

II. CORE SCIENTIFIC PROGRAMMES



From the left: M. Stevenson (President, SFU), N. Ghossoub (PIMS Director), T. Li (Prog. Coordinator, APCTP), K. S. Viswanathan (Physics, SFU), H. Morris (Chair of Board, PIMS), G. Semenov (Physics, UBC), B. K. Chung (Executive Director, APCTP) at the signing ceremony for the APCTP-PIMS Cooperative agreement.

Group photo from the NATO Advanced Research Workshop, August 2001.



PIMS Mini-Programmes

Mini-programmes are more focused events than the thematic programmes and span a shorter period of time. They are supposed to place the focus on having fewer formal lectures and more opportunities for active collaborative work between the participants. Unlike the regular workshops, most participants should be present and involved for an extended period.

Frontiers in Mathematical Physics on Workshop on String Cosmology, PIMS-UBC, July 24 – August 4, 2000

Organizers: Robert Brandenberger (Brown U.), Chaiho Rim (APCTP), Alexander Rutherford (PIMS), Bill Unruh (UBC) and Ariel Zhitnitsky (UBC).

The goal of the workshop was to bring together experts in string theory, nonperturbative gauge field theory and cosmology to explore the consequences for cosmology of the recent breakthroughs in fundamental field and string theory. These consequences may lead to a greatly improved understanding of the early Universe, and to the resolution of some fundamental problems for cosmology left unanswered by the present theories of the early Universe.

This workshop was co-sponsored by PIMS, the Canadian Institute for Advanced Research and the Asia Pacific Center for Theoretical Physics.

Main Speakers:

Brian Greene (Columbia Univ): *What Every Cosmologist Should Know About String Theory*

Nemanja Kaloper (CITA, U. Toronto): *Cosmology of Brane Worlds, Cosmological Constant in the Brane World Scenario*

Lev Kofman (CITA, U. Toronto): *Supergravity Cosmology*

Burt Ovrut (U. Pennsylvania): *Branes from String Theory, Horava-Witten Cosmology, Heterotic M-theory*

Sang-Jin Sin (Hanyang Univ.): *Brane Gases and Cosmology*

Dam Son (Columbia U.): *Nonperturbative QFT, RHIC Physics and Cosmology*

Paul Steinhardt (Princeton): *Questions for String Cosmology from the Perspective of Cosmology, Modular Cosmology*

Gabriele Veneziano (CERN): *Black Hole and String Entropy, Progress in Pre-Big-Bang Cosmology*

Herman Verlinde (Princeton Univ.): *Brane Worlds from String Theory, Holographic RG Flow and the Cosmological Constant*

Eric Zhitnitsky (UBC): *Nonperturbative QCD and Cosmology*



From the left: B. K. Chang, T. Li, B. Russell, A. Gupta, G. Semenoff and H. Morris at SFU'S Diamond Club.

**APCTP, Perimeter and PIMS
Collaborate on *Frontiers in
Mathematical Physics***

The newly established Perimeter Institute for Theoretical Physics has joined the Asia Pacific Center for Theoretical Physics (APCTP) and PIMS in sponsoring the *Frontiers in Mathematical Physics* (FMP) workshop held annually in Vancouver.

The Asia Pacific Center for Theoretical Physics (www.apctp.org) is an international organization based in Seoul, South Korea. The member countries or regions of the institute are Australia, China, Japan, Malaysia, Philippines, Singapore, Taiwan, Thailand and Vietnam.

The APCTP has a mandate to promote and foster high level research in theoretical physics. Since its inception in 1996 it has maintained an active programme of international meetings which has earned it a worldwide reputation for excellence.

Since 1998, APCTP has cooperated with PIMS on jointly organizing and funding the *Frontiers in Mathematical Physics* workshops which have taken place in Vancouver every summer. This year's workshop was used an occasion to sign a cooperative agreement between PIMS and APCTP, which formalizes an already strong record of scientific collaboration and cements future plans for cooperation. Professor B. K. Chung, Executive Director of the APCTP, and Professor Nassif Ghoussoub, Director of PIMS joined SFU President Michael Stevenson and more than fifty participants of the workshop to celebrate this unprecedented collaborative event.

The Perimeter Institute for Theoretical Physics (www.perimeterinstitute.com) is based in Waterloo, Ontario, Canada. It was founded in 2000 through a personal donation by Mike Lazaridis, President and Co-Chief Executive Officer of Research In Motion Limited (RIM) to "serve as a state-of-the-art Canadian physics institute dedicated to bold, provocative research of the fundamental aspects of the physical world...". Both PIMS and APCTP welcome the involvement and support of the Perimeter Institute to the *Frontiers in Mathematical Physics* series.

**Frontiers in Mathematical
Physics on Workshop on
Particles, Fields and Strings
PIMS-SFU,
July 16–27, 2001**

Organizers: K. S. Viswanathan, chair (Simon Fraser University), Taejin Lee (Kangwon University, Korea), Yuri M. Makeenko (Niels Bohr Institute, Copenhagen/ITEP, Moscow), John Ng (TRIUMF), Alexander Rutherford (PIMS) and Gordon W. Semenoff (University of British Columbia)

The sixth workshop in the Frontiers in Mathematical Physics Series focused on the consequences of recent breakthroughs in the rapidly developing areas of superstring theory and non-perturbative gauge field theory.

Invited Speakers:

Dongsu Bak (University of Seoul, Korea)

Bruce Campbell (University of Alberta)

Steve Giddings (University of California): *Strong Gravity at the TEV Scale*

Seungjoon Hyun (Seoul National University, Korea) :

Y. Kitazawa (KEK, Japan)

Per Kraus (Enrico Fermi Institute)

Robert Leigh (University of Illinois): *D-branes on Orbifolds: The Standard Model*

Shiraz Minwalla (Harvard University)

Rob Myers (McGill University): *Dielectric Branes*

Soonkeon Nam (Kyung Hee University, Korea): *Orientifolds, Conifolds and Quantum Deformations*

Mark Van Raamsdonk (Stanford University)

Simon Ross (University of Durham, U.K.)

Savdeep Sethi (University of Chicago)

Richard Szabo (Heriot-Watt University, Edinburgh): *Gauge Symmetries in Noncommutative Yang-Mills Theory*

Arkady Tseytlin (Ohio State University): *Magnetic Backgrounds and Tachyons in Closed Strings*

**NATO Advanced Research
Workshop: New Techniques
in Topological Quantum
Field Theory
University of Calgary and
Delta Lodge at Kananaskis,
August 23–27, 2001**

Directors: John M. Bryden (University of Calgary and Southern Illinois University), F. Deloup (Université Paul Sabatier) and Victor A. Vassiliev (Steklov Mathematical Institute, Independent University of Moscow).

Organizers: D. Rolfsen (University of British Columbia), V. Turaev (Université Louis Pasteur, CNRS Strasbourg) and P. Zvengrowski (University of Calgary).

This workshop was held from August 23–24 at the University of Calgary and August 25–27 at the Delta Lodge at Kananaskis.

Objective of the ARW: The objective of the meeting was to develop a common framework for ideas coming from many important areas of mathematical research related to topological quantum field theory (tqft). In particular, the intent was to examine the interaction between algebraic topology and Vassiliev Theory with Turaev's development of both topological quantum field theory and homotopy quantum field theory. It also dealt with the study of the interaction between the representation theory of braids and other related subjects with tqft.

Plenary Speakers:

- D. Bar-Natan** (Hebrew University)
S. Bigelow (University of Melbourne): *Homology and the Hecke algebra*
J. Birman (Columbia University)
M. Karoubi: *Braiding of Differential Forms and Homotopy Type*

G. Masbaum: *Matrix-Tree Theorems and the Alexander-Conway Polynomial*

Speakers:

- D. Auckly** (Kansas State U.): *Twisted Yang-Mills Theory*
M. Boileau (Université Paul Sabatier): *Uniformization of Small 3-Orbifolds*
P. Bona (U. of Bratislava): *Nonlinear Quantum Systems as Subsystems in Quantum Field Theory*
J. Bryden (U. of Calgary & Southern Illinois U.): *Quantum Homotopy theory II*
F. Cohen (U. of Rochester): *Braid Groups and Modular form*
L. Crane (Kansas State U.): *Mathematical Lessons from Quantum General relativity*
C. Cunningham (U. of Calgary): *Perverse Sheaves and Loop Groups*
F. Deloup (Université Paul Sabatier): *How to Recognize a Linking Summand*
S. Duzhin (Steklov Mathematical Institute, St. Petersburg): *On Kleinian Weight systems*
I. Dynnikov (Moscow State U.): *Finitely Presented Groups and Semigroups in Knot Theory*
M. Heusener (Université Blaise Pascal): *Regenerating Singular Hyperbolic Structures From Sol*
S. Lando (Independent U. of Moscow): *Vassiliev Invariants Obtained from Graph Invariants*
R. Lawrence (Hebrew U.): *Representation Theory of the Braid Groups and Computation of Quantum Invariants*
J. Milgram (Stanford)
S. Natanson (Moscow State U. & Independent U. of Moscow): *Topological Classification of \mathbf{Z}/p Actions on Surfaces*
M. Polyak (Tel Aviv University)
J. Przytycki (George Washington U.): *Symplectic Structure on Coloring of Tangles*
D. Rolfsen (UBC): *Orderable Three-Manifold Groups*
D. Sjerve (UBC): *Automorphisms of Belyaev Surfaces*
D. Thurston (Harvard): *Wheels and Wheeling*
V. Tourtchine (Independent U. of Moscow): *On the Homology of the Spaces of Long Knots*
A. Tralle (U. of Warmia and Mazuria):
V. Turaev (U. Louis Pasteur): *Quantum Homotopy I*
L. Vainerman (Kiev State U.): *Quantum Invariants of 3-Manifolds from Quantum Groupoids*
V. Vassiliev (Steklov Mathematical Institute & Independent U. of Moscow): *New Invariants of Spaces of Knots*
V. Vershinin (Novosibirsk State U.): *Homological Properties of Virtual Braids*

Pacific Northwest Seminar Series

These are annual or bi-annual meetings that bring together various regional groups of mathematicians in areas represented by strong communities in British Columbia, Alberta, Washington, Oregon and Northern California. Some of the scientific goals of the Pacific Institute, e.g. promoting communication and interactions among mathematical scientists, are served by *ad hoc* organizations formed in Western Canada and the U. S. Pacific Northwest.

PNW Algebraic Geometry Seminar

October 13, 2001 at Western Washington University: This meeting in Bellingham featured the following three speakers.

Speakers:

Mark Haiman (UC Berkeley): *The Hilbert scheme and Bridgeland-King-Reid correspondence for the diagonal action of S_n*

Brendan Hassett (Rice University): *Moduli spaces and the minimal model program*

Aaron Bertram (Utah): *Reconstructing genus zero Gromov-Witten invariants*

PNW Geometry Seminar

The Pacific Northwest Geometry Seminar (PNGS) is a regional meeting for geometers of all kinds. It is held at least twice during the academic year, rotating among the University of British Columbia, Oregon State University, University of Oregon, Portland State University,

University of Utah, and the University of Washington.

May 6–7, 2000 at PIMS-UBC: This meeting was co-sponsored by PIMS and the National Science Foundation of the United States.

Organisers: Jim Carrell (UBC) and Jingyi Chen (UBC).

Speakers:

Gang Liu (UCLA): *The Equivalence of Ring Structures in Floer and Quantum Cohomology*

Stephan Stolz (Notre Dame): *Metrics of Positive Scalar Curvature*

Rahul Pandharipande (CalTech): *Integrals over the moduli space of curves*

Paul Yang (Princeton and USC): *A Fully Nonlinear Equation in Conformal Geometry and 4-manifolds of Positive Ricci Curvature*

Jim Carrell (UBC): *Which Schubert Varieties are Smooth*

October 27–28, 2001 at Univ. of Oregon

Organisers: Boris Botvinnik, Peter Gilkey, Jim Isenberg (University of Oregon) and Christine Escher (Oregon State University).

Speakers:

Egidio Barrera-Yanez (Instituto de Matematicas, UNAM, Cuernavaca, Mexico): *The eta invariant and the "twisted" connective real K-theory*

Ben Chow (UC San Diego): *Hamilton's injectivity radius estimate for the Ricci flow*

Claude LeBrun (SUNY Stony Brook): *Curvature and smooth topology in dimension four*

Gregor Weingart (University of Bonn and OSU): *Spectral Sequences arising in Differential Geometry*

Kazuo Akutagawa (Shizuoka University, Japan & U of Oregon): *Yamabe metrics on cylindrical manifolds*

Western Canada Linear Algebra Meeting (W-CLAM)

W-CLAM is a bi-annual sequence of meetings on linear algebra and related fields; previous meetings have been held in Regina, Lethbridge and Kananaskis. The objective is to foster research in linear algebra and its applications. While the primary purpose of W-CLAM is to enable researchers (including graduate students) from Western Canada to get together to present current work and to exchange ideas, the meeting is open to anyone.

May 26–27, 2000 at University of Manitoba: This was co-sponsored by CRM and Fields.

Organisers: Hadi Kharaghani (Univ. of Lethbridge), Steve Kirkland (Univ. of Regina), Peter Lancaster (Univ. of Calgary), Dale Olesky ((Univ. of Victoria), Michael Tsatsomeros (Univ. of Regina) and Pauline van den Driessche (Univ. of Victoria).

Invited Speakers:

Hans Schneider (Univ. of Wisconsin): *Perron-Frobenius & Some Readings in Population Demography*

Bryan Shader (Univ. of Wyoming): *Linear Systems with Signed Solutions*

Henry Wolkowicz (Univ. of Waterloo): *Semidefinite Programming and Matrix Completion*

PNW Number Theory Seminar

April 28, 2001 at Redmond, Washington: This was the 5th PNW Number Theory Seminar.

Organizers: Matt Klassen (DigiPen Institute of Technology), Kristen Lauter (Microsoft Research) and Peter Borwein (Simon Fraser University).

Speakers:

Ed Schaefer (Santa Clara Univ.): *How to compute the p -Selmer group of an elliptic curve for an odd prime p*

Audrey Terras (UC San Diego): *Comparison of Selberg's Trace Formula with its Discrete Analogues*

Nike Vatsal (University of British Columbia): *Ergodic theory and Heegner points*

Trevor Wooley (University of Michigan): *Slim exceptional sets in Waring's problem*

July 5, 2001 at PIMS-SFU: A Day of Number Theory at SFU.

Speakers:

Doug Bowman (University of Illinois): *Zeta Values: From Leibniz to Today*

David Bradley (University of Maine): *Research Update on Multiple Polylogarithms*

Nils Bruin (Simon Fraser University): *Skolem-Mahler-Lech and Chabauty-Coleman*

Edlyn Teske (University of Waterloo): *Factoring $N = pq^2$ with the Elliptic Curve Method*

PNW Numerical Analysis Seminar

October 28–29, 2000 at Vancouver Museum: Vancouver Numerical Analysis Weekend: Potlatch 2000 & Fast Multipole Workshop.

Organisers: Uri Ascher (UBC), Mary Catherine Kropinski (SFU), Steven Ruuth (SFU), Manfred Trummer (SFU) and Jim Varah (UBC).

Speakers at the Potlatch:

Frank Stenger (Utah): *A unified approach to solving PDEs*

Russell Luke (University of Washington): *Non-parametric Phase Retrieval: Iterative transform algorithms and analytic techniques*

Dhavid Aruliah (UBC): *Multigrid Preconditioning of time-harmonic Maxwell's equations in 3D*

Leslie Greengard (Courant Institute): *Robust Algorithms for Computational Engineering*

Sorin Mitran (University of Washington): *Algorithms for computing bubbly flows*

Oliver Dorn (UBC): *A level set approach for shape reconstruction in electromagnetic cross-borehole tomography*

Sharon Filipowski (Boeing): *Applications of nonsmooth optimization in industry*

Ricardo Carretero (SFU): *Metastability and blow-up in reaction diffusion systems: Some computational challenges*

Speakers at the Fast Multipole Workshop:

Michael Epton (Boeing): *Application of Multipoles to Compressible Aerodynamics: Interesting Issues and Observations*

Leslie Greengard (Courant Institute): *A new version of the fast multipole method for screened Coulomb interactions*

Ben Dembart (Boeing): *The Search for an $O(N)$ FMM for the Helmholtz/Maxwell's Equation*

Vikram Jandhyala (University of Washington): *FMM variations for quasi-planar structures and related applications*

Frank Ethridge (Courant Institute): *Fast Algorithms for Volume Integrals in Potential Theory*

Mary Catherine Kropinski (SFU): *Fast Integral Equation Methods for Interfaces in a Stokes Flow*

September 29, 2001 at Western Washington University: The 15th annual PNWNAS.

Organiser: Tjalling Ypma (Western Washington University)

Speakers:

Randy Bank (UC San Diego): *Pre-conditioning*

Tim Chartier (University Colorado Boulder): *Multi-grid*

Lisa Stanley (Montana State University): *Sensitivity Computation*

Wei-Pai Tang (Boeing): *Linear Algebra*

Harold Trease (Batelle): *Large-Scale Computation*

West Coast Optimization Seminar

The West Coast Optimization Meeting takes place twice each year, and alternates between Vancouver and Seattle. In Vancouver, SFU/CECM and UBC/Math share the hosting duties, with local contacts Jonathan M. Borwein and Philip D. Loewen. In Seattle, UW/Math and UW/Applied Math contribute the organizational personnel: R. T. Rockafellar and J. V. Burke do most of the work. The meetings involve an informal get-together for social and technical discussions on Friday evening, followed by a series of talks on Saturday. Speakers are drawn from the considerable body of optimization talent now gathered in the five PIMS

partner sites, the University of Washington, and Washington State University; a featured guest from outside is usually invited to round out the programme.

May 12–13, 2000 at PIMS-SFU

Speakers:

Heinz Bauschke (Okanagan University College): *How JPEG Works*

Jim Burke (University of Washington): *Variational Analysis of Spectral Functions*

Lisa Korf (University of Washington): *Pricing Contracts Contingent on a Market: A Mathematical Programming Perspective*

Ivaylo Kortezov (SFU): *Some Generic Results on Non-attaining Functionals*

Yuri Ledyayev (Western Michigan University): *Sub- and Supergradients of Envelopes, Semicontinuous Closures and Limits of Functions*

Martin Puterman (UBC): *The Censored Newsvendor and the Optimal Acquisition of Information*

Jim Zhu (Western Michigan University): *Generalized Extremal Principle and its Applications*

May 4–5, 2001 at PIMS-SFU

Speakers:

Heinz Bauschke (Okanagan University College): *The method of cyclic projections - the inconsistent case*

James Burke (University of Washington): *Approximating of subdifferentials by random sampling of gradients*

Warren Hare

Lisa Korf (University of Washington): *Duality Theorems in Stochastic Programming*

Mason Macklem (Simon Fraser University): *Current Models in Image Quality Evaluation*

R. T. Rockafellar (University of Washington): *Variational Geometry and Equilibrium*

Stephen Simons (UC, Santa Barbara): *Hahn-Banach and minimax theorems*

Herre Wiersma (Simon Fraser University): *A C^1 function that is even on a sphere and has no critical points in the ball*

Jim Zhu (Western Michigan University): *Necessary conditions for constrained optimization problems in smooth Banach spaces and applications*

PNW PDE Seminar

Organisers: Richard Froese (UBC), Nassif Ghoussoub (PIMS and UBC) and Gunther Uhlmann (U. Washington).

May 20, 2000 at PIMS-UBC

Speakers:

Daniel Tataru (Northwestern): *Local well-posedness for nonlinear hyperbolic equations*

Tatiana Toro (U. Washington): *Potential theory and regularity of non-smooth domains*

Juncheng Wei (Chinese U. of Hong Kong): *On A Simple ODE and Anisotropic Curvature Flows*

May 19, 2001 at University of Washington

Speakers:

James Colliander (UC, Berkeley): *Global well-posedness and long-time behavior of solutions of nonlinear dispersive equations*

Izabella Laba (UBC): *Recent work on the Kakeya conjecture*

Hart Smith (University of Washington): *Global Existence for Quasilinear Wave Equations outside of Star-Shaped Domains*

Luis Vega (Universidad del Pais Vasco, Spain): *Formation of singularities for the vortex filament motion under LIA*

PNW Probability Seminar

This seminar is organized by the probability groups at the UBC, Univ. of Washington and Oregon State University. It usually attracts 25–30 participants and gives the various groups a chance to interact with each other. As these are among the strongest probability groups in North America it has been easy to attract outstanding scientists as speakers. This is also a good way for these groups to share many of the visiting scientists with the other sites.

Scientific advisory committee: Martin Barlow (UBC), Richard Bass (UW), Chris Burdzy (UW), Ed Perkins (UBC) and Ed Waymire (OSU).

March 4, 2000 at Univ. of Washington

Speakers:

Christian Borgs (Microsoft Theory Group): *Partition function zeros: A generalized Lee-Yang theorem*

Xiaowen Zhou (University of British Columbia): *Sample path continuity of continuous-site stepping-stone models*

December 2, 2000 at Univ. of Washington

Speakers:

Zhenqing Chen (University of Washington): *Girsanov transform and absolute continuity of Markov processes*

Antal Jarai (PIMS and UBC): *ncipient infinite clusters in 2D percolation*

Mina Ossiander (Oregon State University): *Multiplicative Random Cascades: Structure and Estimation*

Prasad Tetali (Georgia Tech and Microsoft Research): *A Gittins-type index for Markov systems*

October 20, 2001 at Univ. of Washington

Speakers:

David C. Brydges (UBC): *Branched Polymers and Dimensional Reduction*

Jim Fill (Johns Hopkins University and Microsoft Research): *he Randomness Recycler: A new technique for perfect sampling*

Christopher Hoffman (University of Washington): *Phase Transition in Dependent Percolation*

Enrique Thomann (Oregon State University): *Stochastic Cascades applied to the Navier Stokes Equations*

PNW Statistics Meeting

November 17, 2000 at the Univ. of Washington

Speakers:

June Morita (University of Washington-Bothell): *Contributions to Statistical Literacy*

Constance van Eeden (University of British Columbia): *Estimation in Restricted Parameter Spaces: Some History and Some Recent Developments*

March 16, 2001 at SFU

Speakers:

Merlise Clyde (Duke University): *Empirical Bayes Prior Distributions and Bayesian Model Averaging*

Julia Wirth (Simon Fraser University): *Coherent Risk Measures and Stochastic Dominance*

PNW Seminar on String Theory

March 17, 2001 at UBC

Organisers: Konstantin Zarembo (UBC), Gordon Semenoff (UBC) and Sandy Rutherford (PIMS).

Speakers:

Washington Taylor (MIT): *Tachyon condensation in open string field theory*

Kostas Skenderis (Princeton University): *Holographic renormalization*

Amanda Peet (University of Toronto): *String theoretic mechanisms for spacetime singularity resolution*

Emil Martinec (University of Chicago): *D-branes as noncommutative solitons: an algebraic approach*

Hiroshi Ooguri (Caltech): *Strings in AdS₃ and the SL(2, R) WZW model*

PIMS Lecture Series

- IAM-PIMS Joint Distinguished Lecture Series in Applied Mathematics
- PIMS-MITACS Mathematical Finance Seminar
- PIMS String Theory Seminar
- PIMS Centre for Scientific Computing Seminar
- PIMS Centre for Theoretical Biology Seminar

IAM-PIMS Joint Distinguished Colloquium Series

This series of seminars is co-hosted by the Institute for Applied Mathematics at UBC and PIMS.



Organizer:
Bernie Shizgal
(Director of the IAM)

2000/01 Series

Anne Greenbaum (U. Washington), *Analysis of Krylov Space Methods for Solving Linear Systems*, January 31, 2000

Marc Feldman (Stanford), *Mathematics and Statistics of Human DNA Polymorphisms: Forward and Backwards to History*, February 28, 2000

Alwyn Scott (U. Arizona and U. Denmark), *Nonlinear Science: Past, Present and Future*, March 13 2000

Carlo Cercignani (Politecnico di Milano, Italy), *Kinetic Models for Granular Materials; An Exact Solution*, 13 September 2000

David Brydges (University of Virginia), *Gaussian Integrals and Mean Field Theory*, September 27, 2000

Linda Petzold (UC at Santa Barbara), *Algorithms and Software for Dynamic Optimization with Application to Chemical Vapor Deposition Processes*, 1 November 2000

David Baillie (Simon Fraser University), *Comparative Genomics*, 16 January 2001

Gunther Uhlmann (University of Washington), *The Mathematics of Reflection Seismology*, 6 March 2001

Bengt Fornberg (University of Colorado, Boulder), *Radial Basis Functions - A future way to solve PDEs to spectral accuracy on irregular multidimensional domains?*, 27 March 2001

Planned 2001/02 Series

Philippe R. Spalart (Boeing), *Detached-Eddy Simulation (DES)*, October 1, 2001

David Gottlieb (Brown University), *Spectral Methods for Discontinuous Problems*, October 29, 2001

Joel H. Ferziger (Stanford University), *Numerical Simulation of Turbulence*, November 26, 2001

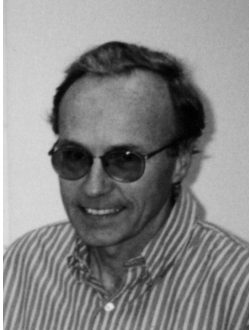
Russel Caflisch (UCLA), *Modeling and Simulation for Epitaxial Growth*, January 28, 2002

Adam Arkin (UC Berkeley), *Signal Processing in Cellular Regulatory Networks: Physical Models, Formal Abstractions and Applications*, February 18, 2002

Eva Tardos (Cornell University), *Approximation Algorithms and Games on Networks*, March 11, 2002

PIMS-MITACS Mathematical Finance Seminars

In conjunction with research activities of MITACS, PIMS hosts a series of talk on recent work in financial mathematics.



Organizer: Ulrich Haussmann (Math, UBC)

Seminars for 2000/2001

G. Stoica (MITACS PDF, UBC): *Calibration of the 2-factor electricity model*, January 27, 2000

Y. Zhao (UBC): *Portfolio selection with minimum wealth requirement*, February 10, 2000

Ulrich Haussmann (UBC): *Optimal portfolio selection with limited diversification*, February 24, 2000

N. Dokuchaev (St. Petersburg State University): *Optimal portfolio selection based on historical prices*, March 2, 2000

J. Chadam (Pittsburgh University): *The Exercise Boundary for an American Put Option: Analytical and Numerical Approximations*, March 9, 2000

J. Cvitanic (USC) *Methods of partial hedging*, March 16, 2000

R. Uppal (UBC): *Risk Aversion and Optimal Portfolio Policies in Partial and General Equilibrium Economies*, March 30, 2000

H. Geman (Paris Dauphine), April 2000

R. Stamicar (MITACS PDF, UBC): *A Survey of Stochastic Volatility Models*, May 2, 2000

J. Walsh (UBC): *The Speed of Convergence of the Binomial Tree Scheme*, May 25, 2000

S. Hatch (Powerex): *Pricing Power Caps by Monte Carlo: Three Factor Mean Reverting Model with Exogenously Heteroskedastic/ARCH Diffusion*, July 20, 2000

M. Lai (UBC and Powerex): *Parameter Estimation of 2-Factor Energy Models: Kalman Filter Approach*, August 31, 2000

D. Chan (UBC): *Introduction to Value at Risk*, September 14, 2000

S. Shreve (Carnegie-Mellon University): *Valuation of Exotic Options Under Shortselling Constraints*, September 18, 2000

J. Rodriguez (math finance student UBC): *More on Value at Risk*, September 28, 2000

S. MacNair (PIMS UBC): *Utility Maximization with Stochastic Factors*, October 12, 2000

P. Laurence (U. Roma & NYU): *American options on multiple assets: bounds via a comparison principle*, November 2, 2000

V. Dion (UBC): *Tutorial on Mortgage Backed Securities*, November 15, 2000

D. Duffie (Stanford): *Valuation in Dynamic Bargaining Markets*, December 1, 2000

A. Lazrak (USC and U. d'Evry): *Incomplete Information with Recursive Preferences*, January 11, 2001

Tan Wang (UBC): *Model Misspecification and Under-Diversification*, February 8, 2001

Simon McNair (UBC): *Delta Hedging and Survival Probabilities in Markets with Frictions*, March 1, 2001

Dilip Madan (University of Maryland): *Levy Processes in Financial Modeling*, March 9, 2001

Alan King (IBM Research Division): *A Contingent Claims Approach to Setting the Franchise Fee for Capacity Constrained, Quantity-Flexible Supply Contracts*, March 22, 2001

Robert Jones (SFU): *Valuing Revolving Lines of Credit Under Jump-Diffusion Credit Quality*, March 29, 2001

A. Lazrak (U. d'Evry): *Information Neutrality in Stochastic Differential Utility and Related Backward Stochastic Differential Equations*, September 6, 2001

R. Tompkins (T. U. Vienna): September 27, 2001

J. Cvitanec (USC): October 11, 2001

PIMS String Theory Seminar for 2000/2001

This is a series of lectures on String theory held approximately once per week at the PIMS facility at UBC.

Organizer: K. Zarembo (PIMS PDF, UBC)

Joel Erickson (UBC): *T-duality*, January 25, 2000

Joel Erickson (UBC): *Orbifolds of Conformal Field Theories*, February 1, 2000

W. Mueck (SFU): *Discouraging Facts about the Randall-Sundrum Metric: Geodesics and Newton Law*, February 8, 2000

Emil Akhmedov (UBC): *Black Holes in String Theory*, February 29, 2000

Emil Akhmedov (UBC): *Black Holes in String Theory (continued)*, March 7, 2000

Peter Matlock (SFU): *Compactification, Supergravity Domain Walls and Brane World Scenario*, March 14, 2000

Andrew DeBenedictis (SFU): *Introduction to the Weyl Anomaly*, March 21, 2000

Noureddine Hambli (UBC): *A Holographic Renormalization Flow in String Theory*, March 28, 2000

Joel Erickson (UBC): *Orbifolds of Conformal Field Theories*, February 1

Damien Easson (Brown University): *The Limiting Curvature Hypothesis and Nonsingular Dilaton Cosmology*, April 4, 2000

Stephon Alexander (Brown University): *A String/M Theory Inspired Alternative to Inflation (VSL Scenario)*, April 11, 2000

Noureddine Hambli (UBC): *A Holographic Renormalization Flow in String Theory (continued)*, April 1, 2000

Gordon Semenoff (UBC): *Matrix Theory Interpretation of the World Sheet of DLCQ String*, May 2, 2000

Mark Laidlaw (UBC): *Noncommutative geometry from bosonic strings: The disk and annulus*, September 14, 2000

Don Witt (UBC): *Topological Censorship and the AdS/CFT Correspondence*, September 21, 2000

Konstantin Zarembo (UBC): *Dielectric Branes*, September 25, 2000

Emil Akhmedov (UBC): *D-branes and Microscopic Description of Yang-Mills Instantons*, October 2, 2000

Radoslav Rachkov (Sofia State University and SFU): *Dielectric branes, magnetic moment effect and Giant gravitons*, October 16, 2000

Noureddine Hambli (UBC): *Spacetime Boundaries as Orbifolds in String Theory*, October 23, 2000

Sumati Surya (UBC): *Localization and Brane Scattering*, October 30, 2000

Neil Constable (McGill University): *Non-abelian Brane Intersections and Fuzzy Geometry*, November 2, 2000

Sachindeo Vaidya (UC Davis): *Magnetic Moments of Branes and Giant Gravitons*, November 10, 2000

Peter Matlock (SFU): *Giant Gravitons: Configurations, Instantons, and Oscillations*, November 20, 2000

Mark van Raamsdonk (Stanford University): *D-particles with multipole moments of higher dimensional branes*, November 28, 2000

Gordon Semenoff (UBC): *Strings in external electromagnetic fields*, January 22, 2001

Konstantin Zarembo (UBC): *String theory: a link between gravity and gauge fields*, January 26, 2001

Gordon Semenoff (UBC): *Matrix strings in a B-field*, February 5, 2001

Sumati Surya (UBC): *Phase transitions for flat AdS black holes*, February 26, 2001

Moshe Rozali (Rutgers University): *Thermodynamics of Nongravitational String Theories*, March 5, 2001

Konstantin Zarembo (UBC): *Testing AdS/CFT correspondence with Wilson loops*, March 12, 2001

Jorgen Rasmussen (University of Lethbridge): *Superconformal algebras on the boundary of AdS₃*, March 19, 2001

Sachindeo Vaidya (UC Davis): *Perturbative dynamics on fuzzy surfaces*, May 1, 2001

Sumati Surya (UBC): *Discussion of "Fluxbranes in String Theory" by M. Gutperle and A. Strominger*, May 14, 2001

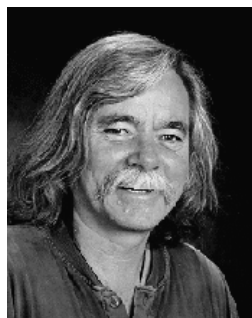
Emil Akhmedov (UBC): *On Unification of D-Brane Couplings to RR Fields*, May 28, 2001

Robert Brandenberger (Brown University): *Review of approaches to string cosmology*, June 18, 2001

Robert Brandenberger (Brown University): *Review of approaches to string cosmology (ctd)*, June 25, 2001

Robert Brandenberger (Brown University): *Review of approaches to string cosmology (ctd)*, July 9, 2001

PIMS-MITACS Centre for Scientific Computing Seminar for 2000/01



Organizer: Bob Russell (CSC Director)

Randy Leveque (University of Washington): *High-resolution Finite-Volume Methods for Waves in Rapidly-Varying Heterogeneous Media*, January 28, 2000

Mary Catherine Kropinski (Simon Fraser University): *Time Evolving Interfaces in a Viscous Fluid*, February 4, 2000

Andrew Calvert (SFU): *A wave-equation-based approach to the compensation of attenuation and dispersion in seismic reflection data*, February 11, 2000

Keith Geddes (University of Waterloo): *Hybrid Symbolic-Numeric Methods Applied to Definite Integrals and ODEs*, February 25, 2000

Manfred Trummer (SFU): *Spectral Differencing with a Twist – Two Wrongs Can Make It Right*, March 3, 2000

Michael Ward (UBC): *Asymptotics and the Regular Part of the Green's Function for Elliptic Equations*, March 10, 2000

- Jared Bronski** (University of Illinois): *Passive Scalar Intermittency in the Majda Model*, March 17, 2000
- Konstantina Trivisa** (Northwestern University): *Hyperbolic Conservation Laws With Large Initial Data*, March 24, 2000
- David Boal** (SFU): *Numerical Simulations of Biological Cells*, March 31, 2000
- Raphael Hauser** (Cambridge University): *About the SVD Approach for Computing Lyapunov Exponents*, April 14, 2000
- Ray Spiteri**, May 26, 2000
- Jim Verner** (Queen's University): *Applications of Deriving Runge-Kutta Methods: Some Two-step Pairs*, June 16, 2000
- Giovanni Alberti**, (Universita di Pisa): *Variational convergence for functionals of Ginzburg-Landau type*, June 21, 2000
- Colin Fox** (University of Aukland): *Exact MAP States and Perfect Expectations: Greig Porteous and Seheult revisited*, June 30, 2000
- Chris Budd** (University of Bath): *Geometric integration of ODEs with scaling invariance*, August 4, 2000
- William Rheinhardt** (University of Washington): *Non-linear Dynamics in the Bose-Einstein Condensate*, September 8, 2000
- Ricardo Carretero** (Simon Fraser University): *Hyper-solitons and Breathers in soliton chains*, September 15, 2000
- Raghu Machiraju** (Ohio State University): *Feature-significant Exploration of Terascale Datasets*, September 29, 2000
- David Muraki** (SFU): *Vortex Asymmetries in the Mid-latitude Atmosphere*, September 29, 2000
- Chris Bailey** (University of Greenwich): *Physics-based Modelling - A Key Component of Design*, October 4, 2000
- Frederic Pio** (SFU): *Identification of new Distant Homologs in Genomic Databases by combining multiple intermediate sequence search and threading methods*, October 5, 2000
- Steven Jones** (Genome Sequence Centre): *Bioinformatics at the Genome Sequence Centre, October 5, 2000*
- Jean-Paul Berrut** (University of Fribour): *The linear rational collocation method with iteratively optimized poles for two-point boundary value problems*, October 13, 2000
- Robert D. Russell** (SFU): *Qualitative Study of Dynamical Systems with Adaptive Numerical Methods*, October 20, 2000
- Francis Clarke** (Université de Lyon and Institut universitaire de France): *The Feedback Problem in Control Theory*, October 25, 2000
- Linda Petzold** (University of Santa Barbara): *Algorithms and Software for Dynamic Optimization with Application to Spacecraft Trajectory Optimization*, November 2, 2000
- Alejandro Garcia** (San Jose State University): *Stochastic Particle Algorithms: From DSMC to CUBA*, November 9, 2000
- Jim Cavers** (SFU): *Interference Mitigation in Wireless Communications*, November 17, 2000
- Diane Finegood** (SFU): *Modeling Applications in the Study of Diabetes*, November 24, 2000
- Brian Wetton** (UBC): *The MITACS/Ballard Collaborative Project: Rivulets and Condensation Front Modelling*, December 1, 2000
- Todd Kapitula** (University of New Mexico): *Stability of waves in perturbed Hamiltonian systems*, December 11, 2000
- Stephen Whitaker** (UC Davis): *Coupled Transport During Drying in Porous Media*, January 5, 2001
- Tom Manteuffel** (University of Colorado): *arge First-order Systems Least-squares Functionals for Linear Elasticity*, January 12, 2001
- Radu Bradean** (SFU): *Heat and Mass Transfer in Porous Fuel Cell Electrodes*, January 19, 2001
- Ray Zahar** (SFU): *A Uniform Analysis of Difference Systems*, February 2, 2001
- Wolfgang Heidrich** (UBC): *Towards Realistic Materials and Lighting in Interactive Applications*, February 9, 2001
- John Bowman** (University of Alberta): *A Statistical Description of Two and Three-Dimensional Turbulence*, February 16, 2001
- Lia Bronsard** (McMaster University): *Phase Boundaries in Ginzburg-Landau Models of Materials Science*, February 19, 2001
- Bernard Deconick** (University of Washington): *The computation of quasi-periodic solutions of integrable partial differential equations*, March 2, 2001
- Ian Frigaard** (UBC): *Super-Stable Parallel Flows of Multiple Visco-Plastic Fluids*, March 9, 2001
- Bjorn Sandstede** (Ohio State University): *Stability and bifurcations of spiral waves*, March 16, 2001
- Chris Jones** (Brown University): *Do Invariant Manifolds Hold Water?*, March 23, 2001
- Bengt Fornberg** (University of Colorado): *Radial Basis Functions - A future way to solve PDEs to spectral accuracy on irregular multidimensional domains?*, March 30, 2001
- Jane Wang** (Cornell University): April 6, 2001
- Emily Stone** (Utah State University) and **Abe Askari** (Boeing): *Nonlinear Models of Dynamics in Drilling*, May 4, 2001
- Yannis Kevrekidi** (Princeton): *Enabling Microscopic Simulators To Perform System-Level Analysis*, May 18, 2001
- Nicolas Robidoux** (SFU): *Numerical solution of the Poisson equation — $\text{div}k\text{grad} = f$ with discontinuous diffusion tensor k and source term f* , September 7, 2001

PIMS Centre for Theoretical Biology Seminar



Organizer: Gerda
de Vries (Univ. of
Alberta)

Dr. Kerry Landman, Department of Mathematics and
Statistics, University of Melbourne, October 1, 2001

*Can you still read the fine print? Water transport in eye
lenses and "How does your stomach feel? Development
of the nervous system in the gut"*

Dr. Hal Smith, Department of Mathematics, Arizona
State University 1 November 2001

Dr. Sebastian Schreiber, Department of Mathemat-
ics, Western Washington University
*Allee effects, chaotic transients, and extinction in simple
population models*, 19 November 2001

Dr. Kevin Painter, Department of Mathematics,
Heriot-Watt University
26 November 2001

Dr. Brian Denis, Department of Fish and Wildlife
Resources and Division of Statistics, University of Idaho
28 January 2002

Dr. Leah Edelstein-Keshet, Department of Mathe-
matics, University of British Columbia
8 April 2002