COMP OCPM

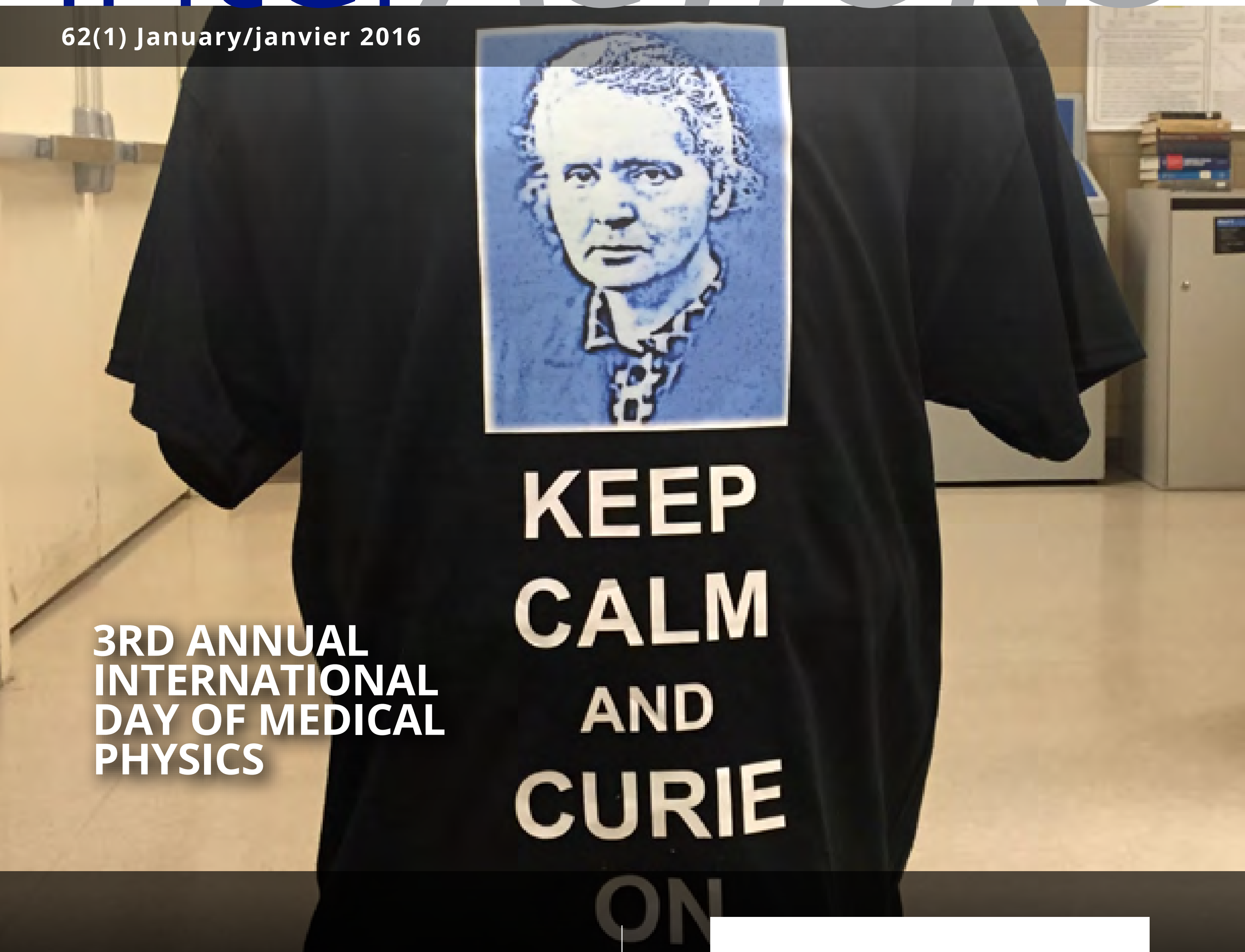
Canadian Organization of Medical Physicists
Organisation canadienne des physiciens médicaux

THE CANADIAN COLLEGE OF PHYSICISTS IN MEDICINE
LE COLLÈGE CANADIEN DES PHYSICIENS EN MÉDECINE

CANADIAN MEDICAL PHYSICS NEWSLETTER | LE BULLETIN CANADIEN de PHYSIQUE MÉDICALE

InterACTIONS

62(1) January/janvier 2016



3RD ANNUAL INTERNATIONAL DAY OF MEDICAL PHYSICS

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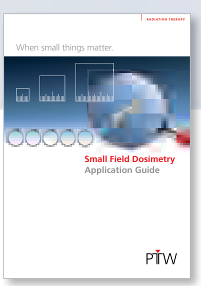
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Please submit stories MS Word or ASCII text format. Images in Tiff format at 300 dpi resolution are preferred.

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MESSAGE FROM THE COMP PRESIDENT

I am writing this message to you from Chicago, where the COMP board met this year in order to coordinate our board meetings with other meetings of sister organisations. We did his by holding our business meetings in conjunction with the RSNA, where we were able to have very productive meetings with the AAPM's EXCOM, the CAR (Canadian Organisation of Radiologists), and the CAMRT.

The meeting with AAPM leadership was the first time we have had such a meeting since I have been on the COMP board, if not longer. It was clear to me during this meeting that COMP has much to contribute to our profession at a global level. We discussed our relations with the IOMP, areas of potential cooperation, and leadership within our profession. Many of the activities that canadian medical physicists participate in are very valuable to the global community, especially our recent work in quality and safety. As many of you know, COMP's quality assurance committee has undertaken the significant task of producing a series of technical quality assurance documents for radiotherapy equipment. This has been a very long project, has roots in the old CAPCA documents, and seems to have found a permanent home with CPQR. After our meeting with the AAPM, I can say that there is considerable interest in these documents and I am very hopeful that they will be impactful not only in Canada, but with the entire medical physics community around the world, the United States included.

One of the important topics of discussion with the AAPM was that of leadership. As I am sure we would all agree, leadership within our profession, and encouraging medical physicists to become leaders, not just within our community, but within the broader health care system is vitally important to all of us and to health care more generally. In this global economy, health care systems are challenged everywhere. In Canada, I worry that with health care budgets being stressed as much as they are, that our system is becoming too focussed on budget reduction without given proper thought to improved efficiencies through innovation. This has the potential to be a vicious and negative circle, since reducing budgets often reduces the resources required for a system to better innovate. In my mind, innovations in health care technology are quite important to making our health care system more efficient, and so it is critical that medical physicist contribute to leadership within the entire health care system for it to improve.

For many medical physicists, the career path stops at the head or chief medical physicists level. This is a shame because our community has all the required analytical skills to effectively lead at the senior hospital executive level. I believe that many of us could and should be aiming to be hospital CEOs, not medical physics chiefs. There have been some in our profession who have become great leaders in health care and elsewhere (think Sylvia Fedoruk, who became Chancellor of the University of Saskatchewan and then Lieutenant Governor of Saskatchewan; Michael Sherar, CEO of Cancer Care Ontario; and now David Jaffray, recently appointed as Executive Vice President of University Health Network), but the vast majority

Dr. Marco Carlone

of our leaders stop at the head medical physics position. It is unfortunate that given our analytical leadership skills, that more people have not been able to advance through the system and become better advocates at the senior health care management level.

So what is the problem? Unfortunately, I would suggest that leadership in analytical and critical thinking does not always (or perhaps even rarely) translate into broader leadership effectiveness. In the world we live in, leadership is more to do with communication, inspiration, and business skills, and less to do with technical excellence. Our members often have little, if any, business training and skills development so that as we interact and negotiate with the broader health care environment, we can communicate using the concepts and terminology that health care administrators understand and work within. Unless we are able to communicate how our technical knowledge of the health care system can help in a manner that

Continued on page 42

MESSAGE FROM THE CCPM PRESIDENT

In November, the CCPM Board met in Ottawa for its mid-year meeting. This is typically a time when we work on changes to our regulations and start discussions on new projects. This year was no different! Here is a summary of our activities.

This year, the College introduced a new online recertification process through the CCPM website. Ninety-six Members were up for recertification so the system was thoroughly tested! Initial feedback indicates that the process was well appreciated by our recertifying members. The College intends on continuing with this procedure in the future. Of the 96 recertifying members, 11 chose not to recertify, having retired from clinical duties. Many of these were past board members of the College. I would like to take this opportunity to publicly thank them for their service to the College and for their support of the College activities over the years.

During the mid-year meeting, the Board approved two significant changes to the eligibility criteria for the radiation oncology membership exam. Firstly, CAMPEP introduced in 2011 a CAMPEP Certificate which was intended to provide a pathway for individuals with a doctoral degree in physics or a related field to obtain the didactic courses required for access to a CAMPEP-accredited residency program. The Board has decided that a graduate from a CAMPEP certificate program would be equivalent to a graduate from a CAMPEP-accredited graduate program, and would therefore meet the "CAMPEP requirement" for eligibility to write the MCCPM exam.

Also missing from our current regulations was an alternative pathway for individuals such as foreign-trained medical physicists or Canadian medical physicists who do not meet the CAMPEP requirement. For these physicists, the Board has introduced a bridging program that would ensure that these physicists meet similar training to a residency program. The bridging program is essentially a structured mentorship that must be presented to the Board for approval. The length of the program varies according to the experience of the candidate, who must have at least four years (FTE) of experience as a medical physicist. Details can be found in our regulations on the CCPM website (and in the article in this issue – editor)..

In 2015, the College made significant changes to the examination process for the fellowship exam. Candidates were required to provide additional documentation to the examiners which emphasised their leadership qualities. The exam process was also slightly modified to allow more questioning on the presentation and supporting documentation. The College will continue with this approach for the 2016 FCCPM exam and has made some minor changes to its regulations and to the fellowship application procedure to allow this to happen.

After discussions, the Board has decided to delay its decision regarding the BMD certification. More information is required on the viability of such a certification. A cost-benefit analysis is also needed before the Board can proceed. Help will be requested from the Ontario physicists who have setup this certification for

Dr. Clément Arsenault

the OAR BMD Facility Accreditation and from COMP.

AMCES has, over the years, accumulated several historical documents relating to the CCPM and COMP. The CCPM Board is asking any past registrars, secretary-treasurers, and chief examiners that might have kept minutes of meetings, old exam questions, or any other document of interest to contact the CCPM president or executive director to see if these documents might be added to our archives.

Finally, the contracts between CCPM, COMP, and AMCES are currently being reviewed since they expire on Jan 31, 2016. The CCPM has a contract with COMP relating to the collaboration and financial support COMP provides the CCPM. There is also a joint contract between AMCES, COMP, and CCPM for services provided by AMCES. Discussions have started on renewing these contracts. Slight changes may occur but the general intent will remain the same.

EXECUTIVE DIRECTOR REPORT

As I write this column I have just come back from the COMP Board midyear meeting. This year the meeting took place in conjunction with the RSNA meeting in Chicago. Hosting the Board meeting in Chicago was a first and we took advantage of the opportunity to meet with the AAPM, the CAR and CAMRT. All of the meetings were a great success and provided an opportunity for us to further increase the profile and influence of COMP.

I have now been working with COMP for 10 years and I continue to be inspired by the dedication and commitment of the volunteers. What has also inspired me is the Board's interest in learning about how they can be more effective leaders of the organization. My company, AMCES, has worked with over 100 not-for-profit organizations and, in our experience, organizations that thrive are governed by Boards with a strong strategic orientation, a culture of self-assessment and accountability, and a healthy attention to board recruitment and development. Evaluated on this basis, you can be assured that COMP is governed well. The Board has a strategic planning process in place, there is sound stewardship of COMP's financial resources, and a commitment to making investments that will benefit the medical physics community now and in the future. The Board participates in an annual orientation process which is focused on roles, responsibilities, and working together. Finding new and qualified Board members no longer requires "arm-twisting" – we even actually have elections from time to time! We are looking for nominations for both the vice-president and secretary roles for 2016. The Board is an energetic and creative group and decisions are made based on open discussions and consensus. It is a pleasure to work with such a professional group of people.

Of course, this extends beyond the Board as well. All committees are also working hard on your behalf and I would like to note the work that is being done (largely unseen) by the imaging committee. The imaging committee has been dealing with the Healing Arts Radiation Protection (HARP) Act in Ontario, which included writing a letter in support of the modernization of the HARP Act and making a submission regarding the establishment of a fee for the approval of x-ray installations. The imaging committee is also representing COMP on the new initiative Canada Safe Imaging – which is a coalition of stakeholders formed to address the need for a national strategy and action plan relating to radiation safety for medical imaging care in Canada. The committee has also assisted the Canadian Agency for Drugs and Technologies in Health (CADTH), with its diagnostic imaging survey. The committee chair, Daniel Rickey, worked closely with the Manitoba Government in renewing their Radiation Protection Act (Bill 37) which received royal assent on November 5, 2015. COMP sent a letter in support of this Act to the minister of health for Manitoba.

COMP was well represented recently at the CNSC hearings by John Schreiner and David Wilkins who are volunteering as part of QARSAC's CNSC liaison sub-committee. This was COMP's first time appearing at these hearings and I was fortunate to be able to attend as an observer. John and Dave's presentation was very professional and they represented COMP will in a true spirit of collegiality. John even got one of the commissioners to laugh!

Ms Nancy Barrett

Our focus over the next few months will be continuing the work on our upcoming meetings. The 2016 Winter School which will be taking place at the Fairmont Le Chateau Montebello, the world's largest log cabin, from February 7th to 11th. To further encourage the participation of multi-professional teams, we are offering 15% off the registration fees for those centres who register participants from more than one profession from within their centre. The 2016 Annual Scientific Meeting will be taking place in colourful St. John's, Newfoundland from July 20th to the 23rd. I encourage you to consider joining us for the professional development and the opportunity to network with your colleagues.

As always, thank you for your support and please contact me anytime with ideas and feedback.

CHIEF EXAMINER REPORT

Renée Larouche
Centre hospitalier de l'Université de Montréal

Les responsabilités de l'Examinatrice en chef du CCPM sont de s'assurer que les examens pour devenir membre ou obtenir la distinction de Fellow se font selon le respect des Règlements du Collège. Ceci comprend

The responsibilities of the chief examiner of the CCPM are to ensure that the membership and fellowship exams are "conducted in accordance with the Regulations of the College" . This includes convening an examination committee to create, invigilate, and mark the exams. Boyd McCurdy has done this the past three years, with me observing and learning from him as the deputy examiner. I owe him a great debt of gratitude for the work that he has done. As the new chief, my priorities will be to organize a smooth examination process for the candidates, and be very clear with them about what is expected from them and how the committee evaluates them. Luckily, the College has a great group of volunteers who help out in all the tasks associated with the examination process. Also, Alasdair Syme, the new deputy examiner of the College is there to help me out. A hearty THANK YOU to all!

Renée Larouche

First, I wanted to look at the success rates of past exams. I looked at the RO sub-specialty to calculate pass rates. Other sub-specialties are not offered every year and when offered, only to a few candidates. These pass rates were calculated for the past three years for each exam: the written and oral. I also looked at a subset group where I excluded candidates repeating the oral exam, and looked at the overall pass rate for both exams. The same analysis was done for the fellowship oral exam, but with all sub-specialties grouped.

year	written exam	oral exam	overall	FCCPM (excluding repeat oral)
2015	79.3%	78.6%	69.0%	50%
2014	80.6%	82.1%	63.3%	64.3%
2013	71.4%	80.9%	53.8%	50%

Congratulations to the successful candidates! The candidates having been successful in 2015 in obtaining membership to the CCPM are:

Ady Abdellatif, Elsayed Ali, Jorge Alpuche Aviles, Laurie Archambault, Hamed Bekerat, Benjamin Burke, Amanda Cherpak, Congwu Cui, Hatim Fakir, Frédéric Girard, Marjorie Gonzalez (NM), James Gräfe, Rafael Katchadourian, Anthony Landry, Aimée Lauzon, Vincent Leduc, Étienne Létourneau, Ives Levesque (MRI), Ian Nygren, Daren Owen, Naomi Shin, Marcus Sonier, Varun Thakur, Atiyah Yahya (DI), and Lixin Zhan.

The candidates having been successful in 2015 in obtaining the fellowship distinction of the CCPM are:

Crystal Angers, Fadi Hobeila, Chandra Joshi, and Ge (Grace) Zeng.

For future candidates to the membership exam, I wish to remind them that this is a competency exam, and as such, evaluates knowledge and clinical know-how in four distinct sub-specialties. I refer the candidates to the regulations (section D.1) for a more in depth explanation of the goals of the exam. The written exam is typically offered in many cities across Canada. In our present technology driven society, I encourage candidates to practice handwriting in the months previous to the exam. This will help in legibility of the writing, on the speed at which a candidate can write, and avoid painful cramps. The oral exam is given in Montreal. Other examination centres elsewhere were visited and would be apt at offering the services required. The Board has discussed the possibility of moving the exam, but for the next few years at least, the oral exam will stay in Montreal in May.

For future candidates to the fellowship exam, I wish to remind them that they must demonstrate "excellence" in clinical or research service. I refer the candidates to the regulations (section E.1) to better understand what the examination committee is looking for. This exam is evolving, and will evolve further in the coming years as the Board is reflecting on what to examine and how. At present, up to two projects, one of which with clinical implications, can be submitted with supporting material. One of these projects is presented to the panel. This presentation needs to be a hybrid between a scientific presentation exposing the quality of work done and a demonstration of how the candidate was involved in the work, the decisions that needed to be made to move forward the project, and how ultimately the completion of the project impacted positively on patient care. Following the presentation of the project, and questions concerning it, a standardized question set is asked of each candidate. The panel is evaluating both the "excellence" of the answer and how it is communicated. The FCCPM exam is held in the days prior to COMP's annual scientific meeting. This year it will be held in St-John's, Newfoundland in July.

To those preparing for the exam, I hope that you enjoy, as much as possible, this time to study and reflect about medical physics applied to patient care. To those who are MCCPM physicists, we are always looking for new volunteers to broaden and enrich our process. I may be contacting you to help out.

CNSC FORUM:

REGULATORY ISSUES WHEN MODIFYING OR UPGRADING CLASS II PRESCRIBED EQUIPMENT

Kavita Murthy
Accelerators and Class II Facilities Division (ACFD), CNSC

Facilities which use Class II prescribed equipment, such as medical accelerators, need to be able to provide the highest quality treatments to the patients they treat. As a result, they are continually in the process of upgrading their equipment to incorporate the latest and best features and software. The CNSC does NOT wish to unduly impede this process. However, every licensee, including equipment manufacturers and end users, must be aware of and comply with the regulatory requirements related to equipment certification when making such changes.

In November of 2015, in response to an incident related to equipment certification, the following notification was sent to Radiation Safety Officers at Class II radiotherapy treatment facilities.

> *"The CNSC is aware that manufacturer upgrades of licensed Class II prescribed equipment such as medical linear accelerators happen quite frequently, particularly for things like software updates. This is acceptable, provided the upgrades do not fundamentally alter the operational characteristics of the equipment (i.e., such that they no longer correspond to the information submitted to the CNSC by the manufacturer when applying for certification of the device). However, it has recently come to our attention that certain manufacturers of Class II prescribed equipment have been performing significant physical modifications and upgrades to linear accelerators that go beyond the limits of what is acceptable under the regulations. When having a new accelerator installed, or when a manufacturer proposes equipment modifications,* ***it is incumbent upon you as the holder of the operating licence to make sure the modifications do not result in you being in non-compliance with your licence.*** *This is a friendly reminder of your obligations as a licensee operating a facility under Class II Nuclear Facility licence.*

> ***Regulatory obligations of licensees operating under a CNSC licence***

> *As licensees operating a Class II nuclear facility under a CNSC licence, you are obliged to operate in accordance with the Nuclear Safety and Control Act, (the Act) the regulations made pursuant to the Act and your licence. Specifically:*
>
> - *The Class 2 Nuclear Facilities and Prescribed Equipment Regulations, (C2NFPER) section 10(a) stipulates that you* ***shall not use a Class II prescribed equipment unless it is a certified model.*** *While self-evident when a brand new piece of equipment is purchased, manufacturers sometimes make such significant changes to the equipment that its Class II prescribed equipment certificate becomes invalid (i.e., the equipment is not certified to allow operation in Canada with the new configuration). To avoid this problem you should require that the manufacturer provide assurance that the equipment is certified for use in Canada.*
> - *The requirement to* ***operate in accordance with your licence*** *requires that the dose rate and annual dose estimates submitted in support the facility design remain valid. Prior to operating equipment in a new configuration such as FFF, you are required to revalidate the safety case for your facility by evaluating the potential impact on dose rates and annual doses to workers in adjacent areas, and submit the information to the CNSC for approval along with a request for a licence amendment.*
> - *The requirement to* ***operate in accordance with your licence*** *also means that the equipment identified in your licence in the section "****Appendix: Nuclear Substances and Class II Prescribed Equipment****" must be the same as the equipment installed in your facility. Upgrades to a new model, which do not otherwise alter the fundamental operating characteristics of the equipment (i.e., beam energy and/or dose rates) do not necessarily require a re-evaluation of the safety case, but you are required to submit the information to the CNSC and request a licence amendment.*
>
> *If you have any questions about this, please contact your CNSC project officer."*

It is important that medical physicists be aware of these requirements and that they notify their RSO when major upgrades or modifications are being planned.

J.R. CUNNINGHAM YOUNG INVESTIGATORS SYMPOSIUM :

WHAT WILL YOU PRESENT THIS YEAR?

Michelle Hilts
BC Cancer Agency- Southern Interior

Calling all graduate students!

It's not too soon to think about what work you would like to submit to the annual J.R. Cunningham Young Investigators Symposium at the COMP annual scientific meeting this summer in St. John's Newfoundland. Yes, St. John's Newfoundland! Don't miss this chance to showcase your work and visit an incredible part of Canada. The Young Investigators Symposium (YIS) is a standout highlight of every COMP meeting with many participants agreeing it is their favourite scientific session of the conference.

The YIS is named in honour of John Robert Cunningham (" Jack" as he is universally known). Dr. Cunningham is familiar to many medical physics students in Canada through his textbook The Physics of Radiology co-authored with H.E. Johns and known simply as "Johns and Cunningham". Although officially retired, Dr. Cunningham remains active in the field and is usually happy to present prizes to the YIS winners each year; a real treat.

It is an honour to be selected to present as part of the YIS: only the authors of the top 10 scoring abstracts submitted to the YIS are invited to speak each year. If you are accepted as part of the competition, you should add this to your CV! Abstracts are scored based on scientific merit as well as written clarity and relevance and potential impact of the work. Student presentations during the symposium are scored based on scientific excellence, presentation flow, oral delivery, quality of slides and the ability to stay on time! Final winners (1st, 2nd and 3rd place prizes are awarded) are determined by combining both abstract and presentation scores. Competition is always fierce and taking home a YIS prize is certainly something to be proud of.

Stay tuned to the COMP news as abstract submission deadlines will be posted soon.

The COMP community is looking forward to hearing about the interesting research you do.
What will you present this year?

See you in St. John's!

INTERNATIONAL DAY OF MEDICAL PHYSICS

Christopher Thomas[1], Samantha Eustace[2]
[1] Nova Scotia Cancer Centre
[2] Cancer Care Manitoba

The 3rd annual IDMP has passed! The IDMP is an initiative of the International Organization of Medical Physics, set on the birthdate of Marie Curie, to raise awareness of medical physics around the world. This year, Canadian medical physicists posted on twitter (see the following pages), posted videos and photos on the Internet (see the following pages), celebrated with cake (see the following pages), wore cool t-shirts (see the cover of this issue of InterACTIONS), and did community outreach (see Emilie Soisson's article in this issue of InterACTIONS). COMP held a contest for the best tweet with the hashtag the #IamaMedicalPhysicist, so congratulations to Nadia Octave for her winning tweet (see it on the following pages)!

The work of medical physicists is often underappreciated, that is until something goes wrong and we make an appearance to solve problems. Oftentimes, nobody, especially amongst the general public, knows the important job we do or even that we exist. IDMP is a chance to let others know about the role medical physics plays in health care. It's a time to do a little self-promotion, something we're not very good at most of the time, but we should be proud of the work we do and try to educate the general public about our profession and the role we play in health care. Even when it isn't IDMP, talk to your friend and family about medical physics. I hope next year we can make it even more successful.

#IAMAMEDICALPHYSICIST

> I perform tests on diagnostic imaging equipment such as MRI and mammography machines to verify that they are functioning as they should – Atiyah Yahya

> I am a physicist in medicine.I work with radiation;
> I ensure that radiation doses are delivered accurately
> So that cancer patients can be treated safely.
>
> I commission, QA and calibrate linear accelerators,
> I play with algorithms of treatment planning computers.
>
> I develop treatment techniques, policies and procedures. At times create cool brachy plans reconstructing the applicators I find the variety work in my profession very captivating; Clinical, engineering, research and teaching – all very interesting.
>
> It's fun to work with dosimetrists and collaborate with radiation therapists; I check treatment plans and often deliberate with radiation oncologists; Patients may not often see me because I work behind the scene.
>
> What else can I say – I am an important member radiation oncology team
> – Joshi Chandra **@cpjoshi1962**

> **#IamaMedicalPhysicist** – What is that? I help implement technology in medicine, most often medical radiation
> – NMRDUDE Diary

> In the field light glow
> a detector is aligned
> and a physicist smiles

> I am right at the isocenter, where physics and medicine meet – Nadia Octave **@noctavedc**

> Effecting safe positive changes for patients in diagnostic and therapeutic uses of radiation
> **@SamanthaEustace**

> I keep patients, general public and other radiation therapy workers safe
> – Marie-Pierre Milette

> Medical Physics and the global cancer problem
> – Jake Van Dyk
> **http://www.mpwb.org/MPWB_video**

I can see with radiation what is in your inside, accurate to shoot your CANCER BUT!
Be Careful – Please DO NOT MOVE.
– Hussun Khouli

Clinical support, technology adoption, patient safety, teaching, risk reduction, quality control...
from **@Psbasran http://physicsfocus.org/medical-physicist-origins-word-clouds-perceptions/**

Medical Physicists "Channel the beam"

Describing the job of a medical physicist
http://youtu.be/KWjKKkwZkcA
@marco_mccarlone

Our primary task is to ensure the correct amount of radiation is delivered to the correct spot
– Keith Nakonechny **@KnakAkadack**

Medical Physicists solve problems, act as peacekeepers & put out fires
– Jeff Bews

Clinical support, technology adoption, patient safety, teaching, risk reduction, quality control... from **@Psbasran http://physicsfocus.org/medical-physicist-origins-word-clouds-perceptions/**

It all started with intelligence, innovation, critical thinking, and an undeniable passion for excellence...with a focus on patient care.... **@Psbasran from http://physicsfocus.org/medical-physicist-origins-word-clouds-perceptions/**

I work in a multidisciplinary team. I juggle clinical, technical and quality responsibilities
– Doug Moseley

Medical Physics is the opportunity to carry out exciting and relevant research, and to train the next generation of Medical Physicists so that we can improve health care
Stephen Pistorius @profpist

My job is about ensuring radiation is used effectively and safely for medical imaging.
I test radiation equipment, help choose and set up new equipment, teach, advise and support... the physicians and technologists I work and collaborate with.
@SamanthaEustace

Bringing future technologies into the clinic
– Derek Hyde

Healthcare today is unimaginable without medical physics

I 'play' with radiation. I may not be The Hulk but you should still be nice to me!

THE INTERNATIONAL YEAR OF LIGHT:

WHAT IT MEANS FOR MEDICAL PHYSICS IN THE MOLECULAR AGE

Brian C Wilson
Professor of Medical Biophysics, University of Toronto/University Health Network
Former Head of Medical Physics, Princess Margaret Cancer Centre, Toronto

The United Nations declared 2015 as the International Year of Light and Light-Based Technologies in recognition of and to promote the pivotal roles that optical sciences and technologies ("photonics") play in almost all aspects of modern life. The first known piece of man-made optical technology (the Nimrud lens) dates from around 700 BC. Through the last two millennia there have been numerous highpoints in optical sciences, from the first known book on optics (in China,~450 BC) to Euclid's Treatise on Optics (Greece, ~ 300 BC) to the invention in the 1600's of the telescope that launched modern astronomy and of the microscope that led to the discovery of cells. The quest to understand the nature of light drove much of modern physics, from Newton's Opticks to Maxwell's equations, quantum theory, and relativity. In the last half century, triggered by the invention of the laser in 1960 and accelerated by many key discoveries and inventions since then, photonics has become a major field of science and technology as well as an important industrial sector, with the global market predicted to reach one trillion dollars by 2020. Advances in non-linear optics, for example, are bringing to reality "science fiction" concepts such as entangled photons (called "spooky action at a distance" by Einstein, but likely to be the future of encrypted telecommunications) and attosecond (10-18s) science that can "freeze" atoms in space to probe the structure of molecules.

The applications of photonics now span: high-speed and precision manufacturing (laser machining); energy-efficient lighting and green energy generation (photovoltaics); remote monitoring of the environment and environmental remediation; defense and security (think of laser guidance, optical detection of explosives and bioterrorism agents, and automated surveillance systems); communications (optical telecom) and information technology (all-optical switching and data storage); and last, but not least, the life sciences and medicine ("biophotonics"). In economic terms, biophotonics represents about 7% of the photonics global market, i.e. >$50B/yr, divided into three main sectors: bioanalytics, clinical diagnostics, and clinical therapeutics.

Bioanalytics: Optical spectroscopy and imaging are ubiquitous in life-sciences laboratories, both academic and industrial (biotech and pharma), for R&D and for quality control, as exemplified by the diverse forms of optical microscopy, flow cytometry and cell sorting, chemical "fingerprinting" by different forms of optical spectroscopy, optics-based "lab-on-a chip" devices, and imaging from sub-cellular analysis to in vivo imaging in animal models using fluorescence, bioluminescence and other forms of "optical reporters", that give access to genomic, proteomic, and functional as well as high-resolution structural information.

Clinical Diagnostics: As in the analytic domain, clinical diagnostics- either in vivo or on ex vivo cells, tissues and body fluids, utilizes many different forms of optical imaging and spectroscopy. Clearly, some specialties such as dermatology, ophthalmology, and endoscopy (of the lung, GI tract, bladder, oral cavity, cervix, ear canal, and joints), are heavily dependent on optical imaging to detect and stage disease, guide treatment, and monitor therapeutic responses. Optical techniques are increasingly penetrating other specialties, such as pediatrics (e.g. non-invasive continuous monitoring of brain oxygenation), neurology (functional mapping), and surgery (real-time image guidance). There is also a strong trend towards the in vivo use of optical reporters (contrast agents) of specific molecular function. In many ways, optical imaging complements radiological imaging and nuclear medicine in its applications and functionality, as illustrated in Figure 1. Pathology, which is usually the gold standard for diagnosis, utilizes optical microscopy as its core technology, and the range of capabilities are expanding as demand grows for more information on molecular biomarker expression to enable individualized treatments.

Clinical Therapeutics. Lasers were considered a breakthrough technology in surgery and, like X-rays, reached the clinic within months of their discovery because of their potential for selective and ultra-precise surgery. Lasers of several different types are still to be found routinely in many surgical specialties, as well as in dermatology (e.g. dissipation of pigmented lesions such as birthmarks) and ophthalmology (e.g. retinal re-attachment, refractive correction). Low-power light sources are used for biomodulation in the relief of chronic conditions, while coupling laser light into optical fibers has opened up many of the inner organs for light-based treatments that exploit photochemical, photothermal, or photomechanical light-tissue interactions to modify tissue structure or function.

There are several "deep" reasons why light is so useful in biomedical applications: the photon energies correspond to intra- or inter-molecular energy levels, rather than atomic or nuclear levels, providing access to molecular information and enabling molecular interventions; there are many different optical interactions that can be induced or measured, resulting in high specificity and information multiplexing; the wavelengths are comparable to the size of intra- and inter-cellular structures, allowing imaging from the single molecule to the whole organ scale; light is non-ionizing, providing a high safety profile; and finally optical technologies are compact, relatively inexpensive, and compatible with other technologies (e.g. radiological imaging, radiation therapy, surgery). At the other extreme of cutting-edge optical technologies, lasers can now generate pulses of light in the attosecond range (Figure 2) – shorter than a single cycle of the EM wave – ¬that allow the atoms in single molecules to be "frozen in space", hence opening new vistas for research and biomedical applications.

Optical techniques and technologies are then exceptionally diverse, as are the biomedical applications that range from highly sophisticated "personalized" medicine techniques to point-of-care devices for global health. This diversity across biomedical disciplines is a huge strength, but also in the clinical domain, means that no single clinical specialty takes full ownership of biophotonics. This point is particularly relevant to the dialogue – or relative lack thereof – between biophotonics and "traditional" medical physics.

At the recent World Congress of Medical Physics and Biomedical Engineering in Toronto, at which I talked about the International Year of Light, I was dismayed, but not surprised, that only about 25 oral papers from a total of over 1000 were on biomedical optics. Compare this, for example, with the annual Photonics West conference, which is the largest, but by no means the only annual conference on photonics, with over 20,000 attendees, around 5,000 papers, and more than 1000 companies exhibiting. The BIOS (i.e. biophotonics) program within this has a proportional number of attendees and papers organized into about 50 sub-conferences. This gives some idea of the scale of the scientific and commercial endeavor, and there are analogous events in Canada (Photonics North) and in Europe, Asia, Australasia, and this year, for the first time, in South America. Likewise, there is an expanding plethora of biophotonics books and internationally at least five journals dedicated to biophotonics.

Given that biophotonics is deeply grounded in biophysics and bioengineering, one then needs to ask why has this field not become part of mainstream medical physics? I suggest that there are several possible reasons, both positive and negative. On the positive side, a distinguishing feature of biophotonics is that it heavily dependent on technology transfer from photonics, which itself is a rapidly changing and expanding field. Hence, the link between the photonics and biophotonics community needs to be kept exceptionally strong to ensure that this transfer is efficient and timely. The negative reason is that the mainstream medical physics community has not shown any great interest in embracing biomedical optics, perhaps because the core science is unfamiliar, or because biophotonics engages with a much wider community of clinicians and life scientists than does radiological physics, or perhaps it is seen as a competitor and so excluded. Perhaps it is simply considered as too immature compared with, say, radiology or radiotherapy, although this is hardly consistent with its history. It is of interest to note on the other hand that, at least in the USA, many university biomedical engineering departments have thriving biomedical optics programs at both graduate and even undergraduate levels. However, this is primarily a research and educational, rather than clinical, enterprise, and a significant challenge is who will pay for "clinical biophotonicists" to work in hospitals? As counterpoint, it is notable that AAPM has undertaken several reports on specific aspects of biomedical optics, but these represent but a small fraction of the total, and similar reports on key issues such as standardization and quality control that are of concern to the practicing medical physicist or hospital biomedical engineer are now also being undertaken by other organizations.

Since we are entering the age of molecular medicine, and light is radiation for the molecular age, and as we celebrate the International Year of Light, perhaps it is time for deeper engagement between the biophotonics and medical physics communities at all levels – education & training, research and development, and clinical translation and service. There is much that both sides could learn and benefit from in order to maximally impact health care.

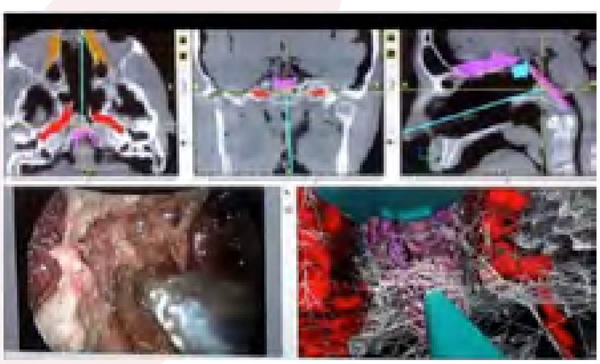

Figure 1. Example of a video frame combining (top) pre-surgical radiological imaging and (bottom) real-time optical imaging for improved guidance in skull-base surgery. The bottom right image shows the digital co-registration of the real (optical) and virtual (radiological) endoscopic images (courtesy GTx Program, University Health Network, Toronto).

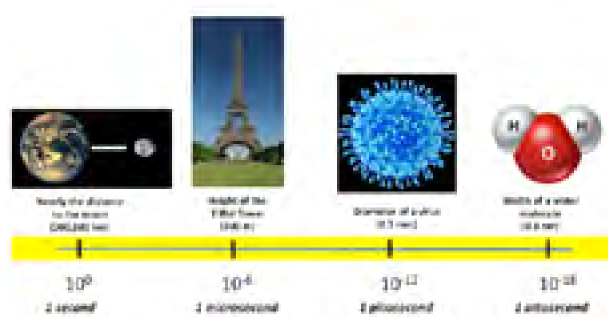

Figure 2. Illustration of the time scales now accessible by optical technologies and that can be used for biomedical applications, allowing probing and modification of "biological targets" down to the scale of single molecules.

CELEBRATING THE INTERNATIONAL DAY OF MEDICAL PHYSICS WITH COMMUNITY OUTREACH

Emilie Soisson
Medical Physics Unit, McGill University

It is November 7th and I am celebrating the International Day of Medical Physics this year by writing this article for InterACTIONS about the value of sharing your knowledge as medical physicists with the community.

My husband's 90 year-old grandfather, Don, is an active member of his local Rotary Club chapter in rural Quebec. I believe they invite speakers to their meetings once a month to talk to them about a wide variety of topics and are heavily involved in fundraising for the local hospital. When Don heard that I am sometimes invited to give talks, he asked me if I would like to come speak to the Rotary Club. Of course I could not say no, and then began the somewhat challenging task of putting together a talk about modern radiation therapy for a audience with an average age in their 80s.

Many of the Rotary Club members have had cancer and radiation therapy before but do not really remember or understand how it was treated. When you ask Don about his own radiation therapy treatment, he describes an experience that is very consistent with external beam but is then insistent that he had radioactive seeds inserted in his prostate. Possibly he had some sort of combination therapy, maybe he had gold seeds for imaging, maybe he had no seeds at all. Don blames every health problem he has now on the fact that he had radiation over 20 years ago. For things like rectal bleeding and incontinence, that might be fair, but the radiation also seems to be to blame for other unrelated ailments. I honestly don't think that Don has any idea what actually happened to him when he went for radiation. He's from a generation that always trusts the doctor (no online searching for your own diagnosis and treatment options), so he just did what the doctor told him, no questions asked.

Essentially, I ended up giving the Rotary group a fundamental science talk about radiation and the electromagnetic spectrum followed by a little biology about how some types of radiation can both cure and cause cancer. Then I moved on to the development of radiation therapy with a lot of emphasis on history with a bit more on the development of cobalt and the Chaulk River facility (with which most of the members of this particular group living about an hour outside Ottawa are familiar). I then talked about advances in target localization and ended with some flashy movies of the Cyberknife (which a few were familiar with due to media surrounding the installation at the Ottawa hospital).

To my surprise, this talk went over extremely well. I feel like the audience walked away with some knowledge of radiation and radiation therapy and maybe even a better understanding of their own cancer treatment. One person mentioned they had been involved in fundraising for the Ottawa Cyberknife and now claimed he finally understood why it was an important acquisition.

From this talk with the Rotary, I have now been invited to give other talks in the same community. My next talk was to a women's wellness group where I spoke about radiation therapy and recent developments for breast cancer to a slightly younger crowd. I had excellent questions after the talk and have since been approached by many members of the community with additional questions. Breast cancer survivors in this audience remember having to drive three hours a day for radiation treatment week after week and it occurred to me how important developments in APBI and breast radiosurgery would be to this population. Again, this was a great experience. I was one of several speakers in a one-day workshop where I spoke alongside other female health professionals, and I learned quite a bit also.

Sometimes it occurs to me that people, young and old, outside the field, don't understand what "radiation" refers to and only have a basic understanding of radiation therapy and medical imaging. In general, they do not have a clue about the field of medical physics. I find that in most people's minds, the fear of radiation causing cancer greatly outweighs their recognition of the benefits. I also don't think many people outside the field fully understand the difference between different types of radiation. Recently, in addition to calls about cell phones causing brain cancer, I've been getting lots of calls from friends (in their 30s) with fears about imaging dose from a diagnostic CT, X-ray, or nuclear medicine exams. I think they have read online about the impact of increased imaging on population based cancer incidence and become worried. My hypothesis is that these calls have picked up recently from the online activity regarding campaigns to reduce medical imaging dose that people from my generation stumble on when they are going through their online self diagnosis. While I encourage a healthy questioning the usefulness of each imaging exam to avoid unnecessary exposure, a few of my friends have been very hesitant to investigate symptomatic health problems due to the "high" dose from CT and their risk of cancer.

This year, the COMP communications committee has been discussing what action we should encourage on the International Day of Medical Physics to promote the profession of medical physics. I proposed that one of method of "celebrating" in the future could be to use this day each year as an excuse to schedule some sort of communication with somebody (or a group) where we have the opportunity to share knowledge with somebody not already involved in the field. Perhaps give a talk to a community group, school, etc., or if speaking isn't your thing, writing an article or just talking about it with friends or family. I think as medical physicists we can play a useful role in helping people understand the role of radiation in their environments and give them information to appropriately weight the benefits and risks of radiation exposure. In addition, this type of outreach may make people aware of the role of medical physicists in a hospital and possibly provide them comfort in knowing that our role includes protecting them from unnecessary or unintended radiation exposures.

EXPANDING GLOBAL ACCESS TO RADIATION THERAPY BY 2035

Jacob (Jake) Van Dyk
Professor Emeritus, Western University

In 2011, the United Nations issued a resolution explicitly stating that the rising burden of non-communicable disease "constitutes one of the major challenges for development in the twenty-first century, which undermines social and economic development throughout the world and threatens the achievement of internationally agreed development goals" [1]. One of the major diseases affected by this trend is cancer. Indeed, cancer kills more people in low-to-middle income countries (LMICs) than HIV/AIDS, malaria, and tuberculosis combined [2]. In September 2015, the new UN Development Goals called for a reduction by one third in premature mortality from non-communicable diseases, including cancer, by 2030 [3].

Various reports have been written describing the growing cancer crisis, especially in the developing world [4]. However, relatively few of them dealt specifically with the concerns of radiation therapy and the potential benefit and impact if such therapy were made available. The feeling by many decision makers is that radiation therapy is too complex, too expensive, and of lower priority compared to other health care concerns in lower income settings.

In the summer of 2013, the Union for International Cancer Control (UICC), under the leadership of Dr. Mary Gospodarowicz, from the Princess Margaret Cancer Centre, developed a Global Task Force on Radiotherapy for Cancer Control (GTFRCC). The primary purpose of the UICC is *"...to unite the cancer community to reduce the global cancer burden, to promote greater equity, and to integrate cancer control into the world health and development agenda."* The GTFRCC was charged by the Board of the UICC to clarify the challenge, identify opportunities, and quantify the investment needed to provide equity in global access to radiation therapy. In other words, what will it cost to close the gap between what exists today and reasonable access to radiotherapy globally by the year 2035? The time line for the task force was to provide a report at the World Cancer Congress in December 2014 (15 months).

The GTFRCC was composed of cancer leaders including radiotherapy professionals, industry partners, cancer control organizations, patient groups, economists, and enablers of health care change. The honorary chair of the GTFRCC was Dr. Tabaré Vázquez, a radiation oncologist and the president of Uruguay. Dr. David Jaffray, Head of Radiation Physics at Princess Margaret Cancer Centre, was the head of the secretariat. Since the UICC is a non-governmental, membership-driven association, it approached COMP to provide delegates from the canadian medical physics community to participate in the GTFRCC. It was my honour and privilege to have been nominated to represent COMP on the task force.

Over the two years of its existence, various meetings were convened mostly by internet teleconferencing, but also at venues associated with national and international conferences. The activities of the GTFRCC were divided into two main work groups:

(1) Work Group 1 (WG1) dealt with the global burden of cancer over the next 20 years on a per country basis, i.e., cancer incidence, the number of patients needing radiation therapy, the number of fractions per patient, and the projected benefit in terms of lives saved with radiotherapy being available globally. This group was led by Dr. Michael Barton, Professor of Radiation Oncology at the University of New South Wales, in Sydney, Australia and Research Director at the Ingham Institute, as well as the Research Director of the Collaboration for Cancer Outcomes Research and Evaluation (CCORE). It is through the latter that he had a number of PhD students working on generating the appropriate data for the GTFRCC.

(2) Work Group 2 (WG2) dealt with the core investments needed over the next 20 years to treat the patients described by WG1, including facilities, equipment, and personnel. This work group was headed by me, but had tremendous support from the other participants, especially Dr Eduardo Zubizarreta, a radiation oncologist who has been at the International Atomic Energy Agency (IAEA) for the last six years. Through several consultants' groups at the IAEA, a radiation therapy cost calculator had been developed, as well as a staffing estimator. Dr. Zubizarreta combined and updated these calculators to fit the needs of the task force. This modified calculator allowed the determination of infrastructure costs for a variety of scenarios in different income settings.

In parallel, with WG1 and WG2, another group looked at outcomes benefit and economic impact using health systems analysis methodologies. This activity was directed by Dr Rifat Atun, Professor of Global Health Systems at Harvard University, and the Director of Global Health Systems Cluster at Harvard T.H. Chan School of Public Health. Through this analysis, the potential economic benefits of investing in radiation therapy were determined.

The outcome of this work was presented at several national and international conferences and was published in the full 26 September 2015 issue of Lancet Oncology as a commission report [5]. The report is extensive with 33 journal pages, in addition to several commentaries that were included in the same issue of Lancet Oncology. Clearly, only a few key points can be presented here, especially those that are relevant to the medical physics community. For further details, interested individuals should review the full report [5]. The key points are summarized in bullet form:

- Cancer incidence varies significantly around the globe and is dependent on the level of the Human Development Index (HDI), which is a measure of education, life expectancy, and income level. In 2012, 56% of new cancer cases occurred in high or very high HDI countries, while these account for only one-third of the world population.
- As levels of socio-economic development increase, cancer emerges as a major source of morbidity and mortality. Cancer is now the leading cause of death world-wide. The incidence of cancer is increasing at a significantly higher rate (by almost a factor of two) in the lower HDI countries.
- With knowledge of cancer incidence by disease type, the number of patients requiring radiation therapy was determined and the corresponding number of treatment fractions was calculated. Using information on existing resources, the additional resources required to treat these patients could be calculated. Worldwide, 204 million fractions of radiotherapy will be needed to treat the 12 million cancer patients who could benefit from treatment in 2035.
- Radiotherapy cost estimates were divided into two components: (1) upfront costs to develop a new facility including building, equipment, and training of new staff; and (2) operating costs once the facility is established.
- An activity-based costing model was used to estimate the required human resources needed for all steps of the radiation therapy process [6] and capital needs (buildings and equipment) for different levels of treatment capacity. The capital and operating costs were estimated at four different regional income levels based on the World Bank-defined regions of low-income (LI), lower-middle income (LMI), upper-middle income (UMI) and high income (HI).
- The operating costs per fraction were found to range between US$60 for LI settings to US$235 for HI settings while the upfront costs per fraction for the first year of operation ranged between US$352 to US$803. This cost per fraction is highly cost-effective and very low compared to the high price of many new cancer drugs.
- The relative costs for salaries, buildings, and equipment ranged from 10%, 9%, and 81% in LI settings to 64%, 6%, and 30% in HI settings, respectively.
- In terms of equipment, nearly 13,000 megavoltage therapy machines and nearly 6,500 CT scanners will be required by 2035 in low-to-middle income countries (LMIC).
- In terms of people, approximately 22,000 radiation oncology medical physicists will be required by 2035 in LMICs.
- Full access to radiotherapy could be achieved for all patients in need in LMICs by 2035 for as little as US$97 billion, with potential health benefits of 27 million life years saved, and economic benefits ranging from US$278 billion to US$365 billion over the next 20 years.

The report ends with the following five "calls for action" with corresponding targets:

1. All countries should have population based comprehensive cancer plans. Target: by 2020, 80% of the countries should have cancer plans that include radiotherapy.
2. Immediate action to establish additional radiotherapy capacity by creating at least one cancer centre in each LMIC by 2020. These new centres should be used to train the radiotherapy workforce to enable further expansion of radiotherapy coverage. Target: an increase of 25% in the 2015 radiotherapy treatment capacity by 2025.
3. A call for new approaches to train radiotherapy professionals globally, with the creation of new core curriculums, innovative learning methods, and international credentialing to expand the radiotherapy workforce. Target: 7,500 radiation oncologists, 20,000 radiation technologists, and 6,000 medical physicists to be trained in low-income and middle-income countries by 2025.
4. Develop sustainable financing to expand access to radiotherapy through domestic and international financing. Target: $46 billion of investment by 2025 to establish radiotherapy infrastructure and training in LMICs.
5. A call for alignment of radiotherapy access with universal health coverage. Target: 80% of LMICs to include radiotherapy services as part of their universal health coverage by 2020.

Continued on page 41

HAROLD E. JOHNS TRAVEL AWARD REPORT

Arman Sarfehnia
Sunnybrook Health Sciences Centre

It is customary for the recipient of the Harold Elford Johns Travel Award to write a short article in InterACTIONS to share their experience of the course/site visit they have attended as part of the award. I shall follow suit, and share my experience of the 2015 AAPM Summer School on "Principles and Practice of Proton Beam Therapy." I was able to attend this excellent educational meeting which took place in the beautiful Colorado Springs in June 2015 with the generous support from CCPM's H.E. Johns Travel award and added support from my home institution, the Sunnybrook Health Sciences Centre.

My interest in proton therapy started early in my career during my doctoral studies at McGill. There, I tried understanding the complications of proton dosimetry, and attempted to modify water calorimetry techniques in order to show the feasibility of performing such high caliber absolute dose measurements in proton beams. Through collaboration with the Massachusetts General Hospital and the Harvard Medical School, we were able to experimentally show the feasibility of water calorimetry in double scattered, as well as for the first time in scanned proton beams.

Over the years, my interest in particle therapy has grown and more recently, during the past three years, as part of a collaboration with McGill University, the Université Catholique de Louvain in Belgium and the National Physics Laboratory of the UK, I participated in further proton and carbon ion absolute and reference dosimetry experiments.

The AAPM Summer School in proton therapy was organized by Drs. Indra Das and Harald Paganetti. The summer school took place over 4.5 days, with lectures running from 8 am to 5:30 pm daily. It was intense but most informative. The conference was very well-attended (I think close to 150 participants from around the world), with many great expert speakers covering a wide range of topics from basic discussions on protons and why/when they may be useful, to more involved discussions on the intricacies of proton therapy and delivery, its Dosimetry, and QA.

The conference started with a great introductory background and history on proton therapy by Dr. Paganetti, followed by a thought stimulating presentation by Dr. Anthony Zietman discussing a physician's perspective on proton therapy. Some of the controversies of proton therapy were brought up and discussed. Specifically, the discussions focused on five topics: 1) detectable clinical benefits from improved proton dose distribution relative to IMRT/VMAT; 2) the technical difficulties of proton delivery; 3) the use of a single, generic LET average value and RBE; 4) the bias in medical literature and presence of randomized trials with unanticipated negative outcomes; and 5) financial aspect of proton therapy and cost-benefit analysis.

The lecture and the discussions that followed (and went on during the coffee break and subsequent days) were eye-opening and revealing. Although I was aware of some of the issues with proton delivery, the data provided by Dr. Zietman on the number of prostate cases and other sites treated by protons that have not yet shown any proven clinical benefits over more conventional photon-treatments were astonishing. Such sites receive the most publicity, but also the most scrutiny. They are often thought to be the 'money-makers' of proton therapy due to the high volume of patients (70% of all patients treated with protons are prostate patients), and as a result help alleviate the high cost of operating the treatment centers, but do not necessarily offer a greater clinical outcome benefit over conventional treatments. In case of prostate, for example, the reason for the lack of a clear advantage of protons relative to IMRT/VMAT may be attributed to the position of the prostate deep within the pelvis, which results in the lateral proton penumbra to be not as sharp at such large depths due to Coulomb interaction. Additionally, the end-of-range uncertainty at these depths and presence of heterogeneities in the path of the beam result in the need for larger margins and, at times, added uncertainties in dosimetry and treatment planning. The small RBE benefit of protons relative to photons may also be partially at blame. The real kicker is that for prostate, many of the cases treated today with protons can be treated just as successfully with many alternative modes of treatment, including watchful waiting (observation).

FIGURE 1 shows the exponential growth of the number of particle centers in clinical operation, as well as the number of patients treated with protons. The question becomes if the exponential growth of the proton centers in North America (mainly USA) and around the world in general is indicative of a true need for such systems, or a sign of easy monetary policy combined with cheap financing resulting in a mal-investment of capital. A look at the number of proton centers currently being planned for construction clearly shows that the trend of increasing proton centers (or more recently single gantry compact proton units) is showing no sign of cooling off.

Perhaps just as revealing were the coffee break discussions with other participants from various centers. Many raised the concern that there is a huge explosion of proton facilities and single gantry compact proton unit installations (there are at least 10 commercial vendors for protons). A simple look at the data shows that the distribution of the proton centers, specifically in the USA, has very little correlation with the population or the need for such machines. From my personal conversations, it seemed that the approach currently taken is one of "build it first, get the patient population later" rather than a detailed analysis of cost vs. benefit.

I did find myself speaking with a few Canadian colleagues about the need of a proton center in Canada. To be frank, I went into the course being sure that we absolutely do need at least one center with proton capabilities in Canada, but came out being unsure if the need is as urgent as I had initially presumed. Indeed, our IMRT/VMAT photon treatments with clinical linacs capable of high dose rate delivery equipped with high definition MLC, robotic couches, and on-board imaging have allowed for ever-more accurate deliveries.

I think proton treatments can and will be an important modality once a number of important issues have been dealt with. From the lectures, it became obvious that on-board imaging in proton therapy is still years behind that of photon therapy units. There seems to be still quite a few uncertainties that need to be researched and better understood. The uncertainties seem to still be large. As Dr. Radhe Mohan discussed, the photon CT HU conversion to proton stopping power already bears an uncertainty of 2%. Even if Monte Carlo algorithms in treatment planning were to be used (becoming more common in recent years), there are still many uncertainties involved, from the actual particle range inside the body to the uniform LET and RBE used for conversion of proton biological effect into photon-equivalent terms. Furthermore, still there is no adequate means of dealing with motion, something much better understood in the photon therapy world.

Although uncertainties were indeed a re-occurring theme during the entire summer school, from the lectures being presented and all the research happening, it seems, at least to me, that the uncertainties in the field of proton therapy will be improved even further in the not too distant future. From the work being done on integrating imaging with therapy and going even further toward 4D motion management, to Monte Carlo treatment planning and robust optimization (which has a huge role to play in proton therapy), it seems to me that many of the sources of uncertainties that were discussed in this year's summer school will be only briefly mentioned in future classes as 'what used to cause us problems.' Indeed, after personal conversation with Dr. Thomas Mackie (on the dielectric wall accelerator technology) and some of the proton accelerator vendors at this year's AAPM, it seems to me that smaller and more affordable proton units may indeed become available in the future.

Hence the question of should Canada get a proton therapy centre may become moot, as the accelerators become smaller and cheaper, and delivery and treatment planning techniques become more robust. However, at the end of the five days course, the question that I had was: "Are protons the way to go?" I am sure many of the challenges that I noted in this article will be solved (indeed many of the solutions already exist in the photon therapy world). But even when uncertainties are reduced, how much added benefit do protons give us over a nicely optimized VMAT or Tomotherapy plan. I asked Dr. Mohan, a pioneer in the field, my question. Surprisingly, his answer was simple. He suggested that protons are too similar to photons (very small RBE advantage), while carbon ions produce too many exotic particles, etc. So perhaps, helium ions are the happy medium. They provide the RBE advantage without the complexities and issues that arise with carbon ions.

So, perhaps a few years down the road, we will have an AAPM summer school on helium therapy.

I would like to once again express my sincere gratitude for this great opportunity that was provided to me by the CCPM, and I would like to thank everyone who has contributed to the HEJ Travel Award directly as well as all of you who have donated your time to COMP and CCPM.

I will end by something that stuck in my head from the presentation of Dr. Mohan. Although Ronald Reagan's motto was "Trust, but verify," Dr. Mohan suggested that today's medical physicist's motto should be "Don't trust until you verify."

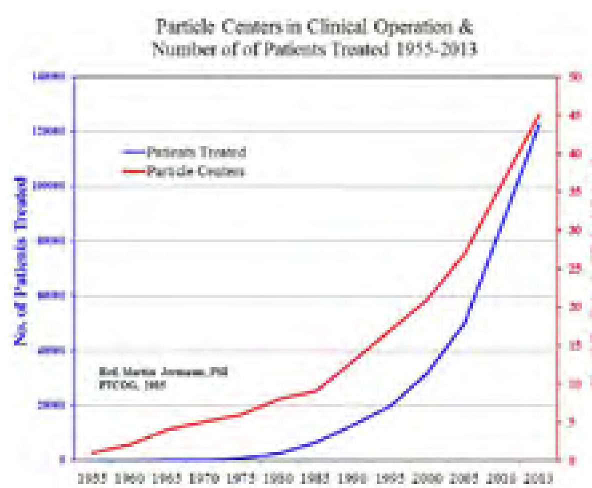

FIGURE 1- Number of patients treated (left axis) and number of facilities in operation (right axis) from 1955 to 2014 (Courtesy of Martin Jermann, PSI, Switzerland. Reproduced with permission from H. Paganetti and the American Association of Physicists in Medicine).

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DEFINITION OF A QUALIFIED MEDICAL PHYSICIST

We are pleased to inform the membership that COMP has published a statement defining a qualified medical physicist (QMP). In the past COMP had issued some general statements regarding professional status, emphasizing competence and referring directly and exclusively to the CCPM certification process. CCPM and COMP now operate at arm's length and COMP must generally recognize other certifying bodies and specifically recognize some U.S. bodies with which reciprocal relationships exist. The identification of a qualified medical physicist by professional bodies such as the AAPM has precedent and it is a term that has been adopted within regulatory and other contexts. Recently, the Ontario Ministry of Health was looking to COMP for such a definition and this was a factor motivating us to publish such a definition. It is important to note the scope of the QMP definition is limited to clinical aspects only; there is no intent here to make any statements regarding the qualifications of medical physicists in other areas such as academic or industrial. You will find the COMP QMP definition to be analogous with the AAPM definition. It is our hope this consistent language will stand in support of the various reciprocal arrangements and will be easily adopted by third parties such as governmental regulatory agencies.

For the purpose of providing clinical professional services, a Qualified Medical Physicist (QMP) is an individual who is competent to independently provide clinical professional services in one or more of the subfields of medical physics. The subfields of medical physics are:

1. Radiation Oncology Physics
2. Nuclear Medicine Physics
3. Diagnostic Radiological Physics
4. Magnetic Resonance Imaging

where the scope of practice of each subfield is defined by the COMP document **Scope of Practice for Canadian Certified Medical Physicists** which is published on the COMP website at www.comp-ocpm.ca.

A Qualified Medical Physicist meets each of the following credentials:

1. Has earned a master's and/or doctoral degree in physics, medical physics, biophysics, radiological physics, medical health physics, or equivalent disciplines from an accredited college or university; and
2. Has been granted certification in the specific subfield(s) of medical physics by an appropriate national certifying body and abides by the certifying body's requirements for continuing education.

The following certifying bodies have been deemed appropriate:

1. For the subfield of Radiation Oncology Physics, certification by:
   - The Canadian College of Physicists in Medicine; or
   - The American Board of Radiology; or
   - The American Board of Medical Physics
2. For the subfield of Nuclear Medicine Physics, certification by:
   - The Canadian College of Physicists in Medicine; or
   - The American Board of Radiology; or
   - The American Board of Science in Nuclear Medicine; or
   - The American Board of Medical Physics
3. For the subfield of Diagnostic Radiological Physics, certification by:
   - The Canadian College of Physicists in Medicine; or
   - The American Board of Radiology; or
   - The American Board of Medical Physics
4. For the subfield of Magnetic Resonance Imaging, certification by:
   - The Canadian College of Physicists in Medicine; or
   - The American Board of Radiology

COMP MEMBER TONY FALCO, SENIOR VP, SOFTWARE OPERATIONS FOR ELEKTA, HAS BEEN AWARDED THE LIONEL-BOULET PRIZE FOR INDUSTRIAL RESEARCH AND DEVELOPMENT IN THE PROVINCE OF QUEBEC, CANADA.

Each year, the government of Quebec attributes five awards in the field of science. The purpose of this tribute is to recognize women and men who stand out in their creative or innovative spirit and whose work has contributed significantly to the influence of Quebec around the world.

Photo Courtesy of Elekta.

Tony Falco, a medical physicist, started with Elekta through the acquisition of Resonant Medical Inc. (RMI), a company he co-founded in 2000. Tony holds 60 patents and has written 35 scientific publications in subjects such as atmospheric physics, medical imaging, non-invasive and personalized medicine. His expertise has earned him several of awards of excellence, research grants, and scholarships. In 2003, he became the youngest medical physicist in the history of the Canadian College of Physicists in Medicine to obtain the status of Fellow. In 2006, he received the Innovation Award from the Association for the Development of Research and Innovation in Quebec.

Quebec's Minister of Culture and Communications, Hélène David, announced the Prix du Quebec winners on Monday, November 2. "These women and men we are honoring today are part of the history of modern Quebec who have advanced our society and its influence," she said. "I warmly congratulate them; they are exceptional people and symbols of excellence that inspire all of us."

SPARING SALIVARY FUNCTION FOLLOWING RADIOTHERAPY FOR HEAD AND NECK CANCER:

NEW INSIGHTS FROM STEM CELL RESEARCH

Vitali Moiseenko[1], Jonn Wu[2], Allan Hovan[2], Robert P. Coppes[3] and Peter van Luijk[3]
[1] Department of Radiation Medicine and Applied Sciences, University of California San Diego
[2] Vancouver Cancer Centre, British Columbia Cancer Agency
[3] University Medical Center Groningen, University of Groningen

Patients treated with radiotherapy for head-and-neck tumors commonly exhibit inadequate salivary function. While there is some recovery, typically within two years after radiotherapy, late toxicity is often irreversible and negatively affects quality of life. Mean radiation doses to parotid glands have been commonly used to describe dose-response for stimulated salivary flow. This means that the planning objective is set to minimize mean dose to the gland while respecting target volume coverage and specific regions of the gland are treated equally. No further differentiation between gland regions in terms of functional burden or regenerative capacity is assumed.

While in general, incidence of toxicity does correlate with mean dose to the gland, error bars are large (Deasy et al. 2010). When it comes to interpreting human data, the large observed uncertainty in conventional dose-response is commonly attributed to patient-to-patient variation due to individual sensitivity, pre-existing conditions, life style etc. This comes with an unspoken implication that there is nothing we can currently do about it.

A recent paper published in Science Translational Medicine by a group of scientists led by stem-cell researchers from the University of Groningen provides novel insight into the mechanism of how salivary dysfunction develops and what we can do to minimize the risk of xerostomia (van Luijk et al. 2015). The study demonstrates the importance of stem cell distribution in rodent salivary glands along with parallel findings in human outcomes data. In brief, the following pieces of evidence are reported:

1. In both rat and human parotid glands, stem/progenitor cells (cells capable of self-renewing and differentiating into salivary gland cells, see Figure 1) were predominantly found in the central gland region occupied by larger ducts as demonstrated with c-Kit expression – a salivary gland stem/progenitor cell marker.
2. Parotid gland regenerative capacity in rat glands was region-dependent with central regions of the gland exhibiting abundancy of stem/progenitor cells, as demonstrated with a salisphere forming assay.
3. Precise partial rat parotid irradiation with protons confirmed that irradiating this central stem cell containing region leads to loss of salivary function beyond what would be expected based on irradiated volume.
4. In a cohort of patients receiving radiation therapy for head-and-neck cancer, dose to a small region in the gland located at the posterior edge of the mandible showed the strongest association with saliva production, which was superior to other dosimetric quantities including the dose to whole gland. Identical to rats and mice, anatomically this is the region where the first branching of the major ducts occurs and the stem cells are located.
5. Biopsies taken from a patient's parotid gland showed that samples taken from the critical region produce the most salispheres (indicating regenerative potential of the parotid gland), whereas samples taken from the superior or inferior edge of the gland produced none.
6. Radiation planning studies showed that, for a substantial proportion of patients, the critical region in the parotid gland can be spared without compromising target volume coverage or increasing the mean dose to the whole gland.

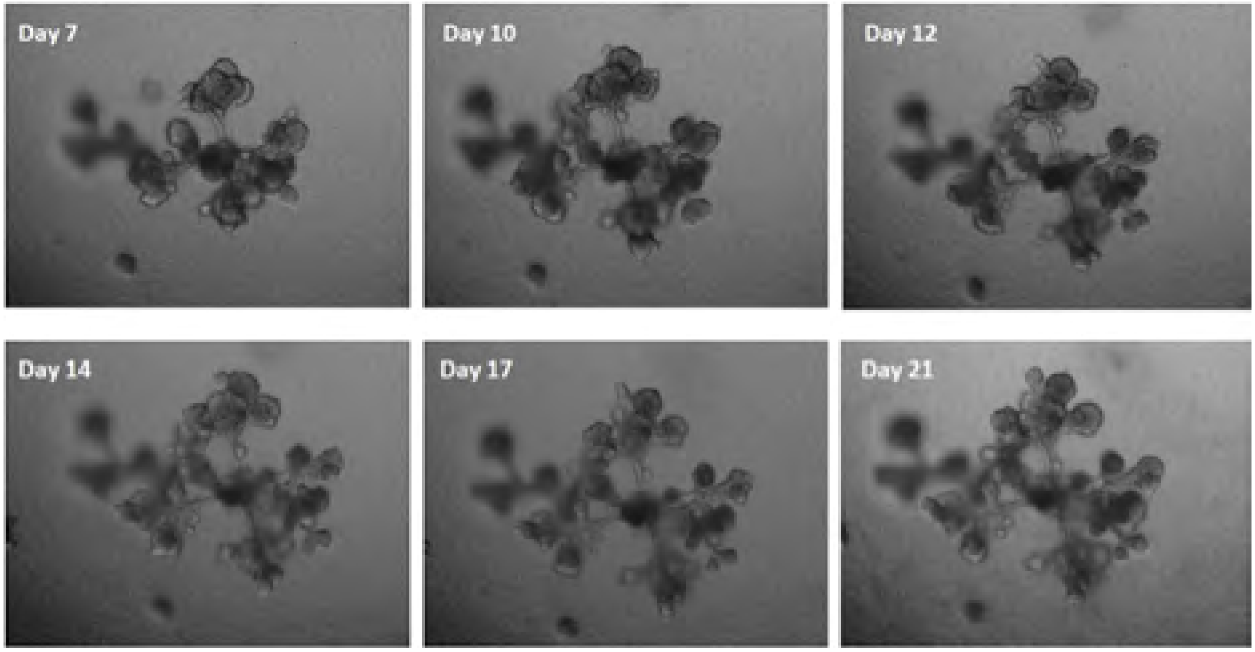

Figure 1. In vitro development of single stem cell derived salivary gland organoid,

This translational research report covers a broad range of findings ranging from animal models to human data. The human salivary flow data were acquired at the Vancouver Cancer Centre, British Columbia Cancer Agency. This centre has a well-established track record of collecting salivary function data for head-and-neck cancer patients treated at the BCCA. In brief, every patient receiving radiation treatment for head-and-neck cancer is seen at dentistry for salivary function assessment. This includes measurements of resting and stimulated salivary flow, as well as assessment of quality of life using a validated questionnaire. Patients are seen prior to radiation therapy for baseline measurements, and then at 3, 12, and 24 months. Salivary flow measurements obtained at one year after radiotherapy were used in this study.

Understanding the biologic heterogeneity of tumors and normal tissues, while appreciated for a long time, is progressively coming to the forefront allowing, thus for more individualized patient care. For tumors, we have modern functional imaging methods that can pave the road to identifying regions of hypoxia, faster proliferating tumor cells, or larger concentration of tumor cells. Radiation dose prescriptions, consequently, can be individualized to account for regional characteristics and associated risk of recurrence. Similarly, for normal tissues we can customize the dose distribution to account for distribution of functional burden or regenerative capacity through the volume of an organ at risk. Mechanistic foundation of this heterogeneity, as described in the paper, provides a novel radiobiological basis for treatment planning.

Regional effects hypotheses ideally would be tested with a randomized clinical trial. One such trial is currently in progress at the University Medical Center in Groningen. Identifying patients who stand to benefit the most from the regional sparing approach and clinical testing of the hypothesis are the next steps following from the publication in Science Translational Medicine.

References

Deasy JO, Moiseenko V, Marks L, Chao KSC, Nam J, Eisbruch A. Radiotherapy dose-volume effects on salivary gland function. Int J Radiat Oncol Biol Phys, 76, S58-S63 (2010).

Van Luijk P, Pringle S, Deasy JO, Moiseenko VV, Faber H, Hovan A, Baanstra M, van der Laan HP, Kierkels RGJ, van der Schaaf A, Witjes MJ, Schippers JM, Brandenburg S, Langendijk JA, Wu J, Coppes RP. Sparing the region of the salivary gland containing stem cells preserves saliva production after radiotherapy for head and neck cancer. Sci Transl Med, 7, 305ra147 (2015).

NEW BRIDGING PROGRAM FOR CCPM EXAM ELIGIBILITY

Clément Arsenault
CCPM President

During the CCPM Board mid-year meetings, new regulations were introduced to provide an alternative pathway to certification. This bridging program is intended for individuals such as foreign-trained medical physicists or Canadian medical physicists who do not meet the CAMPEP requirement. The bridging program would act as a structured mentorship that would ensure the candidate has met similar training goals as a residency program. The program is not intended to be overly prescriptive and can be tailored to the centre or individual. However, it must be presented to the Board for approval. The length of the program varies according to the experience of the candidate, who must have at least four years (FTE) of experience as a medical physicist. Section G of the CCPM regulations covers the details of the program and is presented below.

G Bridging Program

This section describes the general requirements of a bridging program for individuals who do not meet the CAMPEP eligibility requirements indicated in D.2.7.

G.1 Qualifications

G.1.1 The candidate for the bridging program must meet the educational requirements specified in regulation D.2.1.

G.1.2 The candidate must meet the Canadian requirement as specified in regulation D.2.8.

G.1.3 The candidate must have at least four years FTE experience as a recognized medical physicist working with modern equipment and techniques, including but not limited to, medical linear accelerators with MLCs and image guidance, 3D image-based treatment planning, and intensity modulation with inverse planning.

G.2 Length of Bridging Program

G.2.1 For candidates with less than seven years FTE experience, the bridging program must be at least two FTE years.

G.2.2 For candidates with seven or more years FTE experience, the bridging program must be at least one FTE year.

G.3 Program Requirements

G.3.1 The bridging program must take place in a department that has a CAMPEP-accredited residency program or must be overseen by a fellow of CCPM.

G.3.2 A mentor who is a member of the College must be assigned to the candidate to assess the progress of the candidate throughout the structured program.

G.3.3 The candidate must keep a detailed log of his/her activities throughout the program, and these must be signed off by the candidate's mentor.

G.3.4 The candidate must be evaluated on each of the core competencies.

G.3.5 The candidate must obtain at least 20 CAMPEP credits during the bridging program.

G.4 Application process

G.4.1 Prior to commencing the bridging program, the candidate must submit, for approval, the following information to the Registrar:

- Current up-to-date CV.
- Proof of qualifications as indicated in Section G.1.
- Letter of support from the head of the department in which (s)he proposes to carry out the program.
- A structured plan, approved by the department head and the mentor, that details the candidate's participation in various clinical areas relating to the following core competencies as defined by the CCPM:
  - ethics and professionalism.
  - quality assurance and commissioning.
  - treatment planning.
  - radiation safety and radiobiology.
  - brachytherapy.
  - imaging in radiotherapy.
  - special techniques.
- The application fee for the bridging program as stated in the CCPM schedule of fees.

G.4.2 The submitted documentation will be assessed by an ad-hoc committee chaired by the registrar, who will make a recommendation to the Board to either accept or reject the plan. The Board will make a final decision as to whether or not the proposed program is acceptable.

G.5 Eligibility for Membership Exam

G.5.1 In order to demonstrate successful completion of the bridging program, the candidate must provide to the registrar a letter from the mentor stating that the candidate has successfully completed the program. The registrar may request further documentation from the candidate or may contact the candidate's mentor to assess if the requirements of the bridging program have been met. The Registrar may consult with the Board during this process.

G.5.2 Once approval by the Registrar has been granted, the eligibility criterion indicated in Regulation D.2.7 will be met.

G.5.3 The candidate may then submit an application for membership, following the regulations in section D, along with the examination fee specified in the CCPM schedule of fees.

NEW COMP MEMBERS

Please welcome the following new members who have joined COMP since our last issue:

Last Name	First Name	Institute/Employer	Membership Type
Anjomani	Zahra	McMaster University	Student
Chamberland	Marc	Carleton University	Full
Chitsazzadeh	Shadi	University of Victoria	Student
Dydula	Christopher	Carleton University	Student
Fennema	Megan	University of Western Ontario	Student
Maraghechi	Borna	Ryerson University	Student
Momin	Shadab	Ryerson University	Student
Nassiri	Moulay Ali	CIUSS de l'Estrie - CHUS	Full
Oglesby	Ryan	University of Guelph	Student
Robertson	Andrew	University of British Columbia	Student

SYLVIA FEDORUK BIOGRAPHY IN THE WORKS

Merle Massie and Stuart Houston are writing a biography about Sylvia Fedoruk and are looking for former colleagues and friends that could provide them with some information. If you have any recollections you'd like to share or know anybody else who may, please contact Merle at:

Merle Massie

Box 352 Biggar Saskatchewan S0K0M0

306-948-3660 home

306-948-6171 cell

Email: merle.massie@usask.ca

FELLOW OF COMP AWARD

NOMINATION PROCESS

Nominations are being accepted for the Fellow of COMP Award. This honour recognizes an active member who has made a significant contribution to the field of medical physics and to COMP. This contribution is to be in two or more of the following:

- Service to COMP.
- A demonstrated body of work showing an outstanding contribution to research and development in the medical physics profession.
- A demonstrated body of work showing an outstanding contribution to professional practice.
- Through educational activities or mentorship, particularly regarding the education and training of medical physicists, medical residents, and allied health personnel.

Other Criteria that Must be Met:

- Nominees must have a minimum of 10 years of experience in the field of medical physics.
- Nominees must have a minimum of 5 consecutive years as a member of COMP and be a full member in good standing at the time of the nomination.

Nomination Process:

- Any member in good standing may nominate an individual for the FCOMP Award.
- At least two support letters are required in addition to a cover letter from the nominator. If the nominator does not hold an FCOMP, then the nominator is required to solicit two letters of support from members who hold an FCOMP. If the nominator holds an FCOMP, then one additional FCOMP holder must second the nomination and provide a letter of recommendation, and a second letter of support may come from any reference (does not need to be a member of COMP).
- In addition to the cover letter and the letters of support, the nominator must also complete the FCOMP Nomination form in order to provide a summary of the nominee's service to COMP, contributions to research and development, contributions to professional practice and contributions to education and mentorship.
- An informal curriculum vitae of the nominee is also required. The CV should include educational history, work experience, key publications & presentations, awards & honours, and patents
- If a nominee is slated to receive the FCOMP Award, both the nominator and the nominee will be notified by COMP. The nominee will be asked to confirm his/her willingness to accept the Award and will be asked to provide a short bio and a recent photograph.
- Nominations may be submitted at any time and those received by **February 1, 2016** will be considered for presentation at the 2016 AGM in St. John's Newfoundland.

2016 SYLVIA FEDORUK PRIZE IN MEDICAL PHYSICS

The Saskatchewan Cancer Agency is pleased to sponsor a competition for the 2016 Sylvia Fedoruk Prize in Medical Physics. This award is offered annually to honour the distinguished career of Sylvia Fedoruk, former Lieutenant-Governor of Saskatchewan and previously physicist at the Saskatoon Cancer Centre.

The prize will comprise a cash award of five hundred dollars ($500), an engraved plaque and travel expenses to enable the winner to attend the annual meeting of the Canadian Organization of Medical Physicists (COMP), which will be held from July 20th to 23rd, 2016, in St. John's, Newfoundland.

The 2016 Prize will be awarded for the best paper (i) on a subject falling within the field of medical physics,(ii) relating to work carried out wholly or mainly within a Canadian institution, and (iii) published during the 2015 calendar year. The selection of the award-winning paper will be made by a panel of judges appointed by COMP.

Papers published in Physics in Medicine and Biology and Medical Physics, which conform to the conditions of the preceding paragraph, will automatically be entered in the competition and no further action by the author(s) is required. All other papers should be submitted electronically to:

Nancy Barrett
Executive Director
Canadian Organization of Medical Physicists
E-mail: nancy.barrett@comp-ocpm.ca

Each paper must be clearly marked: "Entry for 2016 Sylvia Fedoruk Prize" and must reach the above address no later than **FRIDAY, FEBRUARY 5TH, 2016**.

The award winners from the last five years were:

Goulet M, Rilling M, Gingras L, Beddar s, Beaulieu L, and Archambault L, Novel, full 3D scintillation dosimetry using a staticplenoptic camera, Medical Physics, 41, Vol. 8, August 2014; 082101

Renaud J, Marchington D, Seuntjens J, and Sarfehnia A, Development of a graphite probe calorimeter for absolute clinical dosimetry, Medical Physics, 40, Vol. 2, February 2013; 020701

Goulet M, Archambault L, Beaulieu L and Gingras L, High resolution 2D dose measurement device based on a few long scintillating fibers and tomographic reconstruction:, Medical Physics, 39, Vol. 8, August 2012; 4840-4849

Andreyev A. and Celler A., Dual-isotope PET using positron-gamma emitters, Physics in Medicine and Biology, 56, Vol. 14, 4539-4556 (2011).

Frédéric Tessier and Iwan Kawrakow, Effective point of measurement of thimble ion chambers in megavoltage photon beams, Medical Physics, 37(1), 96-107 (2010).

CALL FOR BOARD NOMINATIONS

The COMP Awards and Nominations Committee is responsible for presenting a slate of nominations for the COMP Board of Directors to ensure that the organization is governed with excellence and vision. There will be two openings on the Board of Directors as of the 2016 Annual General Meeting.

PRESIDENT

The COMP President serves a two-year term and has the following responsibilities:

1. To work in conjunction with other Board members in the best interest of the organization.
2. To prepare for, attend, and Chair all Board meetings and relevant committee meetings. In-person meetings take place in November and at the Annual Scientific Meeting, and there may be up to four (4) teleconferences.
3. To preside over the Annual General Meeting.
4. To serve as the spokesperson for COMP as required.
5. To serve as the representative of COMP to the public as required.
6. To oversee projects and assume responsibilities as required.

VICE-PRESIDENT

The Vice-President serves a two-year term and has the following responsibilities:

1. To work in conjunction with other Board members in the best interest of the organization.
2. To prepare for, attend, and actively participate in all Board meetings and relevant committee meetings. In-person meetings take place in November and at the Annual Scientific Meeting, and there may be up to four (4) teleconferences.
3. To oversee projects and assume responsibilities as required.
4. To represent the President in his/her absence.

While certainly not necessary, there is an expectation that the Vice-President would be willing to stand for the position of President when that position becomes available.

SECRETARY

The Secretary is responsible for overseeing the policies and records of the organization. The Secretary is expected to attend and record the minutes of the Board and Executive committee meetings and may be asked to oversee taskforces and other projects as designated by the President. The Secretary also works with the COMP office as required to review applications for membership and confirm the applicant's eligibility.

Nominations for these roles are due **April 29th, 2016** and **must be accompanied** by a duly signed Expression of Interest and Nomination Form endorsed by no fewer than two (2) voting members of COMP as well as a brief bio. To access the nomination form, please visit www.comp-ocpm.ca or contact the COMP office.

May 16-20 mai 2016

Toronto

CRPA-ACRP

Welcome to COMP
Bienvenue à l'OCPM

from the / de

Canadian Radiation Protection Association
Association canadienne de radioprotection

Canada's network of radiation safety specialists
Réseau canadien des spécialistes en radioprotection

In 2016, the CRPA conference will be held in Toronto ON
En 2016, le congrès de l'ACRP se tiendra à Toronto ON

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De l'exploration spatiale jusqu'aux dépôts géologiques en profondeur

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Pour plus d'informations, y compris notre concours de communications écrites pour les étudiants, visitez notre site officiel du congrès: **www.crpa-acrp.com**

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COMP STUDENT NIGHT OUT – WE WANT YOUR VOTE!

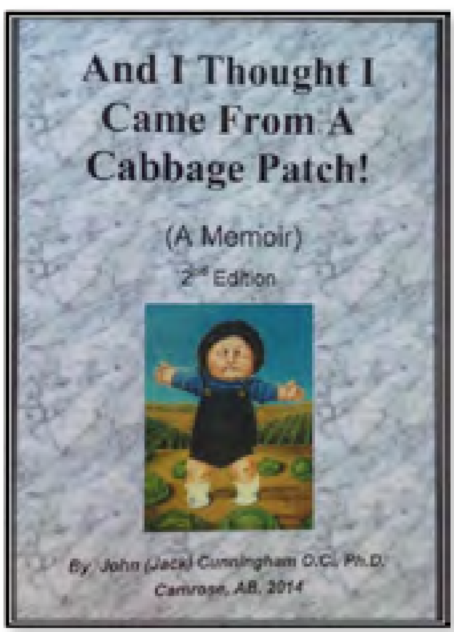
Are you planning to attend the 2016 COMP Annual Scientific Meeting in St. John's, Newfoundland? Your COMP Student Council is looking to organize the best Student Night Out yet!

Whale and iceberg watching on a boat cruise? (http://icebergquest.com/)
Ziplining in Petty Harbour? (https://www.zipthenorthatlantic.com/)
Newfie pub crawls?
A haunted hike around St. John's? (http://www.hauntedhike.com/)
A group tour of the city? (walking tour - http://www.boyletours.com/, or coach tour http://www.legendtours.ca/index.html)

We want to hear from you!
Please respond at:
https://www.surveymonkey.com/r/VZVMSC8
or contact us on our Facebook page.

AND I THOUGHT I CAME FROM A CABBAGE PATCH! (A MEMOIR)

By John (Jack) Cunningham O.C., Ph.D.
2nd Edition, Camrose, AB, 2014



Books may be purchased from COMP for $35.00 (taxes and shipping included).

To place an order:

- Visit the COMP website at comp-ocpm.ca and use the order form link under News

or

- Email the COMP office for an order form (gisele.kite@comp-ocpm.ca).

Payment may be made by: Cheque, MasterCard, or Visa.

A book review, prepared by Crystal Plume Angers, was published in the October 2014 edition of Interactions.

QUALITY MATTERS – TRAVAILLONS ENSEMBLE !

For all professionals in radiation oncology

COMP OCPM
Canadian Organization of Medical Physicists
Organisation canadienne des physiciens médicaux

CANADIAN WINTER SCHOOL
ÉCOLE D'HIVER CANADIENNE

February 7-11th, 2016

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7TH CANADIAN WINTER SCHOOL ON QUALITY & SAFETY IN RADIATION ONCOLOGY

A four-day continuing education course at the beautiful Château Montebello in Quebec.

Highlights

- 15% off the registration fees for Centres who register participants from more than one profession from within their Centre
- Patient participation
- Proffered presentations
- Radiation therapist scholarship competition
- CARO Resident/Fellow Scholarship Award
- Workshops on addressing quality and safety issues at <u>your</u> centre
- New and returning faculty

Curling, cross-country skiing and skating at one of Quebec's most beautiful winter settings!

Learning Objectives in brief

- Learn how to meaningfully involve patients in quality and safety committees
- Learn strategies to improve medical data at <u>your</u> centre
- Learn change management techniques to help put the strategies into practice

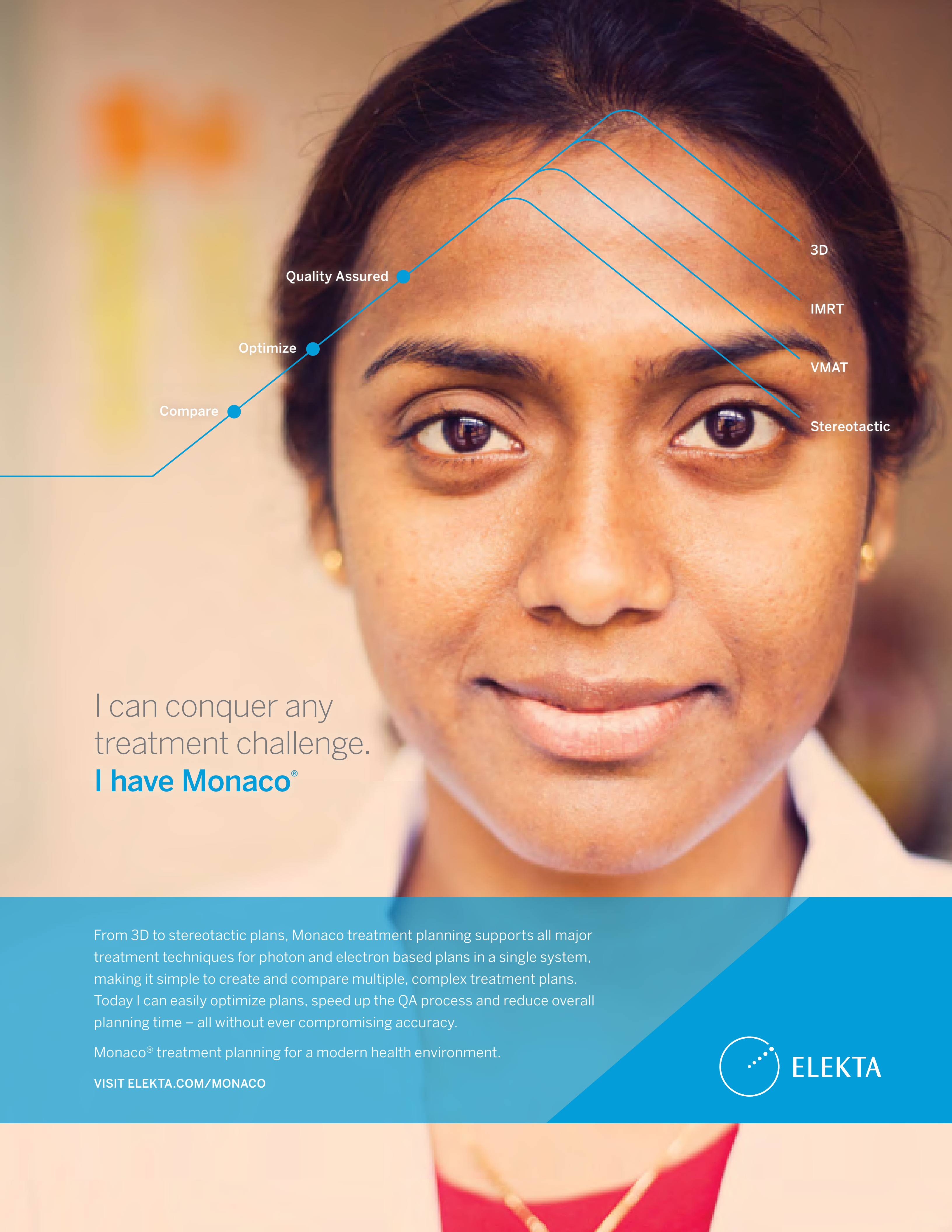
Curriculum

- Patient involvement
- Quality of medical data
- The Second Victim
- High-reliability organizations
- Teamwork

For more information please visit

comp-ocpm.ca/2016-winter-school/

/COMPWinterSchool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CONTRIBUTIONS TO THE HAROLD E. JOHNS 2015

CCPM wishes to recognize and thank the following members of their 2015 donations to the Harold Johns Travel Award. For many years the HE Johns Travel Fund has been awarded to young medical physicists to support their travel to another centre so that they may gain further experience in their specialty. With the economic downturn, investment return is minimal. Donations to the fund have to sustain the annual expenditure in the current economic environment. Please consider donating to the fund this year so that we may continue this legacy of education. Further details on the award can be found on the CCPM website.

The 2015 HEJ winner was Arman Sarfehnia with a proposal to attend the 2015 AAPM Summer School on Proton Therapy.

Ismail AlDahlawi
Muthana Al-Ghazi
Crystal Angers
Will Ansbacher
Clement Arsenault
Chantal Audet
Alistair Baillie
Lesley Baldwin
Jerry Battista
Wayne Beckham
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John Kildea
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Daniel La Russa
Micheal Lamey
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George Mawko
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Maryse Mondat
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Catherine Neath
Silvia Neuteboom
Michelle Nielsen
Ian Nygren
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Timothy Olding
Daron Owen
Horacio Patrocinio
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Jason Schella
Matthew Schmid
John Schreiner
Luc Serre
Rachad Shoucri
Peter Shragge
Narinder Sidhu
Emilie Soisson
David Spencer
Alasdair Syme
Steven Thomas
Christopher Thomas
Christopher Thompson
Jacob Van Dyk
Eric Vandervoort
Shuying Wan
Bradley Warkentin
Heather Warkentin
Glenn Wells
Ellen Wilcox
David Wilkins
Conrad Yuen
Ge Zeng-Harpell

HAROLD JOHNS TRAVEL AWARD ANNOUNCEMENT

DEADLINE FOR APPLICATION: 8TH APRIL 2016

The Board of the Canadian College of Physicists in Medicine is pleased to honour the Founding President of the College by means of the Harold Johns Travel Award for Young Investigators.

> *H.E. Johns – Officer of the Order of Canada, Ph.D., LL.D., D.Sc., Emeritus University Professor and Professor Emeritus in the Department of Medical Biophysics and Radiology, University of Toronto.*
>
> *Dr. Johns was born of missionary parents while in West China. During his scientific career, he published over 200 peer-reviewed papers, trained over 100 graduate students, many of whom hold key positions in the field of Medical Physics across Canada and around the world. He has won many prestigious awards and has published four editions of "The Physics of Radiology", the premiere textbook in the field.*
>
> *His developments in the late 1940s of the Cobalt "bomb" led to a career in the pioneering field of Medical Biophysics. This in turn led to international reputation among scientists. His many awards and accolades reflect the respect and admiration in which he was held by academics and scientists around the world. He was inducted into the Canadian Medical Hall of Fame in 1998. Dr. Johns passed away on August 23, 1998.*

The award is given annually by the Canadian College of Physicists in Medicine to an outstanding CCPM Member proposing to visit one or more medical physics centres or to attend specialized training courses, such as an AAPM summer school. It is intended to assist the CCPM Member in extending his or her knowledge by travelling to another centre or institution with the intent of gaining further experience in his or her chosen field, or, alternately, to embark on a new field of endeavour in medical physics. Its ultimate goal of the award is to enhance medical physics practice in Canada.

Applicants may travel either inside Canada or elsewhere. Applicants must have passed the CCPM membership exam within the previous three years, be less than 35 years of age, and should not have previously taken a similar course or have spent a significant amount of time at the proposed institutions. The award is for $2,250 and will be paid upon receipt of a satisfactory expense claim. Recipients need not be Canadian citizens but must be working in Canada.

The deadline for application this year is Friday April 8, 2016.

Applicants must submit a one-page proposal indicating the course they wish to attend or the name(s) of the institutions they would visit and the reasons for their choice. They should also submit an estimate of the costs involved and letters from their present employer indicating that they are in agreement with the proposal. If their proposed expenses exceed the value of the award, then they should also indicate the source for the additional funds required. For a visit to an institution, the candidate must have that institution write to the Registrar in support of the visit. The candidate should also provide their curriculum vitae and the names and phone numbers of two references that the selection committee can contact. No reference letters are required. The selection committee reserves the right to contact additional individuals or institutions.

A panel appointed by the Board of the College will choose the award recipient. Their choice will be based upon 1) the written proposal submitted by the candidate, 2) references obtained by the committee, and 3) membership exam results. The award will be announced at the Annual General Meeting of the College. Recipients will have two years after their application deadline to complete their travel and will be required to submit a short report to the InterACTIONS newsletter.

Applicants who are unsuccessful in any one year and still eligible in subsequent years may have their applications considered again by writing to the Registrar and providing any necessary updated information.

Applications should be sent to the Registrar of the Canadian College of Physicists in Medicine at:

Ms. Raxa Sankreacha
Carlo Fidani Peel Regional Cancer Centre (F150)
Dept. Of Medical Physics
2200 Eglinton Ave. West
Mississauga, ON L5M 2N1
registrar@ccpm.ca

GOLD MEDAL AWARD

CALL FOR NOMINATIONS

The COMP Gold Medal will be awarded to a member of COMP (or retired former member) who has made a n outstanding contribution to the field of medical physics in Canada. An outstanding contribution is defined as one or more of the following:

1. A body of work which has added to the knowledge base of medical physics in such a way as to fundamentally alter the practice of medical physics.

2. Leadership positions in medical physics organizations which have led to improvements in the status and public image of medical physicists in Canada.

3. Significant influence on the professional development of the careers of medical physicists in Canada through educational activities or mentorship

The Gold Medal is the highest award given by the Canadian Organization of Medical Physicists and will be given to currently active or retired individuals to recognize an outstanding career as a medical physicist who has worked mainly in Canada. It will be awarded as appropriate candidates are selected, but it will not generally be given more than once per year.

Nominations for the 2016 medal are hereby solicited. Nominations are due by **February 5th, 2016** and must be made by a Full Member of COMP. Nominations must include:

1. The nominator's letter summarizing the contributions of the candidate in one or more of the areas listed above.

2. The candidate's CV.

3. The candidate's publication list (excluding abstracts) which highlights the candidate's most significant 10 papers.

4. Additional one to two page letters supporting the nomination from three or more members of COMP.

Please forward nominations electronically to Nancy Barrett at the COMP office (preferably in pdf format, nancy.barrett@comp-ocpm.ca).

Candidates selected for the medal will be invited to attend the COMP Annual Scientific Meeting where the award will be presented by the COMP President. Travel expenses will be paid for the medal winner. The medal winner may be asked to give a 30 minute scientific presentation at the COMP meeting in addition to a short acceptance speech when the medal is presented.

EXPANDING GLOBAL ACCESS TO RADIATION THERAPY BY 2035

Continued from page 19

In summary, the report provides compelling evidence that investment in radiotherapy not only enables treatment of large numbers of cancer cases to save lives, but also brings positive economic benefits.

Acknowledgement: I would like to thank COMP for nominating me to participate in this important and worthwhile activity and for providing travel support to some of the key meetings associated with developing this Lancet Oncology commission report.

References

[1] UNITED NATIONS GENERAL ASSEMBLY. Political Declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases. http://www.un.org/ga/search/view_doc.asp?symbol=A/66/L.1 (Accessed 2015-10-21), United Nations. 2011.

[2] MOTEN A., SCHAFER D., FARMER P., KIM J., FERRARI M. Redefining global health priorities: Improving cancer care in developing settings, J.Glob.Health, 4, (2014) 010304.

[3] UNITED NATIONS GENERAL ASSEMBLY. Transforming our world: the 2030 Agenda for Sustainable Development. http://www.un.org/ga/search/view_doc.asp?symbol=A/70/L.1&Lang=E (Accessed 2015-10-21), United Nations. 2015.

[4] KNAUL F.M., GRALOW J.R., ATUN R., BHADELIA A. Closing the Cancer Divide: A Blueprint to Expand Access in Low and Middle Income Countries., Harvard University Press, Boston, MA (2012).

[5] ATUN R., JAFFRAY D.A., BARTON M.B., BRAY F., BAUMANN M., VIKRAM B., HANNA T.P., KNAUL F.M., LIEVENS Y., LUI T.Y., MILOSEVIC M., O'SULLIVAN B., RODIN D.L., ROSENBLATT E., VAN DYK J., YAP M.L., ZUBIZARRETA E., GOSPODAROWICZ M. Expanding global access to radiotherapy, Lancet Oncol, 16, (2015) 1153-1186. (The full Lancet Oncology Commission report along with its commentaries can be found here: http://press.thelancet.com/GlobalRadiologyCommission.pdf)

[6] LIEVENS Y., VAN DEN BOGAERT W., KESTELOOT K. Activity-based costing: a practical model for cost calculation in radiotherapy, Int J Radiat Oncol Biol Phys, 57, (2003) 522-535.

MESSAGE FROM THE COMP PRESIDENT

Continued from page 5

VPs and CEOs understand, we will always have difficulty becoming effective leaders within the health care setting.

That this is a concern both in Canada and the United States is not surprising to me. The natural relationship with our American counterparts may allow opportunities to better advocate for our profession so that together we can help our members develop improved leadership skills. I am very hopeful that our technical excellence can easily be translated in more broad leadership within the whole medical community. I believe that now is the time when this is most urgently needed, and that our community will be able to rise to the considerable challenges facing our health care system and show how we can help.

DATES TO REMEMBER

Fellow of COMP Award nominations deadline:
February 1st, 2016

Sylvia Fedoruk Prize in Medical Physics 2016 nominations deadline: February 5th, 2016

Gold Medal Awards nominations deadline: February 5th, 2016

COMP Winter School:
February 7th - 11th, 2016

ESTRO CARO Teaching Course on Image-Guided Cervix Cancer Radiotherapy:
April 4-6, 2016, Hilton Hotel, Toronto

Harold E. Johns Travel Award deadline for application:
April 8th, 2016

Clinical and Experimental Radiobiology Course
April 11-15, 2016
University of Toronto
– Bahen Centre

Call for COMP Board nominations deadline:
April 29th, 2016

CRPA-ACRP: May 17th- 20th, 2016


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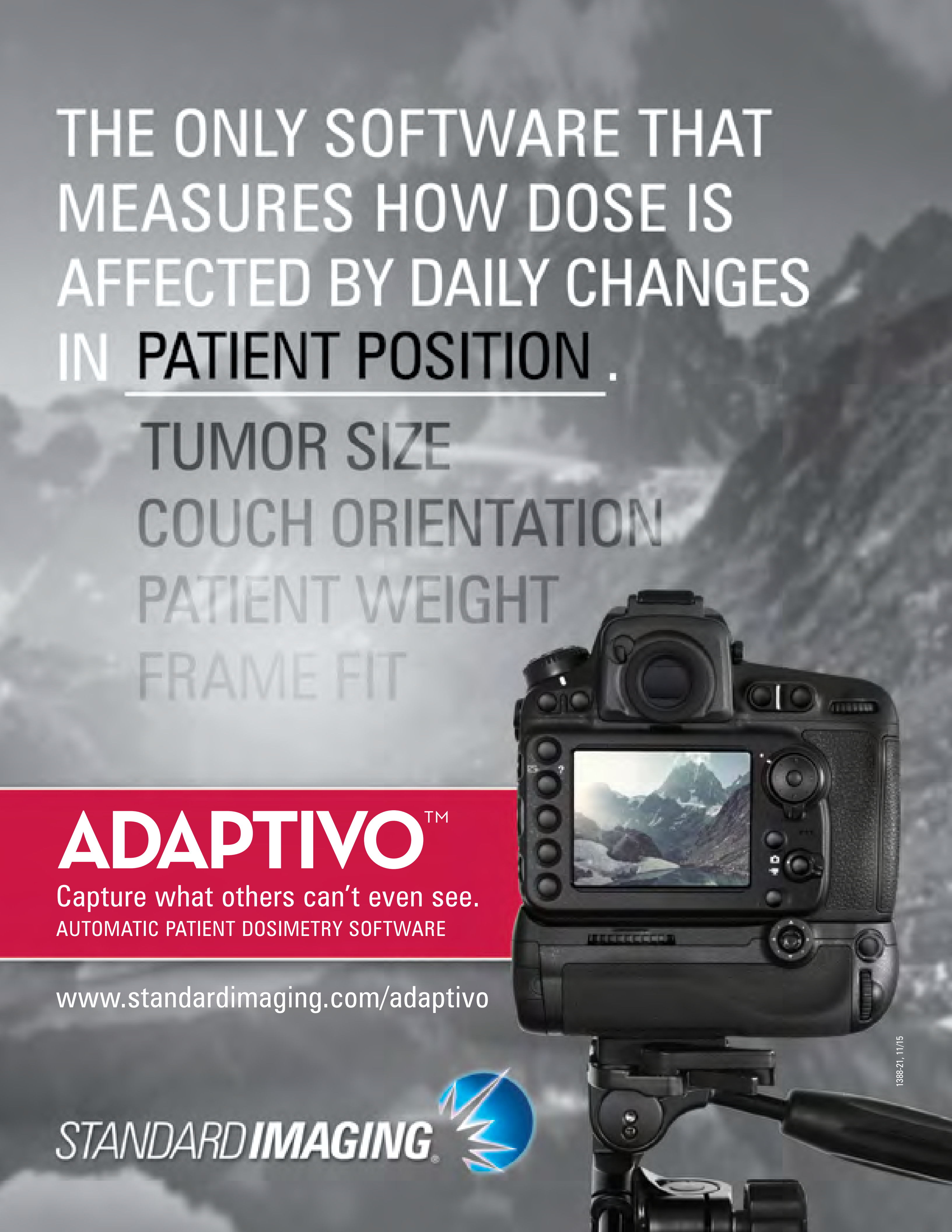
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