>CS-MechE1</b> Computational Mechanics and Engineering	<b>SS-LSNE-3</b> Lie symmetry and other approaches in theory and applications of nonlinear equations	<b>SS-CMS-2</b> Computational Materials Science
19:00-22:00			<b>Conference Banquet.</b> details: section 2, map: section 10		

\* Posters will be on display in rooms BA 110 and BA 111 for the duration of the conference. Authors will be available for discussion during the Thursday Poster Sessions.

Thursday, August 29, 2013

	Room BA202	Room BA208	Room BA209	Room BA210	Room BA211	Room BA305
09:00-10:00			Plenary Talk BA 201 - Chair: I. Kotsireas <b>Nanocomputations by DNA Self-Assembly</b> Lila Kari Western University - Abstract and Biography - p 10			
10:00-10:30				Coffee Break & Poster Session*: BA 110 & 111		
10:30-12:30	<b>SS-ME-2</b> Mathematical Epidemiology	<b>SS-WSM-1</b> Women in Science and Mathematics	<b>SS-HOMCFD1</b> High-Order Methods in Computational Fluid Dynamics	<b>SS-ANMPDE1</b> Advanced Numerical Methods for PDEs and Applications	<b>SS-ADS-1</b> Canada-China Session on Applied Dynamic Systems	<b>CS-Ampr-1</b> Applied Problems and Methods in Research & Education
12:30-14:00				Lunch		
14:00-15:00			Plenary Talk BA 201 - Chair: M. Cojocaru <b>Optimization and Modeling in Energy Systems</b> Panos Pardalos University of Florida - Abstract and Biography - p 13			
15:00-15:30				Coffee Break & Poster Session*: BA 110 & 111		
15:30-18:00	<b>SS-ME3</b> Mathematical Epidemiology	<b>SS-WSM2</b> Women in Science and Mathematics	<b>SS-HOMCFD2</b> High-Order Methods in Computational Fluid Dynamics	<b>SS-ANMPDE2</b> Advanced Numerical Methods for PDEs and Applications	<b>SS-ADS-2</b> Canada-China Session on Applied Dynamic Systems	<b>CS-Ampr-2</b> Applied Problems and Methods in Research & Education
19:00-22:00			Conference Banquet. details: section 2, map: section 10			

\* Posters will be on display in rooms BA 110 and BA 111 for the duration of the conference. Authors will be available for discussion during the Thursday Poster Sessions.

## 8.5 Friday, August 30, 2013

	<b>Room BA101</b>	<b>Room BA102</b>	<b>Room BA110</b>	<b>Room BA111</b>	<b>Room BA112</b>
09:00-10:00			<b>Plenary Talk BA 201 - Chair: M. Cojocaru</b> <b>Phylogenetic Analysis of the Musical Rhythms of the World</b> <b>Godfried Toussaint NYUAD/M.I.T/McGill - Abstract and Biography - p 15</b>		
10:00-10:30			<b>Coffee Break: BA Hallways</b>		
10:30-12:50	<b>SS-SSMBP-5</b> Simulations in soft matter and molecular Bio-Physics	<b>SS-CFDRA-1</b> Computational Fluid Dynamics for Real Applications	<b>CS-MECHE2</b> Computational Mechanics and Engineering	<b>SS-MIPD-1</b> Mathematical Immunology and Pathogen Dynamics	<b>SS-IM</b> Industrial Mathematics
12:30-14:00			<b>Lunch</b>		
14:00-15:00			<b>Plenary Talk BA 201 - Chair: M. Cojocaru</b> <b>Patterns of Synchrony</b> <b>Marty Golubitsky Ohio State University - Abstract and Biography - p 8</b>		
15:00-15:30			<b>Coffee Break: BA Hallways</b>		
15:30-17:50	<b>SS-SSMBP-6</b> Simulations in soft matter and molecular Bio-Physics	<b>SS-CFDRA2</b> Computational Fluid Dynamics for Real Applications		<b>SS-MIPD2</b> Mathematical Immunology and Pathogen Dynamics	<b>SS-SAEEM</b> Statistical Aspects of Environmental and Ecological Modeling
18:00-18:15			<b>Presentation of Student and Young Researcher Awards BA101</b>		

Friday, August 30, 2013

	Room BA202	Room BA208	Room BA209	Room BA210	Room BA211	Room BA305
09:00-10:00			<b>Plenary Talk BA 201 - Chair: M. Cojocaru</b> <b>Phylogenetic Analysis of the Musical Rhythms of the World</b> Godfried Toussaint NYUAD/M.I.T/McGill - Abstract and Biography - p 15			
10:00-10:30			<b>Coffee Break: BA Hallways</b>			
10:30-12:50	<b>CS-CPC-1</b> Computational Physics and Chemistry	<b>SS-MMNN</b> Mathematical Models for Nanoscience and Nanotechnology	<b>SS-QCTA-1</b> Quantum Control: Theory and Application -1	<b>SS-DBCNDE 1</b> Dynamics and bifurcations in coupled networks of differential equations: theory and applications	<b>SS-NMDEAE</b> Numerical methods for differential-algebraic equations and applications	
12:30-14:00			<b>Lunch</b>			
14:00-15:00			<b>Plenary Talk BA 201 - Chair: M. Cojocaru</b> <b>Patterns of Synchrony</b> Marty Golubitsky Ohio State University - Abstract and Biography - p 8			
15:00-15:30			<b>Coffee Break BA Hallways</b>			
15:30-17:50	<b>CS-CPC-2</b> Computational Physics and Chemistry	<b>SS-RPSETS-1</b> Recent progress in spintronics: Experiment, theory and simulation	<b>SS-QCTA-2</b> Quantum Control: Theory and Application -2	<b>SS-DBCNDE 2</b> Dynamics and bifurcations in coupled networks of differential equations: theory and applications	<b>SS-CMAIS</b> Control Methods for Advanced Industrial Systems	<b>SS-VPPO</b> Variational Problems of Physical Origin
18:00-18:15			<b>Presentation of Student and Young Researcher Awards BA101</b>			

## 9 Detailed Conference Schedule

### 9.1 Monday, August 26 – 10:30 - 12:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-AAIP-1</b> Applied Analysis and Inverse Problems - 1  <b>Session Chairs:</b> Herb Kunze  University of Guelph	<b>SS-HPTC-1</b> Recent progress in hyperbolic problems: Theory and Computation - 1  <b>Session Chairs:</b> Tesdall, Allen  CUNY College of Staten Island	<b>SS-DG-1, SCT-1</b> Decisions and Games - 1, Social Choice Theory - 1  <b>Session Chairs:</b> Marcus Pivato,  Trent University	<b>SS-DFT-1</b> Density Functional Theory - 1  <b>Session Chairs:</b> Ian Hamilton, Paul Ayers , Viktor Staroverov Wilfrid Laurier University, McMaster University, Western	<b>SS-SDAG</b> Statistical Data Analysis and Geometry - 1  <b>Session Chairs:</b> Chenouri, Shoja  University of Waterloo
10:30-10:50 #348 <b>Fourier Transforms of Measure-valued images, self-similarity and inverse problem</b>  E.R.Vrscay University of Waterloo	10:30-10:50 #265 <b>Estimation and propagation of volcanic source parameter uncertainty and the Eyjafjallajökull plume</b>  Patra, Abani University at Buffalo	10:30-10:50 #341 <b>When Does Approval Voting Make the Right Choices?</b>  Kilgour, Marc Wilfrid Laurier University	10:30-11:30 #278 <b>Variational principles in wave-functional formulations of quantum mechanics</b>  Levy, Mel (Semi-plenary, p 20) Duke University	10:30-10:50 #365 <b>Spanifold: Spanning Tree Flattening Onto Lower Dimension</b>  Small, Christopher University of Waterloo
10:50-11:10 #409 <b>Denoising of hyperspectral images</b>  D.Otero University of Waterloo	10:50-11:10 #563 <b>Exponential time integration methods for wave-dominated problems</b>  Min, Misun Argonne National Laboratory	10:50-11:10 #41 <b>Implementation of Majority Voting Rules</b>  Sean Horan Université du Québec à Montréal	11:30-11:50 #278 <b>A new DFT approach to polarizable force-fields</b>  Verstraelen, Toon Ghent University	10:50-11:10 #369 <b>Computational Aspects of Inference in Local Mixture Models</b>  Maroufy, Vahed University of Waterloo
11:10-11:30 #406 <b>Numerical solution of 3D vector tomography problem with usage of singular value decomposition</b>  A.Polyakova Sobolev Institute of Mathematics SB RAS, Novosibirsk, Russia	11:10-11:30 #333 <b>Smoothness Increasing Accuracy Conserving (SIAC) filtering for discontinuous Galerkin approximations to nonlinear hyperbolic conservation laws</b>  Ryan, Jennifer University of East Anglia	11:10-11:30 #620 <b>Geometric Analysis of Three-Claimant Dynamic Bankruptcy Rules</b>  Jones, Michael, A. Mathematical Reviews, American Mathematical Socie	11:50-12:10 #141 <b>Accurate Bond Dissociation Curves at Mean-Field Computational Cost: Describing Strongly Correlated Systems with Nonorthogonal Gemini</b>  Limacher, Peter McMaster University	11:10-11:30 #376 <b>The Application of the Convex Geometry in the Generalized Method of Moments for Mixture Models</b>  Huang, Zhiyue University of Waterloo
11:30-11:50 #438 <b>B-Spline slice-by-slice solution of 3D vector tomography problem</b> I.Svetov IM SB RAS, Novosibirsk, Russia	11:30-11:50 #582 <b>Shock detection of discontinuous Galerkin methods using multiwavelets</b>  Vuik, Thea Delft University of Technology	11:30-11:50 #192 <b>Comparing Mutually Naïve and Strategic Sequential Selection</b>  Hopkins, Brian Saint Peter's University	12:10-12:30 #297 <b>Kohn-Sham model for heavy atoms</b>  Melgaard, Michael University of Sussex	11:30-11:50#443 <b>Computing least squares condition numbers on hybrid multicore/GPU systems</b> Baboulin, Marc Inria and Université Paris-Sud, France
11:50-12:10 #438 <b>A novel image registration-reconstruction framework for real-time monitoring of paraspinal tumors in radiation therapy</b> D. Brunet Princess Margaret Hospital, University Health Network	11:50-12:10 #466 <b>Linear Stability Analysis of the Discontinuous Galerkin Method on Uniform and Nonuniform Grids</b>  Qin, Ruibin University of Waterloo	11:50-12:10 #68 <b>The variable choice set logit model applied to the 2004 Canadian election</b>  Gallego, Maria Wilfrid Laurier University		11:50-12:10 #456 <b>Robustness in dimensionality reduction</b>  Liang, Jiaxi University of Waterloo
12:10-12:30 #174 <b>Regularization Approach for Abel Transform Based Image Reconstruction by a Single Radiograph</b> Wei, Su Hua Institute of Applied Physics and Computational Mathematics	12:10-12:30 #658 <b>Relaxing the CFL Number of the Discontinuous Galerkin Method</b>  Krivodonova, Lilia University of Waterloo	12:10-12:30 #425 <b>Convergence rates for the distance-based inconsistencies in pairwise comparison is examined by Monte Carlo study</b>  Koczkodaj, Waldemar W Laurentian University		12:10-12:30 #490 <b>Quantifying the Asymptotic Coverage Probabilities of Bootstrap Confidence Regions</b>  Wang, Chunlin University of Waterloo

Room BA202	Room BA208	Room BA209	Room BA210	Room BA211
<b>CS-MODELING-1</b> Partial Differential and Integral Equations in Mathematical Modeling - 1 <b>Session Chairs:</b> Socolowsky, Jürgen  Brandenburg University of Applied Sciences	<b>SS-MHP-1</b> Mathematics of human placenta: a window into fetal origins of adult disease - 1 <b>Session Chairs:</b> Salafia, C.M., Shlakhter, O., Yampolsky, M.  Institute for Basic Research/Placental Analytics, Alberta Health Services, University of Toronto	<b>SS-MMCMCBM-1</b> Modeling and Computational Methods for Mathematical Biology and Medicine - 1 <b>Session Chairs:</b> Shontz, Suzanne, Drapaca, Corina, Sivaloganathan, Siv Mississippi State, The Penn State University, WLU	<b>SS-MACBE-1</b> Modeling approaches and challenges in the built environment - 1 <b>Session Chairs:</b> Danks, Ryan, Carl, Michael  RWDI, RWDI	<b>CS-DSDE-1</b> Applications of Dynamical Systems and Differential Equations - 1 <b>Session Chairs:</b> Selmane, Schehrazad  USTHB
10:30-10:50 #105 <b>On a Two-Fluid Slot Coating Flow with Evaporation</b>	10:30-10:50 #254 <b>Why placental shape matters: a research trajectory</b>	10:30-10:50 #45 <b>A Study of Brain Biomechanics using Hamilton's Principle</b>	10:30-10:50 #561 <b>Large Scale Modelling of Human Thermal Comfort in the Urban Realm</b>	10:30-10:50 #35 <b>Analytical Integration of the Osculating Lagrange Planetary Equations in the Elliptic Orbital Motion</b> Hautesserres, Denis Centre National d'Etudes Spatiales
Socolowsky, Jürgen Brandenburg University of Applied Sciences	Salafia, Carolyn Placental Analytics	Drapaca, Corina The Pennsylvania State University	Danks, Ryan Rowan, Williams, Davies, and Irwin Inc.	10:50-11:10 #86 <b>Energy Use Analysis at the Master Plan Level</b>
10:50-11:10 #100 <b>Global Existence and Blow-up of Solutions for a Class of Nonlinear Nonlocal Wave Equations</b>	10:50-11:10 #257 <b>Translating Measures of Placental Shape into Predictors of Infant and Childhood Health</b>	10:50-11:10 #371 <b>Modeling and Pharmacokinetic Aspects for the Interaction between Beta Amyloid peptide and Choline Acetyltransferase and Acetylcholine Neurocycle and their relation to Alzheimers and Parkinsons Diseases</b>		10:50-11:10 #86 <b>Stability Analysis of a Human-Phlebotomus Papatasi-Rodent Epidemic Model</b>
Babaoglu, Ceni Istanbul Technical University	Misra, Dawn Wayne State University	Mustafa, Ibrahim Ryerson University	Carl, Michael RWDI	Selmane, Schehrazad USTHB
11:10-11:30 #300 <b>Coupled Heat Transport and Darcian Water Flow in Freezing Soils</b>	11:10-11:30 #255 <b>Is the placental disk really an ellipse?</b>	11:10-11:30 #591 <b>Predicting nonlinearity of tumor spheroid growth in HGF media: a data-driven multi-species continuum model</b>	11:10-11:30 #585 <b>Computational Methods and Applications in Building Ventilation</b>	11:10-11:30 #129 <b>Equivalence of the MTS Method and CMR Method for Delay Differential Equations</b>
Krupicka, Lukas Czech Technical University Prague	Shlakhter, O. Alberta Health Services	Konstorum, Anna University of California Irvine	Li, Eric RWDI	Yu, Pei University of Western Ontario
11:30-11:50 #240 <b>Symmetry classification of a generalized variable-coefficient Gardner equation</b>	11:30-11:50 #137 <b>Optimal transport and placental function</b>	11:30-11:50 #536 <b>Effect of fluid friction in fluid flow simulation in solid tumors</b>	11:30-11:50 #590 <b>Modeling Building Stack Effect Using Network Model</b>	11:30-11:50 #145 <b>Retention of Eventual Stability of Invariant Sets of Impulsive Differential Systems</b> Sood, Anju Rayat Bahra College of Engineering and Nano technology for Women, Hoshiarpur
Bruzon, Maria S University of Cadiz	Xia, Qinglan UC Davis	Soltani, Madjid University of Waterloo	Tang, Vincent University of Waterloo	
11:50 - 12:10 #299 <b>High Concentration Vesicle Suspensions</b>	11:50 - 12:10 # 105 <b>Modeling and analyzing the placental vasculature</b>	11:50 - 12:10 #315 <b>Calcium dynamics in dendritic spines: A link to structural plasticity</b> Dur-e-Ahmad, Muhammad Lahore University of Management Sciences	11:50 - 12:10 #624 <b>Numerical Weather and Climate Prediction for Building Science</b> Lundgren, Jeff Centre for Advanced Studies in Mathematics, LUMS	11:50 - 12:10 #147 <b>Scattering states of a particle, with position dependent mass, in a double heterojunction</b> Sinha, Anjana Jadavpur University
Quaife, Bryan University of Texas	Yampolsky, Michael University of Toronto	12:10 - 12:30 #482 <b>A Machine Learning Tool for Automated Image Segmentation</b> Shontz, Suzanne Mississippi State University		12:10 - 12:30 #154 <b>A new multi-stage spectral relaxation method for solving chaotic initial value systems</b> Dlamini, Phumlani University of Johannesburg, South Africa
	12:10 - 12:30 <b>Discussion</b>			

## 9.2 Monday, August 26 – 15:30 - 17:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-AAIP-2</b> Applied Analysis and Inverse Problems - 2	<b>SS-HPTC-2</b> Recent progress in hyperbolic problems: Theory and Computation - 2	<b>SS-DG-2, SCT-2</b> Decisions and Games - 2, Social Choice Theory - 2	<b>SS-DFT-2</b> Density Functional Theory - 2	<b>SS-RWFDNO</b> Continuous-time random walks, fractional diffusion and non-local operators: Applications
<b>Session Chairs:</b> Herb Kunze  University of Guelph	<b>Session Chairs:</b> Allen Tesdall  CUNY College of Staten Island	<b>Session Chairs:</b> D. Marc Kilgour  Wilfrid Laurier University	<b>Session Chairs:</b> Ian Hamilton, Paul Ayers, Viktor Staroverov Wilfrid Laurier University, McMaster University, Western Ontario	Meerschaert, M., Scalas, E.  Michigan State University, University of Eastern Piedmont
15:30 - 15:50 #552 <b>On the application of Adjoint methods in subsurface flow simulations</b> L.Bush  University of Wyoming	15:30-15:50 #566 <b>A Generalized Sign-Changing Liouville Equation</b> Saxton, Ralph  University of New Orleans	15:30-16:30 #319 <b>Fair Division</b> Brams, Steven (Semi-plenary, p 17)  New York University	15:30-15:50 #281 <b>Constrained 1DM Algorithm with Fractional Occupations</b> Chan, Matthew  McMaster University	15:30-15:50 #79 <b>Correlation structure of fractional Pearson diffusions</b> Sikorskii, Alla  Michigan State University
15:50 - 16:50 #17 <b>On an inverse and ill-posed of autoconvolution type in ultra-short laser.</b> Hofmann, Bernd (Semi-plenary, p 18)  Chemnitz University of Technology, Department of Mathematics	15:50 - 16:10 #543 <b>Special Solutions in Smectic Electroconvection</b> Pugh, Mary  University of Toronto	16:30 - 16:50#117 <b>Ranking Multidimensional Alternatives and Uncertain Prospects</b> Pivato, Marcus  Trent University	15:50 - 16:10 #290 <b>Energy Decomposition Analysis with Occupation Constraints</b> Gonzlez Espinoza, Cristina Elizabeth  McMaster University	15:50 - 16:10 #114 <b>CTRWModel for Fractional Wave Equations</b> Meerschaert, Mark M  Michigan State University
16:50 - 17:10 #302 <b>Changes in habitat of fish population:an inverse problem</b> K.Levere University of Guelph	16:10 - 16:30 #514 <b>Effects of Nonstrict Hyperbolicity on Singularity Formation</b> Saxton, Katarzyna Loyola University, New Orleans	16:50 -17:10#246 <b>Degree of Difficulty: A fundamental Problem in Contest Design</b> Gerchak, Yigal Tel-Aviv University	16:10 - 16:30 #608 <b>Variational Hirshfeld Ensemble</b> Heidar Zadeh, Farnaz McMaster University	16:10 - 16:30 #136 <b>Continuous-time Random Walk from a Continuous Double Auction</b> Scalas, Enrico DISIT, Universita del Piemonte Orientale, Italy  16:30 - 16:50 ##222 <b>Analysis for Nonlinear Equations Involving Space Fractional Diffusion</b>
	16:30 - 16:50 #96 <b>Fast Sweeping Methods for Steady State Problems for Hyperbolic Conservation Laws</b> Chou, Ching-Shan Ohio State University 16:50-17:10#411 <b>Isentropic Flow with Large Data</b> Jenssen, Kris Penn State University	17:10-17:30 #243 <b>Bargaining with Uncertain Commitment: On the Limits of Disagreement</b> Dutta, Rohan McGill University	16:30 - 16:50 #607 <b>Conceptual Density-Functional Theory Formulation of a General-Purpose Reactivity Indicator: Beyond the Classic Reactivity Paradigms</b> Anderson, James Peking University 16:50-17:10 # 156 <b>Kohn-Sham effective potentials from density and correlated wavefunctions</b> Cuevas-Saavedra, Rogelio Western Ontario	16:30 - 16:50 #248 <b>Numerically efficient stochastic solution of the space-time fractional diffusion equation through Monte Carlo simulation of continuous-time random walks</b> Germano, Guido Philipps-Universität Marburg 17:10 - 17:30 #349 <b>Applications of Random Renormalization Group Operators</b> O'Malley, Daniel Purdue University

Room BA202 <b>SS-CSB</b> Computations in Systems Biology	Room BA208 <b>SS-MHP-2</b> Mathematics of human placenta: a window into fetal origins of adult disease - 2	Room BA209 <b>SS-MMCBM-2</b> Modeling and Computational Methods for Mathematical Biology and Medicine - 2	Room BA210 <b>SS-MACBE-2</b> Modeling approaches and challenges in the built environment - 2	Room BA211 <b>CS-DSDE-2</b> Applications of Dynamical Systems and Differential Equations - 2
<b>Session Chairs:</b> Hin Hark Gan, Gaurav Arya NYU,UCSD	<b>Session Chairs:</b> C.M. Salafia, O. Shlakhter, M. Yampolsky Placental Analytics, Alberta Health Services, University of Toronto	<b>Session Chairs:</b> Suzanne Shontz, Suzanne, Drapaca, Corina, Sivaloganathan, Siv Mississippi State, Penn State,WLU	<b>Session Chairs:</b> Danks, Ryan, Carl , Michael RWDI,RWDI	<b>Session Chairs:</b> Ncube, Israel Memorial University of Newfoundland
15:30 - 15:50 #564 Genome organisation influences cell type-specific transcriptional programs	15:30 - 15:50 # 256 Human Placenta The Interface for Two Vascular Systems	15:30 - 15:50 #310 Cluster Newton Method for Sampling Multiple Solutions of an Underdetermined Inverse Problem: Parameter Identification for Pharmacokinetics	15:30 - 15:50 #05 Analytical study of wave run-up generated by bottom motion on a non-uniformly sloping beach	15:30 - 15:50 #16 Extension of Leighton's criteria to nonlinear dynamic equations of neutral type
Mitchell, Jennifer University of Toronto	Miller, Richard University of Rochester	De Sterck, Hans University of Waterloo	Bandyopadhyay, Arghya Khalisani College, Chandannagar, India	Tripathy, Arun Kumar Sambalpur University
15:50 - 16:10 #262 3-D Higher-Order Folded Chromosome Conformations From 2-D Interaction Frequency Maps	15:50 - 16:10 # 249 Efficient methods for detecting low-rank substructure	15:50 - 16:10 #176 The mechanism underlying the therapeutic effects of Vitamin C against cancer, at pharmacological concentrations	15:50 - 16:10 #52 A Cantor Set Model of Earthquake Dynamics in Aftershock Sequences	15:50 - 16:10 #380 Nutrient transport through heterogeneous soil medium
Arya, Gaurav University of California,San Diego	Rangan, Aadyta NYU	Molavian, Hamid University of Waterloo	Kamal, Kamal Indian Institute of Technology Roorkee	Kumar, Atul University of Lucknow, India
16:10 - 16:30 #303 Evidence of Evolutionary Couplings in Chlamydomonas Metabolic Network	16:10 - 16:30 #199 Metabolic Scaling Law for Mouse Fetal and Placental Weight	16:10 - 16:30 #151 The Effects of Body Fluid on Cheyne-Stokes Respiration	16:10 - 16:30 #101 Applicability of a Diffusion Model for Cosmic Ray Transport during Large Forbush Decrease Events	16:10 - 16:30 #382 Stability in a distributed delay differential equation
Salehi-Ashtiani, Kourosh NYU Abu Dhabi	Gasperowicz, Małgorzata University of Calgary	Willms, Allan University of Guelph	Kalugin, German Natural Resources Canada	Ncube, Israel Memorial University of Newfoundland
16:30-16:50 #460 Translational Systems Biology: understanding the limits of animal models as predictors of human biology	16:30-16:50 # 107 Modeling Oxygen Transport in the Inter-Villous Space of the Human Placenta	16:30-16:50 #143 Modeling Cell-Sheets Wound Closure	16:30-16:50 #121 Minimum Stack Height for Micro Aerosols Air Pollution	16:30-16:50 #396 Control of the Landau-Lifshitz Equation
Rhrissorakrai, Kahn IBM	Grebenkov, Denis Laboratory of Condensed Matter Physics, CNRS - Ecole Polytechnique	Habbal, Abderrahmane University Nice Sophia Antipolis and INRIA	Malek, Alaeddin Tarbiat Modares University	Chow, Amenda University of Waterloo
16:50-17:10 #503 Accelerated molecular dynamics simulations and community network analysis reveal allosteric signaling pathways in a lectin-binding chaperone Calreticulin	16:50-17:10 #449 Human Placenta The Interface for Two Vascular Systems	16:50-17:10 #472 Weakly compressible tube flow with radially dependent viscosity and Navier slip at the wall	16:50-17:10 #313 An Input-Output Analysis Approach in Waste of Electrical and Electronic Equipments	16:50-17:10 #402 Feedback Stabilization of Impulsive Underactuated Mechanical Systems by Using Lyapunov Constraints
Arora, Kaurnesh University of Michigan	Salafia, Carolyn Placental Analytics	Rohlf, Katrin Ryerson University	Ulukan, Ziya Galatasaray University	Chaalal, Mohammed Houari Boumediene University of Sciences and Technology
17:10-17:30 #370 Investigating Oscillatory Phenomena in the Continuous Bioreactor for Production of Bioethanol Using Zymomonas Mobilis	17:10-17:30 Discussion	17:10-17:30 #481 Myelosuppression and cytokine interaction in a mathematical model of the human hematopoietic system 1	17:10-17:30 Bélair, Jacques Université de Montréal	17:10-17:30
Mustafa, Ibrahim Ryerson University				
17:30 - 17:50 # 362 Mechanics of microRNA-mediated translational regulation				
Gan, Hin Hark NYU				

### 9.3 Tuesday August 27–10:30 - 12:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-AAIP-3</b> Applied Analysis and Inverse Problems-1	<b>SS-HPTC-3</b> Recent progress in hyperbolic problems: Theory and Computation-1	<b>SS-DG&amp;SCT-3</b> Decisions and Games & Social Choice Theory-1	<b>CS-CACO-1</b> Computational Algebra, Combinatorics and Optimization	<b>SS-MSEPSW-1</b> Multitaper Spectrum Estimation, Prolate Spheroidal Wave Functions, Quadratic-Inverse, and Related Problems
<b>Session Chairs:</b> Kimberly Levere University of Guelph	<b>Session Chairs:</b> Lilia Krivodonova University of Waterloo	<b>Session Chairs:</b> Marcus Pivato Trent University	<b>Session Chairs:</b> Aghayan Reza Kingston University, London	<b>Session Chairs:</b> W. Burr, C. Haley, D.J. Thomson Queen's University
10:30-10:50 #49 <b>Designing a search grid for parameter estimation using sensitivity analysis.</b> Van der Wee�n, Pieter Ghent University	10:30-10:50 #81 <b>High Order Limiters for Hyperbolic Equations</b> Berzins, Martin University of Utah	10:30-10:50 #317 <b>The Total Potential Energy of a Simple Game</b> Zwicker, William S. Union College	10:30-10:50 #88 <b>Highly Accurate Solution of Ordinary Differential Equation with Singularity Arising in Fluid Dynamics</b> Pratibha, Pratibha Indian Institute of Technology Roorkee	10:30-10:50 # 493 <b>Signal and Spectral Estimation on a Sphere</b> Plattner, A. Princeton University
10:50-11:10 #468 <b>Parameter state range for ODE models using monotonic linear multistep discretizations</b> Skelton Andrew University of Guelph	10:50-11:10 #432 <b>A Fourth-Order Solution-Adaptive CENO Scheme for Three-Dimensional Multi-Block Cubed-Sphere Grids</b> Ivan, Lucian University of Waterloo	10:50-11:10 #194 <b>Analogy in decision making</b> Amarante, Massimiliano Universit� de Montr�al	10:50-11:10 #171 <b>New Approach for solving the Linear Assignment Problem</b> Gningue, Youssou Laurentian University, Sudbury, Canada	10:50-11:10 #417 <b>Estimating evoked brain connectivity with discrete prolate spheroidal stimulation</b> Lepage, Kyle Boston University
11:10-11:30 #488 <b>The inverse problem of Fractal Potential Flows</b> Vass, J�szef University of Waterloo	11:10-11:30 #109 <b>The design of a class of positivity preserving high order Lagrangian schemes for multi-material compressible flow</b> Cheng, Juan Institute of Applied Physics and Computational Mathematics	11:10-11:30 #193 <b>Enumeration and Connections for Extensive-Form Games</b> Hopkins, Brian Saint Peter's University	11:10-11:30 #209 <b>Nondeterministic relational fuzzy operators</b> Tchier, Fairouz King Saud University	11:10-11:30 #414 <b>Discrete Prolate Spheroidal Sequences as Filters in Generalized Additive Models</b> Burr, Wesley Queen's University
11:30-11:50 #568 <b>The Monge-Kantorovich metric in application</b> Mendivil, Franklin Acadia University	11:30-11:50#528 <b>A numerical investigation into high-order multiderivative integrators for hyperbolic conservation laws</b> Seal, David Michigan State University	11:30-11:50 #577 <b>Fast Equilibrium Computation for Infinitely Repeated Games</b> Andersen, Garrett Duke University	11:30-11:50 #292 <b>Bias, Noise, and Indeterminacy Correction in Numerically Invariant Signatures</b> Aghayan, Reza Kingston University London	11:30-11:50 #470 <b>Spectral Coherence Evidence for Oceanic Control of Interannual Carbon Cycle Feedbacks</b> Park, Jeffery Yale University
11:50-12:10 #359 <b>Inverse problems for delay differential equations using the Collage Theorem</b> Yodzis, Michael University of Guelph	11:50-12:10 #655 <b>Glancing weak Mach reflection</b> Tesdall, Allen CUNY College of Staten Island	11:50-12:10 #215 <b>Selfish driving behaviour and its effects on highway traffic</b> Nguyen, Sylvia University of Guelph	11:50-12:10 #418 <b>Design and Application of Fault-Tolerant Circulant Digraph Networks</b> Farrag, A. Dalhousie University	11:50-12:10 #500 <b>Localized Band-Limited Representation and Robust Interpolative Image Manipulation</b> Xiao, H. UC Davis
12:10-12:30#571 <b>Gravitational wave parameter estimation with compressed likelihood evaluations</b> Field, Scott University of Maryland	#284 <b>Hyperbolic Descriptions of Viscous Heat-Conducting Gaseous Flows and Their Solution</b> Groth, Clinton University of Toronto	12:10-12:30 #123 <b>On the existence of Berge equilibrium with pseudocontinuous payoffs</b> Deghdak, Messaoud W Universit� Mentouri, Constantine, Algeria	12:10-12:30 #351 <b>Solving the simple Transportation Problem by using the Modified Vogel Approximation method</b> Gningue, Youssou Laurentian University, Sudbury, Canada	12:10-12:30 #572 <b>Paleoclimate time scale estimation using multitaper spectral methods</b> Hinnov, Linda Johns Hopkins University

Tuesday, August 27 – 10:30 - 12:30

Room BA202	Room BA208	Room BA209	Room BA210
<b>SS-CDPB-1</b> Complex Dynamics of Population Behaviour - 1  <b>Session Chairs:</b> Stephen Tully, Scott Greenhalgh, Chad Wells, Chris Pagnutti Guelph,Yale, Yale, Guelph	<b>SS-NCTAP-1</b> New Computational Techniques for Applied Problems in Science and Engineering - 1  <b>Session Chairs:</b> Ludwig Kohaupt, Yan Wu  Beuth University of Technology Berlin,Georgia Southern University	<b>SS-CPH</b> Computational Photonics  <b>Session Chairs:</b> Marek Wartak, Harry E. Ruda  WLU,University of Toronto	<b>CS-FINANCE-1</b> Financial Mathematics and Computation - 1  <b>Session Chairs:</b> Pirvu , Traian  McMaster University
10:30-10:50 #473 <b>Modelling Awareness and Adoption: Aggregate Behaviour versus Agent-Based Interactions with Network Effects</b> Erin Wild University of Guelph	10:30-10:50 # 474 <b>Solving a Large Scale Thermal Radiation Problem Using an Interoperable Executive Library Framework on Petascale Supercomputers</b> Wong, Kwai University of Tennessee	10:30-10:50 #10 <b>Mathematical and Computational Modeling of Noise Characteristics of Channel Amplifiers</b> Shymanska, Alla Auckland University	10:30-10:50 #63 <b>Utility Indifference Pricing: A Time Consistent Approach</b> Pirvu, Traian McMaster University
10:50-11:10 #301 <b>Coevolution of risk perception, sexual behaviour, and HIV transmission in an agent-based model</b> Stephen Tully University of Guelph	10:50-11:10 # 36 <b>On the vibration-suppression property and monotonicity behavior of a special weighted norm for dynamical systems <math>\dot{x} = Ax, x(t_0) = x_0</math></b> Kohaupt, Ludwig Beuth University of Technology Berlin	10:50-11:10 #205 <b>On the numerical solution of chromatographic separation models</b> Tuomela, Jukka University of Eastern Finland	10:50-11:10 #113 <b>A Monte Carlo Measure to Improve Fairness in Equity Analyst Evaluation</b> Yaros, John Rutgers University
11:10-11:30 #94 <b>Agent-Based Modeling of Emotional Communications in Online Social Networks:The Role of Offline Processes in Online Bursting Events</b> Bosiljka Tadic Jozef Stefan Institute	11:10-11:30 #228 <b>Structure-Preserving Simulation of Mechanical Systems</b> Ball, Kenneth North Carolina State University	11:10-11:30 #283 <b>Predicting Optimal Finite Field Strengths Leading to Most Precise Calculations of Nonlinear Optical Properties</b> Mohammed, Ahmed McMaster University	11:10-11:30 #172 <b>Investigating the Market Price of Volatility Risk for Options in a Regime-Switching Market</b> Mielkie, Melissa University of Western Ontario
11:30-11:50 #596 <b>Equation-based and Agent-based models of adoption behaviour in multi-dimensional characteristics space</b> Monica Cojocaru University of Guelph	11:30-11:50#559 <b>Solution of Wiener-Hopf and Fredholm integral equations by fast Hilbert and Fourier transforms</b> Germano, Guido Philipps-Universität Marburg	11:30-11:50 #451 <b>Near and Far Fields in High Quality Resonances of a Periodic Grating</b> Byelobrov, Volodymyr IRE NASU	11:30-11:50 #218 <b>Pricing exotic options under the time-changed Brownian motion model by variance reduction and quasi-Monte Carlo methods</b> Tan, Qiuizi Wilfrid Laurier University
11:50-12:10 #515 <b>Outcome inelasticity and outcome variability in behavior-incidence models: an example from an SEIR infection on a dynamic network</b> Bryce Morsky University of Guelph	11:50-12:10 #578 <b>Interactive computational search strategy of periodic solutions in an essentially nonlinear dynamics</b> Kaushik, Aditya Panjab University, Chandigarh	11:50-12:10 #551 <b>Iterative analytic approximation to nonlinear convection dominated systems</b> Guclu, Yaman Michigan State University	11:50-12:10 #220 <b>Pricing and Hedging Index Options with a Dominant Constituent Stock</b> Cheyne, Helen University of Western Ontario
12:10-12:30#324 <b>Chaos in an unforced Malaria Model</b> Miranda Teboh-Ewungkem Lafayette College	12:10-12:30# ... <b>TBA</b>  Bradley, Jonathan WLU	12:10-12:30 #269 <b>Robust Second-order least-squares estimation for regression with autocorrelated error: application of FMW and Generalized M-Estimates based methods</b> Rosadi, Dedi Gadjah Mada University	

Tuesday, August 27 – 10:30 - 12:30

Room BA211	Room BA305
<b>CS- DSDE-3</b> Applications of Dynamical Systems and Differential Equations - 3	<b>CS-MODELING-2</b> Partial Differential and Integral Equations in Mathematical Modeling - 2
<b>Session Chair :</b> Selmane, Schehrzad USTHB	<b>Session Chair:</b> Pirvu, Traian McMaster University
10:30-10:50 #480 <b>Spectral approach in a 2D variational formulation for swirling flows in ducts with variable radius</b> Dragomirescu Ioana Politehnica University Timisoara 10:50-11:10 #496	10:30-10:50 #355 <b>On Optimal Vortex Structures for Palinstrophy Generation</b> Ayala, Diego McMaster University 10:50-11:10 #358
<b>Dynamics of a modified Leslie-Gower predator-prey model with Crowley-Martin functional responses and stochastic perturbations</b> Ali, Namaat MIA, University La Rochelle 11:10-11:30 #602	<b>Numerical simulation of potential Maxwell's equations in harmonic regime</b> Ortegón, Francisco G. University of Cadiz 11:10-11:30 #394
<b>Collision properties of solitary waves for the Gardner equation</b> Mia, Abdus Sattar University of Saskatchewan 11:30-11:50 #610	<b>Kinetic and Material Property Effects on Fingering Instability in Reverse Smoldering Combustion</b> Ijioma, Ekeoma Rowland Meiji Institute of Advanced Mathematical Sciences 11:30-11:50 #439
<b>Hybrid Fixed Point Theorem For Abstract Measure Delay Integro-Differential Equations</b> Bellalle Sidheshwar Dayanand Science College, Latur 11:50-12:10 #615	<b>A free boundary approach to solve the equilibrium equations of a membrane</b> Vigilaloro, Giuseppe University of Cadiz 11:50-12:10 #453
<b>Triple positive solutions of m point p -Laplacian boundary value problem involving the derivative on time scales</b> Dogan, Abdulkadir Abdullah Gul University 12:10-12:30 #638	<b>Bounds on dispersion tensor in periodic media</b> Smaranda, Loredana University of Pitesti #539
<b>Chaotic flow in single phase natural circulation loops</b> Ardaneh Kazem University of Tsukuba, Japan	<b>A Mathematical Cellular Potts Model for Growth and Migration of Endothelial Cells</b> Soltani, Madjid University of Waterloo

## 9.4 Tuesday, August 27 – 15:30 - 17:30

Room BA101	Room BA102	Room BA111	Room BA112
<b>SS-AAIP-4</b> Applied Analysis and Inverse Problems - 4	<b>SS-HPTC-4</b> Recent progress in hyperbolic problems: Theory and Computation - 4	<b>SS-DFT-3</b> Density Functional Theory - 3	<b>SS-MSEPSW-2</b> Multitaper Spectrum Estimation, Prolate Spheroidal Wave Functions, Quadratic-Inverse, and Related Problems - 2
<b>Session Chairs:</b> Kimberly Levere  University of Guelph	<b>Session Chairs:</b> Lilia Krivodonova  University of Waterloo	<b>Session Chairs:</b> Ian Hamilton, Paul Ayers , Viktor Staroverov  Wilfried Laurier University, McMaster University, Western Ontario	<b>Session Chairs:</b> W. Burr, C. Haley, D.J. Thomson  Queen's University
15:30-15:50 #182 <b>Iterative Techniques for Nonlinear Periodic Boundary Value Problems via Initial value problem</b>  Dezern, David Winston-Salem State University	15:30-15:50 #69 <b>Compressible Navier-Stokes equations with temperature dependent dissipation</b>  Pan, Ronghua Georgia Institute of Technology	15:30-15:50 #170 <b>Free energies of adsorption and activation energies for organo-arsenicals at the liquid/solid interface a computational study.</b>  Adamescu, Adrian University of Waterloo	15:30-15:50#611 <b>Multitaper Smoothed Minimum Statistics Noise Power Estimation</b>  Castellanos, R. Florida Atlantic University
15:50-16:10 #452 <b>The Scientific Way to Simulate Pattern Formation in Reaction-Diffusion Equations</b>  Cleary, Erin University of Guelph	15:50-16:10 #106 <b>Conservation Laws with no Classical Riemann Solutions: Existence of Singular Shocks</b>  Tsikkou, Charis Department of Mathematics, West Virginia University	15:50-16:10 #102 <b>A density functional theory of hydrogen transfer for short-chain alkane thiols on small cationic, anionic, and neutral gold clusters</b>  Smith, Silvija Wilfried Laurier University	15:50-16:10 #545 <b>Multitaper Spectrum Estimation and Quadratic-Inverse Theory: from Conception to Present</b>  Thomson, David Queen's University
16:10-16:30 #155 <b>Regularizing a Volterra integral equation of the first kind</b>  Subbey, Sam Institute for Marine Research, Norway	16:10-16:30 #423 <b>Normal forms and a Burgers-Hilbert equation</b>  Hunter, John University of California at Davis	16:10-16:30# 188 <b>Computational Chemistry Studies On Atmospherically-Relevant Organic Complexes With Iron</b>  Jones, Glynis Wilfried Laurier University	16:10-16:30 #230 <b>Analysis of Multitaper Covariance and Autoregressive Spectral Estimates</b>  Erdol, Nurgun Florida Atlantic University
16:30-16:50 #360 <b>On set-valued nonlinear Fredholm integral equations</b>  Kunze, Herb University of Guelph	16:30-16:50#280 <b>Two-dimensional Riemann problems for conservation laws and shock reflection</b>  Jegdic, Katarina University of Houston - Downtown	16:30-16:50 #229 <b>Accurate ab initio spin densities</b>  Boguslawski, Katharina ETH Zurich	16:30-16:50 #422 <b>Jackknifing Multitaper Auto-correlation Estimate</b>  Haley, Charlotte Queen's University
16:50-17:10	16:50-17:10 #640 <b>Recent Progress Towards Periodic Solutions of the Euler Equations</b>  Young, Robin University of Massachusetts, Amherst	16:50-17:10 #233 <b>Towards reliable modeling of excited states of actinides from (relativistic) time-dependent density functional theory</b>  Tecmer, Pawel McMaster University	16:50-17:10  16:50-17:10

Room BA202	Room BA208	Room BA210	Room BA211	Room BA305
<b>SS-CDPB-2</b> Complex Dynamics of Population Behaviour - 2  <b>Session Chairs:</b> Stephen Tully, Scott Greenhalgh, Chad Wells, Chris Pagnutti Guelph,Yale, Yale, Guelph	<b>SS-NCTAP-2</b> New Computational Techniques for Applied Problems in Science and Engineering - 2  <b>Session Chairs:</b> Ludwig Kohaupt, Yan Wu Beuth University of Technology Berlin,Georgia Southern University	<b>CS-FINANCE-2</b> Financial Mathematics and Computation - 2  <b>Session Chairs:</b> Pirvu, Traian McMaster University	<b>CS-BSM-1</b> Mathematics and Computation in Biological Sciences and Medicine - 1  <b>Session Chairs:</b> H.S. Jhajj Punjabi University, Patiala	<b>CS-MODELING-3</b> Partial Differential and Integral Equations in Mathematical Modeling - 3  <b>Session Chairs:</b> Socolowsky, J. Brandenburg University of Applied Sciences
15:30-15:50 #311 <b>Adaptation and parasite virulence in an increasingly connected world</b>	15:30-15:50 #150 <b>Discretization of Fractional Order Differentiator Over Paley-Wiener Space</b>	15:30-15:50 #384 <b>Valuation of the Peterborough Prison Bond</b>	15:30-15:50#19 <b>Effect of boundary absorption on dispersion of solute in a pulsatile Casson fluid flow</b>	15:30-15:50# 609 <b>Mixed problems for the Telegraph Equation in the Case of a System Consisting of N Segments with different Densities and Elasticities but Equal Impedances</b> Smirnov,Ilyas Lomonosov Moscow State University
Wild, Geoff University of Western Ontario	Wu, Yan Georgia Southern University	Hasan, Majid Western University,	Thomas-Sebastian, Binil University of West Indies	15:50-16:10 #541 <b>Symbolic-Numerical Methods for some Special Functions Involved in Groundwater Hydrodynamics</b> Bagayogo A.Bass
15:50-16:50 #600 <b>Ecological and Epidemiological Drivers of Viral Evolution</b>	15:50-16:50 #631 <b>Boundary Conditions for Constrained Hyperbolic Systems: Mathematical and Numerical Analysis</b>	15:50-16:10 #371 <b>Basket Option Pricing with Levy Processes using Mellin Transforms</b>	15:50-16:10 #46 <b>Designing of Mathematical Models in Study of Essential Hypertension among the Euglycemic Patients of Ischemic Heart Disease</b> Jhajj, H.S	16:10-16:30 # 477 <b>Convergence of the Lagrange-Galerkin method for the equations modelling of fish-like swimming</b> University of Saint-Boniface
Klein, Eili (Semi-plenary, p 19)	Tarulea, Nicolae (Semi-plenary, p 22)	Manuge, Derek	Punjabi University, Patiala	16:10-16:30 #477 <b>Convergence of the Lagrange-Galerkin method for the equations modelling of fish-like swimming</b> University of Saint-Boniface
Johns Hopkins University 16:50-17:10 #234 <b>The evolution of competitive helping within biological markets</b>	Purdue University Calumet 16:50-17:10 #159 <b>Matrices of Green's Type for Sets of Laplace Equations Posed on Joint Surfaces of Revolution Weakened with Apertures</b>	University of Guelph 16:10-16:30 #413 <b>Simulation of Greeks of multiasset options under exponential subordinated Brownian motion models by Malliavin calculus and quasi-Monte Carlo methods</b> Tan, Qiuzi WLU	16:10-16:30 #126 <b>Nonlinear Robust Control and Regulation problems for Biomedical Dynamical Systems</b>	16:10-16:30 # 477 <b>Convergence of the Lagrange-Galerkin method for the equations modelling of fish-like swimming</b> University of Saint-Boniface
Barclay, Pat University of Guelph 17:10 -17:30#179 <b>Outlook on a global forest transition</b>	Borodin, Volodymyr Middle Tennessee State University 17:10-17:30#421 <b>Random but visually nice shapes are used for Monte Carlo study of the area estimation Improvement by pairwise comparisons.</b>	16:30-16:50 #567 <b>Fast pricing of discretely monitored exotic options using the Spitzer identity and Wiener-Hopf factorization</b>	Belmiloudi, Aziz IRMAR-INSA of Rennes 16:30-16:50 #186 <b>Optimal Control of Bioheat Equation using Semigroups</b>	16:30-16:50 #21 <b>Modelling, Simulation and Optimization of Gas Flow in an Exhaust Pipe</b> Smaranda, Loredana University of Pitesti
Pagnutti, Chris University of Guelph	Kakashvili, Tamar Baycrest, Toronto, Canada	Germano, Guido Philipps-Universitat Marburg 16:50-17:10 #639 <b>CVaR Robust Mean-CVaR Portfolio Optimization</b>  Salahi, Maziar University of Guilan	Malek, Alaeddin Tarbiat Modares University 16:50-17:10#237 <b>A Model of Clusters in Binary and Ternary Strings Applied to Protein Secondary Structure Prediction</b> Nikolaev, Alexey The Graduate Center, CUNY 17:10-17:30 #270 <b>A Note on Malthus parameter-Dependent Conservation Law in Population Dynamics</b> Obabiyi, Olawale Sunday University of Ibadan	16:30-16:50 #21 <b>Modelling, Simulation and Optimization of Gas Flow in an Exhaust Pipe</b> Rybicki, Martin University of Hamburg

## 9.5 Wednesday, August 28 – 10:30 - 12:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-SSMBP-1</b> Simulations in soft matter and molecular Bio-Physics - 1  <b>Session Chairs:</b> Trang Do University of Waterloo	<b>SS-HPTC-5</b> Recent progress in hyperbolic problems: Theory and Computation - 5  <b>Session Chairs:</b> Jae-Hun Jung SUNY at Buffalo	<b>SS-MFMCR-1</b> Mathematical Finance Modelling, Computation and Risk Management - 1  <b>Session Chairs:</b> Joe Campolieti, Adam Metzler WLU	<b>SS-LSNE-1</b> Lie symmetry and other approaches in theory and applications of nonlinear equations - 1  <b>Session Chairs:</b> C.M.Khalique, M.Abdulaiib NorthWest University,RSA, Texas A&M University	<b>SS-GLS</b> Geocomputational landscapes and spaces  Steven A.Roberts, Colin Robertson WLU
10:30-10:50 #323 Using hybrid molecular dynamics-lattice Boltzmann simulations to study polymers and porous particles in confined environments  Denniston,Colin University of Western Ontario	10:30-10:50 #334 We establish local well-posedness in Sobolev spaces, and almost global solutions for small localized data for an infinite bottom water wave equation in 2D.  Ifrim, Mihaela McMaster University	10:30-10:50 #266 Interconnected Balance Sheets, Market Liquidity, and the Amplification Effect in a Financial System  Chen, Nan The Chinese University of Hong Kong	10:30-10:50 #60 Exact Solutions of a (3+1)-dimensional B-type Kadomtsev-Petviashvili Equation  Abudiab,Mufid Texas A&M University-Corpus Christi	10:50-11:10#499 Evolutionary Multi-objective Optimization Design for Peri-urban Greenlands Systems: metric implementations  Roberts, Steven Wilfrid Laurier University
10:50-11:10 #429 Coarse-Grained Atomistic Modeling of Colloid Crystallization and Glass Formation with Phase Field Crystal Methods  Berry,Joel McMaster University	10:50-11:10 #367 Absorbing boundary conditions for quantum relativistic mechanics  Lorin, Emmanuel Carleton University	10:50-11:10 #538 Illiquidity and Insolvency: a Double Cascade Model of Financial Crises  Hurd, Tom McMaster University	10:50-11:10 #108 Particles control in fragmentation equations  Oukouomi Noutchie,Suarez Clovis NorthWest University, Mafikeng, South Africa	10:50-11:10#407 Reducing Objectives in Many-Objective Optimization Problems for Landscape Design  Cruz Cortes, Nareli Instituto Politecnico Nacional (CIC-IPN)
11:10-11:30 #489 Colloidal Particles Interacting in a Cholesteric Liquid Crystal  Mackay, Frances University of Western Ontario	11:10-11:30 #475 An Efficient Implicit Boundary Integral Solver for the Vlasov-Maxwell System  Causley, Matthew Michigan State University	11:10-11:30 #120 Trends and trades  Hadjiliadis, Olympia Brooklyn College	11:10-11:30 #196 Symmetry reductions and exact solutions of a generalized Fisher equation  Gandarias,Maria Luz University of Cadiz	11:10-11:30#547 Map Comparisons and Model Checking: A Comparative Analysis  Robertson,Colin Wilfrid Laurier University
11:30-11:50 #321 Phase Field Crystal Modelling of Magneto-Elastic Effects in Isotropic Ferromagnetic Solids  Faghghi, Niloufar McGill University	11:30-11:50 #183 Nonlinear wave interaction for the ultra-relativistic Euler equations  Mahmoud Abdelrahman Otto-von-Guericke, Magdeburg, Germany	11:30-11:50 #616 Stochastic correlation in financial markets  Seco, Luis University of Toronto	11:30-11:50 #272 The effects of the singular lines in nonlinear wave equations  Zhang,Lijun Zhejiang Sci-Tech University	11:30-11:50#574 LSP-GIS Method for Urban Land Suitability Decision-Making  Dragicevic, Suzana Simon Fraser University
11:50-12:10 #327 Colloidal disks in nematic liquid crystals under the action of magnetic fields  Antipova, Alena University of Western Ontario	11:50-12:10 #588 On the solution of dispersive evolution equations with discontinuous data  Biondini, Gino State University of New York at Buffalo	11:50-12:10 #175 Explosive behavior in a lognormal interest rate model  Pirjol, Dan JPM	11:50-12:10 #291 Power geometry for a reversible system of ordinary differential equations  Soleev, Akhmadjon Samarkand State University, Uzbekistan	11:50-12:10#581 Comparing Interpolation Techniques for Predicting Rainfall in Tropical Climates  Plouffe, Cameron Wilfrid Laurier University
12:10-12:30 #522 Pattern non-pattern transition for a nonlocal population dynamics  Oliveira, Fernando University of Brasilia	12:10-12:30 #492 An Adaptive RBF-WENO Reconstruction Method for Hyperbolic Problems  Jung, Jae-Hun SUNY at Buffalo	12:10-12:30 #524 Hedging Bond Returns with Equity  Costanzino, Nick Scotiabank	12:10- 12:30 #308 Application of Homotopy Perturbation Method with an Auxiliary Term for Nonlinear Dropping Equations Arisen In Packaging System  Wang, Jun Jiangnan University,China	12:10-12:30#424 Approximations to Intractable Spatial Econometric Models and Their Solutions Through Global Optimization  Wachowiak-Smolikova, Renata Nipissing University

Room BA202	Room BA208	Room BA209	Room BA210	Room BA211
<b>SS-CDPB-3</b> Complex Dynamics of Population Behaviour  <b>Session Chairs:</b> Stephen Tully, Scott Greenhalgh, Chad Wells, Chris Pagnutti Guelph, Yale, Yale, Guelph	<b>SS-NCTAP-3</b> New Computational Techniques for Applied Problems in Science and Engineering  <b>Session Chairs:</b> Ludwig Kohaupt, Yan Wu Beuth University of Technology Berlin, Georgia Southern University	<b>SS-RTDEDS-1</b> Recent trends in differential equations and dynamical systems  <b>Session Chairs:</b> Xinzhi Liu, Mohamad Alwan, Hongtao Zhao University of Waterloo	<b>CS-FINANCE-3</b> Financial Mathematics and Computation  <b>Session Chairs:</b> Pirvu, Traian McMaster University	<b>CS-BSM-2</b> Mathematics and Computation in Biological Sciences and Medicine  <b>Session Chairs:</b> Dr H.S. Jhajj Punjabi University, Patiala
10:30-10:50 #80 <b>Incentives' Effect in Influenza Vaccination Policy</b>  C. Yamin, Dan Yale University	10:30-10:50 #529 <b>Nonconforming Generalized Finite Element Method for Linear Parabolic Interface Problems</b>  Tarfulea, Nicolae Purdue University Calumet	10:30-10:50 #16 <b>Orthogonal separation of variables in spaces of constant curvature</b>  R. Smirnov Dalhousie University	10:30-10:50 #195 <b>Parametric Estimation of Stationary Stochastic Process under indirect Observability</b>  Ren,Peng University of Huston	10:30-10:50#372 <b>Modeling and Simulation for the Effect of Beta Aggregates on Acetylcholine Neurocycle through Choline Leakage Hypothesis</b>  Awad, Asmaa University of Waterloo
10:50-11:10 #127 <b>Policy resistance undermines superspreaders vaccination strategies for influenza</b>  Wells,Chad Yale University	10:50-11:10 #304 <b>Integration of Inventory Decisions and Supplier Selection to Optimum Design of Cellular Manufacturing Systems: A Stochastic Solution Space</b>  Ghezavati, Vahidreza I.A.U. South Tehran Branch	10:50-11:10 #84 <b>Power geometry for a reversible system of ordinary differential equations</b>  Soleev, Akhmadjon Samarkand State University	10:50-11:10 #276 <b>American option pricing under time-changed Brownian motion models</b>  Tse, Long Yiu Wilfrid Laurier University	10:50-11:10 #273 <b>Modeling Blood Flow in a Brain Tumor Treated Concurrently with Radiotherapy and Chemotherapy</b>  Roy, Ranadhir University of Texas-Pan American
11:10-11:30 #350 <b>A new multi-strain dynamic influenza model</b>  Thommes, Edward University of Guelph & GSK Canada	11:10-11:30 #542 <b>Simulation of a Tumor Growth Model Based on an Adaptive Markov Chain Monte Carlo (AMCMC) Method</b>  Wang, Qing Shepherd University,USA	11:10-11:30 #103 <b>Higher order functional boundary value problems via the lower and upper solutions method - applications</b>  Fialho, Joao College of the Bahamas	11:10-11:30 #502 <b>Optimal Annuitization Timing With Stochastic Interest Rates</b>  Wang, Jinlian York University	11:10-11:30 #426 <b>Singular perturbation solutions of steady-state Poisson-Nernst-Planck systems</b>  Huang, Huaxiong York University
11:30-11:50 #268 <b>The effects of vaccination preferences and perceived risk on the spread of influenza</b>  Greenhalgh, Scott Yale University	11:30-11:50 #157 <b>Exploring Stochasticity and Imprecise Knowledge Based on Linear Inequality Constraints</b>  Subbey, Sam Institute for Marine Research, Norway	11:30-11:50 #152 <b>A class of reaction-diffusion systems with mixed initial conditions</b>  Rosu, Daniela "G. Asachi" Technical University, Iasi, Romania	11:30-11:50 #643 <b>Weather Derivatives and Applications in Canadian Data</b>  Cui, Kaijie University of Calgary	11:30-11:50 #465 <b>Backward Bifurcation in a CTMC based model for the Transmission Dynamics of Dengue Fever</b>  Khan, Adnan Lahore University of Management Sciences
11:50-12:10 #516 <b>Modelling homophilic imitation with replicator equations</b>  Morsky, Bryce University of Guelph	11:50-12:10 #44 <b>Numerical Algorithm to Solve Two-Point Non-Linear Singularly Perturbed Boundary Value Problems Using Initial Value Technique</b>  Tiwari, Surabhi Motilal Nehru National Institute of Technology, Allahabad	11:50-12:10 #153 <b>Viability for a time-dependent domain with respect to a reaction-diffusion system with delay</b>  Burlica, Monica-Dana "G. Asachi" Technical University, Iasi, Romania	11:50-12:10 #239 <b>An Explicit Recursive Formula for Computing the Normal Form and Center Manifold of n-dimensional Differential Systems Associated with Semisimple Cases</b>  Tian, Yun Western University	11:50-12:10 #510 <b>A spatial computer model for the spread of hepatitis C virus infection in vitro</b>  Blahut, Kenneth Ryerson University
12:10-12:30 #433 <b>Parental decision-making towards childhood immunization and social norms</b>  Oraby, Tamer University of Guelph	12:10-12:30			12:10-12:30 #530 <b>Non-Linearity and Heterogeneity in Modeling of Population Dynamics</b>  Karev, Georgiy NCBI, NIH

## 9.6 Wednesday, August 28 – 16:30 - 18:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-SSMBP-2</b> Simulations in Soft Matter and Molecular Bio-Physics - 2	<b>SS-HPTC-6</b> Recent progress in hyperbolic problems: Theory and Computation - 6	<b>SS-MFMCR-2</b> Mathematical Finance Modelling, Computation and Risk Management - 2	<b>SS-LSNE-2</b> Lie symmetry and other approaches in theory and applications of nonlinear equations - 2	<b>SS-EGT</b> Evolutionary Game Theory
<b>Session Chairs:</b> Niloufar Faghghi McGill University	<b>Session Chairs:</b> Jae-Hun Jung SUNY University at Buffalo	<b>Session Chairs:</b> Campolieti, J., Metzler, A. Wilfrid Laurier University	<b>Session Chairs:</b> C. M. Khalique, M. Abudaib NorthWest University, RSA, Texas A&M University	<b>Session Chairs:</b> Joe Apaloo, Ross Cressman St. Francis Xavier, WLU
16:30-16:50 #275 <b>Flow of spherical micellar solutions in confined channels</b>  Habibi, Mona Western University 16:50-17:30 #330 <b>Martini coarse-grained and atomistic simulations of lipids</b>  Tieleman, Peter (Semi-plenary, p 23) University of Calgary 17:30-18:00 #314 <b>The role of PEGylation in drug delivery: what can molecular dynamics simulation tell us</b>  Bunker, Alex University of Helsinki 18:00-18:30 #504 <b>Frontiers in Membrane Biophysics</b>  Rheinstadter, Maikel McMaster University	16:30-16:50 #99 <b>Challenging simulations of Black Hole Binaries</b>  Lousto, Carlos Rochester Institute of Technology 16:50-17:10 #434 <b>Fast recovery of far-field time-domain signals from near-field data</b>  Field, Scott University of Maryland 17:10-17:30 #501 <b>Sparse spectral methods for helically symmetric gravitational binaries</b>  Lau, Stephen University of New Mexico 17:30-17:50#415 <b>Gravitational and electromagnetic phenomena in strongly gravitating systems</b>  Palenzuela, Carlos Perimeter Institute for Theoretical Physics 17:50- 18:10# 128 <b>The Dynamics of a Scalar Field in Anti-de Sitter</b>  Liebling, Steven Long Island University	16:30-16:50 #51 <b>Illiquidity and Insolvency: a Double Cascade Model of Financial Crises</b>  Swishchuk, Anatoliy University of Calgary 16:50-17:10 #531 <b>A Bias-Reduction Technique for Monte Carlo Pricing of Multiple-Exercise Options</b>  Reesor, Mark Western University 17:10-17:30 #405 <b>A convolution method for numerical solution of backward stochastic differential equations</b>  Hyndman, Cody Concordia University 17:30-17:50 #584 <b>Efficient Monte Carlo Simulation For Integral Functionals of Brownian Motion</b>  Kolkiewicz, Adam University of Waterloo	16:30-16:50 #457 <b>Delayed Heston Model: Improvement of Vol Surface and Hedging of Vol Swaps</b>  Anco, Stephen Brock University 16:50-17:10 #618 <b>A Note on Wavelet Approximation Techniques for Differential Equations</b>  Bayram, Mustafa Yildiz Technical University, Turkey	16:30-16:50#148 <b>Game-theoretic methods for functional response and optimal foraging behavior</b>  Cressman, Ross Wilfrid Laurier University 16:50-17:10 #185 <b>Interspecific strategic effects of mobility in predator-prey systems</b>  Xu, Fei Wilfrid Laurier University 17:10-17:30 # 242 <b>Infinite Niche Packing</b>  Apaloo, Joe St. Francis Xavier University 17:30-17:50 #336 <b>Plants and games:adaptive strategies for nutrient foraging and competition</b>  McNickle, Gordon Wilfrid Laurier University
				17:50-18:10 #534 <b>Dynamics of pattern networks in rock-paper-scissors type models</b>  Menezes, Josinaldo Federal University of Rio Grande do Norte, Brazil 18:10-18:30 #634 <b>Habitat Selection for the Ideal Free Distribution in Linear and Nonlinear(Allee Effect)Fitness</b>  Tran, Tan Speaker
		18:10-18:30 #110 <b>Multiple barriers and assets in Financial Mathematics</b>  Escobar, Marcos Ryerson University		

Room BA202	Room BA208	Room BA209	Room BA211
<b>SS-ME-1</b> Mathematical Epidemiology - 1	<b>SS-NCTAP-4</b> New Computational Techniques for Applied Problems in Science and Engineering - 4	<b>SS-RTDEDS-2</b> Recent trends in differential equations and dynamical systems - 2	<b>CS-BSM-3</b> Mathematics and Computation in Biological Sciences and Medicine - 3
<b>Session Chairs:</b> Connell McCluskey	<b>Session Chairs:</b> Ludwig Kohaupt, Yan Wu	<b>Session Chairs:</b> Xinzhi Liu, Mohamad Alwan, Hongtao Zhang	<b>Session Chairs:</b> H.S. Jhajj
WLU	Beuth University of Technology Berlin, Georgia Southern University	University of Waterloo	Punjabi University, Patiala
16:30-16:50 #216 <b>Seasonal Modeling of Chronic Wasting Disease</b>	16:30-16:50 #627 <b>A Numerical Method for Multiple Time Scale Problems</b>	16:30-16:50 #305 <b>Classification of Solutions of Second Order Nonlinear Neutral Delay Dynamic Equations</b>	16:30-16:50 #641 <b>Dynamic models for rodent pest control: A case study of plateau pika</b>
Oraby, Tamer University of Guelph	Kadioglu, Samet Yildiz Technical University	Panigrahi, Saroj University of Hyderabad	Zhang, F. Yuncheng University
16:50-17:50 #613 <b>The spatio-temporal spread of drug-resistant tuberculosis</b>	16:50-17:10 #62 <b>A Bee Foraging Heuristic to Find a Route for Manet-Wcp</b>	16:50-17:10 #393 <b>Input-to-State Stability of Large-Scale Stochastic Impulsive Systems with Time Delay and Application</b>	16:50-17:10 #546 <b>Modeling Oxygen Dynamics of the Retina-Using Discrete Exterior Calculus</b>
Arino, Julien (Semi-plenary, p 16) University of Manitoba	Liang, Yawei Royal Military College of Canada	Alwan, Mohamad University of Waterloo	Rusjan, Edmond SUNYIT, NY
17:50-18:10 #626 <b>The Spread of Infectious Disease with Imported Infections</b>	17:10-17:30 #97 <b>Interactive computational search strategy of periodic solutions in an essentially nonlinear dynamics</b>	17:10-17:30 #403 <b>Impulsive Control and Synchronization of Spatiotemporal Chaos in Gray-Scott Model</b>	17:10-17:30 #560 <b>Role of predators in dynamics of niche construction</b>
Sigdel, Ram Wilfrid Laurier University	Lev Petrov Plekhanov Russian University of Economics	Zhang, Kexue University of Waterloo	Berezovskaya, Faina Howard University
18:10-18:30#392 <b>A multi-strain analysis of Neisseria meningitidis on the impact of immunization in Canada</b>	Poore, Keith University of Guelph	17:30-17:50 #483 <b>Chaos Entanglement: Leading Unstable Linear Systems to Chaos</b>	17:30-17:50 #637 <b>Modelling 1, 5 and 10 <math>\mu</math>m Particle Deposition In Human Lung By CFD</b>
		Zhang, Hongtao University of Waterloo	Goncalves, Jose Federal University of Sao Carlos
		17:50-18:10 #508 <b>Recent results on stability of open-loop and closed-loop switched systems</b>	17:50-18:10 #282 <b>Discrete Solitons for the Discrete Nonlinear Schrödinger Equations</b>
		Stechlinski, Peter University of Waterloo	Zhou, Z. Guangzhou University
		18:10-18:30 #569 <b>Discrete Dynamics of Differential Delay Equations</b>	
		Ivanov, Anatoli Pennsylvania State University	

## 9.7 Poster Session – Thursday, August 29 – 10:00 - 10:30 & 15:00 - 15:30

### Room BA110

#### CS-POST-1

Chair: M. Santoprete

10:00 - 10:30 & 15:00 - 15:30 # 18

Kazemlou Sheikhi, Ahmad  
Ministry of Education of Talesh City, Iran

**Comparing the Results of Transforming Differential Method and Adomian Method in Solving Third Order Nonlinear Delay Differential Equation**

10:00 - 10:30 & 15:00 - 15:30 # 76

Al Salman, Hassan  
King Faisal University, Saudi Arabia  
**Finite Element Approximation of a Parabolic Cross-Diffusion System**

10:00 - 10:30 & 15:00 - 15:30 # 146

Xin, Xin  
University of Guelph  
**Random Jitter Methods for Type 2 Ties in Survival Analysis**

10:00 - 10:30 & 15:00 - 15:30 # 340

Bovard, Luke  
University of Waterloo  
**Short-wave vortex instability in stratified flow**

10:00 - 10:30 am & 3:00 – 15:30 pm # 506

Duncan, Grant  
Laurentian University.  
**A Mathematical Model For Treatment Selection**

10:00 - 10:30 & 15:00 - 15:30 # 583

Prabhakar, Sanjay  
Wilfrid Laurier University  
**Parallel numerical methods for time dependent Schrodinger equations in the analysis of quantum heterostructures**

10:00 - 10:30 & 15:00 - 15:30 # 522

Kloosterman, Matt  
University of Waterloo  
**A Closed NPZ Model with Delayed Nutrient Recycling**

### Room BA111

#### CS-POST-2

Chair: M. Santoprete

10:00 - 10:30 & 15:00 - 15:30 # 61

Leal da Silva, Priscila  
Universidade Federal do ABC, Brazil

**On the group analysis of a modified Novikov equation**

10:00 - 10:30 & 15:00 - 15:30 # 138

Newlands, Nathaniel  
Agriculture and Agri-Food Canada  
**Downscaling of regional climate scenarios within agricultural areas across Canada with a multi-variate, multi-site statistical model**

10:00 - 10:30 & 15:00 - 15:30 # 163

Johnson, Sam  
National Institute of Technology Karnataka, India  
**Multiplication Operators with Closed Range in Operator Algebras**

10:00 - 10:30 & 15:00 - 15:30 # 471

Rocha, Paulo  
Universidade de Brasilia  
**Invariant Solutions of the 2+1 dimensional Gross-Neveu Equations**

10:00 - 10:30 am & 3:00 – 15:30 pm # 575

Jiwari, Ram  
Thapar University, India  
**A Differential Quadrature Algorithm for Numerical Treatment of Two-Dimensional Hyperbolic Equation**

10:00 - 10:30 & 15:00 - 15:30 # 619

Billel, Negal  
University Badji Mokhtar Annaba, Algeria  
**Convergence of the Regularized Sinc Collocation Method Applied to First kind Fredholm Integral Equation**

10:00 - 10:30 & 15:00 - 15:30 # 375

Khor, Susan  
Independent Post-Doc  
**Domain interactions from Protein interactions with Formal Concept Analysis**

## 9.8 Thursday, August 29 – 10:30 - 12:30

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-SSMBP-3</b> Simulations in soft matter and molecular Bio-Physics - 3  <b>Session Chairs:</b> Frances Mackay  Western University	<b>SS-SNDTA-1</b> Symmetry in Nonlinear Dynamics: Theory and Applications - 1  <b>Session Chairs:</b> Manuele Santoprete, Ray McLennaghan  WLU, University of Waterloo	<b>SS-MFMCR-3</b> Mathematical Finance - Modeling, Computation and Risk Management - 3  <b>Session Chairs:</b> Joe Campolieti, Adam Metzler  WLU	<b>SS-SGT</b> Structured Graph Theory  <b>Session Chairs:</b> Chinh Hoang, Kathie Cameron  WLU	<b>SS-CMS-1</b> Computational Materials Science - 1  <b>Session Chairs:</b> Haipeng Wang, Ziad Saghir  NPU and University of Toronto, Ryerson University
10:30-10:50 #419 Multiple Replica Repulsion Technique for Efficient Conformational Sampling of Biological Systems  Malevanets, Anatoly The Hospital for Sick Children, Toronto	10:30-10:50 #66 Relative Equilibria and Rotopulsators of the Curved N-Body Problem  Diacu, Florin University of Victoria	10:30-10:50 #206 Long-dated foreign exchange interest rate derivatives: modeling, computational challenges, and parallel computation via a PDE approach  Dang, Duy-Minh University of Waterloo		10:30-10:50 #139 Homogeneous crystallization of Si136 clathrate from liquid: Molecular dynamics simulations  Lu, Yongjun Beijing Institute of Technology
10:50-11:10 #374 Exploring the Polyelectrostatic Model of Sic1-Cdc4 Interaction using Coarse-Grained Explicit-Chain Simulations  Song, Jianhui University of Toronto	10:50-11:10 #202 Orbits in the Symmetric Four-body Problem  Sweatman, Winston Massey University	10:50-11:10 #250 An unconditionally monotone numerical scheme for the two factor uncertain volatility model  Ma,Kai University of Waterloo	10:50-11:10 #646 On magic labeling of type (1, 1, 1) for the subdivision of prisms  Hussain, Muhammad COMSATS Institute of IT	10:50-11:10 #589 Task Based Parallelization of Molecular-Dynamics Simulations with Short-Range Forces  Meyer, Ralf Laurentian University
11:10-11:30 #556 Velocity and energy distributions in microcanonical ensembles of hard spheres  Germano, Guido Philipps-Universität Marburg	11:10-11:30 #444 Saari's homographic conjecture for the planar equal-mass three-body problem under the Newton potential and a strong force potential  Fujiwara, Toshiaki Kitasato University	11:10-11:30 #236 Computation of the Loss Distribution Based on the Structural Model for Credit Portfolios  Han, Meng RBC Capital Markets, Toronto	11:10-11:30 #245 On Hendrys conjecture on cycle extension  Sritharan, R. The University of Dayton	11:10-11:30 #135 Molecular Dynamics Simulation of Density for Under-cooled Liquid Zirconium  Wang, Haipeng Northwestern Polytechnical University; University of Toronto
11:30-11:50 #507 Ordered Mononucleotide Arrays in Multilamellar Lipid Matrices: Implications for the Origin of Life  Toppozini, Laura McMaster University	11:30-11:50 #221 Symplectic Semiclassical Wave Packet Dynamics  Ohsawa, Tomoki University of Michigan-Dearborn	11:30-11:50 #652 Hedging Costs for Variable Annuities under Regime Switching  Azimzadeh, Parsiad University of Waterloo	11:30-11:50 #339 Constructions of k-critical P5-free graphs  Sawada, Joe University of Guelph	11:30-11:50 #253 Investigation on Temperature Uniformity in Thermo-Diffusion Cells  Farahbakhsh, Bahram Ryerson University
11:50-12:10 #511 Nano-scale Dimer Motor in a Chemical Gradient  Colberg, Peter University of Toronto	11:50-12:10 #158 A new approach to the integrability of the Suslov problem  Fernandez, Oscar Wellesley College		11:50-12:10 #537 Completing colored graphs to meet a target property  Eschen, Elaine West Virginia University	11:50-12:10 #401 Nucleation Heterogeneity in Shape Memory Alloys: Studies with 3D Coupled Thermo-Mechanical Phase-Field Models  Dhote, Rakesh University of Toronto; Wilfrid Laurier University
12:10-12:30 #642 Escape from adaptive conflicts in the evolution of protein folds: bi-stability, mutational robustness, and gene duplication  Sikosek, Tobias University of Toronto	12:10-12:30 #247 An obstruction class for isotropic fibrations  Butler, Leo Central Michigan University	12:10- 12:30 #601 Coloring graphs without induced paths of fixed lengths  Hoang, Chinh Wilfrid Laurier University		12:10-12:30 #98 Drilling Force and Temperature of Metallic Material with Hollow Drill  Wang, Wendong Northwestern Polytechnical University; University of Toronto

Thursday, August 29 – 10:30 - 12:30

Room BA202	Room BA208	Room BA209	Room BA210
<b>SS-ME-2</b> Mathematical Epidemiology - 2  <b>Session Chairs:</b> Zhisheng Shuai University of Central Florida	<b>SS-WSM-1</b> Women in Science and Mathematics - 1  <b>Session Chairs:</b> Shohini Ghose, Hind Al-Abadleh WLU	<b>SS-HOMCFD-1</b> High-Order Methods in Computational Fluid Dynamics - 1  <b>Session Chairs:</b> Lilia Krivodonova, Hans De Sterck UW	<b>SS-ANMPDE-1</b> Advanced Numerical Methods for PDEs and Applications - 1  <b>Session Chairs:</b> Peter A. Forsyth, Dong Liang University of Waterloo, York University
10:30-10:50 #142 <b>Mass Media Effects on an Influenza Epidemic</b>  Collinson, Shannon York University	10:30-10:50 #210 <b>The Power of Diversity: Women's Leadership in STEM</b>  Giordan, Judith Chemical Angels Network	10:30-10:50 #285 <b>Parallel High-Order CENO Finite-Volume Method for Large-Eddy Simulation of Turbulent Premixed Flames</b>  Tobaldini Neto, Luiz University of Toronto Institute for Aerospace Studies	10:30-10:50 #30 <b>Optimal Trade Execution: Mean Variance or Mean Quadratic Variation?</b>  Forsyth, Peter University of Waterloo
10:50-11:10 #168 <b>Sustained and transient oscillations induced by delayed antiviral immune response in an immunosuppressive infection model</b> Wang, Lin University of New Brunswick	10:50-11:10 #395 <b>Fast, recursive and numerically stable algorithms for discrete sine transformations having orthogonal factors</b>  M. Perera, Sirani Daytona State College	10:50-11:10 #337 <b>High-Order Central ENO Finite-Volume Scheme for Ideal MHD</b>  Susanto, Andree University of Waterloo	10:50-11:10 #198 <b>B-Spline Collocation Software for PDEs with Efficient Interpolation-Based Spatial Error Estimation</b>  Muir, Paul Saint Mary's University
11:10-11:30 #325 <b>The impact of the Anopheles mosquito lifestyle, feeding and reproductive habits in the transmission dynamics of Malaria-implications for control</b> Teboh-Ewungkem, Miranda Lafayette College	11:10-11:30 #521 <b>Chemical Property Prediction based on Spectral Signature of Properties on Molecular Surfaces</b>  Heidar Zadeh, Farnaz McMaster University	11:10-11:30 #430 <b>Assessment and Comparison of Discretization Techniques for the Diffusion Operator in High-Order Finite-Volume Methods</b>  Ivan, Lucian University of Waterloo	11:10-11:30 #212 <b>(Towards) a multicore adaptive space time method for PDEs</b>  Haynes, Ronald Memorial University of Newfoundland
11:30-11:50 #573 <b>A Century of Transitions in New York City's Measles Dynamics</b> Hempel, Karsten McMaster University	11:30-11:50 #548 <b>Fibre bundle framework for quantum fault tolerance</b>  Zhang, Lucy Liuxuan University of Toronto, Perimeter Institute	11:30-11:50 #373 <b>An Adaptive High Order Discontinuous Galerkin Solver for Direct Numerical Simulation</b> Mavriplis, Catherine University of Ottawa	11:30-11:50 #95 <b>New Progress on Energy-Conserved S-FDTD Methods for Maxwell's Equations</b> Liang, Dong York University
11:50-12:10 #540 <b>Population-level effects of suppressing fever</b>  Earn, David McMaster University	11:50-12:10 #614 <b>Topos Formulation of Quantum Theory</b>  Flori, Cecilia Perimeter Institute for Theoretical Physics	11:50-12:10 #428 <b>Examining nonlinear wave propagation in the trumpet</b>  Resch, Janelle University of Waterloo	11:50-12:10 #64 <b>ML-<math>\alpha</math>-Deconvolution model in a bounded domain with a vertical regularization</b> Ali, Hani Paris-Descartes University
12:10-12:30 #200 <b>The Effects of Mass Gatherings on the Spatial Spread of an Epidemic</b>  Xu, Fei Wilfrid Laurier University	12:10-12:30 #625 <b>Surface-enhanced quantum control: A SEQC way of controlling light and matter</b>  Rangan, Chitra University of Windsor	12:10-12:30 #225 <b>Accelerated High-Order Solver for the Cahn-Hilliard Equation on General Domains</b>  Abukhdeir, Nasser Mohieddin University of Waterloo	12:10-12:30 #550 <b>Application of Generalized Multiscale Finite Element Method in Multiphase Flow Models</b> Ginting, Victor University of Wyoming

Thursday, August 29 – 10:30 - 12:30

Room BA211	Room BA305
<b>SS-ADS-1</b> Canada-China Session on Applied Dynamic Systems - 1 <b>Session Chairs:</b> Yuming Chen, Fengqin Zhang, Xingfu Zou WLU, Yuncheng University, Western University	<b>CS-AMPRE-1</b> Applied Problems and Methods in Research & Education - 1 <b>Session Chairs:</b> Emmanuel Onwuka Federal College of Education Kano, Nigeria
10:30-10:50 #455 <b>A positivity preserving semi-implicit numerical method for a highly nonlinear diffusion-taxis-reaction model</b> Eberl, H. University of Guelph	10:30-10:50 #29 <b>Learning performances Assessment models For Online Collaborative Learning systems</b> Ibam, Emmanuel Onwuka Federal College of Education Kano
10:50-11:10 #307 <b>Dirichlet problem of delayed reaction-diffusion equations involving semi-infinite intervals</b> Yi, Taishan Central South University	10:50-11:10 #40 <b>Mathematical Modeling of Glassy-winged Sharpshooter Population Dynamics</b> Yoon, Jeong-Mi University of Houston-Downtown
11:10-11:30 #149 <b>Advances in Impulsive Differential Equations</b> Dai, Binxiang Central South University	11:10-11:30 #74 <b>Analytical methods in differential equations and optimal control:An Educational Approach</b> Grigorieva, Ellina Texas Woman's University
11:30-11:50 #112 <b>Controllability of second order impulsive functional differential systems with infinite delay in Banach spaces</b> Li, Meili Donghua University	11:30-11:50 #125 <b>Comparison between Adomian Method and Last Square Method For Solving HIV/AIDS non-linear system</b> Rahmani, Fouad Lazhar Universite Constantine
11:50-12:10 #599 <b>The Impact of a Single-strain Flu Vaccine on the Dynamics of a Two-strain influenza</b> Rahman, Ashrafur University of Western Ontario	11:50-12:10 #144 <b>Infinite families of (non)-Hermitian Hamiltonians associated with exceptional <math>X_m</math> Jacobi polynomials</b> Roy, Barnana Indian Statistical Institute
12:10- 12:30 # 75 <b>Codimension-1 sliding bifurcations of Filippov pest growth model with threshold policy</b> Tang, Sanyi Shaanxi Normal University	12:10- 12:30 #164 <b>Troesch's problem: Numerical simulation based on Haar wavelet collocation method</b> Pandit, Sapna Motilal Nehru National Institute of Technology

## 9.9 Thursday, August 29 – 15:30 - 18:00

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-SSMBP-4</b> Simulations in soft matter and molecular Bio-Physics - 4  <b>Session Chairs:</b> Chitra Narayanan  New Jersey Institute of Technology	<b>SS-SNDTA-2</b> Symmetry in Nonlinear Dynamics: Theory and Applications - 2  <b>Session Chairs:</b> Manuele Santoprete, Ray McLennaghan WLU, University of Waterloo	<b>CS-MECH-1</b> Computational Mechanics and Engineering - 1  <b>Session Chairs:</b> Ali Almansoori  The Petroleum Institute	<b>SS-LSNE-3</b> Lie symmetry and other approaches in theory and applications of nonlinear equations - 3  <b>Session Chairs:</b> C.M. Khalique, M. Abudiaab  North-West University RSA, Texas A&M University	<b>SS-CMS-2</b> Computational Materials Science - 2  <b>Session Chairs:</b> Haipeng Wang, Ziad Saghir  NPU and University of Toronto, Ryerson University
15:30-15:50 #377 Investigating Peptide/RNA Binding Using Enhanced-Sampling Simulation Techniques Do, Trang University of Waterloo	15:30-15:50 #219 A Feasible Short-Step Primal-Dual Interior Point Algorithm for Solving Convex Quadratic Problems Smirnov, Roman Dalhousie University	15:30-15:50 #604 A newly designed hot extrusion die modeling and its comparison with conventional dies Yeprem, Aygul H. Yildiz Technical University	15:30-15:50 #54 Lie group classification for a generalized coupled Lane-Emden system of dimension one Khalique, Chaudry Masood North-West University	15:30-15:50 #166 Twinning in Strained Ferroelastics: Microstructure and Statistics Ding, Xiangdong Xi'an Jiaotong University
15:50-16:30 #464 Role of dipolar interactions in protein folding  Matysiak, Silvina (Semi-plenary, p 21) University of Maryland	15:50-16:10 #251 Orthogonal separation of the Hamilton-Jacobi equation on Spaces of Constant curvature  Rajaratnam, Krishan University of Waterloo	15:50-16:10 #38 Computational Analysis of Slender Body with Varying Elliptical Cross Section at Various AOAs Shams, Taimur  National University of Sciences & Technology, NUST	15:50-16:10 #461 A Computational Study of Forced Oscillations of a Korteweg-de Vries Type Equation Usman, Muhammad  University of Dayton	15:50-16:10 #259 Phase separation and dendritic growth of bulk undercooled ternary Co-Cu-Pb alloy  Yan, Na  Northwestern Polytechnical University
16:30-17:00 #519 Unraveling the role of solvent-macromolecule interactions in determining the conformations of macromolecules in bulk, droplet and vacuum environments Consta, Stylianis (Stella) UWO	16:10-16:30 #39 Reductions and solutions of ZK equation, Gardner KP and Extension KP equations using conservation laws  Naeem, Imran Lahore University of Management Sciences	16:10-16:30 #133 Stochastic modeling of the Oil Sands operations under environmental constraints  Arsie, Alessandro University of Toledo	16:10-16:30 #56 Conservation laws of a system of coupled KdV equations  Erol Genevois, Mujde Galatasaray University	16:10-16:30 #335 Analysis of twinned crystals via eigensymmetries of crystallographic orbits  Marzouki, Mohamed Amine Radboud University Nijmegen
17:00-17:30 #318 Various approaches for accelerating sampling of protein conformation : from amyloids to loop motion Coté, Sébastien Université de Montréal	16:30-16:50 #381 Integrable Viscous Conservation Laws Submission  Rattan, Minto Brock University	16:30-16:50 #298 Supply Chain Flexibility Metrics Evaluation  Mhatre, Ben North-West University	16:30-16:50#58 In this work the (G'/G)-expansion method is used to determine exact solutions of coupled Kortweg de Vries and coupled Boussinesq equations Mothibi, Dimpwo Millicent Panjab University	16:30-16:50 #244 Hysteresis Algorithm For Alleviating Organic LED Degradation  Yang, Ning Northwestern Polytechnical University
17:30-18:00 #533 Computational Studies of Peptide and Proteins in Lipid Membranes Pomès, Régis Hospital for Sick Children, Toronto	16:50-17:10 #326 Traveling Waves and Conservation Laws for Complex mKdV-type Equations  Wolf, Thomas Northwestern Polytechnical University	16:50-17:10 #208 Effect of Particle Gradient on the Creep of an Isotropic Rotating Disc  Rattan, Minto Brock University	16:50-17:10 #59 In this talk we look for exact solutions of the Klein-Gordon-Zakharov equations, which describes the interaction between Langmuir waves and ion sound waves Mhlanga, Isaiah Elvis North West University	16:50-17:10 #213 Dendritic Growth Velocity Calculation and Microstructural Evolution of Ni-Cu-Si Alloy  Wang, Haipeng Northwestern Polytechnical University
		17:10-17:30 # 390 Design, Fabrication and Testing of a Hybrid Magnetostrictive-Piezoelectric Energy Harvesting Unit Ibrahim, Mohammed University of Waterloo	17:10-17:30 #92 Non-equilibrium solidification in undercooled faceted-faceted Ni-56.2 Si at % eutectic alloy  Lu, Yiping Dalian University of Technology	

Thursday, August 29 – 15:30 - 18:00

Room BA202	Room BA208	Room BA209	Room BA210
<b>SS-ME-3</b> Mathematical Epidemiology - 2  <b>Session Chairs:</b> Lin Wang University of New Brunswick	<b>SS-WSM-2</b> Women in Science and Mathematics - 1  <b>Session Chairs:</b> Shohini Ghose, Hind Al-Abadleh WLU	<b>SS-HOMCFD-2</b> High-Order Methods in Computational Fluid Dynamics - 1  <b>Session Chairs:</b> Lilia Krivodonova, Hans De Sterck UW	<b>SS-ANMPDE-2</b> Advanced Numerical Methods for PDEs and Applications - 1  <b>Session Chairs:</b> Peter A. Forsyth, Dong Liang University of Waterloo, York University
15:30-15:50 #140 Pair approximation models of foot and mouth disease. Impacts of IP/CP culling, ring and prophylactic vaccination, vaccine waning, loss of disease-induced immunity and disease re-introduction Ringa, Notice University of Guelph	15:30-15:50 #629 ZeroHopf bifurcation in the hyperchaotic Lorenz system Cid-Montiel, Lorena Wilfrid Laurier University	15:30-15:50 #366 High-Order Summation-by-Parts Discretization of the Navier-Stokes and Euler Equations Del Rey Fernández, David C. University of Toronto Institute for Aerospace Studies	15:30-15:50 #368 Domain Decomposition Techniques for Electromagnetic Scattering from Thin Wires Haslam, Michael York University
15:50-16:10 #484 Target Reproduction Number and Its Applications to Infectious Disease Control Shuai, Zhishengi University of Central Florida	15:50-16:50 #645 Fifteen Years of Funded Programs to Advance Women in Science and Engineering: Progress and Persistent Challenges Mavriplis, Catherine 24 University of Ottawa	15:50-16:10 #309 High-Order Finite Volume Element Methods for Elliptic PDEs with Singularities, and Applications to Capillarity De Sterck, Hans University of Waterloo	15:50-16:10 #207 An numerical impulse control PDE approach for continuous time optimal portfolio allocation under jump-diffusions Dang, Duy-Minh University of Waterloo
16:10-16:30 #487 Modelling pre-emptive vaccination to prepare for bioterrorist attacks Molina, Chai McMaster University	16:50-17:10 #648 Computational Thinking and Simulations in Teaching Science and Mathematics Shodiev, Hasan WLU	16:10-16:30 #463 Analysis of Heterogeneous Multiscale Methods for Long Time Multiscale Wave Propagation Problems Runborg, Olof KTH Royal Institute of Technology	16:10-16:30 #130 Efficient Splitting Characteristic Method for Aerosol Transports in Environment Fu, Kai York University
16:30-16:50 #27 Optimal Infectious Disease Control Grigorieva, Ellina Texas Woman's University	17:10 - 18:00 Women in Science - Panel Discussion A. Hind, S. Ghose WLU	16:30-16:50 #180 Simulation of the Mixing in An Imploding Shell Wang, Lili The Institute of Applied Physics and Computational Mathematics, p. R. China	16:30-16:50 #271 A Truncated FCI Approach Motivated from the Mathematics of Complexity for Solving the Electronic and Nuclear Schrödinger Equation Anderson, James Peking University
16:50-17:10 #87 Seasonal dynamics in an SIR epidemic system Sari, Nadir University of La Rochelle	16:50-17:10 #82 Study on Turbulent Mixing Induced by Richtmyer-Meshkov Instability Using the Second-Order Moment Model Yang, Min	16:50-17:10 #203 On the game p-Laplacian on graphs for processing and clustering of high dimensionnal data Elmoataz, Abderahim University of Caen Basse Normandy	16:50-17:10 #203 Multicomponent polymer flooding in two dimensional oil reservoir simulation Kenettinkara, Sudarshan Kumar TIFR Centre for Applicable Mathematics
17:10-17:30 #91 A mathematical model for the spread of ectoparasite-borne diseases Dénes, Attila University of Szeged			17:10-17:30 #641

Thursday, August 29 – 15:30 - 17:30

Room BA211	Room BA305
<b>SS-ADS-2</b> Canada-China Session on Applied Dynamic Systems - 1 <b>Session Chairs:</b> Yuming Chen, Fengqin Zhang, Xingfu Zou WLU, Yuncheng University, Western University	<b>CS-AMPRE-2</b> Applied Problems and Methods in Research & Education - 2 <b>Session Chairs:</b> Emmanuel Onwuka
15:30-16:50 #177 <b>Agent-Based Modelling for Disease Dynamics in-silico Populations</b> Moghadas, Seyed M. York University	15:30-16:50 #586 <b>Activity Recognition for Remote and Self-monitoring using Android Smartphones</b> Kamal, Ankit University of Waterloo
15:50-16:10 #85 <b>Modeling effects of environmental contamination and volunteers on hospital infections in China</b> Xiao, Yanni Xi'an Jiaotong University	15:50-16:10 #89 <b>Growth Modeling of Mobile communication systems Adaptation in learning</b> Ibam, Emmanuel Onwuka Federal College of Education Kano
16:10-16:30 #261 <b>Global stability of some epidemic models with age structure</b> Yang, Junyuan Yuncheng University	16:10-16:30 #279 <b>New Exceptional Orthogonal Polynomials and Non-linear algebras associated to the Quantum system</b> Dutta, Debjit Indian Statistical Institute
16:30-16:50 #78 <b>Using Lyapunov Functions to Construct Lyapunov Functionals</b> McCluskey, Connell WLU	16:30-16:50 #442 <b>A New Approach of Particle Swarm Optimization based on Inverse Survival Function</b> Singh, Sharandeep Punjabi University
16:50-17:10 #181 <b>Epidemic dynamics on semi-directed complex networks</b> Jin, Zhen North University of China	16:50-17:10 #459 <b>Optimal designs for heteroscedastic accelerated life testing models with multiple factors</b> Krzeminski, Mark Brock University
17:10-17:30 #288 <b>Mathematical Model of Anaerobic Digestion in a Chemostat: Effects of Syntrophy and Inhibition</b> Wolkowicz, Gail McMaster University	

## 9.10 Friday, August 30 – 10:30 - 12:50

Room BA101	Room BA102	Room BA110	Room BA111	Room BA112
<b>SS-SSMBP-5</b> Simulations in soft matter and molecular Bio-Physics - 5 <b>Session Chairs:</b> Cristiano L. Dias  New Jersey Institute of Technology	<b>SS-CFDRA-1</b> Computational Fluid Dynamics for Real Applications - 1 <b>Session Chairs:</b> Lakhdar Remaki, Stéphane Moreau, Abdelkader Baggag BCAM, Sherbrooke, Laval	<b>CS-MECHE-2</b> Computational Mechanics and Engineering - 2 <b>Session Chairs:</b> Salehian, Armaghan	<b>SS-MIPD-1</b> Mathematical Immunology and Pathogen Dynamics - 1 <b>Session Chairs:</b> Jonathan Forde	<b>SS-IM</b> Industrial Mathematics <b>Session Chairs:</b> Sean Bohun
10:30-10:50 #518 <b>Stability and Cooperativity of Protein Folding in Crowded and Confined Environments</b>  Linhananta, Apichart Lakehead University	10:30-10:50 #4 <b>Modeling of Bubble Motion in a Sound Field</b>  Khattar, Dinesh Kirori Mal College, Delhi University	10:30-10:50 #211 <b>Effect of Anisotropy on the Steady State Creep in a Rotating Cylinder</b>  Chamoli, Neeraj D.A.V. College, Chandigarh, India	10:30-10:50 #555 <b>Linking immunology and epidemiology: dynamics of human rhinovirus in an immune-structured host population</b>  Laverty, Sean University of Central Oklahoma	10:30-10:50 #386 <b>Quality assessment of medical images using the structural similarity index</b>  Kowalik-Urbaniak, Ilona University of Waterloo
10:50-11:10 #478 <b>Interactions of extended peptide conformations and beta-sheet formation.</b>  Dias, Cristiano New Jersey Institute of Technology 11:10-11:30 #513 <b>Calculating Free Energy of the Aggregation of the Peptide (HHC-36) In Bulk</b>  Vafaei, Shaghayegh University of Guelph 11:30-11:50 #495 <b>The implication of stochastic resonance effects on neurological disease quantifications</b>  Das, Tushar University of Waterloo 11:50-12:10 #356 <b>A Numerical Study on Tissue Topology Using Single Cell Based Model</b>  Mkrtychyan, Anna Western University	10:50-11:10 #7 <b>On axisymmetrical boundary problem of unsteady motion of micropolar fluid in the half-space</b>  El-Sirafy, Ibrahim Alexandria University 11:10-11:30 #12 <b>The construction of an Integral formula for computing Cylindrical and Non-cylindrical Flow in the Region Bounded by Two Coaxial Cylinders of Varying Radii</b>  Pavlika, Vasos University of London 11:30-11:50 #224 <b>Design considerations for thermal management of electronics enclosures</b>  Cocks, Rachele Regal Beloit Corporatoin 11:50-12:10 #238 <b>Magnetic field effect on the natural convection flow in a cavity</b>  Bozkaya, Canan Middle East Technical University	10:50-11:10 #298 <b>Supply Chain Flexibility Metrics Evaluation</b>  Erol Genevois, Muide Galatasaray University 11:10-11:30 #364 <b>Detecting bifurcation behaviour in car crash simulation data sets with a generative machine learning method</b>  Bohn, Bastian University of Bonn 11:30-11:50 #390 <b>Design, Fabrication and Testing of a Hybrid Magnetostrictive-Piezoelectric Energy Harvesting Unit</b>  Salehian, Armaghan University of Waterloo 11:50-12:10 #445 <b>Strip-saturation-yield model for a piezoelectric plate: A study on influence of change in poling direction</b>  Jangid, Kamlesh Indian Institute of Technology Roorkee	10:50-11:10 #67 <b>Dynamics of In-host Malaria Model</b>  Gumel, Abba University of Manitoba 11:10-11:30 #111 <b>Hiv Escape from Ctl Response during Acute Infection: Modeling and Inference</b>  Leviyang, Sivan Georgetown University 11:30-11:50 #65 <b>Understanding antibody-host dynamics following EIAV infection</b>  Ciupu, Stanca Virginia Tech 11:50-12:10 # 312 <b>Modeling HIV-1 virus dynamics</b>  Zou, Xingfu Western University	10:50-11:10 #204 <b>Some recent mathematics-in-industry study group projects from Australia and New Zealand</b>  Sweatman, Winston Massey University 11:10-11:30 #509 <b>Modelling and Simulation of Atmospheric Pollutant Dispersion</b>  Stockie, John Simon Fraser University 11:30-11:50 #525 <b>Optimal Flu Vaccination in a Multiple Group Model</b>  Kloosterman, Matt University of Waterloo 11:50-12:10 #289 <b>Dominatedly Non-Decreasing Approximations for Waiting Time Asymptotics of the M/G/2 Queue with Heterogeneous Servers</b>  Sani, Sulaiman University of Botswana
	12:10-12:30 #497 <b>A CFD Optimization of Airflow Efficiency for an Electric Motor Driven Centrifugal Fan System for Residential HVAC Applications</b>  Cocks, Rachele Regal Beloit Corporatoin		12:10-12:30 # 118 <b>Using within-host mathematical modelling to predict the long-term outcome of human papillomavirus vaccines</b>  Smith?, Robert University of Ottawa	12:10- 12:30 #592 <b>Modelling Mass Transfer in a Rotating Disk Reaction Vessel</b>  Bohun, C Sean UOIT 12:30-12:50 # 448 <b>3D Modeling of some industrial processes of steel heat treating</b> Garcia Vazquez, Concepcion University of Cadiz

Room BA202	Room BA208	Room BA209	Room BA210	Room BA211
<b>CS-CPC-1</b> Computational Physics and Chemistry - 1  <b>Session Chairs:</b> Xia Cui  Institute of Applied Physics and Computational Mathematics, Beijing, China	<b>SS-MMNN</b> Mathematical Models for Nanoscience and Nanotechnology  <b>Session Chairs:</b> Lyon, K., Anicic, R.  University of Waterloo	<b>SS-QCTA-1</b> Quantum Control: Theory and Application -1  <b>Session Chairs:</b> Lian-Ao Wu  IKERBASQUE, Basque Foundation of Science and University of the Basque Country	<b>SS-DBCNDE-1</b> Dynamics and bifurcations in coupled networks of differential equations: theory and applications - 1  <b>Session Chairs:</b> Luciano Buono  UOIT	<b>SS-NMDAEA</b> Numerical methods for differential-algebraic equations and applications  <b>Session Chairs:</b> Griewank, A., Nedialkov, N., Pryce, J.  Humboldt University, Cardiff University
10:30-10:50 #22 <b>Avoiding the coordinate singularity problem in the numerical solution of the Dirac equation in cylindrical coordinates</b> Fillion-Gourdeau, Francois Centre de recherches mathématiques	10:30-10:50 #93 <b>An integral equation solver for the simulation of two-dimensional metallic nanoplasmonics</b> Kurkcu, H. Gulf University of Science and Technology, Kuwait	10:30-10:50 #20 <b>Fast and Robust Spin Manipulation in a Quantum Dot by Electric Fields</b> Sherman, Eugene University of Basque Country	10:30-10:50#553 <b>Network synchronization and mixed couplings: when friends turn enemies and vice versa</b> Belykh, Igor Georgia State University	10:30-10:50#90 <b>Optimization of large scale DAE systems in chemical process design and control using parallel computing</b> Washington, Ian McMaster University
10:50-11:10 #50 <b>A discrete stochastic model for pitting corrosion</b>  Van der Ween, Pieter Ghent University, Belgium	10:50-11:10 #363 <b>Tackling Surface Roughness in Graphene Plasmonics</b>  Lyon, K. University of Waterloo	10:50-11:10 #24 <b>Tight-binding models for ultracold atoms in honeycomb optical lattices</b> Modugno, Michele University of Waterloo	10:50-11:10#628 <b>Chaos and reliability in fluctuation-driven, balanced spiking networks</b> Lajoie, Guillaume University of Washington	10:50-11:10# 296 <b>Progress on the DAESA tool for structural analysis of DAEs</b>  Pryce, John Cardiff University
11:10-11:30 #122 <b>GKS Scheme for Compressible Two-phase Flow Models Containing Non-conservative Products</b>  Zhao, Guiping National Natural Science of China	11:10-11:30 #416 <b>Piezo-electromechanical effects in embedded nanowire superlattices</b>  Prabhakar, S. Wilfrid Laurier University	11:10-11:30 #37 <b>Cooling and probing a nanomechanical resonator coupled to a double quantum dot</b>  You, Jianqiang Beijing Computational Research Center	11:10-11:30# 178 <b>Low-dimensional descriptions of neural networks</b>  Barreiro, Andrea Southern Methodist University	11:10-11:30# 306 <b>Generalized Bessel functions and Sturm Liouville equations</b>  Balsim, Igor Kingsborough Community College of CUNY
11:30-11:50 #201 <b>Theoretical Analysis and Iteration Acceleration of Second-order Temporal Accurate Fully Implicit Discretization for Non-linear Diffusion Problem</b>  Cui, Xia Institute of Applied Physics and Computational Mathematics, Beijing, China	11:30-11:50 #427 <b>Effects of finite ion size and dielectric saturation of water in electrolytically top-gated graphene</b>  Sharma, P. University of Waterloo	11:30-11:50 #260 <b>Experimental novel and robust quantum control of single electron spin in diamond</b>  Du, Jiangfeng University of Science and Technology of China	11:30-11:50 #227 <b>Emergent Collective Behaviour on Stochastic Coupled Cell Networks</b>  DeVille, Lee University of Illinois	11:30-11:50 #441 <b>Structural analysis and dummy derivatives - some relations</b>  McKenzie, Ross Cardiff University
11:50-12:10 #603 <b>We obtain complete set of constraints on the moduli of N=4 superstring compactifications that permit rare marginal decays of 1/4 -BPS dyons to take place</b>  Nigam, Rahul BITS-Pilani, India	11:50-12:10 #576 <b>Spectra of Few-body complexes in Quantum Dot Molecules</b>  Khoshnegan, M. University of Waterloo	11:50-12:10 #48 <b>Stochastic Schrödinger Equation for Open Fermionic Systems</b>  Yu, Ting Stevens Institute of Technology	11:50-12:10#160 <b>Instabilities in delayed regulatory loops of the haematopoietic system</b>  Bélair, Jacques Université de Montréal	11:50-12:10 # 491 <b>A simple method for Quasilineararity Analysis of DAEs</b>  Nedialkov, Ned McMaster University
12:10-12:30 #650 <b>Adaptive Matrix Transpose Algorithms for Distributed Multicore Processors</b>  Bowman, John University of Alberta	12:10-12:30 #389 <b>Substrate structure effects on electrical properties of graphene</b> R. Anicic University of Waterloo	12:30-12:50#579 <b>Effect of Microwave and Terahertz Radiation on Superconducting Nanowires</b> Jafari Salim, Amir University of Waterloo	12:10-12:30 #605 <b>Symbolic application of the Pryce <math>\Sigma</math>-method for index reduction of DAEs in CyModelica</b> Harman, Peter CyDesign Ltd.	
12:30-12:50 #635 <b>Nonequilibrium Green's function approach to simulations of active photonic nanostructures</b>  Wartak, Marek Wilfrid Laurier University				

## 9.11 Friday, August 30 – 15:30 - 18:00

Room BA101	Room BA102	Room BA111	Room BA112
<b>SS-SSMBP-6</b> Simulations in soft matter and molecular Bio-Physics - 6 <b>Session Chairs:</b> Joel Berry McMaster University	<b>SS-CFDRA-2</b> Computational Fluid Dynamics for Real Applications - 2 <b>Session Chairs:</b> Lakhdar Remaki, Stéphane Moreau, Abdelkader Baggag BCAM, Sherbrooke, Laval	<b>SS-MIPD-2</b> Mathematical Immunology and Pathogen Dynamics - 2 <b>Session Chairs:</b> Stanca Ciupe Virginia Tech	<b>SS-SAEEM</b> Statistical Aspects of Environmental and Ecological Modeling <b>Session Chairs:</b> Vyacheslav Lyubchich University of Waterloo
15:30-15:50 #485 <b>Understanding beta-sheet stabilization - Lessons from a model hairpin peptide</b> Narayanan, Chitra New Jersey Institute of Technology	15:30-15:50 #535 <b>Wake Topology for Steady Flow past an Inclined Elliptic Cylinder</b> Young, Peter NATO Communications and Information Agency	15:30-15:50 #187 <b>A study of recurrent infection in deterministic in-host models</b> Zhang, W. Western University	15:30-15:50 #450 <b>Estimation of Absolute and Relative Abundance</b> Horrocks, Julie University of Guelph
15:50-16:20 #197 <b>Principles of Protein Folding from Coarse-Grained Modeling</b> Chan, Hue Sun University of Toronto	15:50-16:10 #612 <b>A robust computational procedure for nonlinear thermo-electrical problems in fractured media based on XFEM</b> Baggag, Abdelkader	15:50-16:10 #161 <b>Modeling within-host dynamics of influenza virus infection</b> Rong, L. Oakland University	15:50-16:10 #354 <b>Censored Gamma Regression with Applications</b> McLeod, Ian Western University
16:20-16:50 #223 <b>Intrachain ordering and segregation of polymers in a confined space</b> Ha, Bae-Yeon University of Waterloo	16:10-16:30 #622 <b>CFD Simulation of Biomass Gasification using Circulating Fluidized Bed by Eulerian-Eulerian Approach</b> Liu, Hui University of Waterloo	16:10-16:30 # 226 <b>The importance of cell-to-cell transmission during the acute stage of HIV infection</b> Wells, Chad Yale University	16:10-16:30 # 286 <b>Analyzing Inter-Annual Variability in North America Net Ecosystem CO2 Exchange</b> Luus, Kristina University of Waterloo
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15:30 - 15:50 #388 <b>Properties of Dimethylimidazolium Chloride- Molecule of the Mono-substituted Benzene at T=400K by Molecular Dynamics Simulation</b> Atamas, Natalija Kiev Taras Shevchenko University	15:30 - 15:50 #263 <b>Switching current and thermal stability of perpendicularly-anisotropic CoFeB-MgO based magnetic tunnel junctions</b> Sato, Hideo Center for Spintronics Integrated Systems, Tohoku University	15:30 - 15:50 #116 <b>Correlation Dynamics and Scaling Behavior of Two-Qubit System in the Spin-Chain Environments</b> Lin, Hai-Qing Beijing Computational Science Research Center	15:30 - 15:50 #264 <b>Collective Behavior of a Network of Spin Torque Nano-Oscillators</b> Palacios, Antonio San Diego State University
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**Room BA211**

**SS-CMAIS**

Control Methods for Advanced Industrial Systems  
**Session Chairs:**  
Behzad Samadi and Jürgen Gerhard  
Maplesoft

15:30-15:50 #346  
**Symbolic Methods in Control Theory**

Gerhard, Jürgen  
Maplesoft  
15:50-16:10 #486  
**Discovering Lyapunov functions for dynamical systems using simulation**  
Kapinsky, James  
Toyota  
16:10-16:30 #347  
**Using Kernel Module Bases for fast polynomial matrix arithmetic**

Labahn, George  
University of Waterloo  
16:30-16:50 #469  
**Transverse feedback linearization and exterior differential systems**  
Nielsen, Christopher  
University of Waterloo  
16:50-17:10 #479  
**Model Predictive Control via Triangular Decompositions of Semi-Algebraic Systems**  
Chen, Changbo

17:10-17:30 #398  
**An optimal predictive control strategy for a plug-in hybrid electric powertrain**  
Taghavipour, Amir  
University of Waterloo

**Room BA305**

**SS-VPPO**

Variational Problems of Physical origin  
**Session Chairs**  
Robert Jerrard, Andrew Lorent  
University of Toronto, University of Cincinnati

15:30-15:50 #344  
**Global stability and instability of solutions to nonlinear parabolic and hyperbolic equations**

Kalantarov, Varga  
Koc University, İstanbul, Turkey  
15:50-16:10 # 654  
**Front speed enhancement by large incompressible flows in 3 dimensions**

El Smaily, Mohamad  
University of Toronto  
16:10-16:30#387  
**Variational problems with non-local operators**

Melgaard, Michael  
University of Sussex  
16:30-16:50#476  
**Thin limit theories in nonlinear elasticity and infinitesimal isometries**  
Pakzad, Reza  
University of Pittsburgh

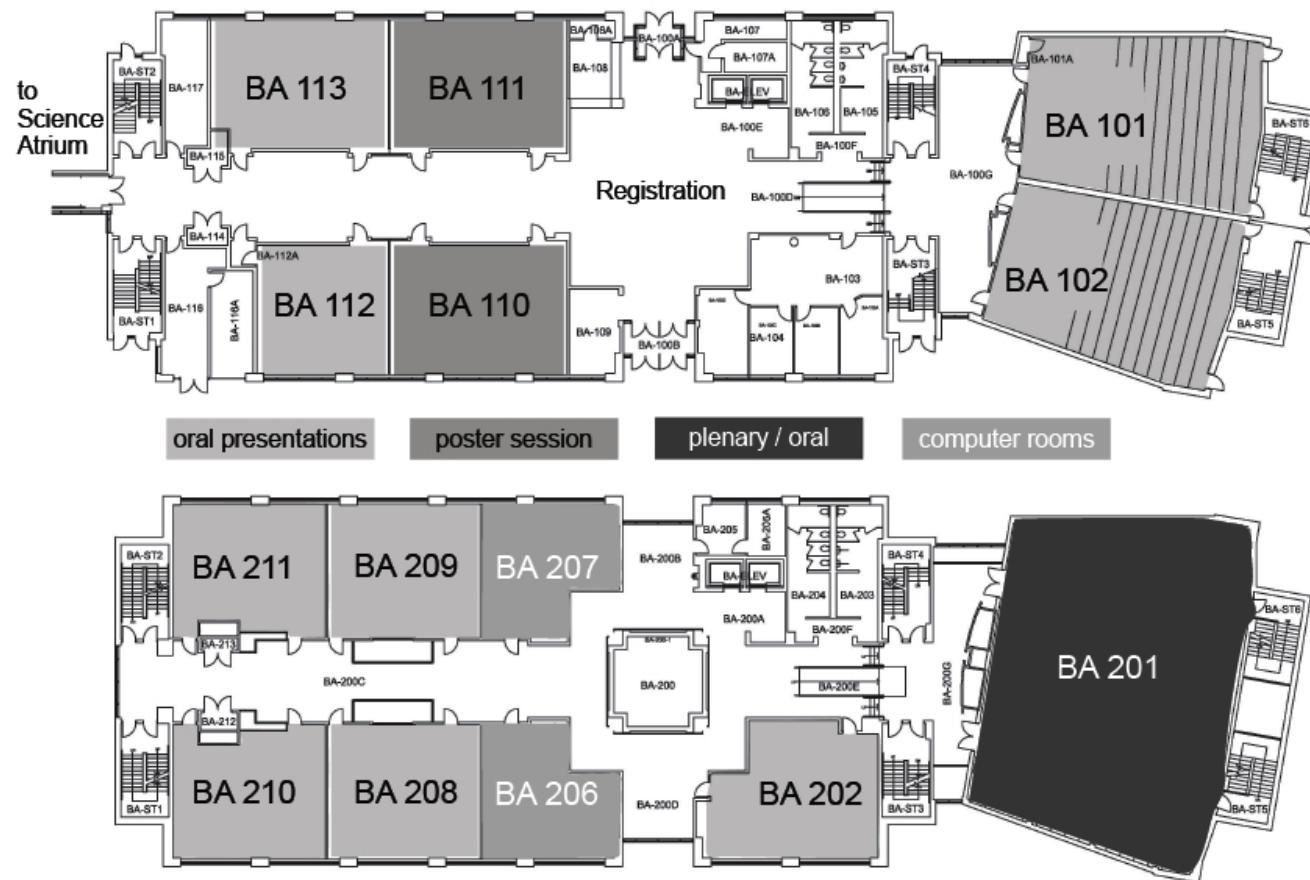
16:50-17:10#587  
**A generalized Stoilow decomposition and applications**

Lorent, Andrew  
University of Cincinnati  
437  
**Stable Vortex States in Superconductivity**

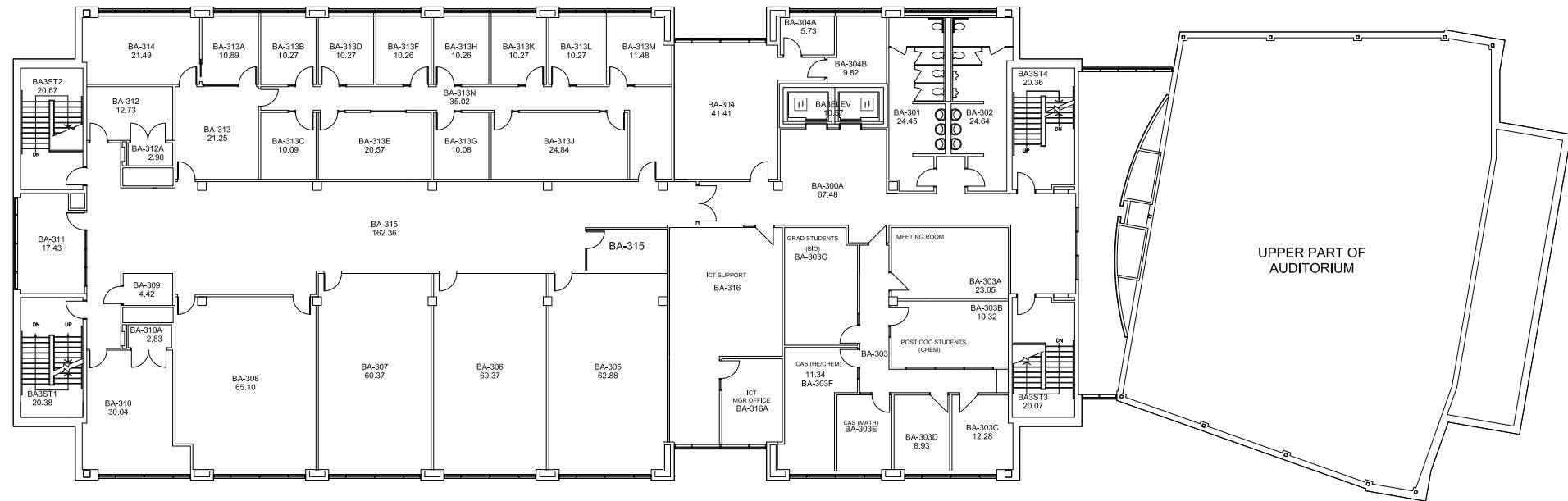
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## 10 Maps

### 10.1 Bricker Academic Building - Floors 1 and 2 Map

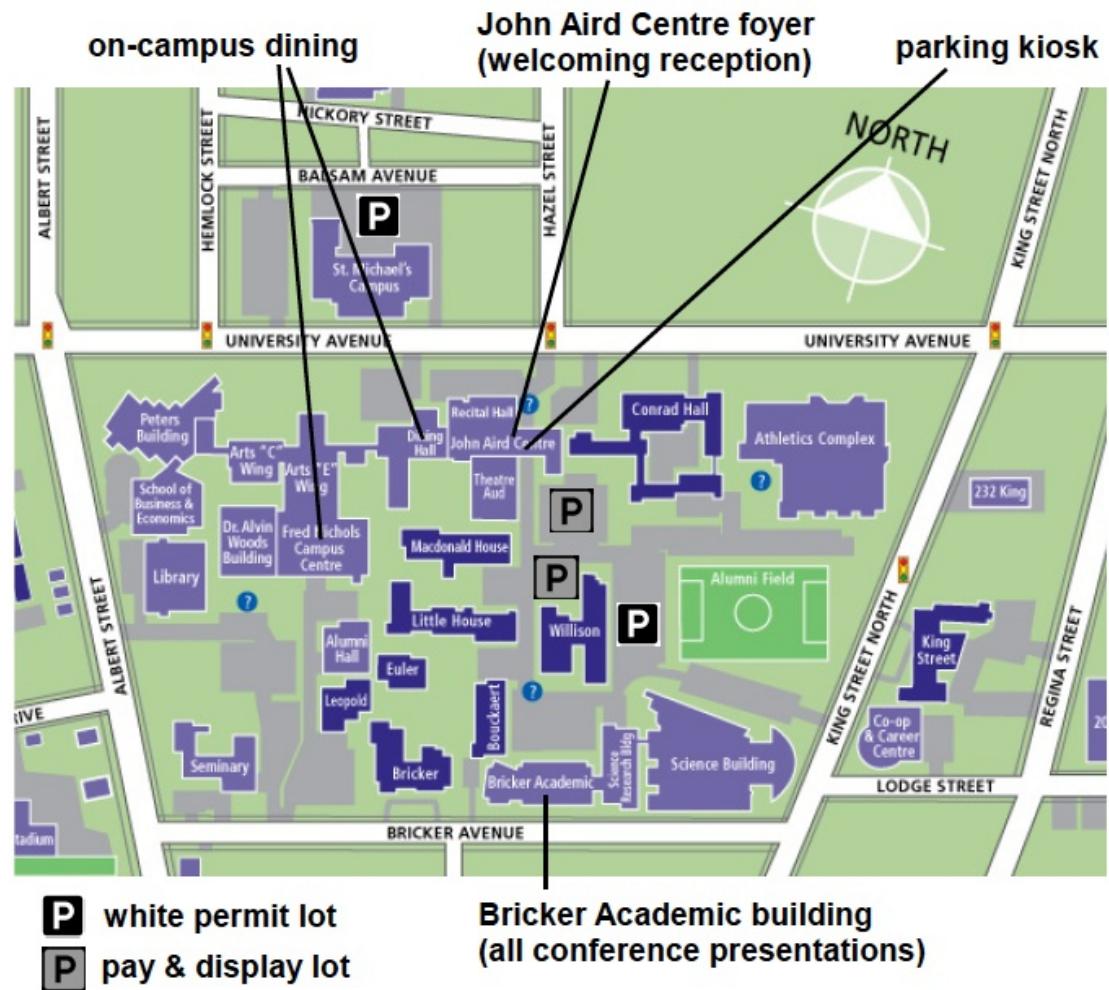


## 10.2 Bricker Academic Building - Floor 3 Map



BLDG. CODE - 43  
FLOOR CODE - 43L03  
EXTERIOR GROSS AREA =  
19522.30 sq. ft.  
1813.62 sq. m.

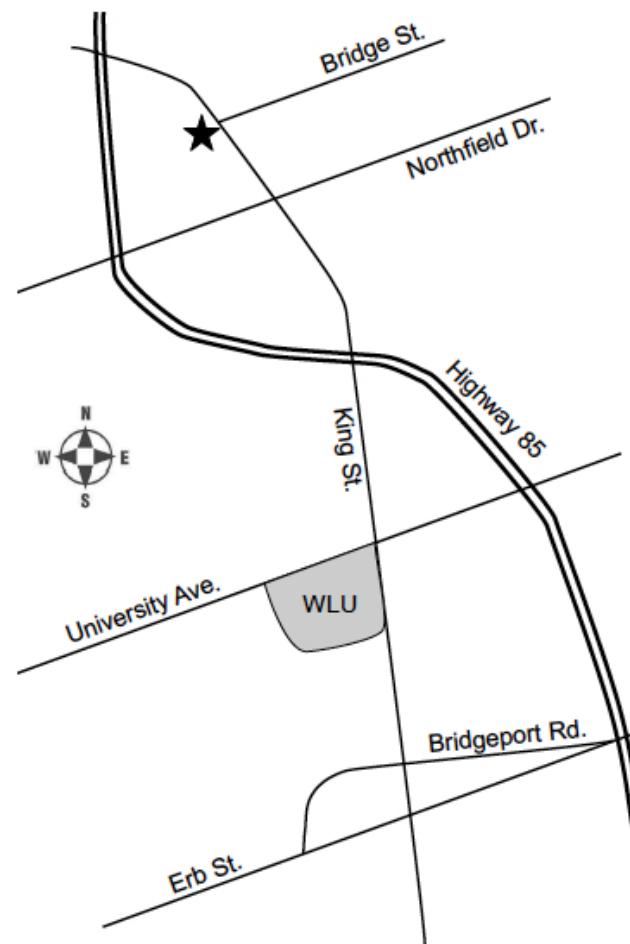
### 10.3 Wilfrid Laurier University Campus



#### 10.4 Directions to the Conference Banquet

St. George Hall, 665 King St. N, Waterloo (at Bridge St.)

10 minute drive from WLU campus



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