Ottawa Carleton Institute for Physics
L'Institut de physique d'Ottawa Carleton

2004 Newsletter

During 2004 the OCIP welcomed two new faculty members: Manuella Vincter in experimental particle physics and Bruce Campbell in theoretical particle physics. Manuella is the sixth CRC chair to join OCIP in recent years. The OCIP directorship also changed in the Summer of 2004 when André Longtin stepped down as OCIP director and was replaced by Gerald Oakham. The position of Associate Director of OCIP was taken on by Béla Joós. In the wider context of the universities, Gary Slater completed his term as Vice Dean of the Faculty of Graduate and Postdoctoral Studies in June 2004 and was chosen to be the next dean of FGPS starting in January of 2005. In the broader physics community OCIP has had a record number of persons on NSERC GSC's with Xiaoyi Bao on GSC29: general physics, Béla Joós on GSC28: condensed matter physics, and André Longtin on GSC21: interdisciplinary. In 2004 the OCIP had a strong series of seminars and presentations. One notable OCIP seminar was given by Theodore Postol from MIT on Missile Defense. This was one of a number of meetings for Dr Postol during his visit to Ottawa and one study found that this visit was the second most influential media event leading to Prime Minister Paul Martin's refusal of MD. Postol's Ottawa visit was cited in over 50 major print articles.

Gary Slater was one of the founding members of the AFMnet Network of Centres of Excellence on Advanced Foods and Materials. This new NCE started in early 2004 and has more than 50 other PIs from across the country (AFMnet.ca).

Xiaoyi Bao has had a number of roles in conference organization in her field of applied optics and has also served as topical editor for the Journal of Applied Optics, has been a member of the Research management committee of Intelligent Sensing for Innovative Structures of Canada -NCE program and served on the steering Committee for Structural Health Monitoring of Civil Structures, ISIS Canada.

David Rogers gave the Cameron Lecture in Medical Physics at the University of Wisconsin in Sept, 2004. It was a special honour since it was the last of these special lectures attended by John Cameron who passed away in early 2005. After serving on the ad-hoc committee to select the new editor of the journal Medical Physics, Dave Rogers was appointed to be one of two Deputy Editors of the journal, which is the most highly cited journal in the field.

In an article in the Jan 2004 edition of Interactions, the Canadian Medical Physics Newsletter, it was pointed out that a paper written by Dave Rogers et al (BEAM: a Monte Carlo code to simulate radiotherapy treatment units, Med Phys 22(1995) 503--524) is the most highly cited paper published by Canadian medical physicists since the study began in 1990. A similar letter to the Journal Medical Physics stated that the same paper was the sixth most cited paper in the Journal's history and the third most cited paper between 2000 and 2003.

Members of OCIP on the SNO experiment continued their contribution to the precise study of the elusive neutrinos produced in the core of the Sun. As a consequence, the Sudbury Neutrino Observatory publications stood as top-cited papers in particle physics. SPIRES, the high-energy physics literature database, identifies 13 scientific papers with over 500 citations in the high-energy physics experiment e-print archive. Nine of the 13 papers have been about neutrino experiments. Of all neutrino experiment publications, the top-cited paper belongs to the Super-Kamiokande collaboration, based in Japan. Cited more than 2300 times, the paper presents evidence for the oscillation of atmospheric muon neutrinos. Second place goes to the Sudbury Neutrino Observatory (SNO) in Canada. It rescued the Standard Solar Model by finding evidence for muon and tau solar neutrinos, which established oscillation of solar electron neutrinos.

In the summer of 2004 the ATLAS group members were at CERN Geneva for a test beam to characterize and calibrate their detectors. This test was specifically designed to look at an interface region between two different kinds of detector which has a significant amount of inactive material. Combining data from this test with simulated data will allow us to correct for losses in this crack region. The 2004 test will likely be the last beam test before the ATLAS experiment starts taking data in 2007.

Steve Godfrey was on the organizing committee of the First Meeting of the APS Topical Group on Hadronic Physics held at Fermilab (near Chicago) October 24-26, 2004. It covered all areas of hadronic physics but concentrated on hadron spectroscopy. The meeting was a great success with over 120 participants and over 80 talks.

Activities at the Institute can be consulted online at http://www.ocip.carleton.ca, which has links to the departmental web sites at the University of Ottawa and Carleton University.

Gerald Oakham, OCIP Director

Bela Joos, Associate Director

2004 OCIP Seminar Series

OCIP – Spring Graduate Student Seminars –
University of Ottawa – Monday May 3, 2004

12:30 – Yannik Gratton (O)	Molecular Dynamics Study of a Tethered Polymer in a Shear Flow
13:00 – Steven White (C)	Absolute Gas Space Volumetry Using Hyperpolarized Xenon MRI
13:30 – Matthew Wallace (O)	Rigidity Transition of Polymer Melts with van der Waals Interactions
14:00 – Olivier Simard (C)	Optical Calibration of SNO
14:30	**Coffee Break**
15:00 – Frederic Tessier (O)	Computer Simulations of Electrokinetic Transport in Microfluidic Devices and Nanopores
15:30 – Claudine Allen (O)	How to Turn an Inconvenient Property into a Useful Application: A Study of QD Ensembles to Tunable Lasers
16:00 – Mohammad Nisar (C)	Coherent Scatter X-Ray Imaging of Plastic/Water Phantoms
16:30 – Jean Francois Mercier (O)	Modelling of Solid Phase DNA Amplification

OCIP – Fall Graduate Student Seminars –
University of Ottawa – Tuesday December 7, 2004

13:30 – Tim Gorjanc (O)	Organic Field Effect Transistors
14:00 – Lesley Buckley (C)	EGSnrc Investigation of Correction Factors for Radiation Dosimetry
14:30 – Laurette McCormick (O)	The Molecular End Effect and its Critical Impact on the Behaviour of Charged-Uncharged Polymer Conjugates During Free Solution Electrophoresis

15:00	**Coffee Break**
15:30 – Nishard Abdeen (C)	Demonstration of Prolongation of Alveolar Gas Transfer Times by Hyperpolarized 129 Xenon Spectroscopy in Rats with Stachybotrys Chartarum Spore Induced Pneumonitis
16:00 – Robert Walker (O)	Shaping the Radiation Field Profile of Tilted Fibre Bragg Gratings
16:30 – Gordana Tesic (C)	Solar Neutrino Oscillation Analysis

OCIP – Christmas Symposium –
Carleton University – Wednesday December 15, 2004

9:00 – Andre Longtin (O)	Non-Linear Dynamics of Electroreception
9:30 – Alain Bellerive (C)	What Can We Learn About Neutrinos at SNOLAB?
10:00 – Xiaoyi Bao (O)	Distributed Stain and Temperature Sensor Development and Application in Structural Health Monitoring with Centimetre Spatial Resolution
10:30	**Coffee Break**
11:00 – Ruth Wilkins (C)	Biological Dosimetry for Radiological Emergency Response
11:30 – Steven Mihailov (O)	Ultrafast Laser Fabrication of Bragg Grating Devices
12:00 – Bruce Campbell (C)	Superstrings: The Dreams that Stuff is Made Of?
12:30	**Lunch**

2004 Departmental Seminars

Name	Institution	Title	Date	
David Jaffray	PMH	Development of an On-Line Imaging & Planning System for Image-Guided Radiation Therapy	Jan. 5, 2004	C
Shouhua Zhu	Carleton University	Thinking About the CKM Mechanism	Jan. 12, 2004	C
Normand Mousseau	Département de physique, Université de Montreal	Replier les protéines in silico, un travail de physiciens? Folding proteins in silico: a physicist's job	Jan. 15, 2004	C
Louis-Andre Hamel	University of Montreal	CZT Detector Development for Gamma-Ray Spectroscopy & Imaging	Jan. 19, 2004	C
Physics Fest	Physics Professors and adjuncts	Short research presentations by members of the Ottawa Carleton Institute for Physics associated with the University of Ottawa	Jan. 22, 2004	O
David Boal	Simon Fraser University	Nature's building code: the Bauhaus school of cell design	Feb. 5, 2004	O
Cliff Burgess	McGill University	Strings and Branes: Quantum Gravity Meets Experimental Physics?	Feb. 12, 2004	O
Eeuwe Sieds Zijlstra	Brock University	Title: Atomic and Electronic Structure of Quasicrystals: An ab initio Study	Feb. 19, 2004	O
Dr. Guenadi Rabinski	President of R&D Innovative Solutions Inc.	Fundamental Scientific Challenges and Role of Materials Science in Industrial Applications of Free-Space Optical Instrumentation.	Mar. 4, 2004	O
David Z. Chen	Advisory Engineer MCI - Optical & Data Network		Mar. 10, 2004	
Yves Bourgault	Dept of Math and Stat. U. of Ottawa	Problems, models and computations in cardiology	Mar. 11, 2004	O
Ravi Bhardwaj	Steacie Institute for Molecular Sciences, NRC. Ottawa	Femtosecond laser-matter interaction: fundamentals applications	Mar. 15, 2004	O
Brian Amsden	Department of Chemical Engineering, Queen's University	Modeling solute diffusion in polymer gels and solutions using scaling concepts	Mar. 18, 2004	O
Vicky Kaspi	McGill University	CAP Lecture: Diversity in Young Neutron Stars	Mar. 22, 2004	C
4th year students	U.O.	Honours Research Projects	Apr. 1, 2004	O
V.M. Nadutov	G. V. Kurdyumov Institute for Metal Physics of the N.A.S. of Ukraine, Kyiv, Ukraine	Invar Fe-Ni-C-based alloys: phenomena and properties	May 13, 2004	O
Dr. Christof Meile	Department of Marine Sciences University of Georgia	Special Joint Seminar Physics & Earth Sciences	Sept. 14, 2004	O

Physics Fest 2004	Department of Physics, University of Ottawa	Short research presentations by members of the Ottawa Carleton Institute for Physics associated with the University of Ottawa	Sept. 23, 2004	O
Jan Seuntjens	McGill University	Advanced Clinical Dosimetry Techniques in Radiation Therapy	Sept. 27, 2004	C
Theodore Postol	MIT	The Science & Technology of the Bush National Missile Defense	Sept. 30, 2004	O
Andre D. Bandrauk	Canada Senior Research Chair Computational Chemistry & Photonics, Université de Sherbrooke	La Science aux temps ultracourts – L'ère attoseconde et le contrôle des Electrons - Science at Ultrashort Times - The Attosecond Era and Electron Control	Oct. 7, 2004	O
Christine Kraus	Queen's University	Final Result of the Mainz Neutrino Mass Experiment	Oct. 18, 2004	C
Carsten Krauss	Queen's University	Lessons Learned from HERA-B	Oct. 25, 2004	C
D. Fortin	University of Victoria	Determination of IvubI Using Semileptonic B Decays	Nov. 3, 2004	C
Kevin D. Dorfman	Laboratoire Physicochimie-Curie (UMR/CNRS) France	Ephesia: Separation of long DNA in microfluidic magnetic arrays	Nov. 4, 2004	O
David Rainwater	University of Rochester	New Models of EWSB	Nov. 8, 2004	C
Dean Karlen	University of Victoria	The T2K Project & the Near Detector Tracker	Nov. 11, 2004	C
Jorge Vinals	Physics Department, McGill University	Self-Assembly, Defect Motion and Coarsening of Mesophases	Nov. 11, 2004	O
Marco Carlone	Regional Cancer Center	Challenges for Biologically Based Treatment Planning	Nov. 15, 2004	C
Mike Ronan	Lawrence Berkeley National Laboratory	ILC Large Detector Design Studies	Nov. 19, 2004	C
Jo Dudek	JLAB	Exciting Hybrid Mesons	Nov. 22, 2004	C
Jean-Pierre Matte	INRS-EMT, Université du Québec, Varennes, Québec	Non-equilibrium physics in plasmas heated by intense laser beams	Nov. 25, 2004	O
Paul J. Reckwerdt	TomoTherapy Inc., Madison WI	Image Guided Intensity Modulated Radiotherapy: Painting with Photons	Dec. 3, 2004	C
Ervin Podgorsak	McGill Medical Physics Unit, Montreal General Hospital	Crisis in Health Care Financing in North America: A Medical Physicist's Perspective	Dec. 6, 2004	C
Peter Jenni	CERN Laboratory	The ATLAS Project at the Large Hedron Collider: Exploring the High-Energy Frontier of Particle Physics	Dec. 8, 2004	C

Publications in Refereed Journals and Book Series in 2004

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Other Conference Presentations and Posters in 2004

S. Afshae, L. Chen and **X. Bao**, "High accuracy temperature and strain measurements with cm spatial resilution for distributed Brillouin based fiber optic sensors", presented at Photonics North 2004.

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Stephen Godfrey, Shouhua Zhu, Resolved Photon Contributions to Higgs Boson Production and Measurement of tan in Associated t H Production in Collisions, Victoria Linear Collider Workshop, July 28 -31 2004, Victoria Canada. (Presented by Shouhua Zhu)

Stephen Godfrey, Shouhua Zhu, Top Production and Strong Electroweak Symmetry Breaking, Victoria Linear Collider Workshop, July 28 -31 2004, Victoria Canada. (Presented by Shouhua Zhu).

Stephen Godfrey and Shouhua Zhu, Recent Progress on Higgs Physics at a Collider 32nd International Conference on High Energy Physics, August 16 - 22 2004, Beijing China. (Presented by Shouhua Zhu). [hep-ph/0409326]

B. Jarosz, "Thermal dose control by configuration of ultrasonic interstitial applicator array", Scientific Program & Abstracts, 9th Int. Congr. Hyperthermic Onc., April 20-24, 2004, St. Louis, MO, p. 144.

P. Johns, Invited Talk: Presentation at the Medical Imaging Workshop of the 2004 CLS Users' Meeting, "Scattered X Rays as a Diagnostic Tool for Medicine", Canadian Light Source, University of Saskatchewan, Saskatoon, Saskatchewan (November 19, 2004).

I. L'Heureux, Model of Oscillatory zoning in the $(Ba,Sr)SO_4$ solid solution system, Goldschmidt Geochemistry Conference, Copenhagen, June 2004.

I. L'Heureux, Examples of nonlinear effects in reaction-diffusion systems: A physicist's musings, Utrecht University, June 2004.

A. Longtin, International Conference on Differential Equations and Applications in Mathematical Biology, Nanaimo, BC, July 2004.

A. Longtin, Computational Neuroscience Annual Meeting, Baltimore, July 2004

A. Longtin, Gordon Research Conference on Theoretical Biology and Biomathematics, Session on Neuroscience, Tilton, NH, June 2004. (FS)

A. Longtin, Workshop on Complex Dynamical Processes in Passive Electroreceptors and Hair Cells. Max Planck Institute for Complex Systems, Dresden, May 2004. (FS)

A. Longtin, Winter School on Point Processes, University of Ottawa, Sponsored by Fields Institute, February 2004.

A. Longtin, International Workshop on the Dynamics of Stochastic Systems with Memory, Berlin, January 2004. (FS)

Amelia Grobnic, Robert James, Claire L. Callender, Ping Lu, **Stephen J. Mihailov,** "Thermal Stress Phenomena Induced into a Packaged Polymer AWG", Presented at the International Micorelectronics and Packaging Society Meeting IMAPS 2004, Long Beach CA, Nov. 8-14 2004.

Lelia B. Vann, Russell J. De Young, **Stephen Mihailov**, "Ultra-narrow band fiberoptic Bragg grating filters for atmospheric water vapor measurements", paper S2P-41, 22nd International Laser Radar Conference (ILRC 22), Matera, Italy, July 12-16, 2004.

Griffith M, Hodge W, Bueckert D, Faraji H, Jackson WB, Carlsson D, Liu Y, Li F, **Munger R**, Lagali N, Priest D, Marmo C. Implantation of sub-epithelial lenticules in the cornea for refractive correction. 4th Annual conference on Lacimal glands, Tear films, Ocular Surface and Dry eye Syndrome. Puerto Rico 2004

Jackson WB, **Munger R**. Planning Ablations for the Optimal Eye Model with Wavefront and Topographic Data. ESCRS annual meeting, Paris, France. 2004

Munger R, Marchese L. Clinically based eye model optimizing wavefront based refractive surgery. ASCRS annual meeting 2004.

Marchese LE, Priest D, **Munger R**. A Phase Plate Model of the human eye for wavefront guided treatment planning. ARVO 2004.

Priest D, Marchese L, **Munger R**. The efficacy of Wavefront Guided Ablations on customized eye models. 5th International Congress on Wavefront Sensing and Optimized Refractive Corrections. Feb 2004.

R. Munger, Marchese L, Hou L. Phase Modulators for Refractive Corrections of Human Eyes. SPIE, 2004:9.

M. Fancy, **R. Munger**, A. Fahim, Instrument for Non-invasive Photonic Assessments of Biological Materials. SPIE, 2004:14

P. Piercy and A. Castonguay, "Diffusion-limited relaxation kinetics of nano-scale rough-surface morphology", APS March Meeting, 2004, Montreal.

D.G. Rancourt. Advances in characterizing nanophase materials and composites. Invited Symposium Talk (1 of 3), Nanophase Materials Symposium (2.8), Goldschmidt Geochemistry Conference, Copenhagen, June 6-12, 2004. Abstract 554-2.8.21. Geochimica Cosmochimica Acta 68(11S), 2004, p.A220.

D.G. Rancourt. Adventures in mineral physics: From environmental nanoparticles to meteoritic anti-Invar via layer silicate surprises. Invited Keynote Lecture (1 of 11), 82nd Annual Meeting of the Deutsche Mineralogische Gesellschaft (DMG) (German Mineralogical Association), Karlsruhe, September 20-22, 2004.

I. L'Heureux, S. Katsev, **D.G. Rancourt**. An approximate treatment of pH-dependent adsorption in reaction-transport models. Talk, ASLO 2004, February 15-20, 2004, Honolulu, Hawaii.

S. Katsev, I. L'Heureux, **D.G. Rancourt**. A method for investigating interactions among chemical species in sediments: Application to sulfate-assisted phosphorous mobilization. Talk, ASLO 2004, February 15-20, 2004, Honolulu, Hawaii.

D.G. Rancourt, B. George, M.-Z. Dang, K. Telmer. Solid-phase characterization of sediments from 100 boreal forest lakes. Poster, AGU 2004 Joint Assembly, May 17-21, 2004, Montreal, Canada. Eos Transactions, AGU, 85(17) (2004), Joint Assembly Supplement, Abstract B33B-03, page JA80.

D.G. Rancourt, P.-J. Thibault. Bacteria are redox active sorbants that do not template nucleating hydrous ferric oxide. Talk, Goldschmidt Geochemistry Conference, Copenhagen, June 6-12, 2004. Abstract 1524-2.7.14. Geochimica Cosmochimica Acta 68(11S), 2004, p.A199.

B. George, **D.G. Rancourt**, M.-Z. Dang, K. Telmer. Sediment Fe mineralogy of 100 boreal forest lakes. Poster, Goldschmidt Geochemistry Conference, Copenhagen, June 6-12, 2004. Abstract 940-4.2.53. Geochimica Cosmochimica Acta 68(11S), 2004, p.A368.

D.G. Rancourt, B. George, M.-Z. Dang, and K. Telmer. Solid-phase characterization of sediments from 100 boreal forest lakes. Poster. 82nd Annual Meeting of the Deutsche Mineralogische Gesellschaft (DMG) (German Mineralogical Association), Karlsruhe, September 20-22, 2004.

P.H.J. Mercier, **D.G. Rancourt**. Recent advances in layer silicate crystal chemistry. Poster. 82nd Annual Meeting of the Deutsche Mineralogische Gesellschaft (DMG) (German Mineralogical Association), Karlsruhe, September 20-22, 2004.

A. Babinski, **S. Raymond**, S. Awirothananon, M. Potemski and J. Lapointe, "Single Dot Spectroscopy in High Magnetic Fields", accepted for publication in Physica E (proceedings of the third international conference on the physics and chemistry of quantum dots, QD2004, Banff, Canada, May 9th-13th 2004).

C. Nì. Allen, P. J. Poole, P. Barrios, P. Marshall, Greg Pakulski, **S. Raymond** and S. Fafard "External cavity Quantum-Dot tunable laser through 1.55 μm", accepted for publication in Physica E. (proceedings of the third international conference on the physics and chemistry of quantum dots, QD2004, Banff, Canada, May 9th-13th 2004).

D. Sinclair, Recent results from SNO, Seesaw Conference, Japan, 2004.

D. Sinclair, Underground Facilities on North America, ILLIAS Meeting, Paris, 2004.

D. Sinclair, Progress in Neutrino Physics, Physics in Collisions, Boston, 2004.

D. Sinclair, SNOLAB, International Conference on Dark matter, Edinburgh, 2004.

Other Presentations in 2004

X. Bao, F. Ravet, L, Zou, L. Chen, Rong Feng Huang, Heng Aik Khoo, "Pipeline buckling detection by the distributed Brillouin sensor", North American Euro Pacific Workshop For Sensing Issues in Civil Structural Health Monitoring 2004, Hawaii, USA. Invited talk.

Xiaoyi Bao, "Development and applications of the distributed sensor system", IEEE Sensors 2004, Vienna, Austria**.** Invited talk.

Xiaoyi Bao, Lufan Zou, Qinrong Yu, Graham Ferrier, Fabien Ravet, Liang Chen, "Distributed strain and temperature sensors and their application in structural health monitoring with cm spatial resolution", Proceedings of International Symposium on Advances and Trends in Fiber Optics and Applications (AFTO) 2004 (China). Invited talk**.** P.157-166.

D. Waddy, L. Chen, S. Hadjifaradji, **X. Bao**, R. Walker, S. Mihailov, "High-order PMD and PDL emulator", presented at Optical Fiber Communications 2004. Los Angles, California, Feb 22-26, 2004.

T. Brabec "Clusters in strong laser fields," Atomic physics workshop at the MPI, Dresden, Germany (2004) (invited).

T. Brabec, "High harmonic generation and attosecond science," MIT (2004) (invited).

T. Brabec, "Attosecond laser electro nuclear physics," Ultrafast intense laser science in Palermo, Sicily (2004) (invited).

T. Brabec, "Attosecond science," Imperial College, London, UK (2004) (invited).

Chen, L. et al, Polarization Fluctuations in Field Fibers, The 17th Annual Meeting of the IEEE Lasers & Electro-Optics Society 7-11 November 2004 Rio Grande, Puerto Rico.

deKemp, R. "Serial PET Imaging and CAD – computer assisted diagnosis?", University of Ottawa Heart Institute, ON, Jan 2004

deKemp, R. "Attenuation Correction in PET and SPECT", Nuclear Medicine Technologists Symposium, Ottawa, ON, April 2004

S. Desgreniers. "Transformations and Crystalline Structures in Dense Hydrates: Recent Results". IUCr High Pressure Commission, Workshop on Crystallography at High Pressure. CLS, Saskatoon, SK, Canada (2004), Invited Talk.

*R. Flacau and **S. Desgreniers**. "Electronic Density Changes and Structural Phase Transitions in Dense Gas Hydrates" APS March Meeting, Montréal, Canada (2004).*

Desgreniers, S. "En Route to the Centre of the Earth and Other Interesting Side Trips". CAP Lecture, Royal Military College, Department of Physics, Kingston, February 2004.

Desgreniers, S. "En Route to the Centre of the Earth and Other Interesting Side Trips". CAP Lecture, Queen's University , Department of Physics, Kingston, February 2004.

Desgreniers, S. "En Route to the Centre of the Earth and Other Interesting Side Trips". CAP Lecture, McMaster University, Department of Physics, Hamilton, February 2004.

S. Awirothananon, S. Raymond, A. Babinski, M. Potemski, **S. Fafard**, W.D. Sheng, P. Hawrylak, and A. Sachrajda, Single Exciton shell structure of self-assembled quantum dots from Magneto-Photoluminescence excitation spectroscopy, QD-2004 conference, Banff, May 2004.

S. Awirothananon, S. Raymond, S. Studenikin, W. Render, **S. Fafard**, W.D. Sheng, P. Hawrylak, and A. Sachrajda, Magneto-Photoluminescence excitation spectroscopy of InAs/GaAs Self-assembled Quantum dots, Photonics North, Sep. 2004.

C.Ni Allen, P.J. Poole, P. Barrios, D. Roth, P.A. Marshall, E. Post, J.W. Fraser, S.Raymond, **S. Fafard**, Tunability of InAs Quantum-Dot Lasers Grown on InP, Photonics North, Sep. 2004.

P. Finnie, J. Lefebvre and Y. Homma, "Nanotubes as Optical Quantum Wires" Queen's University, Nov. 17, 2004 [invited]

R. J. Hemingway, e+e- Annihilation at LEP using the OPAL Detector

Joós, B., The rigidity transition in polymer melts with van der Waals interaction, Festschrift for Michael Thorpe's 60th birthday: Flexibility in complex materials, glasses, amorphous and proteins (Sainte-Adèle, Quebec, Canada, 7-10 August 2004).

Kaern, M. Workshop on Complexity of Biological Networks. Gesellschaft für Biotechnologsiche Forschung, Braunschweig. 2004.

Kaern, M. The 5th International Conference on Systems Biology. Heidelberg. 2004.

Rogers, D.W.O. Monte Carlo simulation of radiotherapy sources: recent advances in the BEAM code, at the Varian Research Partners Symposium, Mary Lake, Florida, Jan 30, 2004.

Rogers, D.W.O. Recent Improvements in the BEAMnrc code, at the McGill Workshop on Monte Carlo Treatment Planning, Montreal, May 3, 2004.

Rogers, D.W.O. Monte Carlo simulation of electron-photon transport: from particle physics to cancer radiotherapy, at the CAP Annual Meeting, Winnipeg, Manitoba, June 16, 2004.

Rogers, D.W.O. Monte Carlo for radiotherapy treatment planning, at a Symposium on Monte Carlo Treatment planning at the 2004 AAPM annual meeting in Pittsburgh, PA, July 27.

Rogers, D.W.O. Monte Carlo simulation of electron-photon transport: from particle physics to cancer radiotherapy, CAP Lecture at the Department of Physics, University of Windsor, Windsor Ontario, March 2, 2004.

Rogers, D.W.O Monte Carlo simulation of electron-photon transport: from particle physics to cancer radiotherapy, CAP Lecture at the Department of Physics, University of Western Ontario, London Ontario, March 3, 2004.

Rogers, D.W.O. Monte Carlo simulation of electron-photon transport: from particle physics to cancer radiotherapy, Cameron Symposium Lecture at the University of Wisconsin, Sept 13, 2004.

Rogers, D.W.O. Improving the efficiency of EGSnrc Monte Carlo calculations at the McGill Medical Physics Unit, Montreal General Hospital, Montreal, Oct 15, 2004.

G. W. Slater (2004) "Molecular Dynamics Simulations as a Tool to Understand Separations at the Molecular Level: Application to Nanopores, Capillary Electrophoresis and Nanofluidics". INVITED talk at the 40th Annual Symposium of the New Mexico Chapter of the American Vacuum Society, Albuquerque, May 17-18.

G. W. Slater, F. Tessier, S. Guillouzic, M. Kenward (2004) "Molecular Dynamics Simulations as a Tool to Understand Separations at the Molecular Level: Application to Nanopores, Capillary Electrophoresis and Nanofluidics". Oral presentation at the 17th International Symposium on Microscale Separations and Capillary Electrophoresis HPCS2004, Salzburg (Austria) Feb 8-12.

G. W. Slater (2004) "Single-Molecular Polymer Physics Using Molecular Dynamics Simulations". Invited Talk at the Annual Congress of the Canadian Association of Physicists, Winnipeg, June.

M. Gauthier, **G. W. Slater** (2004) "Exact Lattice Calculations of Diffusion Coefficients in the Presence of External Fields and Obstacles". Oral presentation at the March Meeting of the American Physical Society, Montréal.

G. W. Slater, S. J. Hubert (2004) "Reptation Dynamics in a Random Energy Landscape with Long-Range Correlations". Oral presentation at the March Meeting of the American Physical Society, Montréal.

F. Tessier, **G. W. Slater** (2004) "Control of Electroosmotic Flow in a Nanofluidic Channel using Grafted Polymer Chains". Oral presentation at the March Meeting of the American Physical Society, Montréal.

L. McCormick, **G. W. Slater** (2004) "Diffusion of DNA during Gel Electrophoresis: a Predictive Function Spanning the Relevant Regimes". Poster presentation at the March Meeting of the American Physical Society, Montréal.

Y. Gratton, **G. W. Slater** (2004) "Molecular Dynamics Study of Tethered Polymers in Shear Flows: Freely-Jointed and Worm-Like Chains". Poster presentation at the March Meeting of the American Physical Society, Montréal.

J.-F. Mercier, **G. W. Slater** (2004) "A Brownian Dynamics Study of Dense DNA Brushes". Oral presentation at the March Meeting of the American Physical Society, Montréal.

K. Kopecka, G. Drouin, **G. W. Slater** (2004) “Capillary Electrophoresis of small ssDNA molecules”. Poster presentation at the March Meeting of the American Physical Society, Montréal.

T. Yergou, **G. W. Slater** (2004) “A Simulation Model of Biofilms with Autonomous Cells: Analysis of a Two-Dimensional Version”. Poster presentation at the March Meeting of the American Physical Society, Montréal.

M. Kenward, **G. W. Slater** (2004) “Molecular Dynamics Simulations of Polymer Friction Coefficients and Collision Dynamics in Sieving Media”. Oral presentation at the March Meeting of the American Physical Society, Montréal.

Technical Reports (unpublished) in 2004

deKemp RA. PET Imaging Standards for OCOG Clinical Trials. Adopted by Clinical Trials Methodology Group, Ontario Clinical Oncology Group, Hamilton, ON, 2004.

D. W. O. Rogers, B. Walters, and I. Kawrakow, BEAMnrc Users Manual, NRC Report PIRS 509(a)revH (2004).

B. R. B. Walters and **D. W. O. Rogers**, DOSXYZnrc Users Manual, NRC Report PIRS 794 (rev A) (2004).

Members of the Institute in 2004

John Armitage	Photonics	C
Xiaoyi Bao	Photonics	O
Alain Bellerive	Solar Neutrino Physics	C
Thomas Brabec	Photonics	O
Ian Cameron	Medical Physics	C – Adjunct
Robert Carnegie	Experimental Particle Physics	C
Sylvain Charbonneau	Semiconductor Physics	O –Adjunct
Liang Chen	Theoretical Condensed Matter, Photonics	O
Robert Clarke	Medical Physics	C – Adjunct
Paul Corkum	Photonics	O - Adjunct
Joanna Cygler	Medical Physics	C – Adjunct
Andrej Czakowski	Photonics	O
Robert deKemp	Medical Physics	C – Adjunct
Serge Desgreniers	High Pressure Physics	O
Marie D'Iorio	Condensed Matter	O – Adjunct
Madhu Dixit	Experimental Particle Physics	C – Adjunct
Simon Fafard	Semiconductor Physics	O – Adjunct
Paul Finnie	Condensed Matter Physics	O - Adjunct
Emery Fortin	Semiconductor Physics	O - Adjunct
Lee Gerig	Medical Physics	C – Adjunct
Stephen Godfrey	Theoretical Particle Physics	C
Clive Greenstock	Medical Physics	C – Adjunct
Cliff Hargrove	Experimental Particle Physics	C – Adjunct
Pawel Hawrylak	Theoretical Condensed Matter	O – Adjunct
Richard Hemingway	Experimental Particle Physics	C – Adjunct
Richard Hodgson	Theoretical Nuclear Physics	O

Boguslaw Jarosz	Medical Physics	C
Paul Johns	Medical Physics	C
Bela Joos	Theoretical Condensed Matter	O
Pat Kalyniak	Theoretical Particle Physics	C
Iwan Kawrokov	Medical Physics	C - Adjunct
Gilles Lamarche	Low Temperature Physics	O – Adjunct
Marcel LeBlanc	Superconductivity	O - Adjunct
Ivan L'Heureux	Nonequilibrium Processes in Nonlinear Systems	O
Andre Longtin	Nonlinear Dynamics, Biophysics	O
Rejean Munger	Medical Photonics	O - Adjunct
Barry McKee	Medical Physics	C – Adjunct
Hans Mes	Experimental Particle Physics	C – Adjunct
Stephane Mihailov	Photonics	O - Adjunct
Cheng Ng	Medical Physics	C – Adjunct
Gerald Oakham	Experimental Particle Physics	C
Peter Piercy	Condensed Matter Physics	O
Peter Raaphorst	Medical Physics	C – Adjunct
Guenadi Rabinski	Condensed Matter	O - Adjunct
Denis Rancourt	Solid State Magnetism	O
Sylvain Raymond	Semiconductor Physics	O - Adjunct
David Rogers	Medical Physics	C – Adjunct
Alain Roth	Condensed Matter	O – Adjunct
Giles Santyr	Medical Physics	C
Ken Shortt	Medical Physics	C – Adjunct
David Sinclair	Solar Neutrino Physics	C
Gary Slater	Polymer Physics	O
Tom Smy	Condensed Matter	O - Adjunct

Augustin Song	Theoretical Studies in Solid State	O – Adjunct
Zbigniew Stadnik	Electronic Structure & Magnetism	O
M.K. Sundaresan	Theoretical Particle Physics	C - Adjunct
Rod Taylor	Condensed Matter	O - Adjunct
John Tse	Theoretical Material Sciences	O – Adjunct
Yatendra Varshni	Theoretical Solid State, Astrophysics	O - Adjunct
Manuella Vincter	Experimental Particle Physics	C
Peter Watson	Theoretical Particle Physics	C
A.J. Waker	Medical Physics	C – Adjunct
David Wilkins	Medical Physics	C – Adjunct
Ruth Wilkins	Medical Physics	C - Adjunct
Robin Williams	Semiconductor Physics	C – Adjunct

Graduate Students at the Institute in 2004

Student	Registered	Supervisor(s)	Completed
1. *Abdeen, Nishard*	*(C) M.Sc. Sep-02*	*Santyr*	
2. Abuzariba, Suad Mohamed	*(O) Ph.D. May-04*	*Chen*	
3. Allen, Claudine	*(O) Ph.D. Jan-00*	*Fafard/ Raymond*	
4. Almarzoug, Saeed	*(O) Ph.D. Jan-04*	*Hodgson*	
5. Al-Qadi, Khalid	*(O) Ph.D. Sep-01*	*Stadnik*	
6. Andrievski, Andrei	*(C) M.Sc. Sep-04*	*Wilkins, R.*	
7. Archambault, John	*(C) Ph.D. Sep-04*	*Vincter*	
8. Awirothananon, Sunida	*(O) Ph.D. Sep-02*	*Fafard*	
9. *Babineau, David*	*(O) M.Sc. Sep-03*	*Longtin/Lewis*	

10. Barrie, Gregory	*(O) Ph.D. Jan-01*	*Longtin*	
11. Beckwith, Paul	*(O) Ph.D. Sep-03*	*Bao*	
12. Bertrand, Martin	*(O) M.Sc. Sep-04*	*Slater*	
13. Bouchard, Line	*(O) M.Sc. Sep-03*	*Bao*	
14. Boucher, Pierre-Alexandre	*(O) M.Sc. Sep-03*	*Joos*	
15. Buckley, Lesley	*(C) Ph.D. Sep-01*	*Rogers*	
16. Carlone, Marco	*(C) Ph.D. Sept-00*	*Raaphorst*	*Completed*
17. Casault, Sebastien	*(O) M.Sc. Sep-04*	*Slater*	
18. Charron, Luc	*(O) M.Sc. Sep-02*	*Fortin*	*Completed*
19. Chen, Ou	*(O) M.Sc. Sep-01*	*Bao*	*Completed*
20. Clark, Cynthia	*(O) Ph.D. Jan-04*	*Munger*	
21. Cojocaru, Claudiu	*(C) Ph.D. Sep-04*	*Vincter*	
22. Doiron, Brent	*(O) Ph.D. May-00*	*Longtin/Maler*	*Completed*
23. Drouin, Pierre-Luc	*(C) M.Sc. Sep-04*	*Bellerive*	
24. Dugal, Clifford	*(C) M.Sc. Sep-03*	*Wilkins, D.*	
25. Dybalski, Wojciech	*(O) Ph.D. May-03*	*Hawrylak*	
26. Evans, James	*(O) Ph.D. May-01*	*Rancourt*	
27. Flacau, Roxana	*(O) Ph.D. Sep-01*	*Desgreniers*	
28. Foottit, Claire	*(C) M.Sc. Sep-04*	*Cameron*	
29. Frederick, Simon	*(O) Ph.D. Sep-03*	*Williams*	
30. Gagnon, Justin	*(O) M.Sc. May-04*	*Corkum*	
31. Gao, Zhanrong	*(C) Ph.D. Sep-01*	*Gerig*	
32. Garcia Fernandez, Maria	*(C) M.Sc. Sep-03*	*Raaphorst/ D. Wilkins*	
33. Gauthier, Alain	*(O) M.Sc. Sep-03*	*Joos*	
34. Gauthier, Michel	*(O) Ph.D. Jan-03*	*Slater*	
35. Ghasroddashti, Esmaeel	*(C) Ph.D. Jan-02*	*Gerig*	
36. Gherase, Mihai Raul	*(C) Ph.D. Sep-01*	*Santyr*	

37. Gorjanc, Timothy	*(O) Ph.D. Jan-99*	*D'Iorio*	*Completed*
38. Grant, Darren	*(C) Ph.D. Sep-98*	*Noble*	*Completed*
39. Gratton, Yannick	*(O) M.Sc. Jan-02*	*Slater*	*Completed*
40. Hasan, Ziaul	*(C) M.Sc. Sep-01*	*Johns*	*Completed*
41. Heelan, Louise	*(C) M.Sc. Sep-03*	*Hemingway*	
42. Hnatovsky, Kyrylo	*(O) Ph.D. Sep-02*	*Brabec/Taylor*	
43. Kenward, Martin	*(O) Ph.D. May-01*	*Slater*	
44. King, Brian	*(C) Ph.D. Sep-04*	*Johns*	
45. Knight, Gary	*(O) Ph.D. Sep-00*	*Hodgson/Smy*	
46. Korkusinski, Marek	*(O) Ph.D. Sep-00*	*Hawrylak*	*Completed*
47. Kwiecinski, Premyslav	*(O) M.Sc. Sep-04*	*Desgreniers*	
48. La Russa, Daniel	*(C) M.Sc. Sep-04*	*Rogers*	
49. LeBlanc, Serge	*(O) Ph.D. Sep-02*	*Munger*	
50. Li, Yun	*(O) M.Sc. Sep-04*	*Bao*	
51. Liu, Fang	*(O) M.Sc. Jan-04*	*Longtin*	
52. Martinez-Ortega, Jose	*(C) Ph.D. Sep-01*	*Jarosz*	
53. McCormick, Laurette	*(O) Ph.D. May-00*	*Slater*	
54. McDonald, Chris	*(O) M.Sc. Sep-04*	*Brabec*	
55. Mercier, Jean-Francois	*(O) Ph.D. May-99*	*Slater*	*Completed*
56. Middleton, Jason	*(O) Ph.D. Sep-01*	*Longtin*	
57. Myint, Kenji	*(C) Ph.D. Sep-01*	*Gerig*	
58. Nezamzadeh, Marzieh	*(C) Ph.D. Jan-02*	*Cameron*	
59. Niedbala, Malgorzata	*(C) Ph.D. Jan-99*	*Raaphorst*	*Completed*
60. Nisar, Mohammad	*(C) M.Sc. Jan-02*	*Johns*	*Completed*
61. Nkongchu, Kenneth	*(C) Ph.D. Sep-01*	*Santyr*	
62. Olariu, Elena	*(C) Ph.D. May-03*	*Cameron*	
63. Oliver, Eric	*(O) M.Sc. Sep-04*	*Slater*	

64. Parra Robles, Juan Miguel	*(C) Ph.D. Jan-00*	*Santyr*	*Completed*
65. Pegoraro, Adrian	*(O) M.Sc. Sep-04*	*Brabec*	
66. Prevost, Jean-Paul	*(O) Ph.D. Jan-01*	*Rancourt*	
67. Ravet, Fabien	*(O) Ph.D. Jan-03*	*Bao*	
68. Rollin, Etienne	*(C) M.Sc. Sep-02*	*Bellerive*	*Completed*
69. Schram, Malachi	*(C) Ph.D. Sep-02*	*Oakham*	
70. Sego, Zdenko	*(C) M.Sc. Sep-03*	*Rogers*	
71. Simard, Olivier	*(C) M.Sc. Sep-02*	*Bellerive*	*Completed*
72. Smelser, Christopher	*(O) Ph.D. Sep-03*	*Mihailov*	
73. Smith, Jesse	*(O) M.Sc. Sep-04*	*Desgreniers*	
74. Sutherland, Connie	*(O) M.Sc. Jan-04*	*Longtin*	
75. Taylor, Jason	*(O) Ph.D. Jan-03*	*Charbonneau/Cada*	
76. Taylor, Randle	*(C) M.Sc. Sep-04*	*Rogers*	
77. Tesic, Gordana	*(C) Ph.D. May-04*	*Bellerive*	
78. Tessier, Frederic	*(O) Ph.D. Sep-99*	*Slater*	
79. Tonkopi, Elena	*(C) M.Sc. Sep-03*	*Kawrakow*	
80. Truica, Sorina	*(C) Ph.D. Jan-03*	*Cameron*	
81. Tsandev, Iana	*(O) M.Sc. May-03*	*L'Heureux/Rancourt*	
82. Walker, Robert	*(O) Ph.D. Sep-01*	*Mihailov/Bao*	
83. Wallace, Matthew	*(O) M.Sc. Sep-03*	*Joos*	*Completed*
84. Wan, Yidun	*(O) M.Sc. Sep-03*	*Bao/Chen*	*Completed*
85. Wang, Pu	*(O) Ph.D. Sep-04*	*Stadnik*	
86. Wassenaar, Richard	*(C) Ph.D. Sep-00*	*deKemp*	
87. Wheeldon, Jeffrey	*(O) M.Sc. Sep-03*	*Cada/Hall*	
88. White, Steven	*(C) M.Sc. Sep-02*	*Santyr*	*Completed*
89. Wind, Andrew	*(C) M.Sc. Sep-02*	*McKee*	*Completed*
90. Xie, Li	*(O) M.Sc. Sep-03*	*Bao*	

91. Yu, Qinrong *(O) Ph.D. Jan-01* *Chen/Bao*

92. Zhang, Ziyi *(O) Ph.D. Jan-01* *Bao/Chen*

Research Associates at the Institute in 2004

Name	Period	Supervisor(s) or Group
S. Afshar	2001 - 2004	L. Chen & X. Bao
David Babineau	Sept. 2003 – present	A. Longtin
Greg Barrie	Sept. 2002 – present	A. Longtin
Smaine Bekhechi	April 2004 – present	G. Slater
Jan Benda	Feb. 2002 - Sept. 2004	A. Longtin
John Benda	Feb 2002 – August 2004	A. Longtin
Maurice Chacron	Sept. 2003 – Sept. 2004	A. Longtin
Xiongxin Dai	Nov 2002 – present	SNO group
Brent Doiron	Sept. 2000 – Sept. 2004	A. Longtin
Ranpal Dosanjh	Jan 2002 – Aug 2004	SNO group
Damien Flannery	2003 - present	J. Munger
Junqi Gao	2004 (3 Months)	X. Bao
Saeed Hadjifaradji	May 2002 – present	X. Bao & L. Chen
Lijian Hou	2004 - present	Munger
Wujun Huo	Jan 2003 – present	S. Godfrey & P. Kalyniak (theory)
Vladimir Kalosha	Sept. 2004 – present	X. Bao & L. Chen
Sergei Katsev	Oct. 2002 - July 2004	L'Heureux
Mohsen Khakzad	Sept. 2000 – present	ATLAS group
Neil Lagali	2003 - present	J. Munger
Benjamin Lindner	Feb 2002 – Feb 2005	A. Longtin
Mireille Lortie	2003 – present	R. deKemp
Linda Marchese	2002-2004	J. Munger
Jean-François Mercier	Sept 2004 – present	G. Slater
F. Mesak	2002 – 2004	Ng
Jason Middleton	Sept. 2001 – present	A. Longtin
Cathy Mifflin	years back – present	SNO group
Sorin Nedelcu	June 2004	G. Slater
Juan Miguel Parra-Robles	Sept 2004 - present	G. Santyr
Evgueni Ponomarev	May 2003 – present	X. Bao & L. Chen
Palani Selvam	Apr 2004 – present	D.W.O. Rogers
Kevin Sprague	2002 – present	R. deKemp
Connie Sutherland	Jan 2004 – present	A. Longtin
Krisztina Szalisznyo	Feb 2003 – Feb 2005	A. Longtin
Yergou Tatek	July 2002 - present	G. Slater
Shahraam Afshar Vahid	Oct 2001 – May 2005	X. Bao & L. Chen
D. Waddy	2001 - 2004	L. Chen & X. Bao
Julia Wallace	Jan 1997 - Apr. 2004	CBCRI project fellow (G. Santyr)
David Waller	Feb 2003 – present	SNO group
Hui Wang	2004 - 2005	X. Bao
Shiquan Yang	Aug 2003 – present	X. Bao & L. Chen
Gultekin Yegin	Dec 2003 – March 2004	D.W.O. Rogers
Shouhua Zhu	Nov 2002 – Jan 2005	S. Godfrey & P. Kalyniak (theory)
Lufan Zou	May 2002 – present	X. Bao & L. Chen

Funding in 2003

Name	Source	Amount Per Year
A. Bellerive	PREA	30,000
	CRC	100,000
X. Bao	TCPL	11,739
	Neubrex	51,000(US)
	UofO	20,000
	NCIT	20,000
	UofO/CRC chair	70,000
	EXFO	3,000
	AAPN-NSERC	85,000
	NSERC	60,000
	PRO/CITO	100,000
	NCE-ISIS	70,000
	NCE-ISIS	25,000
	NCE-CIPI	65,815
	PREA&U of O	50,000
	UofO	50,000
T. Brabec	CIPI	40,000
	Steacie Memorial Fellow	75,000
	PRO	50,000
	CRC, Tier 1	70,000
	CRC-CFI supplement	290,000
	FWF Austria	240,000
B. Campbell	NSERC	33,500
I. Cameron	ORDCF	150,000
	Heart & Stroke Found. of Ont.	53,643
Chen	CIPI	15,000
	CIPI	49,040
	NSERC	17,000
J. Cygler	Thomson – Nielsen	20,000
Czajkowski	NSERC	15,000
R. deKemp	J.P. Bickell Foundation	63,000
Desgreniers	NSERC	32,000
D'Iorio	NSERC	12,000
	CRTI	1,000,000
Finnie	Japan Science & Technology Agency CREST Grant	80,000
	New Energy & Industrial Technology Development Organization (NEDO) Intn'l Joint Research Program	50,000

Fortin	NSERC	18,000
	NSERC	30,000
L. Gerig	ORCC	17,613
	MDS/CCO	8,500
S. Godfrey	NSERC (Discovery)	70,000
	NSERC (IOF)	35,400
P. Hawrylak	ONR/IUPAP/ARO	30,000
B. Jarosz	Carleton	5,000
	Carleton	4,700
P. Johns	NSERC	19,300
B. Joos	NSERC	30,000
P. Kalyniak	NSERC	33,000
M. Kaern	NSERC	100,000
	CFI	139,591
	OIT	139,591
I. L'Heureux	NSERC	25 000
	NSERC Strategic	153 061
A. Longtin	NATO Postdoctoral Fellowship	30,000
	CIHR	92,000
	CIHR Group Grant	180,000
	NSERC	50,000
Munger	CANARIE	1,000,000
	VISX Inc.	75,000
	OSI	25,000
	IBM	800,000
	Ocular Science Inc.	2,709,000
	VISX Inc.	750,000
	CIHR	322,266
C. Ng	Nat. Cancer Inst. of Canada	364,668
	Aventis Inc.	150,000
	Can. Inst. of Health Res.	237,445
G. Oakham	CA*net4	532,628
D. Rancourt	NSERC Strategic Project Grant	753,304
	GSC in kind	718,312
	NSERC Discovery	45,000
D. Rogers	CRC	200,000
	NSERC	32,000
	Tomotherapy Inc.	26,000
	MDS Nordion	10,000
	CFI/OIT	329,000
	Course Revenue	24,000

Slater	University of Ottawa	30,000
	NSERC	69,000
	Fonds France-Can	10,000
	MMO-ORDCF-EMK	18,000
	NSERC	1,100,000
Stadnik	NSERC	29,000
Varshni	NSERC	10,000
M. Vincter	CFI	361,000
	Canada Research Chair	100,000
P. Watson	NSERC	5,000
R. Wilkins	CRTI	250,000
R. Williams	CIPI	208,000
ATLAS Collaboration G. Oakham (PI), M. Vincter	NSERC Operating	238,000
ATLAS Collaboration	NSERC equipment	173,000
F.G. Oakham, M. Vincter	NSERC ATLAS	170,000
+ 23 others	Canada Common fund payments	
ILC Collaboration M. Dixit, H. Mes, R. Carnegie,	NSERC	140,000
MFA	NSERC	210,000
G. Oakham (PI), M.S. Dixit, A. Bellerive, R.J. Hemingway, D. Sinclair, M. Vincter, C.K. Hargrove		
OPAL Collaboration R.K. Carnegie (PI), R.J. Hemingway, D.A. Karlen, H. Mes	NSERC	52,700
SNO Collaboration	NSERC	360,000
	NSERC (Sudbury)	2,950,000
R.J. Hemingway (PI), A. Bellerive, C.K. Hargrove, D. Sinclair		
SNOLAB Collaboration	CFI	38,902,108
D. Sinclair (PI), A. Bellerive, C. Hargrove		
	NOHFC	4,500,000
	OIT	4,821,194
	Total Funding for 2004	**$68,188,118.00**