

Ottawa Medical Physics Institute (OMPI)

*A Carleton University Research Centre
based in the Department of Physics,
Carleton University, Ottawa, Canada*

www.physics.carleton.ca/ompi

Annual Report # 22
2009 July 1 – 2010 August 31

Submitted by Malcolm McEwen, PhD, OMPI Director.

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1. Editorial

In 1993 I visited Ottawa for the first time as a young physicist working at the National Physical Laboratory in the UK. I was here to see how things were done at the renowned National Research Council laboratories

Why bring this up? Well 1993 was also the year that the Canadian Organization of Medical Physicists (COMP) Annual Scientific Meeting was held in Ottawa. Seventeen years later the conference returned to Ottawa and OMPI was heavily involved in the local organization of the meeting, as detailed later in this report.

Annual conferences are a good way to track the development of any field and over a period of almost two decades one would expect to see significant change. The basics of radiotherapy are no different from the early '90s, indeed all the way back to the earliest uses of ionizing radiation – radiation kills cancer cells – but the range of technologies available to deliver that radiation today is so much broader. Devices with names like Tomotherapy, Cyberknife and VMAT, advanced technologies now in daily use at the Ottawa Hospital Cancer Centre, were little more than concepts (if that) in 1993. Imaging has also seen major changes and the Public Lectures and Symposia held during the COMP meeting and at other times during the last year have highlighted how far we have come so that now physicians can see both form and function of the human body in exquisite detail.

All of this means that medical physicists continue to be vital to the diagnosis and treatment of cancer and other major diseases. From commissioning new facilities to investigating alternative imaging techniques, from developing advanced radiation transport simulations to monitoring environmental radioactivity levels, Ottawa-based medical physicists have been very active in 2009/2010 and the organization that links all these activities is the Ottawa Medical Physics Institute (OMPI). Founded in 1989, and based in the Department of Physics of Carleton University, it is a network of approximately 30 medical physicists in the Ottawa region who are active in research, teaching and graduate student education. The Ottawa medical physics community has one of the most diverse spectra of research and service activities in Canada. Our members are located at The Ottawa Hospital and Cancer Centre, the University of Ottawa Heart Institute, Health Canada, the National Research Council of Canada (NRC), Atomic Energy of Canada Limited (AECL) Chalk River Laboratories, as well as at Carleton University. This Annual Report summarizes our activities during the 2009-2010 academic year. To better match the annual university cycle, with this

year's report we are shifting the reporting period to conclude with the end of the summer term.

2. Membership

Table 1 summarizes our membership, which at year's end numbers 34, and Table 2 lists the Executive of the organisation. Our members' activities span the field of medical physics, including cancer therapy physics (17 members), imaging (8), and radiobiology and health physics (6). Complete profiles are given on the website. Two new members were welcomed into OMPI this year:

Frédéric Tessier is a Research Officer in the Ionizing Radiation Standards group at NRC. He completed a PhD at the University of Ottawa in computational physics and is working on Monte-Carlo radiation transport algorithms.

Laurel Sinclair is a Research Scientist at Natural Resources Canada, working on the development of new detectors and techniques for airborne and land-based mobile gamma/neutron surveying for investigative and emergency response applications.

3. Graduate Program

One of the prime activities of OMPI members is to coordinate and deliver the MSc and PhD programs in medical physics within the Physics Department at Carleton University.

This academic year, Paul Johns gave our foundation course, *Medical Radiation Physics*, in the fall term. In the winter term, *Physics of Medical Imaging* was taught by Tong Xu (coordinator), Ian Cameron, Rob deKemp, Bog Jarosz, Richard Wassenaar, and Glenn Wells. Also in the winter term, *Radiation Protection* was taught by David Wilkins (coordinator) and Pat Saull. Thank you to all those who taught in our program, especially those from outside Carleton who made the time available to benefit our students.

Table 3 lists the graduate students in the program, and Table 4 the graduate theses (five M.Sc. plus five Ph.D.) completed in the 14 month period of this report. Elena Olariu is now an imaging resident at Henry Ford Hospital in Detroit, while Dan LaRussa and Claire Footitt have joined The Ottawa Hospital Cancer Centre's radiation therapy physics residency program. Brian King has moved his family to Australia where he has taken up a postdoc position in Peter Greer's group at the University of Newcastle. Lourdes Garcia worked for some months on a research project with Radiological Sciences and the Ottawa Hospital Cancer Centre, but then also followed the siren call of residency training and won a position in Kingston. Marc Chamberland has continued for a

PhD on PeTrack with Tong Xu, Amir Pourmoghaddas for a PhD with Glenn Wells, and Chad Hunter for a PhD with Rob deKemp. A hearty "well done" to all!

4. Seminars

The monthly OMPI seminars (Table 5) continue to be well attended. Students are expected to give regular presentations during their program (at least once for M.Sc. students, 2 or 3 times for Ph.D.'s). This is excellent practice for both conference presentations and career development. Members give seminars on a rolling schedule, typically every three years or so. Thank you to all speakers and attendees.

Table 6 lists the 2009-2010 medical physics component of the regular weekly seminar series of the Carleton University Department of Physics.

5. OMPI News and Events

CAMPEP Accreditation

The Commission on Accreditation of Medical Physics Educational Programs is the organization in North America that oversees medical physics education programs – both university-based graduate programs and hospital-based residencies. CAMPEP accreditation is a clear statement that the program in question provides the necessary foundation that medical physicists will need to eventually practice in the clinical environment. Carleton University embarked on the accreditation process and in April 2009 the CAMPEP site visit team came to Ottawa. The report of this visit was favourable and accreditation was approved in November of that year, effective January 1 2010).

External teaching activities

In the first half of 2010, OMPI and the Carleton Physics Department offered two general interest public events. The first was the evening of March 31 at Carleton and concerned the global medical radioisotope crisis which had been precipitated by the shutdown of AECL's NRU reactor for prolonged repairs. The speakers were **Richard Wassenaar** from The Ottawa Hospital, and **Paul Schaffer** from the Nuclear Medicine division of TRIUMF in Vancouver. They addressed how radioisotopes are used for nuclear medicine imaging and possible ways to replace AECL's troubled supply route for $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ generators. The second was the evening of June 16 at the opening of the COMP/CCPM conference at the Crowne Plaza. **Dr. Robert Beanlands**, Chief of Cardiac Imaging at the University of Ottawa Heart Institute, gave the annual COMP Public Lecture which was offered in conjunction with OMPI and the Physics Department. A dynamic and entertaining speaker,

Dr. Beanlands reviewed how cardiac imaging has evolved and how new technology is revolutionizing cardiac care. All three of our public speakers this year were very well received.

The Ionizing Radiation Standards group at NRC held a 1-day workshop on "Primary Standards, Calibration Services and Research Capabilities" which attracted more than 60 medical physicists from across the country. **Claudiu Cojocar** was responsible for the successful organization of the meeting and reports that the IRS group hopes to make this an annual meeting to update, and interact with, the Canadian medical physics community.

In the Fall of 2009 the IRS/Carleton collaboration of **Iwan Kawrakow**, **Ernesto Mainegra-Hing**, **Blake Walters** and **Dave Rogers** taught another successful BEAM course. The BEAM Monte-Carlo code is used worldwide in the simulation of radiation delivery devices (linear accelerators, x-ray tubes, etc.) and over 300 people have received training on the software from Dr Rogers and his colleagues.

In addition to the Carleton medical physics program, a number of our OMPI members – including **Ian Cameron** and **Richard Wassenaar** – are regularly involved in teaching courses for Radiology, Oncology and Diagnostic Imaging Residents at the Ottawa Hospital and Cancer Centre.

COMP Annual Scientific Meeting

A total of 270 registrants attended the 2010 annual scientific meeting of the Canadian Organization of Medical Physicists (COMP) and Canadian College of Physicists in Medicine (CCPM). Hosted by members and colleagues of the Ottawa Medical Physics Institute (OMPI) June 16-19 at the Crowne Plaza Hotel in downtown Ottawa, it was one of the most successful national Canadian medical physics conferences in recent years.

Over the 3.5 days of the conference, a total 52 proffered oral presentations and 74 posters were presented. In addition, special highlights were the Public Lecture by **Dr. Robert Beanlands** (see item earlier) and the CCPM Symposium on "Medical isotopes and imaging: Where do we go from here?" which featured OMPI members **Glenn Wells** and **Carl Ross**.

As part of the meeting, **Peter Raaphorst**, **Paul Johns** and **Dave Rogers** were key organizers of successful workshops on, respectively, Bone Mineral Densitometry, the Canadian Light Source and NSERC Funding Opportunities, which were appreciated by the conference attendees.

There were two local award winners to report. **Chad Hunter**, who completed his MSc at Carleton in August, won 3rd place in the J.R. Cunningham

Young Investigators' Symposium and **John McCaffrey** (Ionizing Radiation Standards, NRC) was runner up in the proffered presentations category.

Table 7 lists all those from the Ottawa medical physics community that played a part in making the conference such a success. Thanks to all who contributed so much.

People

In April 2010 **Dr Gabriel Sawakuchi** was appointed as an Assistant Professor in the Department of Physics at Carleton. Gabriel arrived in chilly Ottawa from the warmth of Houston and the world-renowned M. D. Anderson Cancer Center. Gabriel's background is in proton dosimetry and the use of optically-stimulated luminescent dosimeters. His long-term aim is to see the first proton therapy centre opened in Canada.

In the summer of 2010 **Dr Rowan Thomson** made the transition from post-doctoral fellow to assistant professor with the Carleton Department of Physics. Her appointment means that there is now a very strong faculty of medical physicists within the department, which should only lead to greater visibility for OMPi.

The future complement of OMPi was added to in the last year:

- Vlad (**Claudiu Cojocaru**, NRC), Aug, 2009
- James (**Lesley Buckley**, TOHCC), March 2010
- Leena (**Elsayed Ali**, Carleton U), Aug, 2010.

From our students and members there were multiple finalists in conference competitions this year. **Elsayed Ali** (along with **Chad Hunter** noted above) was a finalist in the 2010 COMP J.R. Cunningham Young Investigators' Symposium while **Amanda Cherpak** was a finalist in the Young Scientist Competition at the ESTRO 2010 meeting in Barcelona. **Iwan Kawrakow** was co-author on the paper awarded the Farrington Daniels prize at the 2010 AAPM meeting in Philadelphia. These examples show the high quality of research carried out within the OMPi network.

Inaugural Awarding of the Kiwanis-Marwah Scholarship

The first seminar of the season, on Sept 17, was followed by a reception to mark the inaugural awarding of a new scholarship. This was the second such event in 2009, the first having been the Clarke Scholarship in February (see Annual Report # 21). The recipient was **Claire Foottit**, who was then entering the final stretch of her PhD on using mri signal phase to measure arterial input function and perfusion.

Claire writes:

“Last September, I had the privilege of receiving the inaugural **Kiwanis Club of Ottawa Medical Foundation and Dr. Kanta Marwah Graduate Scholarship in Medical Physics** while studying for my doctorate at Carleton University. This scholarship fund was established to support MSc and PhD students conducting research in medical physics. The establishment of this fund was made possible by money raised by the Kiwanis Club of Ottawa Medical Foundation through the Kiwanis Bed Race at Winterlude and private member donations, as well as through a sizable donation by Dr. Kanta Marwah, a professor emeritus in the Department of Economics at Carleton University. The money raised was then matched by Carleton University to establish a \$100,000 scholarship fund.

Receiving this award was a great honour, and the recognition of my work motivated me to work even harder towards the completion of my degree. This generous award also provided relief from financial stress which arose near the end of my degree. I feel very lucky that the community was there to support me. I am grateful for all the support I received while studying at Carleton University.

I would like again to thank Dr. Kanta Marwah and the members of the Kiwanis Club of Ottawa for their generous donation and their choice to support the Medical Physics program at Carleton University. I know many other students will benefit from their kindness and hard work. On behalf of myself and them, thank you.”

And our congratulations to Claire!



2009 Sept 17, left to right: Wayne French (chair, Kiwanis Club of Ottawa Medical Foundation), Dr. Roseann O'Reilly Runte (President, Carleton U.), Prof. Kanta Marwah (Dept. Economics), Claire Foottit, Bill Gosewitz (President 2007-2008, Ottawa Kiwanis Club). The oversized cheque represents the donation made in May 2008 to establish the scholarship.

AAPM Coolidge Award to David Rogers

In July 2010 **Professor David W.O. Rogers** was awarded the 2010 William D. Coolidge Award from the American Association of Physicists in Medicine (AAPM). He is only the fourth Canadian recipient in the history of the award. This is the AAPM's highest honour and is presented annually to a member who has made a significant impact in the field of medical physics.

"Dave Rogers is one of the greatest medical physicists that Canada has produced to date and he richly deserves the Coolidge Award," says Ervin Podgorsak, professor emeritus from McGill University, who nominated Rogers for the award.



Dave is the Canada Research Chair in Medical Physics and heads the Carleton Laboratory for Radiotherapy Physics. He has been very active in OMPI since its inception and shows no sign of

taking a break following this wonderful award. Our warmest congratulations go to Dave!

Grants, Facilities and Equipment

Glenn Wells of the University of Ottawa Heart Institute was awarded a Heart and Stroke Foundation of Ontario grant (more than \$150,000) to develop quantitative flow measurements for SPECT using the new dedicated cardiac SPECT cameras based on cadmium-zinc-telluride multipinhole detectors.

Rob deKemp (also UOHI) was awarded a grant in Oct 2009 by CIHR in commercial partnership with DRAXimage (Kirkland, QC). This large project (\$2M over 2 years) is a multi-centre Canadian clinical trial to evaluate the use of low-dose Rubidium-82 PET for myocardial perfusion imaging as a replacement for Tc-99m SPECT. This is one of a number of projects related to the isotope crisis outlined elsewhere in this report.

The new cancer centre at the **Queensway Carleton Hospital** began treatments early in 2010. In conjunction with the expansion of radiotherapy facilities at The Ottawa Hospital General Campus this meant that 5 new linear accelerators were installed and commissioned in under 6 months. In addition, an *Accuray Cyberknife* robotic radio-surgery linac was installed and commissioned over the summer of 2010. This device can treat very small tumours with unparalleled precision. Ottawa now boasts one of the most comprehensive cancer

centres in Canada. Congratulations must go to Brenda Clark and her team of medical physicists for achieving so much this year.

National and International Activities

During the past academic year many OMPI members served on various national and international committees. A small selection is listed below:

CCPM (Canadian College of Physicists in Medicine) Board members: **David Wilkins** became President in 2009, and **Glenn Wells** joined the Board in 2010.

AAPM Science Council - **David Rogers**

AAPM Calibration Laboratory Accreditation Sub-committee – **Malcolm McEwen** (Chair)

AAPM Brachytherapy Source Registry Work Group - **Rowan Thomson**.

ICRU (International Commission on Radiation Units) report committee on "Key data for measurement standards in the dosimetry of ionizing radiation" – **Carl Ross**

Editorial Advisory Board, *Physics in Medicine and Biology* – **Carl Ross, David Rogers**

CAMPEP (Commission on Accreditation of Medical Physics Educational Programs) Graduate Education Program Review Committee – **Brenda Clark**

Editorial Board and Deputy Editor (radiotherapy) of *Medical Physics* – **David Rogers**

IEC (International Electrotechnical Commission) Sub-committee 62C (Equipment for Radiotherapy, Nuclear Medicine and Radiation Dosimetry) – **Lee Gerig**

IAEA EMRAS II (Environmental Modeling for Radiation Safety) working group 1 – harmonization of controlled discharges – **Trevor Stocki** (chair).

6. OMPI Executive

I would like to thank the following for serving on the Executive in 2009-2010: David Rogers (Academic Officer to the end of 2009) and Paul Johns (Academic Officer for 2010), Rob deKemp (Past-Director), and Richard Wassenaar (Secretary). I'd like to thank Tong Xu for continuing to organize excellent seminars. Thanks, finally, to Amanda Cherpak for representing the students, and to our observers, Brenda Clark (TOHCC) and Trevor Stocki (Health Canada).

7. OMPI Website

The OMPI maintains a website with detailed information on the organization, its members, students and alumni, seminars and research areas. Please visit

www.physics.carleton.ca/ompi.

Table 1. OMPI Members, 2009-2010.For details see <http://www.physics.carleton.ca/ompi> and select Members/Students.

	Member	Institution and Unit	Specialization within Medical Physics
1	Lesley Buckley	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
2	Ian Cameron	Diagnostic Imaging, The Ottawa Hospital	MRI
3	Brenda Clark	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
4	Claudiu Cojocaru	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiotherapy and radiation dosimetry
5	Joanna Cygler	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
6	Rob deKemp	Cardiac PET Centre, University of Ottawa Heart Institute	PET
7	Madhu Dixit [§]	Department of Physics, Carleton University	Detectors for ionizing radiation
8	Costel Fleuraru	Institute for Microstructural Sciences, NRC	Optical coherence tomography
9	Lee Gerig	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
10	Elizabeth Henderson	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
11	Bog Jarosz	Department of Physics, Carleton University	Ultrasound thermal therapy
12	Paul Johns	Department of Physics, Carleton University	X-ray imaging
13	Iwan Kawrakow	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiotherapy and radiation dosimetry
14	Malcolm McEwen	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiation dosimetry
15	Cheng Ng	Retired from Ottawa Hospital Research Institute	Radiobiology and hyperthermia
16	Balazs Nyiri	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
17	G. Peter Raaphorst	Retired from The Ottawa Hospital Cancer Centre; Consultant medical physicist.	Radiobiology and hyperthermia
18	Richard Richardson	Radiation Biology & Health Physics, Chalk River Laboratories, AECL	Radiation physics and radiation protection
19	David Rogers	Department of Physics, Carleton University	Radiotherapy and radiation dosimetry
20	Carl Ross	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiation dosimetry
21	Ken Shortt	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiation dosimetry
22	Laurel Sinclair [§]	Earth Sciences Sector, Natural Resources Canada	Detection of radiological threats
23	Trevor Stocki	Radiation Protection Bureau, Health Canada	Health Physics
24	Jason (Jiansheng) Sun	Therapy Systems, Nucletron Canada	Radiation treatment planning
25	Janos Szanto	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
26	Frédéric Tessier	Ionizing Radiation Standards, Institute for National Measurement Standards, NRC	Radiation dosimetry
27	Rowan Thomson	Department of Physics, Carleton University	Radiotherapy and radiation dosimetry
28	Tony Waker	Faculty of Energy Systems & Nuclear Science, University of the Ontario Institute of Technology	Radiation physics and radiation protection
29	Julia Wallace	Department of Physics, Carleton University	MRI
30	Richard Wassenaar	Division of Nuclear Medicine, The Ottawa Hospital	Nuclear medicine imaging
31	Glenn Wells	University of Ottawa Heart Institute	Nuclear cardiology
32	David Wilkins	Department of Medical Physics, The Ottawa Hospital Cancer Centre	Radiotherapy
33	Ruth Wilkins	Consumer & Clinical Radiation Protection Bureau, Health Canada	Radiobiology
34	Tong Xu	Department of Physics, Carleton University	Positron emission tracking (PeTrack)

[§]Associate Member

Table 2. OMPI Executive, 2009-2010.

Position	Member	Position	Member
Director [§]	Malcolm McEwen	Student Representative [†]	Amanda Cherpak
Past-Director [§]	Rob deKemp	Seminar Organizer	Tong Xu
Academic Officer [§]	David Rogers (to Dec 31) Paul Johns (from Jan 1)	Observer – TOHCC	Brenda Clark
Secretary [§]	Richard Wassenaar	Observer – Health Canada	Trevor Stocki

[§]position elected by the members

[†]position elected by the medical physics graduate students

Table 3. Graduate Students in Medical Physics, 2009-2010.

For details see <http://www.physics.carleton.ca/ompi> and select Members/Students. A list of Past Graduates is also available.

	Student	Program	Supervisor	Project Area
1	Elsayed Ali	Ph.D.	Dave Rogers	Linac spectral measurements
2	Patrick Assouad	M.Sc.	John Armitage	FTIR instrumentation for cancer detection
3	Lindsay Beaton	Ph.D.	Ruth Wilkins	Novel biological dosimeters
4	Jason Belec	Ph.D.	Brenda Clark	Elekta radiotherapy
5	Marc Chamberland	M.Sc./PhD	Tong Xu	PeTrack algorithm development [commenced PhD Sept 2009]
6	Amanda Cherpak	Ph.D.	Joanna Cygler	Radiation dosimetry applications of MOSFETs
7	Tyler Dumouchel	Ph.D.	Rob deKemp	Small-animal PET
8	Claire Footitt	Ph.D. [†]	Ian Cameron	MR perfusion imaging using signal phase
9	Lourdes Maria Garcia-Fernández	Ph.D. [†]	Peter Raaphorst & David Wilkins	Radiobiological model development and verification
10	Elena Gil	M.Sc. [†]	Joanna Cygler	Effect of dose to medium vs dose to water in radiation therapy
11	Chad Hunter	M.Sc.	Rob deKemp	⁸² Rb PET effective dose determined from patient images
12	Brian King	Ph.D. [†]	Paul Johns	X-ray scatter imaging: measurement of cross sections
13	Michel Lalonde	Ph.D.	Richard Wassenaar	Nuclear med.: cardiac dyssynchrony
14	Dan La Russa	Ph.D. [†]	Dave Rogers	Accuracy of Spencer-Attix cavity theory
15	Ernesto Mainegra-Hing	Ph.D.	Iwan Kawrakow	MC corrections for x-ray standards
16	Bryan Muir	Ph.D. [§]	Dave Rogers	rad. dosimetry: calculating beam quality conversion factor k _Q
17	Munira Fardous-Nahin	M.Sc.	Glenn Wells	²⁰¹ Tl small animal SPECT reproducibility
18	Elena Olariu	Ph.D. [†]	Ian Cameron	MR tractography of white matter
19	Elizabeth Orton	Ph.D.	Brenda Clark	lung tumour delineation using PET
20	Amir Pourmoghaddas	M.Sc./PhD	Glenn Wells	cardiac PET respiratory motion correction [commenced PhD Jan 2010]
21	Mojgan Soleimani	M.Sc. [†]	Tong Xu	PeTrack detector development
22	Jared Strydhorst	Ph.D.	Glenn Wells	Reconstruction algorithm for small-animal PET
23	Justin Sutherland	Ph.D.	Dave Rogers	MC dose calculations for brachytherapy
24	Sorina Truica	Ph.D.	Ian Cameron	Diffusion-weighted mri: blood flow abdominal microvasculature

[§] Fast-tracked from M.Sc. program, Sept 2009.

[†] Degree completed between 2009 July 1 and 2010 August 31; see Table 4.

Table 4. Theses Completed, 2009-2010.

Ordered by date of defence.

Student	Degree	Supervisor	Thesis Title and Date of Defence
Mojgan Soleimani	M.Sc.	T. Xu	Detector development for positron emission based real-time tumour tracking Aug 28, 2009
Elena Olariu	Ph.D.	I. Cameron	Analysis of water diffusion in white matter using a hydration layer model Sept 1, 2009 External Examiner: Terry Thompson, Univ. of Western Ontario
Dan LaRussa	Ph.D.	D. Rogers	The effect of low-energy electrons on the response of ion chambers to ionizing photon beams Sept 9, 2009 External Examiner: Larry DeWerd, Univ. of Wisconsin at Madison
Marc Chamberland	M.Sc.	T. Xu	Performance evaluation and algorithm development for real-time tumour tracking using positron emission markers Sept 11, 2009
Brian King	Ph.D.	P. Johns	Accurate measurement of the x-ray coherent scattering form factors of tissues Sept 11, 2009 External Examiner: David Fleming, Mt. Allison Univ., Sackville NB
Lourdes Maria Garcia-Fernández	Ph.D.	P. Raaphorst & D. Wilkins	Total marrow irradiation using helical Tomotherapy Jan 5, 2010 External Examiner: John Schreiner, Queen's Univ., Kingston ON
Elena Gil	M.Sc.	J. Cygler	Analysis of dosimetric differences between dose-to-water and dose-to-medium calculations for electron beams Jan 7, 2010
Amir Pourmoghaddas	M.Sc.	G. Wells	Respiratory motion compensation in ⁸² Rb cardiac PET/CT Jan 21, 2010
Chad Hunter	M.Sc.	R. deKemp	The internal dosimetry of Rubidium-82 based on dynamic PET/CT imaging in humans Aug 31, 2010
Claire Foottit	Ph.D.	I. Cameron	The use of signal phase in dynamic contrast-enhanced magnetic resonance imaging Sept 2, 2010 External Examiner: Martin Lepage, Université de Sherbrooke

Table 5. OMPI Seminars, 2009-2010.For details see <http://www.physics.carleton.ca/ompi/news/seminars/archives>.

Date / Location	Speakers and Titles
Sept 17, 2009 Carleton University	Claire Footitt: Perfusion measurement in brain and prostate cancer: Use of mri signal phase to measure arterial input function Carl Ross: A prize-winning paper Presentation of the first Kiwanis Club of Ottawa Medical Foundation and Dr. Kanta Marwah Graduate Scholarship in Medical Physics.
Nov 19, 2009 CNSC Headquarters	Kavita Murthy (Class II Nuclear Facilities and Equipment Division, Canadian Nuclear Safety Commission): Growth and trends in class II nuclear facilities in Canada: A regulator's perspective
Dec 18, 2009 Canada Science and Technology Museum	Frédéric Tessier: Effective point of measurement of thimble ion chambers in megavoltage photon beams David Pantalony (Canada Science and Technology Museum): Nuclear medicine in Canada in the 1950's: History through one artifact
Jan 21, 2010 NRC/IRS	Justin Sutherland: Monte Carlo-calculated absorbed dose energy dependence of EBT and EBT2 film Brenda Clark: Management of error in radiation treatment using incident learning
Feb 25, 2010 Heart Institute	Richard Richardson: Ionizing radiation and aging: rejuvenating an old idea
March 25, 2010 Carleton University	Chad Hunter: New effective dose estimates for Rb-82 based on dynamic PET/CT imaging in humans Laurel Sinclair (Natural Resources Canada): Long-range detection of radioactive threat material Reception to mark the opening of the PeTrack Lab at Carleton, under the direction of Dr. Tong Xu.
April 22, 2010 Health Canada	Elsayed Ali: Unfolding linac photon beam spectra from transmission measurements Tong Xu: Dynamic dual-energy chest radiography: A potential tool for lung tissue motion monitoring and function study
May 20, 2010 NRC/IRS	Munira Fardous Nahin: Reproducibility of Tl-201 for cardiac micro-SPECT imaging with a rat model Paul Johns: Coherently-scattered x rays as a source of radiological contrast Followed by the Annual BBQ.

Table 6. Carleton University Department of Physics Seminars in Medical Physics, 2009-2010.

Departmental seminars on medical physics topics. For a complete list, see

<http://www.physics.carleton.ca/colloquium>.

Date	Speaker, Institution, and Title
Sept 9, 2009	Larry DeWerd, Dept. Medical Physics, University of Wisconsin at Madison Brachytherapy calibrations: The first step towards clinical use
Sept 15, 2009	Sangeeta Murugkar, School of Information Technology & Engineering, Univ. of Ottawa Non-invasive optical imaging in biomedicine
Sept 29, 2009	Rowan Thomson, Carleton Laboratory for Radiotherapy Physics Brachytherapy physics with Brachydose
Oct 27, 2009	Gabriel Sawakuchi, M.D. Anderson Cancer Center, Houston, Texas Clinical proton dosimetry: A brief overview and challenges
Nov 10, 2009 OCIP Seminar	Richard Wassenaar, Nuclear Medicine, The Ottawa Hospital Nuclear medicine and the isotope shortage
Dec 15, 2009 OCIP Fall Graduate Student Seminars	Claire Foottit Perfusion measurements in brain and prostate cancer: Use of mri signal phase to measure the arterial input
Dec 18, 2009 OCIP Christmas Symposium	Paul Johns, Carleton University X-ray coherent scatter imaging: Using diffraction from people
March 31, 2010, evening. Public Lecture	Richard Wassenaar, Nuclear Medicine, The Ottawa Hospital & Paul Schaffer, Nuclear Medicine, TRIUMF, Vancouver The Global Isotope Crisis: How does it affect my healthcare? How Canadian scientists are solving the problem.
April 1, 2010	Paul Schaffer, Nuclear Medicine, TRIUMF, Vancouver Alternative technologies for the production of medical isotopes
May 7, 2010 OCIP Spring Graduate Student Seminars II	Chad Hunter Effective dose estimates for Rubidium-82 based on dynamic PET/CT imaging in humans
May 19, 2010 OCIP Spring Graduate Student Seminars III	Ernesto Mainegra-Hing Fast Monte Carlo cone beam computed tomography (CBCT) scatter correction calculations Munira Fardous-Nahin Reproducibility of Tl-201 for cardiac micro SPECT imaging with a rat model
June 16, 2010, evening. Public Lecture in con- junction with COMP/ CCPM Conference	Robert Beanlands, Chief of Cardiac Imaging, University of Ottawa Heart Institute The window to your heart: Revolution in cardiac imaging

Table 7. Ottawa people involved in the organization of the 2010 COMP Annual Meeting

Malcolm McEwen *	Andrew McDonald	Jared Strydhorst †	Lin Moody
Crystal Angers *	Tong Xu *	Justin Sutherland †	David Wilkins *
Amanda Cherpak †	Elsayed Ali †	Mark Xu	Eric Vandevort
Elizabeth Orton †	John-Paul Archambault	Glenn Wells *	Brenda Clark *
Claudiu Cojocaru *	Lindsay Beaton †	Carl Ross *	Gosia Niedbala
Bryan Muir †	Marc Chamberland †	Rob deKemp *	Jean Gallant
Quaji Jahan	Tyler Dumouchel †	Joanne Martin †	Mallory Thomas
Lesley Buckley *	Claire Foottit †	Marlene Orton	Bill Jack †
Costel Fleuraru *	Lourdes Garcia	Carrie Barlow	Yeremia Henderson †
Paul Johns *	Munira Nahin †	Beth Gorham	

* OMPI member

† Carleton Physics Department