

InterACTIONS

62(4) October/octobre 2016

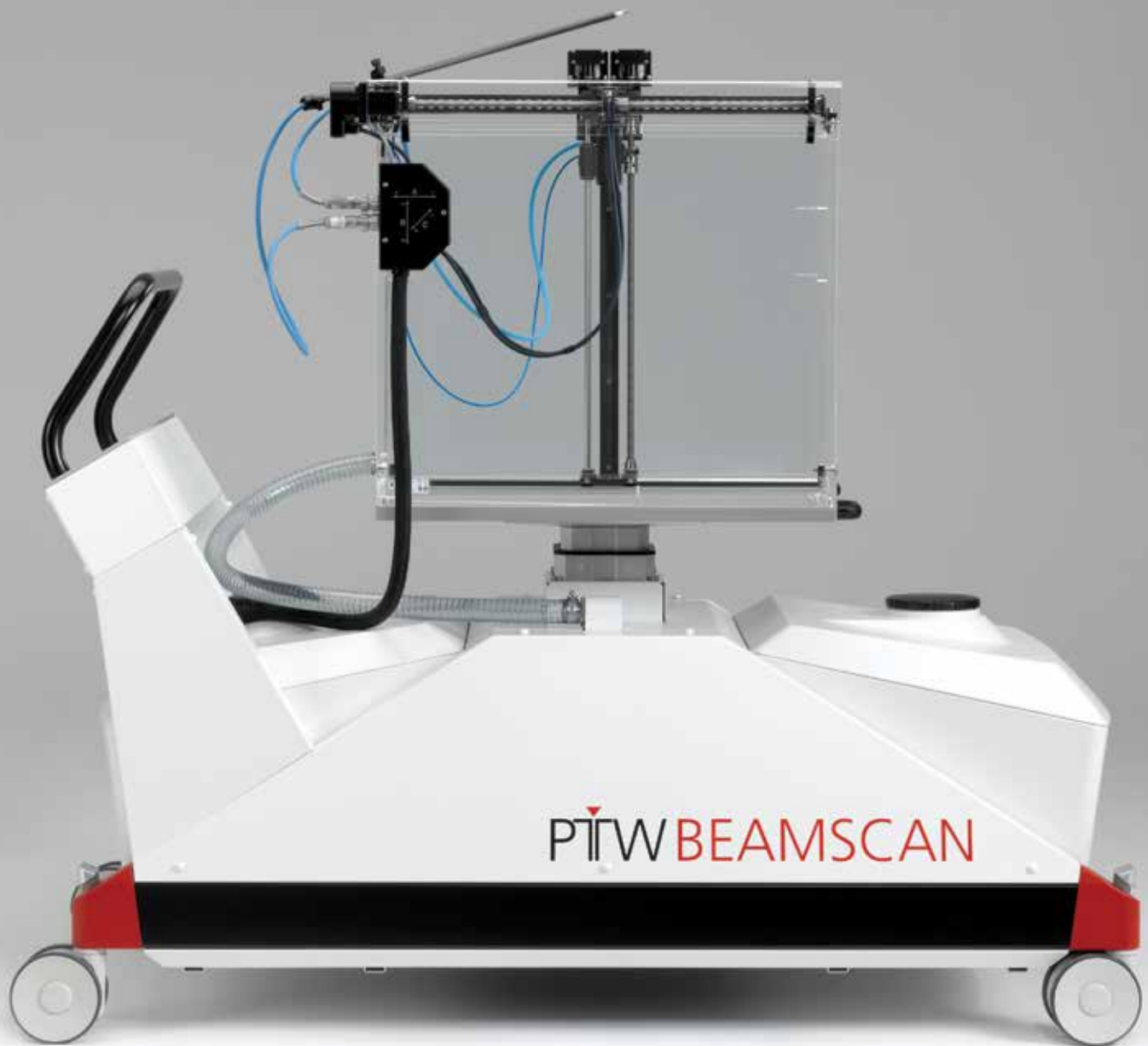


2016 COMP GOLD MEDAL AWARDED TO G. PETER RAAPHORST

FROM LEFT TO RIGHT: MARCO CARLONE,
JAKE VAN DYK, PETER RAAPHORST
AND JOHN SCHREINER

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The Canadian Medical Physics Newsletter, which is a publication of the Canadian Organization of Medical Physicists (COMP) and the Canadian College of Physicists in Medicine (CCPM) is published four times per year on 1 Jan., 1 April, 1 July, and 1 Oct. The deadline for submissions is one month before the publication date. Enquiries, story ideas, images, and article submissions can be made to:

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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 have just begun my two year term as the new president of COMP. I would like to start here by extending my deepest appreciation to Marco Carlone for his role as president of COMP during the past two years. Marco finished his term at our annual general meeting in July and for those not able to be in St. John's, I would like to echo here the thank you to Marco that was iterated at that time. Marco put an incredible amount of passion and energy into his role as president. Over the last couple of years I have witnessed an increase in the recognition of medical physicists as key players in quality health care in Canada, and I think Marco's advocacy efforts have contributed significantly to this. Thank you, Marco, for your service to COMP!

As I step into this role, there are many of you I don't know, so I thought I should take a moment to introduce myself. Currently, I'm a senior radiation oncology physicist at the BC Cancer Agency in Kelowna BC, having worked previously at the BC Cancer Agency centres in both Vancouver and Victoria. I am director of the BC Cancer Agency's provincial Medical Physics Residency Program and am a residency program reviewer for CAMPEP. I also maintain academic appointments with UBC and UVic. I've been a member of COMP for nearly 20 years and was involved in organizing several of our Annual Scientific Meetings prior to accepting a position on the board two years ago. I truly love being a medical physicist, and I hope to carry some of this enthusiasm for our profession effectively into this new role.

COMP's 62nd annual scientific meeting was held in St. John's NFLD this summer. As in

previous years, the meeting was outstanding, with stimulating science, engaging education sessions, networking with industry partners, students and colleagues, meeting new people, connecting with old friends and... becoming honorary Newfoundlanders of course! Throughout this issue of InterACTIONS you will find stories about the meeting that are sure to be of interest. Here I would briefly like to highlight a couple of points.

First, I've always felt that the strong participation of students at our ASM is key to its success and this year was certainly no exception. I had several people comment on the particularly high quality of the 2016 Young Investigator's Symposium and I absolutely agree it was a standout session. One contributing factor may have been the high number of submissions for the competition this year, totalling 23. I would like to extend congratulations to all YIS participants and to the winners - Thomas Hrinivich (Robarts), André Diamant (McGill), and Jason Crawford (UVic). I have a strong interest in science and education, and continued support for students and residents is certainly something I plan to focus on in the years to come. And speaking of young talent, in a tradition started at the World Congress, a group of local high school science fair winners joined the ASM to exhibit their projects, view the YIS competition, and visit with vendors. The future is bright indeed!

Secondly, the ASM this year featured a luncheon put on by the newly formed COMP Women's Committee (CWC). This inaugural CWC event was standing room only and participants, women and men, engaged in lively discussions around the guiding themes of



Michelle Hilts

leadership, mentorship, and partnership. The CWC is just getting started, but clearly interest is high and we look forward to seeing what it plans for the future.

My prior experience with COMP largely surrounded our excellent ASM. Upon joining the board, I was impressed by the amount and scope of work being undertaken by COMP in a wide range of areas, such as partnership with allied organizations, advocacy with governmental organizations, and professional and regulatory issues. Of particular note, the board has put a tremendous amount of effort over the last year into establishing a new strategic plan and over the next series of columns I hope to illuminate this plan and the ongoing efforts of COMP to fulfill its mission: to champion medical physicists' leadership in patient care through education, innovation, and advocacy.

I hope that we can work together to continue to make COMP a standout organization and to

Continued on page 58

MESSAGE FROM THE CCPM PRESIDENT

The CCPM board held its annual business meeting prior to the COMP annual scientific meeting in July. Here are the key topics that were discussed during this meeting.

In 2015, an ad-hoc committee was formed to review the current recertification process and to provide recommendations to the board on how the system could be improved. The committee was led by our current registrar, Raxa Sankrecha, and our past-registrar, Horacio Patrocinio. The committee recommends to the board that changes be made in three specific areas. First, the full-time equivalent (FTE) requirements for recertification should be reviewed. Some experienced physicists choose to reduce their workload near the end of their career through progressive retirement. There should be some latitude in the recertification process to allow for this. Secondly, the recertifying member's referees must currently be board-certified physicists. This can be a challenge for some physicists who might be the only physicist in the department (e.g. in some imaging departments). The committee has suggested a few options that might help in these situations. Finally, the recertification credit system should be changed to focus more on clinical service. This would allow clinical physicists more opportunities to get credits for clinical work. These recommendations will be reviewed by the board before any changes are made. Any changes to the system will likely be gradual to ensure that those members recertifying are not penalized during the transition to the new credit system.

Since the core business of the college is providing a certification exam, the examination process is always a topic of discussion during board meetings. A few key changes were made to the

MCCPM examination process. Each question in the written exam is now marked by three separate individuals. This allows the chief examiner to ensure consistency in the marking of the exams and to validate the marks prior to providing results to candidates. An important decision was also made by the board regarding the location for the exam. Since the CCPM exam is intended to serve the Canadian public, the board has added to its regulations the requirement that the MCCPM written exams must be written in Canada. The exam process that we have is successful thanks to the participation of our members. I would like to sincerely thank all of the CCPM members who have participated in the exam process this year. They represented 18% of our membership! Now that's participation!

Finally, the board has decided to organize a strategic planning exercise in November to review its current approach to certification. This exercise will allow the board to review and discuss current trends in professional certification. Of particular importance is the process of keeping the certification relevant to current professional practice. The board will also investigate what role external stakeholders, like COMP and the CAMPEP-accredited residency programs might play in this process. Interestingly, as I was writing this message, the ABR sent to all AAPM members a notice that it will circulate a survey on medical physics practice which will be used to update its examination process. It is interesting to see that both the ABR and the CCPM are embarking in reviews of their examination process.

Two board directors have finished their terms on the board during the summer. Glenn Wells and Horacio Patrocinio are both coming off the board after six years. On



Clément Arsenault

behalf of the college, I would like to thank them both for their valuable contributions to our certification process. Replacing Glenn will be Gord Mawdsley from Sunnybrook Research Institute. He is the current chair of the committee on Physics of Mammography Certification. Gord will be taking the role when Wendy Smith's term finishes. Also new on the board is Andrew Kerr from the Cancer Center for Southeastern Ontario (Kingston). Andrew will be replacing Raxa Sankrecha as registrar when her term finishes.

Let me end this column with a quick explanation for the change to my picture. My wife and I spent the three weeks following the COMP ASM touring around Newfoundland. What a wonderful province! Great weather, great people, and great hikes! The picture is taken from the end of Western Brook Pond gorge, a famous lookout that appears in most Newfoundland tourism commercials. What they don't tell you is that it is a strenuous four hour hike to get to the lookout! Then you need two to three days to get back out!

EXECUTIVE DIRECTOR REPORT

As I write this article, summer holidays are coming to a close and Canada's other "new year" is beginning. This presents an opportunity to reflect on our accomplishments and get energized about what is coming up. There have been many accomplishments since the last issue.

The board approved a new three year strategic plan.

The key priorities of the plan will be shared with members, our partners, and other stakeholders and regular updates on our progress will be provided.

We hosted a most successful annual scientific meeting (ASM) in St. John's, Newfoundland.

Under the leadership of BeiBei Zhang, the ASM provided excellent continuing education and scientific content, as well as an opportunity to network with old and new friends and colleagues. The Local Arrangements Committee, under the leadership of Maria Corsten, ensured that great fun was had by all – even the weather cooperated! The ASM also had some firsts: the first education and networking session focused specifically on young professionals in the field of medical physics, the first COMP Women's Committee meeting and the first time the new Publication Impact Prize was awarded. We are grateful to all of our volunteers and to our corporate sponsors, Elekta, Varian, and Medron Systems.

Plans are well underway for the next Winter School which will be taking place in February 2017 in Montebello, QC.

The 2017 Winter School will be different than previous years in that it is focused on medical imaging. The theme is quality improvement and radiation safety in medical imaging, and the

planning committee is being led by Thor Bjarnason and is made up of medical physicists, radiologists, and technologists.

A two-day mammography workshop has also been scheduled for February 2017.

This is the first time COMP will be offering this workshop, and it will be held in conjunction with the Imaging Winter School so that those who are interested can attend both programs. The workshop will provide medical physicists who are certified in mammography with an opportunity to earn their required continuing education credits without having to travel outside of Canada.

The participation at both the CCPM and COMP annual general meetings was outstanding

and indicates that our members and engaged and interested in what is happening in the organization and enjoyed sharing a beverage with their colleagues at the same time! Following the AGM, it was great to acknowledge and celebrate the contribution of this year's fellow of COMP award winners (profiled later in this issue) as well as the Sylvia Fedoruk award winner, Quinn Matthews. COMP's newest prize, the Publication Impact Prize, was awarded to Karl Otto. COMP's highest award, the Gold Medal, was given to Peter Raaphorst. John Schreiner gave an excellent tribute to Peter sharing stories about the impact he has had. More information about Peter can be found in this issue. (Editor's note: we also have articles by Quinn and Karl).

I would like to take this opportunity to thank our outgoing board members: Luc Beaulieu and Emilie Soisson. Luc was passionate about engaging



Ms Nancy Barrett

students in COMP and as COMP president and past-president, was also instrumental in helping the board to navigate the new Canada Not-for-Profit Act and clarify the contractual arrangements between COMP and CCPM. Emilie served as COMP board secretary and played a key role in ensuring that COMP's policies were clear and well-documented. It was a pleasure working with both Luc and Emilie. I am also pleased to welcome Horacio Patrocinio from McGill, who has taken on the role of vice-president, and Heping Xu from Nova Scotia, who has moved into the role of secretary.

International Day of Medical Physics will be taking place on Marie Curie's birthday on November 7th. This event provides us an opportunity to increase the awareness of the important role of medical physicists, so consider participating in this year's activities. We are looking to highlight and celebrate the contribution that medical physicists make to healthcare. More details can be found in this issue.

Continued on page 58

MESSAGE FROM THE EDITOR

Wow, this issue is jammed packed, so I'll keep this really short. It's so full I had to recruit extra help, as can be seen in my photo this issue. Unfortunately, she seemed more interested in eating the pages ...

The ASM has come and gone, so we have lots of content focuses around that, including John and Peter's speeches, an article from Karl on his Impact Prize win, a summary article from Quinn on his Fedoruk prize-winning article, and a summary article on the ASM itself. Be sure to check out our Facebook page for lots of photos from the ASM as well.

We also have our second legal column from Robyn Grant. I think

these have been interesting reads, and next issue we'll be hearing from a bioethicist. We also have reports from three conferences/workshops. And a batch of other stuff.

And in sad news, over the past year we lost two colleagues: John Taylor, from the London-Regional Cancer Program, and Michael Sharpe, from Princess Margaret Hospital. Our condolences to family and friends of course.

This is easily the biggest issue I've edited in my tenure as your editor, and the reason is because of YOU, the members who send in articles. It's very much appreciated, and please keep sending them along! Have a good autumn!



Chris Thomas

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
Al Makdessi	Georges	McGill University	Student
Bartolac	Steven	John Hopkins School of Medicine	Full
Mahon	Rebecca	Virginia Commonwealth University	Student
Nano	Tomi	University of Western Ontario	Student
Ratner	Martin	Orfit Industries	Corporate
Riblett	Matthew	Virginia Commonwealth University	Student
Sandeman	Jeff	Canadian Nuclear Safety Commission	Associate
Wepler	Sarah	Tom Baker Cancer Centre	Student

MAMMOGRAPHY WORKSHOP

February 1st - 3rd 2017
Fairmont Le Château Montebello,
Québec

www.comp-ocpm.ca



IMAGING WINTER SCHOOL

February 2nd - 5th 2017
Fairmont Le Château Montebello,
Québec

Quality Improvement and
Radiation Safety

www.comp-ocpm.ca

Mark your calendars for these two events!
You won't want to miss the following topics for discussion:

Mammography Workshop

This program will be covering a number of relevant topics, including quality control, digital breast tomosynthesis, informatics, and other breast imaging modalities.

Mammography Workshop – Confirmed Speakers:

Keynote Speaker: Dr. Martin Yaffe, Senior Scientist, Sunnybrook Health Sciences Centre, Toronto, ON

Alain Gauvin, Manager of RIS-PACS, McGill University Health Centre, Montreal, QC

Gordon Mawdsley, Medical Physicist, Imaging Research Group, Sunnybrook Research Institute, Toronto, ON

Dr. Daniel Rickey, Medical Physicist, CancerCare Manitoba, Winnipeg, MB

Stephanie Schofield, Quality Control Technologist, Diagnostic Imaging, Nova Scotia Health Authority, Halifax, NS

Dr. Jean M. Seely, Head of Breast Imaging, The Ottawa Hospital, Ottawa, ON

Dr. Atiyah Yahya, Medical Physicist, Cross Cancer Institute, Edmonton, AB

Mammography Workshop Organizing Committee

Atiyah Yahya, Medical Physicist

Idris Elbakri, Medical Physicist

Imaging:

- Risk Models and Controversies.
- Peer Review.
- Medical Imaging and Interventions outside Medical Imaging.
- Appropriateness.
- Machine Learning.
- Canada Safe Imaging Session.
- Project Galleries and Workshops.

Winter School Imaging – Confirmed Speakers:

Keynote Speaker: Dr. Martin Yaffe, Senior Scientist, Sunnybrook Health Sciences Centre, Toronto, ON

Dr. Sandor Demeter, HSC Section Head of Nuclear Medicine, Health Sciences Centre, Winnipeg, MB

Dr. Guy Frija, Eurosafe Chair, European Society of Radiology, Vienna, Austria

Dr. David Koff, Radiologist in Chief, Diagnostic Imaging, Hamilton Health Sciences, Hamilton, ON

Dr. William Miller, Deputy Chief and Chair of Diagnostic Imaging, Ottawa Hospital, Ottawa, ON

Stephanie Schofield, Quality Control Technologist, Diagnostic Imaging, Nova Scotia Health Authority, Halifax, NS

Winter School Organizing Committee Thor Bjarnason, Chair, Medical Physicist

Daniel Rickey, Medical Physicist

Marco Carlone, Medical Physicist

Glenn Wells, Medical Physicist

David Koff, Radiologist

Sandor Demeter, Radiologist

Jonathan Mandel, Radiologist

Deborah Murley, Technologist

Darren Oczkowski, Technologist

CNSC FORUM:

SECURITY OF HIGH ACTIVITY RADIOACTIVE SOURCES AT CLASS II FACILITIES

Rick Kosierb

Project Officer: Accelerators and Class II Facilities, CNSC

As a physicist or technician working in a hospital or a processing facility, you may work with prescribed equipment such as a GammaKnife, cobalt teletherapy machine, high dose rate brachytherapy (HDR) unit or an irradiator of some form. With that, you probably already know that the Canadian Nuclear Safety Commission (CNSC) regulates the operation of this equipment to ensure you, your fellow workers, and the general public are safe during its operation. But are you aware that the CNSC also regulates the security of the sealed sources used within these devices?

The need to secure radioactive sources is generally defined within the Canadian Nuclear Safety and Control Act (NSCA). To further clarify these requirements, the CNSC publishes regulations and regulatory documents. One regulatory document, REGDOC 2.12.3 - *Security of Nuclear Substances: Sealed Sources*, describes the minimum security measures that licensed facilities must implement to secure and prevent the loss, theft, or illegal use of radioactive sealed sources. It also provides information and guidance on how to meet the minimum security measures necessary to secure these sources. This document is referenced with your facility's CNSC operating licence and came into effect as of May 31, 2015 for those licensees with category 1 and 2 radioactive sealed sources. It will come into effect as of May 31, 2018 for licensees with only category 3, 4 and/or 5 sources. At this point you may be thinking: "I don't have to worry about that, my radiation safety officer (RSO), security officer (SO), and facility management handle the security. I just have to ensure the equipment is properly locked up at the end of the day." Yes, you do have to ensure the prescribed equipment that contains radioactive sources is secure at the end of the day, but you are also an important component of its security during the day. Your RSO, your SO, and your management rely on you to notice unusual situations, recommend security improvements, and assist during CNSC security inspections. So what does the CNSC expect, as a minimum, from you and your organization in securing the prescribed equipment?

CNSC's expectation is that you and your organization abide by REGDOC 2.12.3 and recognize the possible signs that could lead to criminal activity regarding this equipment, prevent this activity, delay it, and have the means of apprehending the culprit. What we have

found since REGDOC 2.12.3 came into effect is that while the security measures at most of the facilities inspected were relatively good, some improvements are still needed. The improvements needed must consider five key components of security: dissuasion, detection, delay, response, and training. Understanding each of these concepts is important for improving your present security system for radioactive sources and prescribed equipment, and for ensuring that it complies with CNSC expectations.

Dissuasion or *deterrence* is like the police person sitting on the side of the road to prevent speeders, or securing a window with iron bars. Observing that the prescribed equipment that you operate always has someone around it, or is effectively secured, will help deter a potential intruder from targeting that equipment.

Detection is the notification that there is an attempt of unauthorized access to either the area or facility where the radioactive source/equipment is located. As a staff member and operator, you are also a means of detection, in that you can alert security personnel in the event of an unusual situation or intrusion. Your reporting can decrease the security response time and minimize the adversary's window for success. Passive alarm systems such as motion detectors, door contacts, and magnetic switches (as seen in Figure 1) are mechanical devices that can be used to detect an intrusion. However, that detection is insignificant if it is not communicated to someone to make an assessment of the situation.

During the communication, assessment, and response, there is a need to **delay** or slow the intruder's progress so the response personnel can interrupt and defeat the intruder. This delay is usually accomplished by a series of diverse barrier types. Examples of barriers are depicted in Figure 2. REGDOC 2.12.3 requires that a minimum of two physical barriers be established that cannot be easily defeated by simple hand tools, such as screwdrivers, bolt cutters, crowbars, etc. The major difficulty we've observed with existing security systems is ineffective barriers. Figure 3 depicts the anchorage of a HDR unit via a chain to the wall. Although the chain could be improved by encircling it with a shroud, it is the actual anchor point that makes it ineffective. The eyebolt can simply be unscrewed from the wall. Outside bars on

windows having access to the secure area may also be used to provide protection, as shown in Figure 4. Unfortunately, these are ineffective if they are not secured by tamperproof screws.

Locked cabinets are good, unless the gap between the door and the frame is large enough to defeat the deadbolt with a crowbar (Figure 5). The important point for the barrier is to delay the intruder sufficiently to enable the response personnel to respond and prevent the intruder from reaching his/her goal. For example, if the barriers can delay the intruder for over an hour, and the security team response time is only a few minutes, this makes an effective security system. However, if the barriers can be defeated quickly as described above, then the response may not be fast enough.

Response is the action taken to prevent the intruder's success. The detection mechanism must be able to communicate the intrusion in sufficient time for the response personnel, such as local law enforcement or facility security staff, to deploy and prevent further progress by the intruder. An alarm bell that only rings outside of the secure area is ineffective if the monitoring and response personnel cannot hear it. It is important to ensure that security personnel and/or local law enforcement understand the physical barriers incorporated and estimate the corresponding required response time, to ensure that they are able to be on site within this timeframe.

Finally, **training** is possibly the most important aspect of any security system. Responders must be trained to ensure they know what the prescribed equipment/radioactive sources they are to protect looks like, where it is, how it is secured, and the procedures to follow on encountering an alarm. Having the response personnel do an actual tour of the security areas within your facility is a good mechanism to improve the system. Security training is not limited to the response team. All staff at your facility, including yourself, should have security training. This training should include understanding the policies and procedures for ensuring the equipment you operate is secure and how to recognize unusual situations that could undermine the facility's security. One of

those situations may involve how to handle irregular behavior of a fellow worker or student.

Facilities that are licensed to hold high-risk radioactive sources (Category 1, 2 and 3) must also implement a trustworthiness and reliability verification program in order to allow staff to have unescorted access to these sources. This requirement means that a person's criminal record and employment history must be verified prior to management authorizing them to have unescorted access to high risk sources and/or prescribed equipment. For those of you employed by hospitals, you may have already had such a check done as a condition of your employment. The CNSC regulatory requirement also states that this verification must be done on a regular basis, at a minimum of every five years.

The main purpose of a trustworthiness check is to ensure that individuals with unescorted access do not pose a potential "insider" threat. This also means that if you're unsure of someone's background (such as a student or a contractor), or if you feel the person that you are working with appears distressed or agitated, you must keep that person in sight (under escort) at all times if they are allowed within secure areas and have access to radioactive sources. More information on this topic can be found within the CNSC's Directorate of Nuclear Substance Regulation (DNSR) Special Edition 2016 Newsletter at <http://nuclearsafety.gc.ca/eng/nuclear-substances/directorate-of-nuclear-substance-regulation-newsletter/index.cfm>, as well as REGDOC 2.12.3 Frequently Asked Questions on the CNSC website. .

This article has only briefly highlighted some of the key components of CNSC requirements for security. If you would like more information on REGDOC 2.12.3, please visit the CNSC website at <http://nuclearsafety.gc.ca/eng/acts-and-regulations/regulatory-documents/index.cfm> or talk to your RSO.

The CNSC recognizes that security goes hand-in-hand with safety. It is not only your RSO, your SO, and/or your management that is responsible for the safekeeping of radioactive sources/equipment. You must also do your part.



Figure 1 - Alarm Systems



Figure 2 - Various Barriers

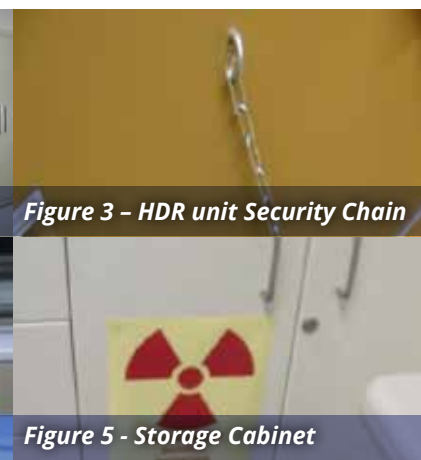


Figure 3 - HDR unit Security Chain

Figure 4 - Tamperproof screw

Figure 5 - Storage Cabinet

IN MEMORIAM – MICHAEL SHARPE

Stephen Breen

Princess Margaret Cancer Centre

Dr. Michael Sharpe, associate head of physics at the Princess Margaret Cancer Centre and associate professor of radiation oncology at the University of Toronto, died from cancer on June 22nd, 2016, after a very short illness.

Michael Sharpe had an extraordinary passion for medical physics. During his undergraduate physics degree at Western University, he was introduced to medical physics at the London Regional Cancer Centre, where he worked after his graduation. In 1989, he started graduate school at Western, and went on to complete his PhD in medical biophysics, performing research on convolution-superposition dose calculation.

After graduation, Mike began his career at William Beaumont Hospital in Royal Oak, Michigan, commuting across the border every day from Windsor. At Beaumont, Mike was involved in the early clinical implementation of IMRT, leading efforts for wedge-free breast treatment, and helping to develop breath-hold techniques. In 2002, he was recruited to the Princess Margaret Hospital. In the Radiation Medicine Program at Princess Margaret, he was a leader in the wide-spread adoption of image-guided intensity-modulated radiotherapy, and an early leader in adaptive radiotherapy.

Mike made positive differences at many levels in the medical physics and radiation oncology communities. He traveled to South America, Asia, and Europe to teach several courses on IMRT, IGRT, and adaptive RT with ASTRO, ESTRO, and IAEA. In Ontario, he was the physics quality lead for Cancer Care Ontario. And in the Radiation Medicine Program at Princess Margaret, he was a mentor to many residents and junior staff. He enjoyed challenging his colleagues in the Radiation Medicine Program to integrate new technology in patient care.

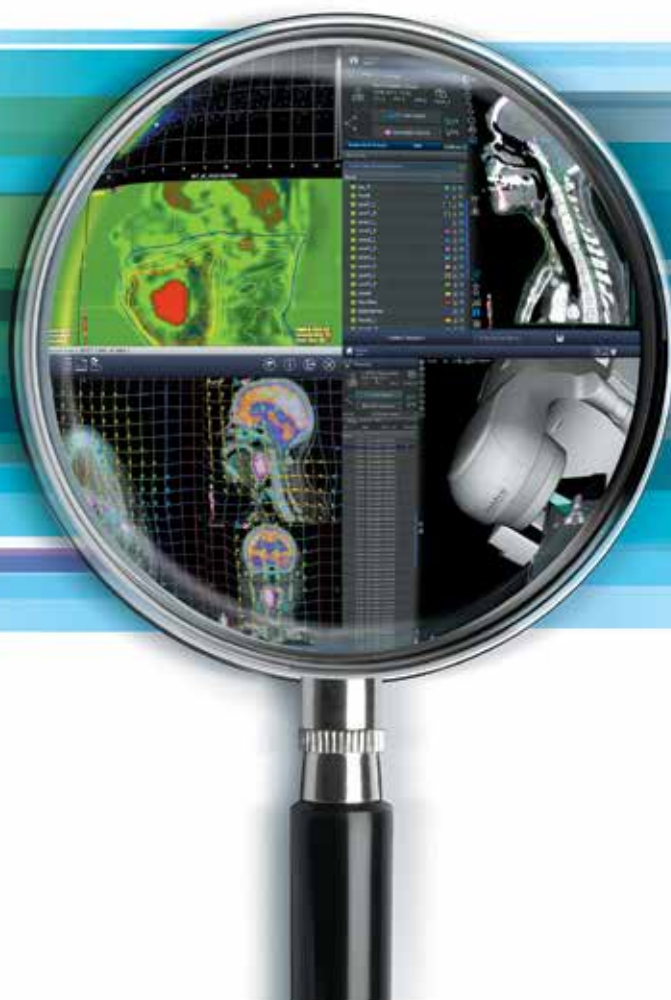
Mike's passion for medical physics was matched in recent years by his passion for road cycling. He was one of the inaugural riders in the first Ride to Conquer Cancer, a fundraising effort at the Princess



Margaret Cancer Foundation. Just as he shared his passion for medical physics with his colleagues, he shared his passion for cycling with those around him, and as the inspirational team captain of the RMP Accelerators cycling team, encouraged many staff in radiation medicine to join the Ride.

Mike's dedication to medical physics was recognized in many awards, among them Cancer Care Ontario's Innovation Award in 2007 and University Health Network's Inventor of the Year Award in 2009. In 2015, he was honoured as a Fellow of the American Association of Physicists in Medicine.

Mike's profound zeal for improving cancer care was expressed in various ways: through his visionary interest in the intersection of technology and healthcare; through the many friends whom he quietly helped through their own cancer journeys; through his excitement in teaching medical physics around the world; and, day to day, through the relationships he nurtured with his many colleagues in the Radiation Medicine Program and around the world. Mike's legacy – his passion for the application of physics in cancer care – can comfort and inspire those of us who had the good fortune to know him.



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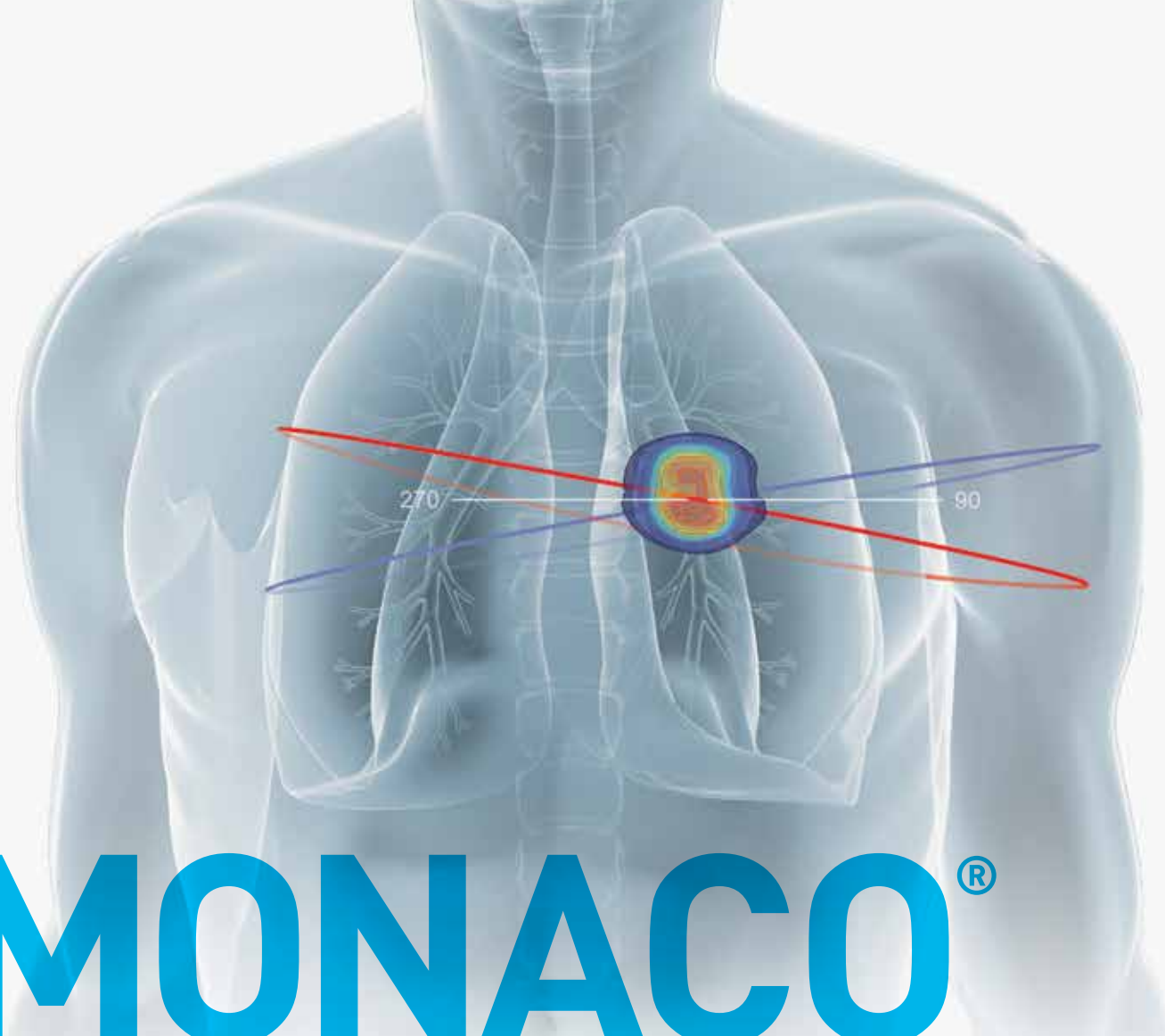
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IN MEMORIAM – JOHN TAYLOR

Rob Barnett

London Regional Cancer Centre

I have very sad news to share with you about John Taylor. John was a medical physicist at London-Regional Cancer Program from 1992 – 2013.

On August 3rd, John passed away at his retirement home in London after a difficult struggle with ALS. John is survived by his wife Wendy and his daughters, Heather (Carlos) and Caroline.

John Taylor was a colleague and close personal friend to many of us. His untimely death brings an end to a courageous fight by John and family against a relentless and increasingly debilitating disease. Although very difficult to do, John had learned to live in a wheelchair and to manoeuvre it skillfully using head and neck motion and partial touch. It's hard to describe the extent of John's determination and the strength and courage of the Taylor family through many challenging physical and emotional adjustments during his illness.

I would like to acknowledge kind and helpful support for John and Wendy from many colleagues and friends. I know John and Wendy are very grateful for all the visits over the last few years. I would like to thank Dr. Kathleen Surry for coordinating recent events involving John and for organizing our participation in the annual Walk for ALS. Wendy and family provided tremendous support for John and made it easy for us to visit with him.

John Taylor completed a Baccalaureate degree in 1975 and a Master's degree in 1981, both from applied science in electrical engineering at University of Toronto. He then went on to work for Princess Margaret Cancer Centre (formerly OCI) and Picker International as a CT support specialist before taking a job as manager of Biomedical Engineering at St. Joseph's Health Care in London in 1987. Subsequently, John made a decision to pursue a career in medical physics and was hired into the residency program at LRCP by Dr. Don Dawson in 1990.

John was a great resource physicist within the radiation program and provided primary technical expertise for many areas including CT simulation, HDR brachytherapy, stereotactic radiosurgery, and multimodality image-guided treatment planning (CT, MR, and PET). John coordinated engineering services at LRCP for over ten years and organized cooperative technical service for our CT scanners and linear accelerators. One of John's many talents was his ability to read architectural drawings and to provide

critical input for planning and construction required for major capital equipment replacement. Before his retirement, John provided strong input for the MR simulation program and also our recent transition to TrueBeam linacs. He was also active provincially and served as a technical advisor for CT and linac specifications required by CCO for major capital procurement.

At John's retirement ceremony in 2013, Dr. Jake VanDyk presented him with an outstanding service award that Jake named the "Order of the Cancer Program." This year the radiation program has extended that idea to an award in the name of John Taylor presented annually for achievement of excellence in clinical service.

John had many interests outside of work and enjoyed spending time outdoors with his family. He sang with the Karen Schuessler Singers for several years, and many of us enjoyed memorable performances of his at Wesley-Knox United Church in Wortley Village. John enjoyed cycling and also riding on his motorcycle. He had a great sense of humor and was part of the infamous LRCP Christmas skits in the early 1990s.

We will all miss John Taylor. He will forever be part of us.

Retirement ceremony for John Taylor, April, 2013. From left to right, Wendy and John Taylor, and machinist George DeWaele.



THANK YOU TO OUR OUTGOING BOARD MEMBERS



Luc Beaulieu is a professor and director at Réseau du Centre de Recherche sur le Cancer de l'Université Laval - Cancer Research Centre Network Chu du Québec.

Serving on the COMP board for the past six years, Luc has made a tremendous contribution to COMP. Luc is a firm believer in the importance of engaging medical physics graduate students in COMP, and worked hard to ensure that the board has policies and programs in place to provide support for students. As COMP president, Luc was instrumental in leading COMP's transition to the new Not-for-Profit Corporations Act. As part of that process, and under Luc's leadership, the relationship between COMP and CCPM was clarified and a formal contract between the two organizations was established. As past-president, Luc worked to streamline the processes for the COMP awards and also played a key role in the introduction of COMP's newest award, the Publication Impact Prize.

COMP was well-served by Luc's leadership, energy, and passion.



Emilie Soisson FCCPM is a clinical medical physicist at the McGill University Health Centre and an assistant professor at McGill.

Emilie served COMP for the past three years in the capacity of board secretary. This role involves a lot of behind the scenes work: reviewing membership applications, taking minutes at board meetings, and participating in committee meetings. Emilie also led the development of COMP's policy manual to support the new bylaws that were approved in 2013. This was a significant undertaking, and the policy manual is a comprehensive document. As a result of Emilie's leadership, there is a process in place to ensure that the policies are reviewed and updated on a regular basis.

The COMP board and the organization as a whole were well-served by Emilie's focus and contribution to ensuring that discussions and decisions were clearly articulated and effectively documented.

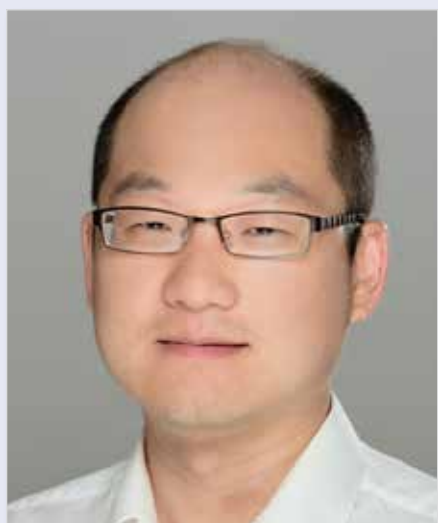
WELCOME NEW BOARD MEMBERS



Horacio Patrocinio FCCPM completed his graduate studies in medical physics at McGill University in 1993 and has since worked as a clinical medical physicist. He has been involved in the teaching of medical physics for almost twenty years in the various programs at McGill University.

Horacio has been active in professional organizations since 1999. Provincially, he has served as both treasurer and president of the Association Québécoise des Physiciens Médicaux Cliniques, and has participated on several committees working to improve the conditions and recognition of medical physicists in Quebec. He has volunteered with the ABR and IAEA, and served on the CCPM board from 2010 to 2016.

Horacio's involvement with COMP started in 2002 when he served as treasurer, and has continued over the years as a member of the Professional Affairs Committee and through liaison work for COMP on several multi-disciplinary or event committees.



Heping Xu FCCPM Completed his PhD in medical physics at McMaster University in 1993. He has been CCPM certified since 2009, and received the CCPM fellowship distinction in 2016.

Heping is currently working as a medical physicist at the Cape Breton Cancer Centre. He served on the Promotion and Appointment Committee for the Dalhousie University Department of Radiation Oncology from 2013 – 2015. Heping also chaired the Cape Breton Cancer Centre Advanced Technique Meeting in 2012 and 2013.

Heping will be serving as secretary of the COMP Board for a three-year term.

PATIENT PRIVACY: STAYING OUT OF THE HEADLINES

Robyn Grant

Lawyer at Borden Ladner Gervais LLP

OVERVIEW

Generally speaking, privacy laws in Canada afford individuals protection of their personal health information. Most provinces have legislation that specifically addresses personal health information and imposes the important obligation on the custodians or holders of such information to protect it. As health information custodians, hospitals typically have a privacy program that usually includes personnel, policies, and procedures aimed at complying with privacy laws.

Some may have observed what seems to be an up-take in the news about breaches of patient privacy perpetrated by health care providers who, by virtue of their employment or occupation, have access to patient records. Healthcare providers not wanting to be the subject of such news may wonder what it is that they need to be mindful of. In other words, how does an obligation to protect an individual's personal health information translate for the individual health care provider working in a hospital or health care setting?

One of the basic principles to keep in mind is that there can be no collection, use, or disclosure of an individual's personal health information unless that person consents, or there is another applicable permission or exception, such as court order or circumstance outlined in the law that allows for the collection, use, or disclosure being contemplated.

For the individual health care worker/provider, the focus tends to be more on disclosure of and access to personal health information, as opposed to the collection of it. On the disclosure side, it would be considered safe to disclose an individual's personal health information to another health care provider within the circle of care for the patient in question. Similarly, with respect to access, if you are a care provider within the circle of care for a patient, it would be considered appropriate for you to access that patient's records at the time and/or in the course of delivering health care to the patient. It not usually inadvertent access of a patient's record (eg. accidentally pulling up the wrong patient's record because the names are similar) that will sustain attention and/or result in consequences. Rather, the privacy breach behavior that is most likely to attract attention tends to be purposeful including "snooping", and/or access or disclosure of records for some kind of gain.

OBLIGATION TO NOTIFY

In certain provinces, privacy legislation requires that the affected patient and/or privacy regulator be notified in the event of a breach of privacy, although there are some differences in the requirements of the provincial laws such that some might be considered to have more "teeth" than others.

By way of example, recent amendments to the Ontario law governing personal health information (the *Personal Health Information Protection Act (PHIPA)*)¹ now require notification of the affected individual when their personal health information is "used or disclosed without authority". Previously, notification of the affected individual was required when information was "stolen, lost, or accessed by unauthorized persons." In notice letters to patients, health information custodians must also now explicitly state that "the individual is entitled to make a complaint to the Privacy Commissioner". Other amendments are aimed at placing an increased responsibility on hospitals and other health information custodians to monitor employees' access and use of personal health information. It does not seem a stretch to conclude that these latter amendments were informed by recognition of the importance of audit functions in the era of electronic access.

RAMIFICATIONS FOR HEALTHCARE PROVIDERS

Complaints and reports to the applicable provincial privacy regulator (eg. in Ontario, the Information and Privacy Commissioner) will usually result in investigations, and sometimes, prosecution.

For example, in Ontario, the first prosecution under the *PHIPA* involved a nurse who allegedly inappropriately accessed the health records of 5,800 patients over the span of several years. The case was dismissed for delay in 2016². Many may have also heard of the health care providers at Princess Margaret Cancer Centre who were found to have "snooped" into Toronto Mayor Rob Ford's records in January 2015. It was reported³ that those employees pleaded guilty under the *PHIPA* and were fined \$2,505 each.

In December 2011, the Office of the Information and Privacy Commissioner of Alberta issued a

news release⁴ about the case of a pharmacist who was charged following a complaint that she had inappropriately accessed a patient's records through Alberta Netcare and posted information about the patient's prescriptions on Facebook. The pharmacist was charged under the *Health Information Act*⁵ for unlawfully gaining or attempting to gain access to health information. She subsequently pleaded guilty to knowingly obtaining information in contravention of the *Health Information Act* and was fined \$15,000.

Proceedings and sanctions by a health care provider's regulatory body will likely also ensue as a result of a privacy breach, following the notification of the regulator by a hospital or other health information custodian, or a complaint by the person whose privacy has been breached. For example, the Hearing Tribunal of the Alberta College of Pharmacists found the pharmacist who was the subject of the prosecution described above to have committed professional misconduct. The pharmacist had her licence to practice suspended for four months, was fined \$4,000, and was issued a reprimand.⁶

It may also go without saying that employment consequences are almost certain for the health care professional who has intentionally breached patient privacy. Several Ontario arbitrators have upheld a "zero tolerance" approach for privacy breaches at hospitals, holding that summary dismissal is appropriate.

When a breach of privacy occurs, there is also the possibility that a law suit for damages will be brought. In some common law provinces, there is a statutory cause of action for breach of privacy (eg. British Columbia, Manitoba, Saskatchewan, and Newfoundland). This is not the case in Ontario, however, in the 2012 decision of *Jones v Tsige*⁷, the Ontario Court of Appeal recognized the tort of invading personal privacy, or "intrusion upon seclusion", which requires intentional conduct. While the case dealt with banking records, in listing examples of intrusion into matters that may raise this tort, health records were specifically referenced. In assessing damages, the Court held that where there is no pecuniary loss, damages tort should be modest, in a range of up to \$20,000. The Court cited the factors outlined in the *Manitoba Privacy Act* "as a useful guide to assist in determining where in the range [of damages] the case falls".⁸

In 2015, the Ontario Court of Appeal affirmed the Superior Court decision in *Hopkins v. Kay*.⁹ In that case, it was alleged that approximately 280 patient records of the Peterborough Regional Health Centre (the "Hospital") were intentionally and wrongfully accessed by the Hospital, Sir Sanford Fleming College (the "College"), and seven employees of the Hospital without patient consent.

The main issue before the Superior Court was whether the *PHIPA* was a comprehensive legislative scheme governing patient records such that the Superior Court did not have jurisdiction for common law breach of privacy claims. The Court concluded that it was bound by the decision in *Jones v Tsige* in so far as a recognition of the tort of intrusion upon seclusion would amount to an incremental step that is consistent with the role of the court to develop the common law in a manner consistent with the changing needs of society. The Court agreed with Justice Sharpe in *Jones v Tsige* when he stated that no provincial legislation provides a precise definition of what constitutes an invasion of privacy. The Hospital's motion to dismiss or stay the action because the court has no jurisdiction as a result of provisions of *PHIPA* was dismissed.

The Court of Appeal concluded that the *PHIPA* is not an exhaustive code; it specifically contemplates the resolution of disputes regarding personal health information by other tribunals. Moreover, allowing actions based on *Jones v Tsige* does not undermine the *PHIPA* scheme. The elements of the common law cause of action are, on balance, more difficult to establish than a breach of *PHIPA*, and therefore it cannot be said that a plaintiff, by launching a common law action, is "circumventing" any substantive provision of *PHIPA*. As such, there is no basis to exclude the Superior Court jurisdiction from entertaining a common law claim for breach of privacy, and given the absence of an effective dispute resolution procedure, there is no merit to the suggestion that the court should decline to exercise its jurisdiction.

FINAL THOUGHTS

The protection of health information translates into an overarching obligation on the individual health care provider to handle a patient's personal health information with great care. This includes only accessing the records of patients in whose care the health care provider is involved, and not disclosing a patient's personal health information absent consent or another applicable exception. Maintaining this important confidence will go a long way to avoiding undesirable consequences. In the age of advancing technologies where health information is increasingly made available online and stored electronically, it will be interesting to see how the law of privacy keeps up. The corollary is that health care providers and their employers will need to adapt to the changing landscape of health information privacy law. This is not something health care providers need to fear, however; they can be part of a solution to patient privacy worries by educating themselves on the law and the policies in their workplaces, and, building trust with their patients.

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1. *Personal Health Information Protection Act*, SO 2004, c 3, Schedule A.
 2. Olivia Carville, "Ontario's sole health privacy prosecution quietly dismissed" *Toronto Star* (March 30 2015) online: https://www.thestar.com/life/health_wellness/2015/03/30/ontarios-sole-health-privacy-prosecution-quietly-dismissed.html.
 3. May Warren, "Hospital workers convicted for snooping Rob Ford's personal health files" *Toronto Star* (May 6, 2016) online: <https://www.thestar.com/news/gta/2016/05/06/hospital-workers-convicted-for-snooping-into-rob-fords-personal-health-files.html>.
 4. Office of the Information and Privacy Commissioner of Alberta, News Release, "Pharmacist Pleads Guilty to Misuse of Alberta Netcare" (December 6 2011), online: <https://www.oipc.ab.ca/news-and-events/news-releases/2011/pharmacist-pleads-guilty-to-misuse-of-alberta-netcare.aspx>.
 5. RSA 2000, c H-5.
 6. *Alberta College of Pharmacists v Marianne Songgadan* (2011), online: ACP <<https://pharmacists.ab.ca/sites/default/files/SonggadanDecision.pdf>>.
 7. *Jones v Tsige*, 2012 ONCA 32, 108 OR (3d) 241 (CanLII).
 8. *Ibid.* at para. 87.
 9. *Hopkins v Kay*, 2015 ONCA 112, 380 DLR (4th) 506 (CanLII).

CNSC ANNOUNCEMENT

It is our pleasure to announce the appointment of Mark Broeders to the role of director, Accelerators and Class II Facilities Division (ACFD), effective August 1, 2016.

Mark joined CNSC on September 8, 2008 as a project officer in ACFD and was promoted to program officer in 2011. Prior to joining CNSC, Mark was managing director at Nucletron Canada Inc. and director, business development at Resonant Medical Inc. for several years, gaining valuable experience and building his leadership competencies. Mark has extensive experience in radiotherapy applications. Combined with his management and regulatory background, this provides him with an excellent perspective on licensing and compliance of Class II Nuclear Facilities.

Mark replaces Kavita Murthy, who has been the driving force behind the evolution of the ACFD over the past decade. Kavita took on a new challenge within the CNSC when she was appointed to the position of Director, Nuclear Processing Facilities Division (NPFDD) in the Directorate of Nuclear Cycle and Facilities Regulation (DNCFR), in March 2016. Kavita's innovation skills, technical expertise, and strong collaborative leadership style with her team members and other stakeholders helped to build effective relationships with both national and international organizations, including COMP, during her tenure as ACFD director. Some of Kavita's key contributions to the CNSC over recent years included bringing low energy accelerators under CNSC regulatory control and implementing improvement initiatives, such as electronic licensing. We'll miss her, but are also looking forward to working with Mark in the future.

REPORT ON BEST-OF-ASTRO – IRAQ

Muthana Al-Ghazi

University of California, Irvine



The Best-of-ASTRO - IRAQ (B-O-A-I) was held in Sulaimaniyya, Kurdistan region, Iraq (10-12 December, 2015). This is the first time an ASTRO related activity took place in the country and the Middle East at large. The conference drew attendees from various parts of Iraq, as well as Kingdom of Saudi Arabia (KSA), Jordan, Lebanon, and the United Kingdom (UK). There were approximately 100 participants consisting of oncologists, physicists, therapists, and engineers. Local organizations and vendors sponsored the event. During the three day meeting the B-O-A-I approved program was presented. Faculty was a mixture of local and visiting delegates. The conference chairman was Dr. Layth Mula-Hussain, director of the radiation oncology residency program at the Zhianawa Cancer Center (ZCC). An interesting and unique presentation was given by a distinguished radiation oncologist, Dr. Qahtan A. Radwan, who spoke on the history of radiation oncology in the city of Mosul (1964-2013), chronicling his own career. The conference venue was Faruk Medical City, a modern health care facility. There were social activities that provided opportunities to interact informally, including a banquet attended by dignitaries from the Kurdistan regional government ministry of health and other officials.

One and a half day refresher courses preceded the conference. These consisted of site-specific clinical and physics lectures. In addition, there were practical workshops: one on high dose rate brachytherapy (HDR) commissioning and quality assurance (QA), and linear accelerator (linac) calibration and QA. The HDR workshop was led by Dr. Shada Wad-Ramahi, chief physicist at the King Faisal Specialist Hospital & Research Center (KFSH&RC) in KSA. The linac workshop was led by the author. We had the able collaboration of Dr. Wassim Jalbout, chief physicist, American University of Beirut (Lebanon). The workshops were held at the ZCC.

Conference program can be found on Facebook at: <https://www.facebook.com/2015BOASTROIraq/>

Post-conference, I spent five days working with the staff of the ZCC, the main sponsor of the conference. During this time I gave physics lectures to the radiation oncology residents and worked with ZCC staff on various aspects of their clinical and physics practice.

Our hosts were most gracious. They spared no effort to provide legendary Iraqi hospitality with a distinct Kurdish flavor. The city of Sulaimaniyya was an ideal venue with its scenic surroundings and mountainous terrain serving as background.

Attendees, conference chair, Dr. Layth Mula-Hussain, is 1st row, 4th from right.



Linac QA workshop, author 3rd from left.



Physicists outside Zhianawa Cancer Center, Drs. Shada Wadi-Ramahi & Wassim Jalbout are 4th & 5th from right, respectively.



FEEDBACK ON THE ENDOMETRIUM AND PENILE CANCER BRACHYTHERAPY WORKSHOP

Maryse Mondat
Hôpital Charles LeMoine

On May 20 and 21 2016, the Endometrium and Penile Cancer Brachytherapy Workshop took place in Club St-James, Montreal, Quebec. This workshop was organized by Curietherapies. Curietherapies is an initiative designed to promote standards of practice in brachytherapy, to stimulate exchange of scientific knowledge, and to discuss the literature and to compare individual expertise. The workshop allowed 60 professionals to discuss on endometrium and penile cancer brachytherapy. The professionals were composed of radio-oncologists, urologists, oncologists, radiologists, surgeons, medical physicists, therapists, and nurses. Also, industry representatives were present.

Systematically, for each site, the workshop objectives were to cover the anatomy involved with the different cancer stages and the different treatment options. Specifically for brachytherapy treatment, the subjects involved the imaging modalities, the implant techniques, the planning, the dosimetry, the treatment outcomes, and the patient quality of life. It also include the applicator commissioning, dosimetry QA, and treatment QA.

The first day covered endometrium cancer. The first part of day was dedicated to the operable form of the endometrium cancer. A contouring workshop also took place. A contouring assignment was sent to the participants before the workshop and the comparison of the different drawn contours was presented. The second part of the day was dedicated to the non-operable form of this cancer. Also a session on recurrent endometrial cancer was offered.

Different aspects of the penile and urethral cancers were presented the second day. The presentations included radical surgeries (penectomy, inguinal, and pelvic lymphatic dissection), sexuality after a penectomy, and brachytherapy treatment for conservative option. Juanita Crook MD, BC Cancer Agency, presented the 2013 ABS-GEC-ESTRO Consensus Statement for Penile Brachytherapy.

Since 2012, different workshops and forums have been organised by Curietherapies. Each time it

allowed fruitful exchange among professionals involved in brachytherapy. For the first time this year, there was a posters display. The year workshop went smoothly and was a success. More information can be found on the Curietherapies web site, <http://curietherapi.es/>.

RETOUR SUR L'ATELIER DE CURIETHERAPIE DES CANCERS DE L'ENDOMETRE ET DU PENIS

Le 20 et 21 mai 2015, l'Atelier de curiethérapie des cancers de l'endomètre et du pénis a eu lieu au Club St-James, Montréal, Québec. Cet atelier était organisé par Curietherapies. Curietherapies est une initiative qui permet de faciliter l'échange d'information en curiethérapie, commenter la littérature et partager l'expertise de chacun dans le but maintenir des standards de qualité pour les patients traités par curiethérapie. L'atelier a permis à 60 professionnels d'échanger sur la curiethérapie des cancers de l'endomètre et de la prostate. Les professionnels comprenaient des radio-oncologues, des urologistes, des radiologistes, des oncologues, des chirurgiens, des médecins médicaux, des technologues, et des infirmières, ainsi que des représentants de l'industrie.

Systématiquement, pour chaque site, les objectifs de l'atelier sont de couvrir l'anatomie touchée par les différents stades du cancer et les différentes options de traitement. Spécifiquement pour les traitements de curiethérapie, les sujets comprennent les modalités d'imagerie, les techniques d'implantation, la planification du traitement, la dosimétrie, les résultats des traitements, et la qualité de vie des patients. La mise en service clinique des applicateurs, les contrôles de qualité de la dosimétrie, et du traitement sont aussi couverts.

La première journée fût consacrée au cancer de l'endomètre. L'avant-midi a été dédié au cancer de l'endomètre opérable. Un atelier de délinéation de contours a eu lieu. Un devoir de délinéation de contours avait été envoyé au participant

préalablement et la comparaison des différents contours dessinés nous a été présentée. Lors de l'après-midi, le cancer de l'endomètre non-opérable a été couvert. Une session sur la récurrence du cancer de l'endomètre a aussi eu lieu. Les différents aspects du cancer du pénis et de l'urètre ont été présentés la deuxième journée. Les présentations incluaient l'explication de la nécessité de chirurgie radicale dans certains cas (pénectomie, dissection lymphatique inguinale, et pelvienne), la sexualité après une pénectomie et les traitements de curiethérapie comme option conservatrice. Juanita Crook MD, BC

cancer Agency, a présenté le consensus de l'ABS-GEC-ESTRO sur la curiethérapie du pénis de 2013.

Depuis 2012, différents ateliers et forums ont été organisés annuellement par Curietherapies. Chaque fois, cela a permis des échanges intéressants entre les différentes professions impliquées en curiethérapie. Pour la première fois cette année, il y a eu des présentations sur affiches. Le déroulement de cet atelier fût couronné de succès. Des informations sont situées sur le site web de Curietherapies, soit <http://curietherapi.es/>.



Figure 1: Jurgen Last and Maryse Mondat, medical physicists.

MEDICAL PHYSICS LEADERSHIP ACADEMY AAPM 2016 SUMMER SCHOOL

The AAPM recently held its first summer school dedicated to the topic of leadership at the Westfield Marriott Hotel in Chantilly, Virginia from June 12-16, 2016. The following relates the personal experiences of three of the recipients of COMP bursaries designed to cover tuition for the event.

AND NOW FOR SOMETHING COMPLETELY DIFFERENT!!!

Horacio Patrocínio

McGill University Health Centre

It sounds like a Monty Python movie but that's a little of what attending the AAPM's first Medical Physics Leadership Academy (MPLA) felt like. To be fair, this was the first time the AAPM decided to dedicate its summer school to a topic this far removed from our technical world. Personally, I had applied to take advantage of COMP's bursary since like most people involved in the leadership of COMP, CCPM, and the AQPMC over the years, I had no previous training whatsoever in leadership.

Jennifer Johnson and Bob Pizzutiello, the MPLA's co-organizers, admitted to realizing early on that the only way to make the event a success was to bring in outside experts to give some of the talks and to guide the physicist speakers as well. For the first day and a half, two speakers from Impact International, a recognized leader in the field, would cover the more "touchy-feely" topics of emotional intelligence, leadership styles, and teamwork. The rest of the summer school, covering project management, human resources, finance, and academic and clinical practice leadership was then left to a cohort of AAPM speakers with varied experience. The format was simple: start with a talk and then have each table of six to eight participants work on exercises under the guidance of a faculty member.

The very first exercise set the tone for the week. We were given a long rolled up piece of paper and told the object was to lower it to the ground while having each person supporting it by two fingers. How hard can this be for a bunch of physicists? Impossible, apparently, since no one succeeded. Ten minutes later my table was left with a group of seven passive

aggressive physicists, all trying to work as a team while inwardly fuming at the others for not using common sense, which of course we alone possess!!! That was actually point of the exercise: to elicit a strong emotional response and to have us recognize that feelings creep up on us every day. So it went for the first day and a half, with each of us given opportunities to confront ourselves, to recognize who we are as people and to think of how that can influence how we act when we manage or lead.

When the lecturing turned to the AAPM speakers, it was obvious some were not as comfortable talking on leadership as they would be technical issues. That didn't detract from the quality of the sessions though. Each new topic gave the participants a chance to work individually and together on practicing various management tasks. Even the sessions on financial issues, mostly related to the constrained environment of reimbursement in the USA, gave us Canucks present a chance to think about our own challenges here.

The best part of the MPLA was the chance it offered for meeting the participants and staff. The informal evening "sessions" under the setting sun were an opportunity to share stories, experiences, and laughs over a beer (or several!). As expected, the Canadians there did a wonderful job of not only bonding, but also of sharing our unique perspectives with many of the other participants. The whole experience was eye-opening and definitely convinced me that we at COMP need to offer some of this type of training for our membership in the future.

MPLA: THE ROAD TO BECOMING LOVABLE STARS

Marija Popovic

McGill University Health Centre

The announcement that the AAPM was putting together the Medical Physics Leadership Academy (MPLA) came at the most opportune moment for me. I was spending my evenings preparing to take the FCCPM exam that strives to demonstrate excellence and leadership in our profession, and I wondered what it takes to influence change in any setting. As earlier in the year our institution was facing a budget squeeze and the consequences were felt in our department, I wished to learn about broader organizational issues and decision making that went beyond scientific and technological expertise. I signed up for the MPLA with the hope that it will provide me with the tools to make change management more successful and exciting in the context of my various clinical and educational projects.

Over the course of five days, the MPLA managed to create one very functional team of 200 odd, quirky physicists and numerous self-proclaimed introverts. The behaviors changed gradually, but I have to admit that the first day felt like jumping off the deep end. We were all stuck together, many, many miles away from the distractions and temptations of Washington, D.C. Eating all of our meals together was a requirement. We were asked to join a different table and form a new team at every session. This could have been a bad social experiment, but, miraculously, it worked extremely well. After one day, it became completely natural to join a group of new friends and strike up a conversation. We reinvented ourselves in order to meet the challenge, and we did great!

The moderators from Impact International and the AAPM exposed us to a diversity of topics in strategic planning, organizational development, conflict

management, change management and goal-setting. Through exercises, it became apparent that everyone possesses certain leadership attributes, and that the combination of such traits makes each one of us unique. Stamina, intelligence and competence are some of the leadership qualities, but so are adaptability, trustworthiness, being able to understand the needs of all members of the team, and the capacity to motivate people. It took some hard work for us to recognize and articulate our own qualities and personal drives (see Figure 1)!

I reflected on my own leadership challenges to gauge what will help me move forward professionally and what I might be able to do differently in my own environment. From the MPLA, I take away three points to remember. The first is the importance of the question “why?” People and organizations who lead attract others because they can articulate their purpose, cause, and belief. They communicate clearly why they get out of bed in the morning and why anyone should care about their cause. The second point is eloquently summed up by Barack Obama in a piece of advice that he gives to his daughters: “Be useful. And be kind.” And last, it is to appreciate the professional freedom to serve our patients, students, and colleagues. We all get to practice leadership in some way by responding to deficiencies in our environment, and the best of us will do it with benevolence and integrity.

I thank the COMP committee for sending me on this adventure. This is just one of the many great examples of COMP investing into the professional development of its members.



MY EXPERIENCE AT THE 2016 AAPM SUMMER SCHOOL MEDICAL PHYSICS LEADERSHIP ACADEMY

Orest Ostapiak
Juravinski Cancer Centre

This year's AAPM summer school offering was a Medical Physics Leadership Academy. The school drew 200 medical physicists from across North and South America (eight from Canada) to a serene setting amid a prestige industrial park near Washington Dulles Airport for five days of intensive seminars, workshops, buffets, and cocktail receptions.

Attending the school required a considerable investment of time, effort, and money. Each attendee must have carefully examined their reasons for wanting to learn about leadership. I did so in response to COMP's scholarship offer to applicants able to articulate how training in leadership would benefit the organization, the medical physics community in Canada, or our own personal growth. My story started with the retirement of Mike Patterson. Apart from being a giant in the field of medical physics and biophotonics, Mike is an exemplary leader. The foreboding hole he left at the top of the org chart had spurred me to better understand the qualities demanded of a worthy successor.

Course directors Jennifer Johnson (UT MD Anderson Cancer Centre) and Robert Pizzutiello (Upstate Medical Physics) set the tone of the meeting by asking everyone to step outside of their comfort zone and make a habit of sitting with and meeting new people during each session and break. As everyone took this request to heart, an atmosphere of inclusivity, collegiality, and friendliness was created for all.

The program was exhaustive, with sessions running from 8:00 am to 5:30 pm each day, except for free time Tuesday and Thursday afternoon. Some of us even met up at 5:30 am to get a run in. There were three full buffet meals each day and a cocktail reception at the end of the day to provide an opportunity to discuss the day's lessons with friends and new acquaintances.

The first two days of the program were the most enjoyable as the agenda was primarily lead by two compelling speakers from Impact International, a firm with specialized expertise in leadership development training. They engaged the participants in didactic presentations and small group exercises to help us manage and master the processes of awareness, decision making, and action. To summarize their key message about good leadership in a single statement, "If you act in good faith, with courage, with mindfulness of others, and with commitment to collaboration, you will have legitimacy and be lent authority", or in other words, "Be kind and useful".

Subsequent sessions were equally valuable, but tended to focus more on technical aspects of leadership in medical physics, such as project management, operations management, human resources management, productivity measurement, finance, accounting, and communication. Each session provided a concise overview of the topic with examples and direction for further study. One particularly entertaining lesson was based on a job performance review acted out between manager, played by Dan Pavord, and employee, played by Jatinder Palta.

The final sessions fleshed out strategies for successful leadership in academic and clinical contexts, whereby highly successful leaders in our field shared some of their daily challenges and philosophies that allow them to meet those challenges.

To conclude, the summer school exceeded all of my expectations: we gained a deep understanding of what leadership actually means, we were introduced to skills that we must practice in order to master, we got a mountain of homework, and we had the opportunity to meet and socialize with wonderful friends and colleagues, particularly my COMP-atriots: Andrew, Crystal, Cynthia, Horatio, Marco, Marija, and Michelle.

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 an 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 2017 medal are hereby solicited. Nominations are due by **February 3rd, 2017** 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 1 to 2 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.

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4TH ANNUAL INTERNATIONAL DAY OF MEDICAL PHYSICS

November 7, 2016 is Marie Curie's birthday and the 4th Annual International Day of Medical Physics – time to celebrate the medical physics community!

As medical physicists, we depend on our colleagues, teammates, and predecessors in the hospital or research environment to ensure safe, effective treatment, and study. Highlight your community's contributions today!

In honour of International Day of Medical Physics, every member who posts a medical physics community contribution referencing #MedPhysDay will be entered into a draw for \$250 worth of Curie Credit, to be used towards membership dues or a COMP registration.

Take a moment today to share an important discovery, alternative approach, above and beyond response, or other experience indicating dedication to or advancement in medical physics. You can use video, photos, poems, stories – anything social goes!

To enter:

- Post it on our Facebook page (<http://www.facebook.com/CanadianMedphys>);
- Tweet it to our twitter account @medphysca, (hashtag #MedPhysDay);
- Post it to the LinkedIn account (<https://www.linkedin.com/groups/4135236>); or
- Using a different platform? E-mail a link of your posting on a different platform to christina@comp-ocpm.ca

Any social platform can be used to get your creative juices flowing – youtube, Instagram, Snapchat...let's get the word out about the importance of medical physics!

For more information about the International Day of Medical Physics please visit the [IDMP web page](#).



"My vision for medical physicists: a dedicated team partner. Even if it involves going to the next bookstore on my lunch break to buy a colored sharpie pen so that our patient immobilization system is ready on time ;)"

– Nadia Octave

2016 COMP AWARD WINNERS

GOLD MEDAL - DR. G. PETER RAAPHORST

SYLVIA FEDORUK PRIZE - QUINN MATTHEWS

Radiation-Induced Glycogen Accumulation Detected by Single Cell Raman Spectroscopy Is Associated with Radioresistance that Can Be Reversed by Metformin

(co-authors: Martin Isabelle, Samantha J. Harder, Julian Smazynski, Wayne Beckham, Alexandre G. Brolo, Andrew Jirasek, Julian J. Lum) (PLoS ONE 10(8): e0135356. doi:10.1371/journal.pone.0135356)

PUBLICATION IMPACT PRIZE - KARL OTTO

"Volumetric modulated arc therapy: IMRT in a single gantry arc" (Medical Physics 35, 310-317, 2008; DOI: 10.1118/1.2818738)

J. R. CUNNINGHAM YOUNG INVESTIGATORS AWARD

1st Place /1e prix

Thomas Hrinivich

Western University, London

2nd Place /2e prix

André Diamant

McGill University, Montreal

3rd Place /3e prix

Jason Crawford

TRIUMF, Vancouver

COMP ORAL PRESENTATION AWARD

1st prize: Samantha Harder, Martin Isabelle, Lindsay DeVorkin, Julian Smazynski, Wayne Beckham, Alexandre Brolo, Julian Lum, Andrew Jirasek

BC Cancer Agency-Vancouver Island Cancer Centre, Gloucestershire Hospitals NHS Foundation Trust, University of Victoria, University of British Columbia Okanagan

2nd prize: Joel St. Aubin, Amir Keyvanlook, Oleg Vassilev, B. Gino Fallone

Cross Cancer Institute, Edmonton and Tom Baker Cancer Centre, Calgary

COMP POSTER AWARDS

Danielle Anderson (tie)

BCCA - Sindi Ahluwalia Hawkins Centre for the Southern Interior, Kelowna BC

Todd Stevens (tie)

Saint John Regional Hospital, Saint John, NB

62ND ANNUAL SCIENTIFIC MEETING PHOTOS

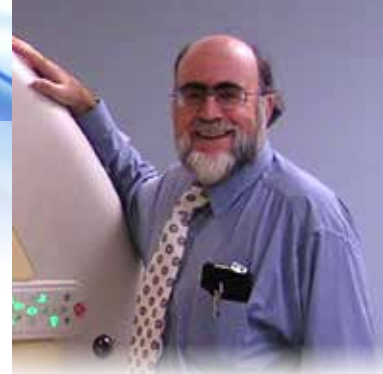
Editor's note: Below are some photo highlights of the award winners from the ASM.
Please see the COMP Facebook page for more photos from this year's ASM!



2016 COMP GOLD MEDAL AWARDED TO G. PETER RAAPHORST

L. John Schreiner

Cancer Centre of Southeastern Ontario



It is my pleasure and honor to introduce Dr. G. Peter Raaphorst, the 2016 recipient of the Canadian Organization of Medical Physicists' Gold Medal Award.

The Gold Medal is awarded to a COMP member (or retired former member) who has made an outstanding contribution to the field of medical physics in Canada, by adding to the knowledge base of medical physics, by providing leadership in medical physics organizations which have led to improvements in the status and public image of medical

physicists in Canada, and/or by advancing, through their educational activities or mentorship, the professional development of medical physicists in Canada. The Gold Medal is the highest award given by the COMP. Peter contributed greatly in all criteria set for a Gold Medal recipient throughout an outstanding career.

Gijsbert Peter Raaphorst was born in Oudewater, Netherlands and moved to Canada with his family at a young age, and then grew up in the Ottawa Valley. After high school in Renfrew, he attended the University of Waterloo receiving three degrees in physics: a BSc (honors) in 1972, an MSc in 1974, and, just over two years later, his PhD in physics and biophysics. He then did a two year post-doctoral research fellowship in the Department of Radiology and Radiobiology at Colorado State University. Peter returned to Canada in 1976 to join the radiobiology section of the Whiteshell Laboratories of Atomic Energy of Canada Limited in Pinawa, Manitoba; within a few years he became the head of the section. In 1985, he decided to change his occupational focus from industrial basic radiobiological research and joined the Ottawa Hospital Cancer Center as head of medical physics. He worked there until he retired in 2005. I know from personal experience one of Peter's early decisions in 1985: he did not offer me a job as a medical physicist in the department; Peter, I suspect this was a decision that likely benefitted both of us. While head, Peter led the development and growth of the hospital's medical physics department helping build a strong and active radiation oncology program. Peter was an excellent manager who had the respect of his staff and of his fellow managers. A clear indication of his mentoring was the encouragement he gave his medical physicists to become certified as members of the Canadian College of Physicists

in Medicine; certification he considered not only to strengthen the credentials of the individuals, but also to solidify the standing of the profession.

Over his 20 years in Ottawa, Peter had multiple academic appointments at both Carleton University and the University of Ottawa, achieving the rank of full professor in various departments at the two universities. Peter was one of the founders of OMPI, the Ottawa Medical Physics Institute (originally called the Medical Physics Organized Research Unit), and served as director from its inception in 1989 through 1993. While he did retire from TOH in 2005, Peter has maintained an active role in medical physics; most recently acting as a senior consulting scientist and chief medical physicist for the Certified Bone Mineral Density Facility Accreditation Program of the Ontario Association of Radiologists.

Dr. Raaphorst's achievements over a remarkable career can be summarized quickly by some simple accounting: 22 graduate students supervised in his time at Carleton and the U. of O.; 215 papers with 166 colleagues in over 50 different peer-reviewed journals (50 of them in a four year period between 1993 and 1996); 8 book chapter; and 50 grants, totally more than 3.4 million \$CAD from the NCIC, NSERC, Department of Defence, pharmaceutical and industrial partners, and others, 43 of them as principle investigator. His published work has been cited over 2170 times between 1975 and 2015. Peter's main research interests were in radiation biology and hyperthermia, and he was recognized as a world authority on the effect of hyperthermia on cancer cells, and the mechanisms of synergistic biological effects of heat and radiation. But his research was broader and more eclectic. To add another personal note, I first became aware of his work when I joined the biophysics program of the NMR lab in Waterloo. Peter had participated in early NMR relaxation analysis of mammalian tissue; work that indicated NMR contrast in various tissues and motivated a number of scientists to pursue MR based imaging techniques. Dr. Raaphorst's reputation as a broad, well-rounded, researcher was clearly indicated by an appointment in 2000 as a visiting professor to the Henan Tumour Hospital in Zhen Zhou, China, a position he still holds. His contributions were also recognized in 2005 when he received the Career Achievement Award of the Ottawa Life Sciences Council.

Peter made significant contributions to medical physics organizations in Canada over his career. He was chair of the Physics Advisory Committee which advised the OCFR (now Cancer Care Ontario) regarding medical physics practice in the province. He was a strong advocate for medical physicists provincially, and through his efforts the status of medical physics in the province was enhanced. He served COMP for many years on the Professional Affairs Committee, which he chaired from 1996 to 1999. He was an author of an early scope of practice document for medical physics that clearly defined the role of the profession in cancer programs. As noted earlier, he is senior consulting scientist with the OAR's facility accreditation program for bone mineral density, and manages the Certified Bone Mineral Density Medical Physicists Program for them.

**GP Raaphorst, J Kruuv and MM Pintar. 1975
Nuclear magnetic resonance study of mammalian
cell water, *Biophys J* 15, 391-402.**

**NUCLEAR MAGNETIC RESONANCE STUDY
OF MAMMALIAN CELL WATER
INFLUENCE OF WATER CONTENT AND IONIC ENVIRONMENT**

G. P. RAAPHORST, J. KRUV, and M. M. PINTAR

From the Department of Physics, University of Waterloo, Waterloo, Ontario, Canada

ABSTRACT The water proton spin-lattice relaxation time (T_1) in mammalian cells and tissues has been measured as a function of external ion concentration and total cell water content. The results can be interpreted in terms of changes in the fractions of bound and unbound water, and changes in the coordination shells of macromolecules due to alterations in macromolecular configuration caused by changes in salt molarity and the amount of water. It is shown that the direct effect of the ions (Na^+ , K^+ , Li^+ , Cl^-) on structuring cellular water, i.e., into ion coordination shells, is small; the main effect of these ions on cellular water structure is an indirect one, resulting from their capability of changing macromolecular coordination shells.



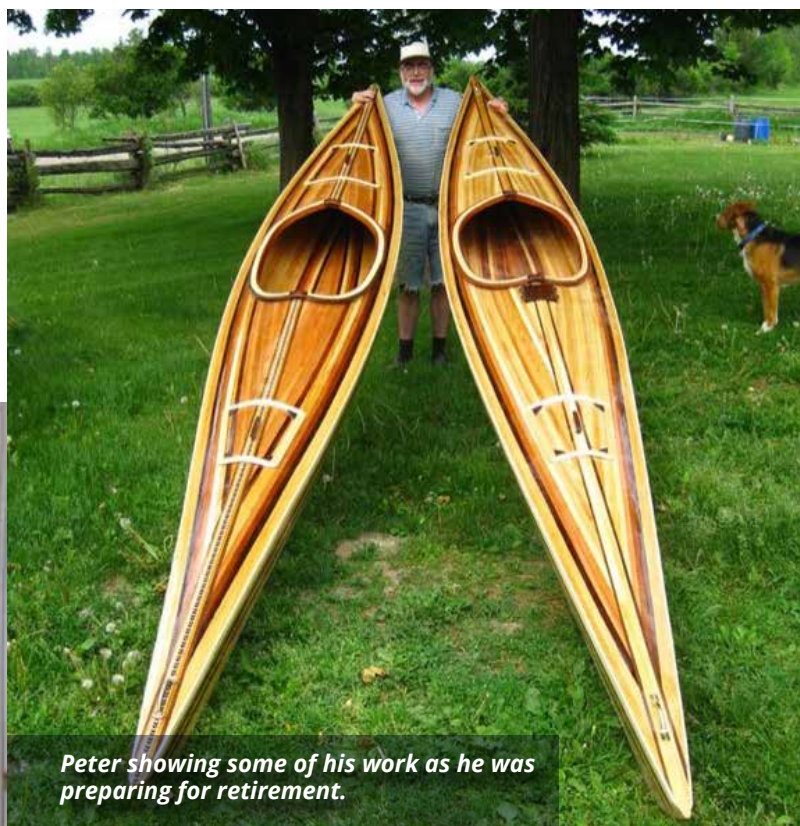
Peter building a medical physics program



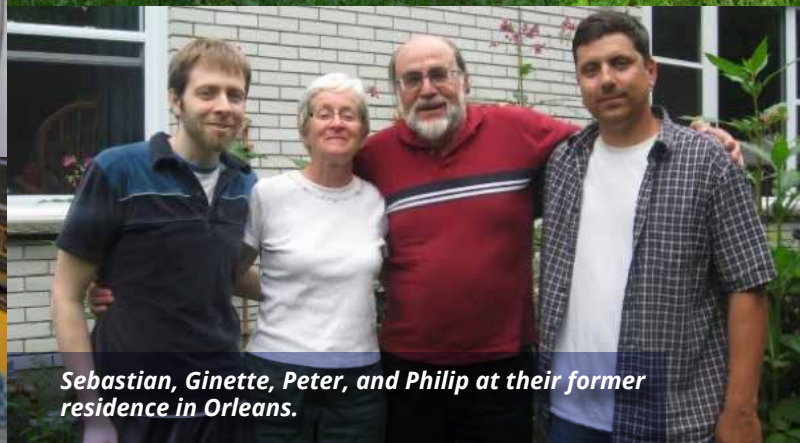
Everyone around would hang on to every word Peter had to say, even in our early days on the schoolbus.

Finally, Peter was a family man devoted to his wife, Ginette, and his sons, Sebastian Marc and Philip. He worked hard to enhance their home through the labour of his hands. His nomination letters note how his research presentations often included slides showing his house in Calabogie or a piece of furniture he had crafted as an accomplished schreiner (cabinetmaker). The furniture in his home reflected Peter's progression through his career; early work made with wood scavenged from shipping crates for equipment that had come into the hospital, and final work using wood befitting an accomplished chief physicist.

Peter, we applaud your accomplishments over your career, and congratulate you on this well-deserved honour. It is with great honour that I present you to readers of InterActions.



Peter showing some of his work as he was preparing for retirement.



Sebastian, Ginette, Peter, and Philip at their former residence in Orleans.

BECOMING A MEDICAL PHYSICIST: “AN UNEXPECTED JOURNEY”

G. Peter Raaphorst

I graduated from University of Waterloo with a B.Sc. in physics and then went on to get an M.Sc. and Ph.D. from University of Waterloo in physics with specialization in biophysics. This was followed by a postdoc at Colorado State University studying hyperthermia combined with radiation in the treatment of cancer.

The first 11 years was spent doing research in biophysics, which included the study of water structure in cancer cells using NMR, radiosensitization using anisotonic salt solutions, hyperthermia, and radical scavengers, and delving a little into cryobiology freezing of mammalian cells and mouse embryos. During this time I did have a brush with medical physics during a summer project at AECL in Chalk River working on tuning the first microwave section of the Therac 25. This was in my younger days when I had less gray hair (Figure 1).

In the spring of 1985, while working in medical biophysics at AECL in Pinawa, Manitoba, AECL was undergoing reorganization. Seeing the writing on the wall, I went for an interview for a radiobiology position in Sherbrooke, Quebec. On the way back through Ottawa, my wife Ginette said “why don’t you check to see if there is an opening at the cancer center?” Note, many of her relatives lived in Ottawa. So off I went, and at the Cancer Center I met Lee Gerig who indicated that they were interviewing for the head of medical physics, and he took me to Dr. Catton who was the CEO. Dr. Catton said “send your CV and we will get back to you.” I sent it and was invited for an interview within two weeks. Not knowing any medical physics, I got the bible by Johns and Cunningham, entitled the Physics of Radiology, and read it from cover to cover and went for one day to the Manitoba Health Sciences Centre to cram for knowledge in operational medical physics.

Off to the interview in Ottawa I went. The committee had about 15 people including deans from Carleton and University of Ottawa, and directors at the hospital etc., but most notable was the presence of Harold Johns, which made me nervous because I had seen him at student presentations asking the really tough scary questions. The interview went smoothly until Harold Johns said “go the blackboard and write out the Klein Nishina equation for Compton scattering and explain all the coefficients.” Being

caught like a deer in the headlights, there was only one thing that I could do. I stated that I was here for a job interview and not for a test in medical physics. The room went dead silent for a minute, and then the interview went on. At the end I was told to go for lunch and return in one hour. Arriving back at the office, both Drs. Catton and Johns were there. They offered me the job with conditions that I would go to the PMH and learn medical physics and then build up the clinical, academic, and research programs.

Off I went to the PMH and started staying in the old house in the parking lot across from the PMH. Jack Cunningham took pity on me and invited me to stay at his house. What a great experience in hospitality and kindness, but I did have to have a chore and that was making coffee. I graduated from bad coffee making to good coffee making, and of course 24/7 medical physics with Jack and his staff. Jack and Sheila, thank you so much for your kindness, and Jack for introducing me to Dr. Who and pizza on Friday evenings.

From the conditions put on me at the interview by Harold Johns, I learned the three important pillars of medical physics:

1. Clinical Service

With support of CCO and the hospital, we built up the physics staff and the radiation imaging and therapy equipment. We brought in new linacs, and Millar McPherson was in charge of bringing in the new Tomo unit. I took charge of bringing in the PET-CT unit. Note, the people present in the photo (Figure 2) include staff from Carleton University, NRC, and Health Canada, demonstrating the excellent environment for collaboration in Ottawa. One notable figure in the bottom photo, 2nd from left, is Bob Clark.

2. The Academic Program

My first meeting was with Bob Clark a physicist/biophysicist at Carleton, and he and I discussed starting a collaborative academic program in medical physics at Carleton. We founded the Ottawa Medical Physics Institute (OMPI, formerly named MPORU), and I was the founding director. Very quickly we developed a full slate of medical physics courses, which include radiotherapy physics and imaging, but

the most interesting was trying to get radiobiology and physiology/anatomy to be recognized in a high energy physics department. However, persistence paid off. Many adjunct professors joined the program and many graduate students were trained and to date, it is about 60 M.Sc. and 40 Ph.D. students. These activities lead to a boom in research.

3. The Research Program

Whilst my own interests were in hyperthermia and radiobiology, many of the physicists developed strong research programs. The top picture (figure 3) shows hyperthermia research on the porcine model at NRC that led to successful treatment of patients at the cancer center. The bottom image (figure 3) shows the potential impact of radiosensitivity to low doses on a brain tumour model, with totally unexpected results when convolving the radiation response curve on to the radiation dose curve of a brain tumour.

My Outreach to Other Nations

This was a rewarding project to reach out in China and teach at the Chinese National Academy of Sciences in Beijing, and also to be cross appointed to

and teach at the Henan University Medical Center, which had a catchment area of 100 million people.

Upon retiring I was asked by the OAR to be involved in the development of the physicist's role in the Canadian Bone Mineral Density site accreditation program. I developed all the policies and procedures for physics site visits, trained physicists and we accredited 100 sites in the pilot project. We found a number of miscalibrations of DXA units, which were leading to misdiagnoses of bone mineral status/loss in thousands of patients. It is an honour to continue to serve for the public good.

Finally, a thank you to all those who supported me, and especially to all my graduate students. As they approached graduation we morphed from me teaching them to them teaching me. Also, I learned so much from them, re: their wide variety of ethnic backgrounds. I give a shout out to all of you.

Best wishes,
Peter



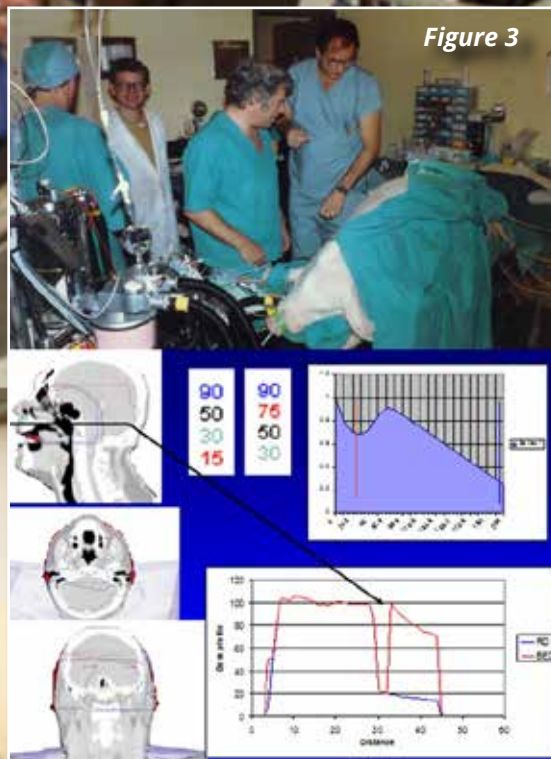
Figure 1



Figure 2



Figure 4



With special thanks to my Graduate Students

Ph.D. Graduates

- David Wilkins 1993 Carleton
- Denis Heller 1993 Carleton
- Ed Azzam 1994 U of Ottawa
- Ruth Brown 1996 Carleton
- Julia Wallace 1996 Carleton
- Joanne Dolling 1998 U of Ottawa
- Malgorzata Niedbala 2004 Carleton
- Marco Carlone 2004 Carleton
- Lourdes Garcia-Fernandez 2009 Carleton

M.Sc. Graduates

- Elias Zakhour 1990 Carleton
- Bilal Shahine 1995 Carleton
- Sheri Boyden 1998 Carleton
- Julia LeBlanc 1998 U of Ottawa
- Malgorzata Niedbala 2004 Carleton
- Narine Kizilian 1999 Carleton
- Heather Abbott 2000 U of Ottawa
- Debbie Smith 2000 Carleton
- Kenji Myint 2001 Carleton
- Lourdes Garcia-Fernandez 2005 Carleton

Physics department at Carleton U.
Radiology, Biology, Physiology depts. at U of O



Also thanks to colleagues who helped in the achievements and making my career fun.



PERSONAL REFLECTION ON COMP INAUGURAL 2016 PUBLICATION IMPACT PRIZE

Karl Otto

Adjunct Professor, Physics and Astronomy, University of British Columbia

I was honoured to receive the inaugural Publication Impact Prize at this year's COMP meeting for my paper titled "Volumetric Modulated Arc Therapy: IMRT in a Single Gantry Arc". That the award is for "impact" makes me particularly proud. The work I did with VMAT has been rewarding to me on many different levels. There are tens of thousands of patients treated with VMAT each day. I've heard from people around the world about the positive impact VMAT has had on their clinics and their patients. I've met patients completely outside of my professional activities that have been treated with VMAT. The Vancouver Cancer Center treated their 5000th VMAT patient in September. I cannot describe the feeling of being told that a patient received a curative instead of a palliative treatment due in part to the VMAT work.

I did not envision the importance of VMAT when I started working on it over 10 years ago. In fact, at that time I was not happy with my medical physics career. I had done some work and published a few papers but I didn't feel that I was making a meaningful difference. I was seriously lacking motivation and wasn't sure if medical physics was where I should be. When I started working on VMAT Tomotherapy was just starting to be adopted clinically and was receiving a lot of praise as the natural future of radiation therapy. The question had been around for some time (starting with Cedric Yu in 1997) whether you could also deliver high precision dose distributions quickly and reliably with gantry rotation on a conventional linac. An important moment came when I decided to calculate what kind of MLC motion was needed for a complex nine field dynamic IMRT plan and whether the MLC can move by at least the same amount in a single arc at maximum gantry speed. The answer after a simple calculation: yes, it can. Encouraged by this important clue, I decided it should be possible to treat patients very quickly and in complex scenarios in a single arc. The only (not so simple) problem was figuring out how to create a deliverable treatment plan for any arbitrary patient. I started a very ambitious project. If I failed, I was probably going to hang up my ion chamber

as a medical physicist and try a different career. Several investigators had worked in the area of arc IMRT, however there was still no system adequate for widespread clinical implementation. After months and years of hard work, testing and throwing out failed ideas, I found the last few pieces of the arc IMRT puzzle. The VMAT system described in the paper is still a main component of the commercial systems used in clinics today.

I have structured my career around the principal goal of having a maximal positive impact in the field. It seems like an obvious goal, and I believe most would argue that they are doing the same. A conscious choice for me is to continually question whether I am working on something that could possibly make a significant difference. Simple questions like: if I am successful with this research, how much will it really help patients? For me, I didn't see the point of working on a project that has little chance of improving a patient's quality of life or chance of survival. And why shouldn't we always try to maximize that impact by being highly selective about where we place our efforts? I encourage students to choose a project based on the potential effect it will have on the field. How difficult it will be to achieve success should be a secondary consideration. You don't necessarily have to solve it completely. Just make some progress in that direction. Also, from personal experience, you never know how far you might actually get.

A piece of advice that I received long ago was that it is important to occasionally go outside your comfort zone. Doing so has always been educational and usually led to opportunities for me. The challenge is that one must do so with intention, since by definition it will make you uncomfortable. Probably the most important example I have experienced is the partnerships I established with industry. Industry is quite different than academia and before VMAT I had no commercial experience. However, in an applied branch of science like ours, industry plays a critical role in seeing our research efforts realized in practice. It was quite daunting for me, a 33 year old medical physicist from Canada, to convince an

international multibillion dollar company like Varian Medical Systems to convert my VMAT solution into a commercial product. Regardless of how uncomfortable I was at the beginning of the process, I had a great experience working with many intelligent and highly motivated people. I now understand the pressures of business and feel comfortable that I can preserve my scientific integrity in that environment. Without an industry partner, VMAT would never have had the kind of impact it has seen.

I've done my best to do things that maximize potential improvements in the field. I think it's important that I also mention some pitfalls I tried to avoid. In a researcher's career they become experts in a specific sub-field, build credibility, and access grant money. Often, once a sub-field is fully investigated, it becomes stale and the opportunities for improvement have been fully exploited. This can be a particularly difficult situation for a researcher, as it could take years to reach the same level in a new area. The alternative, however, is to continue working in an area that has very little chance of making a difference. If impact truly is your goal, then there should be no question. In my opinion, in this situation it is better to quit what you're doing and try something different.

In academia we are encouraged to write many scientific articles. Number of papers published is the most common yardstick by which we measure a researcher's success. As a researcher, publishing your work is an obligation for when you've reached an important milestone. I believe there is too much temptation to publish for the sake of self-promotion instead of the advancement of science. This is a mentality that breeds mediocrity instead of innovation and impact. I didn't want to choose my research projects based on what I might be able to publish or where I might find grant money. My belief is that this way of thinking prioritizes projects that are low risk and easy to complete. This is not where we find true innovation.

The last thing I would like to reflect on is how much fun I had developing VMAT. I honestly loved it. I would think about how to solve problems and make improvements to VMAT all the time. Having the opportunity to improve the lives of thousands of people by solving complex and fascinating problems using state of the art technology is wonderfully satisfying. Finding the solution to a problem that no one has solved before is a great challenge. Seeing it actually help friends, family, and people all over the world is the best feeling.



RADIATION-INDUCED GLYCOGEN ACCUMULATION DETECTED BY SINGLE CELL RAMAN SPECTROSCOPY IS ASSOCIATED WITH RADIORESISTANCE THAT CAN BE REVERSED BY METFORMIN

Quinn Matthews^{1,4}, Martin Isabelle^{1,2}, Samantha J. Harder², Julian Smazynski³, Wayne Beckham^{2,4}, Alexandre G. Brolo⁵, Andrew Jirasek^{6*}, Julian J. Lum^{1,3*}

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Original Article Citation:

Matthews Q, Isabelle M, Harder SJ, Smazynski J, Beckham W, Brolo AG, et al. (2015) Radiation-Induced Glycogen Accumulation Detected by Single Cell Raman Spectroscopy Is Associated with Radioresistance that Can Be Reversed by Metformin. PLoS ONE 10(8): e0135356. doi:10.1371/journal.pone.0135356.

INTRODUCTION:

Tumor cells exhibit altered signaling pathways and metabolic processes that contribute to tumor cell resistance to systemic anti-cancer agents and radiation therapy. One hallmark of tumor cells is the reprogramming of energy metabolism, most commonly described as increased glucose uptake and glycolytic metabolism. This inherent metabolic property of cancer cells has been suggested to alter the sensitivity to radiation [1]. Many of these pathways are under investigation as candidate molecular targets to sensitize tumor cells to cell death when combined with radiation therapy. However, the success of this approach will require assessment and early monitoring of tumor cells that can identify metabolic features capable of conferring radiation sensitivity.

Raman spectroscopy can provide label-free molecular information from single live cells. Raman spectroscopy has been applied to discriminate between various cell types, both healthy [2] and pathological [3]. Moreover, Raman spectroscopy is able to monitor molecular and metabolic changes within a given cell population. Recent work with single cell Raman spectroscopic techniques have proven sensitive to detect metabolic changes due to the differentiation of human embryonic stem cells into lineage specific cardiac cells, where the dominant

Raman feature responsible for discrimination was found to be intracellular glycogen content [4]. Raman spectroscopy is highly sensitive to detect and quantify variability in absolute intracellular glycogen content [5]. Intracellular glycogen can be detected in different tumor cells [6] and may provide metabolic precursors to protect against hypoxia and other forms of stress [7-8]. Thus, intracellular glycogen observed with Raman spectroscopy may serve as a key bio-response marker during different cellular processes.

Single cell Raman spectroscopy used in conjunction with principal component analysis (PCA) is sensitive to molecular and metabolic changes within human cancer cells responding to clinically relevant single low and high doses of ionizing radiation [9,10]. The radiation responses observed with Raman spectroscopy are cell-line dependent and segregate according to both p53 status and intrinsic radiosensitivity, but not tissue of origin [11]. In this study, we report that the dominant radiation response observed in radioresistant tumor cell lines arises from a radiation-induced metabolic switch that can be detected by Raman spectroscopy as an increase in intracellular glycogen abundance. This accumulation of glycogen was associated with radiation resistance. In radioresistant MCF7 breast tumor cell lines, co-treatment with metformin resulted in enhanced cell death and loss in viability. This resulted in a significant reduction in radiation-

induced glycogen accumulation and increased radiosensitivity. Thus, our data show that Raman spectroscopic detection of glycogen levels provides a powerful approach to assess metabolic changes that could render tumor cells resistant to radiation therapy.

RESULTS:

Raman spectroscopy detects radiation-induced glycogen accumulation in radioresistant H460 and MCF7 cells, but not in radiosensitive LNCaP cells

In the current work, we asked whether Raman spectroscopy could identify spectral features that change post-radiation and if those changes would be different for radiosensitive and radioresistant human tumor cell lines. Two radioresistant human tumor cell lines were selected: a non-small cell lung tumor cell line, H460, and the estrogen receptor positive breast cancer cell line, MCF7. The prostate tumor cell line, LNCaP, was chosen as a radiosensitive control cell line. Each cell line was subjected to clinically relevant single fractions of 2 – 10 Gy radiation. On day one, two, and three post-irradiation, single-cell Raman spectra were acquired as previously described [9,11]. As shown in Fig 1A, we observed marked differences in Raman features for H460 cells after radiation treatment. A representative point-by-point difference spectrum and the PCA component from the entire data set are both dominated by Raman spectral features of glycogen. A similar change in this glycogen signature was found in irradiated MCF7 cells, but not in the radiosensitive control LNCaP cells. The complete Raman data set in Fig 1A and 1B comprised 3240 single-cell spectra. The first PCA component accounts for 40.9% of the total variance, and represents the dominant observation of variability in intracellular glycogen content within all cells in the complete Raman data set. The mean PCA scores for the first PCA component (Fig 1B) indicate that statistically significant ($p < 0.05$) increases in intracellular glycogen, relative to same day un-irradiated cells, occurred for all radiation doses at days 1 – 3 for H460 cells and at days 2 – 3 for MCF7 cells. In LNCaP cells, we did not detect any significant change in glycogen levels regardless of dose or time.

To investigate possible biological endpoints correlating with this radiation-induced glycogen change, we performed proliferation, viability, cell-cycle, and clonogenic assays in parallel with the Raman analysis. On day three post-irradiation and for each dose that was tested, all three tumor lines exhibited statistically consistent reductions in proliferation and increases in cell death with a dose-dependent trend in both of these endpoints. The decrease in cell proliferation was consistent with cell

cycle redistribution in response to 2 – 6 Gy radiation, with a common trend towards accumulation of cells in the G2-fraction at the expense of G1- and S-phase fractions. Interestingly, despite these comparable responses to radiation the clonogenic survival assays indicated that both H460 and MCF7 cells are significantly more radioresistant than LNCaP cells (Fig 1C). As such, it is possible that glycogen, or the radiation-induced signaling pathways that promote glycogen accumulation, could contribute to the observed resistance to radiation in H460 and MCF7 cells.

Raman spectroscopy detects suppression of radiation-induced glycogen accumulation in metformin treated MCF7 cells, but not H460 cells.

Metformin is an oral anti-diabetic drug that has been widely used as an activator of AMP-activated protein kinase (AMPK α). The target of metformin remains largely unknown, however, metformin can sensitize a number of tumor cells to radiation [12 – 17]. In particular, metformin was able to enhance radiosensitivity of MCF7 tumor cells via modulation of AMPK α [12]. To further investigate the relationship between radiosensitivity and the radiation-induced increase in intracellular glycogen observed with Raman spectroscopy, H460 and MCF7 cells were irradiated in the presence or absence of metformin. As shown in Fig 2A, there was minimal effect on radiation-induced glycogen accumulation in H460 cells after incubation with 5 mM metformin for 1 – 3 days post-irradiation. In contrast, Raman spectroscopy was able to detect a dramatic reduction in glycogen levels in MCF7 cells treated with metformin and radiation (Fig 2B and 2C). The reductions in glycogen levels were significant ($p < 0.01$) for all irradiated MCF7 cultures from 2 – 3 days. The change in glycogen detected by Raman spectroscopy could be observed in the first PCA component, which accounts for 40.0% of the total variance in the complete Raman data set of 2160 single-cell spectra (Fig 2C).

To corroborate the spectral detection of radiation-induced changes in glycogen, we used a biochemical enzyme assay to assess total intracellular glycogen levels three days post-irradiation, with or without metformin. As expected in H460 cells, 10 Gy radiation caused a reproducible 4.5-fold increase in total intracellular glycogen levels. Similarly, MCF7 cells showed a 4.1-fold higher amount of glycogen after radiation (Fig 2D). As we predicted based on the Raman spectra, H460 cells showed no significant change in the amount of glycogen when radiation was given in the presence of 5 mM metformin. In contrast to H460 cells, treatment of MCF7 cells with 5 mM metformin reduced the total amount of glycogen by 40% when co-treated with 10 Gy radiation. At

the 4 Gy radiation dose, treatment with metformin resulted in more than a 60% reduction in glycogen.

Metformin-mediated suppression of radiation-induced glycogen accumulation sensitizes cells to cell death

Since metformin was able to reverse the effects of radiation on the accumulation of glycogen, we investigated how this would affect survival. At all the clinically relevant radiation doses tested, there was a dramatic loss in MCF7 cell viability with the addition of 5 mM metformin (Fig 3A). Incubation of metformin also caused the percentage of dead cells to increase from 12.6% to 43.3% after three days of co-treatment with 10 Gy of radiation (Fig 3B). In H460 cells, radiation did not change the viability or degree of cell death with metformin treatment (Fig 3A and 3B). When we investigated this combination treatment using radiosensitivity assays, irradiated H460 cells had similar levels of clonogenic survival in cells treated with (SF2 = 0.58) or without metformin (SF2 = 0.57) (Fig 3C). In contrast, the addition of metformin to irradiated MCF7 cells resulted in significant loss in clonogenic survival at all doses of radiation (Fig 3D).

DISCUSSION & CONCLUSIONS:

There remains an unmet need for new approaches that can predict or monitor patient responses to radiation, and identify patients that may benefit from combination therapies. Label-free Raman spectroscopy coupled with chemometrics, such as PCA, is a potential way to discriminate between cell types, and to monitor biochemical changes within a given population of cells. This study has shown its application in detecting radiation-induced changes in glycogen that are associated with radiosensitivity. A key feature of our observations is the detection of changes in glycogen following radiation treatment in two radioresistant cell lines MCF7 and H460, but not in radiosensitive LNCaP cells. More importantly, Raman spectroscopic changes can be assessed with varying clinical doses of radiation, and when combined with the drug metformin, could lead to enhancements in radiotherapy. Thus, single-cell Raman spectroscopy has the potential to detect and distinguish novel biochemical signatures that are associated with tumor cell radioresistance.

Our data, to the best of our knowledge, is the first report of Raman detection of radiation-induced glycogen accumulation in tumor cell lines. Although it is still uncertain exactly how metformin exerts its anti-cancer properties, monitoring glycogen and other metabolic changes post-irradiation by Raman spectroscopy provides a new approach to assist in developing personalized treatments that have the highest likelihood of improving responses to radiation treatment.

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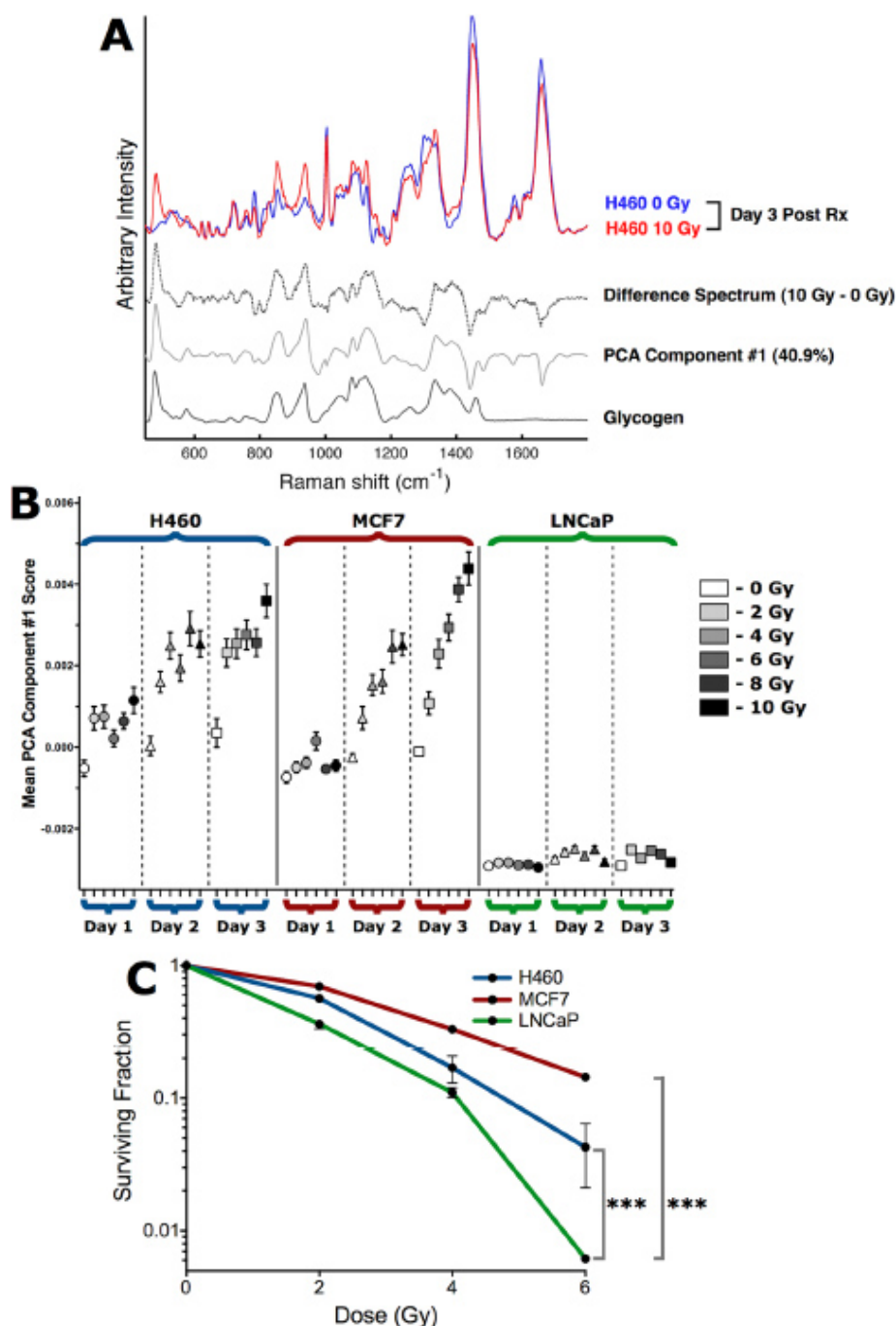


Fig 1. Single-cell Raman spectroscopy with PCA detects early radiation-induced glycogen synthesis in H460 and MCF7 cells, but not in radiosensitive LNCaP cells. (A) Single-cell Raman spectra of an irradiated H460 cell (10 Gy) and an unirradiated H460 cell at three days post-irradiation demonstrate the Raman spectroscopic detection of increased intracellular glycogen in irradiated H460 and MCF7 cells. The difference spectrum (dashed trace) is shown for comparison with the first PCA component (solid gray trace) from the entire Raman spectroscopy data set presented in B. The Raman spectrum of glycogen (black trace) is shown for comparison. (B) H460, MCF7 and LNCaP cells were irradiated with single fractions of radiation, and single-cell Raman spectra were collected from 20 cells from each sample post-irradiation. Experiments were performed in triplicate, resulting in 60 single-cell spectra per sample condition, and 3240 spectra overall. The mean PCA scores ($n = 60$ spectra per point, error bars are $\pm$ SE) for the first PCA component indicate statistically significant ($p < 0.05$ by unpaired two-tailed t-test) increases in intracellular glycogen, relative to same day unirradiated cells. (C) Clonogenic survival of irradiated H460, MCF7 and LNCaP cells. Data are the mean $\pm$ SE from three independent experiments, each cultured in triplicate. *** $p < 0.001$ (extra sum-of-squares F test).

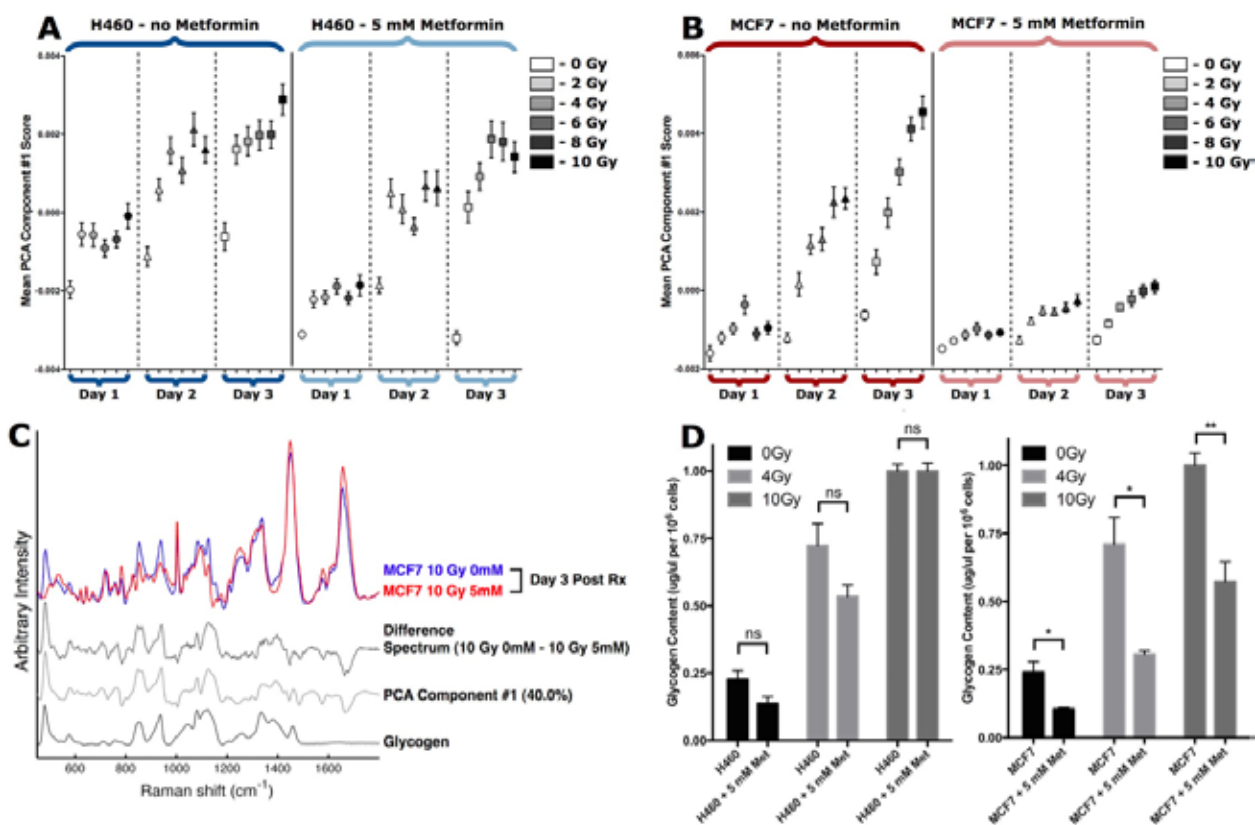


Fig 2. Single-cell Raman spectroscopy detects early and sustained inhibition of radiation-induced glycogen accumulation in metformin treated MCF7 cells. (A, B) H460 and MCF7 cells were treated with or without 5 mM metformin from 1 hour prior to irradiation with single fractions at the doses shown. Single-cell Raman spectra were collected for 20 cells from each sample at one, two, and three days post-irradiation. Experiments were performed in triplicate, resulting in 60 single-cell spectra per sample condition, and 2160 spectra overall per data set. The mean PCA scores ($n = 60$ spectra per point, error bars are $\pm$ SE) for the first PCA component are shown. (C) Single-cell Raman spectra of 10 Gy irradiated MCF7 cells at three days post-irradiation, with and without 5 mM metformin. The difference spectrum (dashed trace) is shown for comparison with the first PCA component (solid gray trace) from the entire Raman spectroscopy data set presented in B. The Raman spectrum of glycogen (black trace) is shown for comparison. (D) Intracellular glycogen levels measured enzymatically three days post-irradiation in the presence or absence of 5 mM metformin. Each bar represents the average of three independent experiments $\pm$ S.D, where each sample is assayed in triplicate. Statistical significance was determined using unpaired two-tailed t-test, n.s. not significant, * $p < 0.05$, ** $p < 0.01$.

Continued on page 57

ONTARIO ASSOCIATION OF MEDICAL PHYSICISTS UPDATE

Stephen Breen

Princess Margaret Cancer Centre

The Ontario Association of Medical Physicists held their first annual general meeting in St. John's during the COMP meeting. This new organization had its founding meeting in Toronto during the World Congress meeting in 2015, and in the past year, the incorporating board of directors were busy preparing for the incorporation of the organization. This included setting out the Objects of the Corporation and the enormous task of developing by-laws. The OAMP was incorporated in June, a few weeks prior to the AGM.

Even though we are a young organization, we have been busy with issues other than our founding. Late last year, the OAMP responded to a request for input to the Expert Panel to Enhance the Quality and Safety of Energy-Appling Medical Devices in Ontario, which was initiated by Health Quality Ontario. The goal of the panel is to modernize the provincial Healing Arts and Radiation Protection Act. OAMP emphasized the important role of medical physicists in assuring quality in the use of physics in medicine, and indicated that OAMP is a new organization which aims to represent medical physicists in Ontario. The final report of the expert panel is now available online.

The board of directors has kept in touch with the provincial associations in British Columbia, Alberta, and Quebec regarding the status of medical physics as a regulated profession. In Ontario, we have communicated with clinical chemists, geneticists, and

microbiologists, who are considering issues related to regulation. These healthcare professionals are similar in number to medical physicists, have similar education, and work closely with specialist physicians in hospitals.

The new board of directors took office in St. John's. The board thanks Dr. Joe Hayward and Ms. Danielle Fraser, who were members of the incorporating board for the past year and contributed to the establishment and early success of our organization. The OAMP now has about eighty-five members, and with such a small membership, we will need strong engagement by our members to create an active organization. In the next year, the board will focus on establishing our organization by communicating with our membership, setting fees in consultation with members, and building relationships with other groups. In addition, we will need to address the issues contained the Energy-Appling Medical Devices Report. It will be a busy, exciting year ahead for the board and the OAMP members as we build our organization.

OAMP DIRECTORS

Stephen Breen – President
Ivan Yeung – Vice-President
Jeff Richer – Secretary
Monique van Prooijen – Treasurer
Anthony Kim, Jenna King, Jeff Frimeth
– Directors-at-Large

1ST COMP WOMEN'S COMMITTEE LUNCHEON DURING 2016 ASM: A SUCCESS STORY!

COMP Women's Committee

At the ASM in St. John's, Newfoundland, the COMP Women's Committee (CWC) had its 1st official luncheon. It was standing room only with more than 60 participants curious to see what was going on. Given the committee's title there were a good number of men in attendance, supporting the view of the CWC that successfully addressing gender issues requires everyone's input. After a short introduction of the committee members, the attendees were split into groups around tables to exchange opinions and ideas about the main values of the committee: **leadership**, **mentorship**, and **partnership**. The brainstorming session produced a rich discussion (and a lot of noise) as participants shared personal stories and offered opinions on these values. In the limited time available between scientific sessions

it was difficult to collate all the discussions but the consensus was that the three values were linked, rather than separate concepts, with mentorship being the most valued. This was very helpful in providing guidance to the committee in planning future activities, so thank you to all who contributed. There was also a lot of positive feedback concerning the initiative and several innovative ideas were provided to ensure that the committee better represents the members. In the coming months, the work will focus on designing a survey to help develop the vision and goals of the committee and to propose activities accordingly. So stay tuned, your input is essential to the success of this endeavor. For additional inquiries, suggestions or input, please contact the CWC chair (Nadia Octave, nadia.octave@mail.chuq.qc.ca).

STUDENT EVENTS AT THE 2016 COMP ANNUAL SCIENTIFIC MEETING

COMP Student Council

STUDENT NIGHT OUT

This year, the student night out took place at the Yellowbelly Brewery in downtown St. John's, at the intersection of Water Street and the famous George Street, which is packed with pubs and restaurants. The second floor of the restaurant was reserved for the gathering, and was filled with approximately 60 students, residents, and a few other members of the medical physics community. Attendees enjoyed great conversation, refreshing drinks, and delicious food. It was a successful night of networking and socializing with grad students from around the country.

YOUNG PROFESSIONAL'S WORKSHOP

The Young Professional's Workshop took place the day before the official start of the annual scientific meeting, and replaced the student luncheon, which has happened in past years. This workshop gave students the opportunity to hone their communication and networking skills. The panel

discussion gave insight into a variety of possible career paths, the business skills session had a lot of great tips for starting a new business and product development, and the final workshop taught us about communication and people skills. A big thank you to the organizing committee, Cheryl Duzenli, Ives Levesque, and Jan Seuntjens, as well as the panel members and other presenters, for their time and effort creating this event for the young professionals.

STUDENT COUNCIL ELECTION

Student council elections took place at the beginning of the workshop, with Patricia Oliver being elected as vice-chair. Olga Maria Dona Lemus stepped down as chair, and Hali Morrison was promoted from vice-chair to chair. Since last year, the student council has acquired two new recruits (Tyler Doiron and Humza Nusrat). If you are interested in getting involved with the student council, or have any questions about council activities, please send an email to either of the chairs (hamorris@ualberta.ca or PatriciaOliver3@gmail.com).



MESSAGE FROM THE CHAIRS OF THE STUDENT COUNCIL

Dear COMP Students,

As chairs of the student council (SC) for the Canadian Organization of Medical Physicists (COMP), we would like to welcome you to our student community. First and foremost, our mission is to be your voice within the COMP organization. Specifically, our key aims include distributing resources to students, establishing funded educational opportunities, collecting and presenting the information of most interest to the student body, and contributing to student-related COMP activities.

The SC annually hosts a student lunch symposium session and a student night out at the annual scientific meeting (ASM). This year followed a different format with the introduction of the Young Professionals Workshop, created to provide residents, graduate students, and early-career medical physicists with education on professional and job-readiness skills. Members of the SC helped the organizers of this event with choosing some of the topics to be presented and moderating the panel discussion. The student night out was hosted at St. John's famous Yellowbelly Brewery with some good eats and drinks.

This past year, the SC has also worked hard to maintain, expand, and create new funding opportunities for students. We are beyond excited to serve as chairs of the COMP student council and will be continuing with the great work of our predecessors. We strongly encourage you to contact us with any suggested improvements or questions you may have regarding your role as a COMP student member. Please do not hesitate to contact us should you have any feedback, questions, or concerns. We can be reached by email, either to Hali Morrison (hamorris@ualberta.ca) or Patricia Oliver (PatriciaOliver3@cmail.carleton.ca).

Sincerely,
Hali Morrison and Patricia Oliver

SO, WHAT DO YOU FIND AT THE END OF THIS SMALL NFLD ROAD?

WHY, A PAST-CHAIR OF UNSCEAR, OF COURSE!

Clément Arsenault

As we prepared for our last day in Newfoundland, my wife, Joanne, and I started our day with our usual search for our morning coffee. Not being Tim Horton enthusiasts, we couldn't find a coffee shop in Port aux Basques that was open. We continued on Route 470, a small rural highway which hugs the South coast of Newfoundland from Port aux Basques. No success in the first community! Only coffee shop in town was not open on Saturdays! We continued to the end of road to a small community called Rose Blanche. Lo and behold, we see a sign for a tea house next to a bed and breakfast. We try our luck!

We were greeted by the owner, a lovely lady, called Lynne Sawford. As she served us our coffee and snacks, she mentioned that she and her husband had been spending their summers in Newfoundland for a number of years and that her husband was now retired from the "atomic energy business". This definitely sparked my interest! After indicating to her that I was a medical physicist and I was interested in knowing more about her husband's line of work, she went inside to invite her husband, Dr. Norman Gentner, to come and meet us.

Dr. Gentner was a past-secretary (2001 - 2005) and a past-chair (2008 - 2010) of UNSCEAR, the United Nations Scientific Committee on the Effects of Atomic Radiation. For those who may not know it, UNSCEAR was established by the General Assembly of the United Nations in 1955. Its mandate in the United Nations system is to assess and report levels and effects of exposure to ionizing radiation. As a member of the Canadian delegation to UNSCEAR since 1989 and in his role as secretary and chair, Dr. Gentner has had the opportunity to work on many important subjects throughout his career with UNSCEAR. Needless to say the Chernobyl disaster was high on this list!

Our 30 minute discussion touched on many subjects. Here are a few comments that show Dr. Gentner's interesting sense of humour.

ON CHERNOBYL:

- Having visited the Chernobyl area several times, Dr. Gentner commented that he has rarely seen an eco-system thrive so well, now that "humans" are no longer present!

- After asking him what his thoughts were on the relocation of the population near Chernobyl, his comment was that the net benefit would be the same as moving the entire population of Winnipeg to Toronto! I assume he was talking here about radiation exposure effects!

ON THE CNSC:

- Prior to working with UNSCEAR, Dr. Gentner was a scientist at AECL (Atomic Energy of Canada Ltd). Back in those days, there was quite often confusion between the Canadian Atomic Energy Company (AECL) and the atomic energy regulator (Atomic Energy Control Board - AECB). When the AECB was changed to the Canadian Nuclear Safety Commission in 2000, Dr. Gentner suggested to his managers at AECL that they too should change their name. He suggested the Canadian Nuclear Sales Company, just to maintain the confusion! Needless to say he was met with strange looks!

So, if you are ever in the small Newfoundland community of Rose Blanche, drop in at the RoseSea Bed and Breakfast and Tea Room. I am certain Dr. Gentner would be delighted to chat with you! You could be the third person to visit who actually knows what UNSCEAR is. I wish I knew who the first was! Forgot to ask.



COLOURFUL INTERACTIONS: REPORT ON THE 62ND ANNUAL SCIENTIFIC MEETING IN ST. JOHN'S, NEWFOUNDLAND

Dan La Russa and Elsayed Ali
The Ottawa Hospital

As you well know, the COMP-OCPM annual scientific meeting was held this past July in beautiful St. John's, Newfoundland. The meeting took place over three and a half days at the Delta St. John's Hotel, mere steps from many historic buildings, the harbour, and a lively array of restaurants and shops that adorn the famous George Street and neighbouring downtown core.

There were 210 people in attendance for this ASM, which boasted 59 oral and 57 poster presentations. This year's meeting was chaired by BeiBei Zhang, who did an admirable job organizing and coordinating the event.

The meeting officially kicked-off on Wednesday afternoon with an inaugural workshop for young professionals. This event consisted of various tips and tricks for residents, graduate students, and early-career medical physicists. Jerry Battista opened the workshop with an engaging presentation on the rewards and challenges of choosing a clinical physics career, tips on preparing for a residency interview, and discussion of future job prospects in Canada. The next speaker was Aaron Fenster. He shared with the audience the lessons learned from establishing the Imaging Research Program in London. It was particularly useful that Aaron discussed the steps that led to failure, not just those that led to success. The next session featured a diverse five-member panel (clinical radiation oncology, clinical imaging, regulatory, and research) that presented their respective career paths, their typical work day, and the best (and worst) part of their jobs. The remainder of the session focused on professional issues, from communication with colleagues, to approaching potential collaborators, to dealing with different personality types. The afternoon was very well received by those in attendance. If you were not able to attend, or for those wishing to review the content of the session, you can view video recordings of the session presentations on the virtual library section of the COMP-OCPM website.

The first day of the meeting was capped with a brief welcome reception followed by a captivating public lecture on the craft of beer making by local celebrity

brew master Liam McKenna. Liam presented the rich history of beer making and shared many tales about his own career as a brew master and beer taster. His passion for the subject was as deep and obvious as his knowledge of it.

The rest of this year's ASM was structured in the usual way, with CE sessions each morning followed by single-track oral and poster presentation sessions. The CE session topics this year were on quality, safety, and regulatory issues in imaging and therapy (John Kildea, Mark Broeders, and Thor Bjarnason), MR and cancer (Sharon Clarke and Stephen Breen), and machine learning, knowledge-based planning, and informatics (Issam El Naqa, Ross Mitchell, and Chris McIntosh). All of the CE session presentations were outstanding, and we highly recommend you view the recordings of the presentations on the COMP-OCPM virtual library if you didn't get a chance to see them in person.

Following the Thursday CE session was the J. R. Cunningham Young Investigator Symposium. This session featured ten presenters, all of whom continued the tradition of delivering outstanding presentations, and who once again made it difficult on the judges to select the best of the best. The winners of the YIS were announced in an earlier COMP-OCPM communication and are listed on the COMP-OCPM website (under "News"). Congratulations to all the YIS participants!

There were a few other inaugural events at this meeting. One is the Women in Physics meeting held on Thursday during the lunch break. Also on Thursday, COMP hosted the winners of the St. John's high school science fair. These bright, young scientists were invited to display their winning project posters, attend Q&A-style presentations on medical physics over lunch, and network with COMP members. On Friday, the first meeting for imaging physicists took place over the lunch break. Needless to say this was a very busy ASM.

On Friday, following the AGMs for COMP and CCPM, was the ceremony to introduce the newest fellows of COMP and to present the COMP gold medal. This year's gold medal was awarded to Peter Raaphorst,

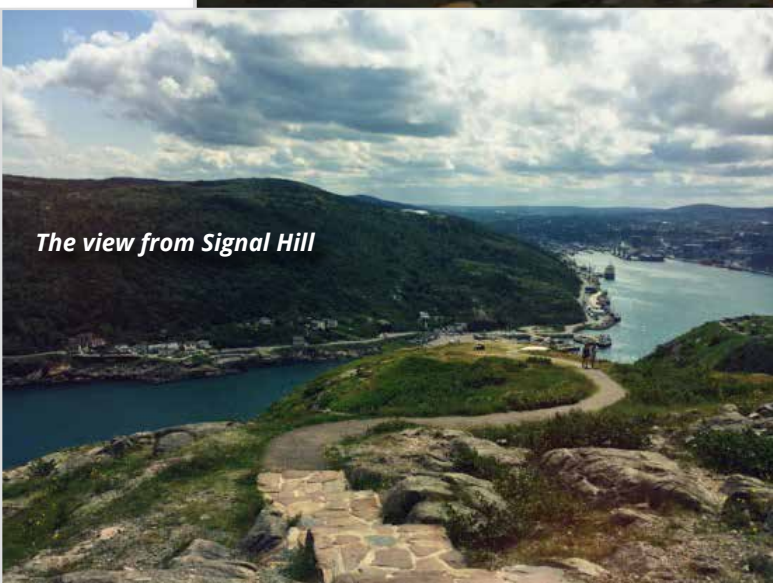
who spent much of his career as a distinguished researcher and head of physics at The Ottawa Hospital. In his speech, Dr. Raaphorst provided us with a portal into his many contributions to research and the medical physics community in Ottawa, all while providing some great insights.

You couldn't ask for a better location than St. John's for a meeting like the ASM, which offers so much to do and see. Of course there was the fun run on Friday morning which took runners through a scenic 5 km course. But many of the attendees also took advantage of the locale by walking along the harbour, taking in views of St. John's from the vantage point

of Signal Hill, or hiking Cape Spear. Some of us also took boat tours to get a unique view of the rocky coasts, Atlantic puffins (our guide described them as resembling flying potatoes...hard to disagree there), other seabirds, and to perhaps even catch a glimpse of a whale. Of course nothing beat the night out festivities that followed the awards ceremony on Friday. Maria Corsten and the rest of the local arrangements committee are to be commended for all the thought and hard work they put into hosting the event. If you didn't make it to the ASM this year, we hope to see you next year in Ottawa.



Attendees of the workshop for young professional participating in an interactive activity.



The view from Signal Hill



Seabirds off the rocky coast.

CONGRATULATIONS TO THE 2016 FELLOW OF COMP AWARD RECIPIENTS



Dr. Boyd McCurdy completed his M.Sc. and Ph.D. in medical physics at the University of Manitoba. He has worked at CancerCare Manitoba throughout his career, and is currently the head of their radiation oncology physics group, with academic appointments at the University of Manitoba as an associate professor. He has made research, training, teaching, and professional volunteerism contributions to our field.

Boyd has co-authored almost 40 papers, over 150 presentations, a book chapter, and a patent. He is recognized internationally as a leader in the field of in vivo patient dosimetry using transmission imaging. He has been active in the local medical physics graduate program, supervising many post-doctoral fellows, Ph.D., M.Sc., and undergraduate summer students, and also teaching several graduate courses. Furthermore he has been highly involved in the local medical physics residency program.

Boyd has been a fellow of the CCPM since 2007 and served the CCPM as the deputy examiner (2010-2012) and chief examiner (2013-2015). He also has volunteered for COMP on the Communications Committee, served as newsletter editor (2003-2006), and has also helped out the Awards and Nominations Committee, and the Science and Education Committee.



Dr. Peter McGhee received his Ph.D. in atomic nuclear physics from the University of Guelph in 1988 and two years later, after a short stint in industry, joined the medical physics team at the then newly established Northeastern Ontario Regional Cancer Centre in Sudbury.

He became a member of the CCPM in 1992, sub-specializing in radiation oncology. In 1996 he accepted the position as head of medical physics for the Northwestern Ontario Regional Cancer Centre in Thunder Bay and subsequently became a fellow of the CCPM in 1997. He is now director of the medical physics program and radiation safety officer for the Radiation Therapy Operational Network of the Thunder Bay Regional Health Sciences Centre. He has held a number of posts of professional interest including chair of the Radiation Therapy Advisory Committee to the Healing Arts Radiation Protection Commission of the Ontario Ministry of Health and Long Term Care (1998-2002); chair of the Medical Physics Professional Advisory Committee of Cancer Care Ontario (1999-2003); council for Professional Affairs for COMP (2003-2007); chair of the Radiation Treatment Quality and Safety Committee of Cancer Care Ontario (2002-2011); and president of COMP (2010-2012). He currently maintains academic appointments with both Lakehead University and the Northern Ontario School of Medicine.



Jason Schella graduated with an M.Sc. in astronomy from St. Mary's University in Halifax. After being introduced to the field of medical physics, he joined the residency program at the Nova Scotia Cancer Centre (NSCC) in 1992. Today, Jason is a staff physicist in radiation oncology and radiation safety officer at the NSCC and holds an academic appointment at Dalhousie University. He also performed as acting chair of medical physics at the NSCC for four years. Jason has been involved in the education and training of radiation oncology residents and medical physics graduate students for many years.

Jason has served the Canadian medical physics community through his involvement with the COMP board in the role of president-elect, president, and past-president from 2006-2012. He has also been involved with many sub-committees such as the Awards, Nominations, Sylvia Fedoruk Prize, and Professional Affairs Committees. From 2008 - 2013, he took on the role of coordinating the scientific portion of the COMP annual scientific meeting in the form of abstract submissions, reviews and proceedings documents. Jason also sat on the steering committee for the Canadian Partnership for Quality Radiotherapy (CPQR) from 2011 - 2013 as a COMP representative.



Matthew Schmid completed his post-graduate studies in Saskatoon, obtaining his M.Sc. in physics at the University of Saskatchewan in 1978.

After graduating, he worked for the Department of National Defense in Victoria, B.C. for about four years before returning to Saskatchewan to take the post of physicist at the Allan Blair Cancer Centre in Regina in 1982.

During his early years in Regina, Matt worked in both nuclear medicine and radiation therapy, but later transitioned to full time in radiation therapy. He served as radiation safety officer for most of his 23 years in Regina and was acting director of the physics department for a period of time during his tenure there.

In 2006, he took up a position with the BC Cancer Agency in Kelowna, where he works as a senior physicist. He is actively engaged in Kelowna's busy brachytherapy program and also serves on the Provincial Medical Physics Residency Program Committee.

Matt has been a member of the CCPM since 1985 and a fellow since 2001. He served as vice-President of the CCPM from 2009 - 2012, and president from 2012 - 2015, during which time the bylaws of the CCPM were rewritten to comply with Canada's Not For Profit Act and the relationship between COMP and CCPM was redefined, which involved the creation of a formal contract between the two organizations.



Dr. Katharina Sixel received her Ph.D. in physics from McGill University in 1993, and soon after she joined the Toronto Bayview Regional Cancer Centre, which is now known as the Odette Cancer Centre at Sunnybrook Health Sciences Centre, as a medical physics resident. She graduated from the residency program in 1994, taking on a medical physics role.

In 1996, she became a member of the Canadian College of Physicists in Medicine (CCPM) and a Fellow in 1999. That same year, Katharina joined the board of the CCPM. In 2002 she became chief examiner for the college. As examiner, she introduced an explicit safety component to the exam: radiation safety for those certifying in radiation oncology, diagnostic imaging, or nuclear medicine, and magnetic resonance safety for those specializing in MRI. In addition, an oral component was added to the membership exam under her leadership. This oral section has strengthened the credibility of the MCCPM and created a more robust certification process.

In 2006, Katharina had the opportunity to join the start-up Durham Regional Cancer Centre (DRCC) in Oshawa. As chief of medical physics, she helped build the radiation program which has grown to a seven linac facility, with one satellite bunker and over 2700 treated radiation courses per year. She is also the radiation safety officer and provides leadership to the radiation team in her capacity as chair of the Radiation Oncology Sub Council of the Cancer Program.

Katharina is an assistant professor in the Department of Radiation Oncology at the University of Toronto. She is the site coordinator for DRCC in the CAMPEP accredited physics residency program at the University of Toronto. She has mentored residents and graduate students. Prior to joining DRCC, she had an active research career with over 70 published papers and abstracts. In her current role, she is more focused on administrative and leadership initiatives, helping to translate state of the art technology and techniques into clinical practice at a community based cancer centre.

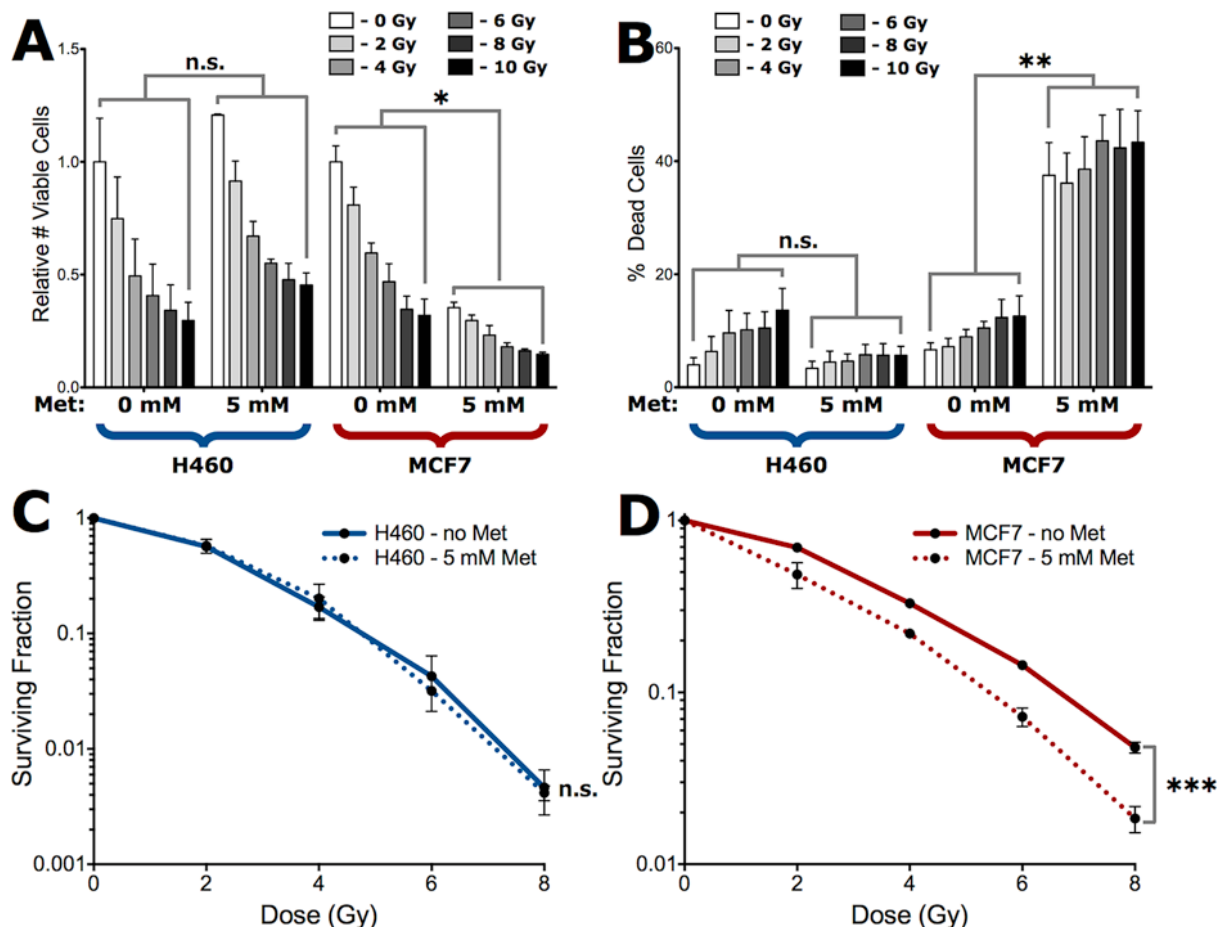


Fig 3. Preferential sensitization of MCF7 cells treated with radiation and metformin. (A, B) Total numbers of (A) live and (B) dead cells in metformin co-treated H460 and MCF7 cultures were counted in triplicate at three days post-irradiation. Viable cell counts in (A) are relative to the untreated control for each cell line. Statistical significance tests shown apply to each dose-matched sample pairing within each group. (C, D) Clonogenic survival of metformin cotreated (C) H460 and (D) MCF7 cells performed one day post-treatment. Data are the mean $\pm$ SE from three independent experiments, each cultured in triplicate. n.s.—no significant difference between curves, *** $p < 0.001$ (extra sum-of-squares F test).

MESSAGE FROM THE COMP PRESIDENT

Continued from page 5

propel us to new heights in Canadian medical physics. I very much welcome any comments and suggestions that you may have in making COMP the best possible organization that we can. I look forward to working with you in my coming term!

With that, enjoy your fall!

Michelle

EXECUTIVE DIRECTOR REPORT

Continued from page 7

As you may have noticed, we are now communicating with members and stakeholders in a variety of ways: through our weekly Sosido Digest, our monthly e-broadcast, our website and social media, and of course through this publication. We hope that the information provided is helpful interesting – let us know what you think!

It was great to see so many of you in St. John's. Thank you for all of your support. Please contact me anytime with ideas and feedback.

DATES TO REMEMBER

Abstract submission deadline for Imaging Winter School: November 18th, 2016

Deadline for January issue of InterACTIONS: December 1st, 2016

Early-bird registration for Imaging Winter School/Mammography Workshop: December 21st, 2016

CCPM membership application deadline – December 21st, 2016

CCPM fellowship application deadline – January 20, 2017

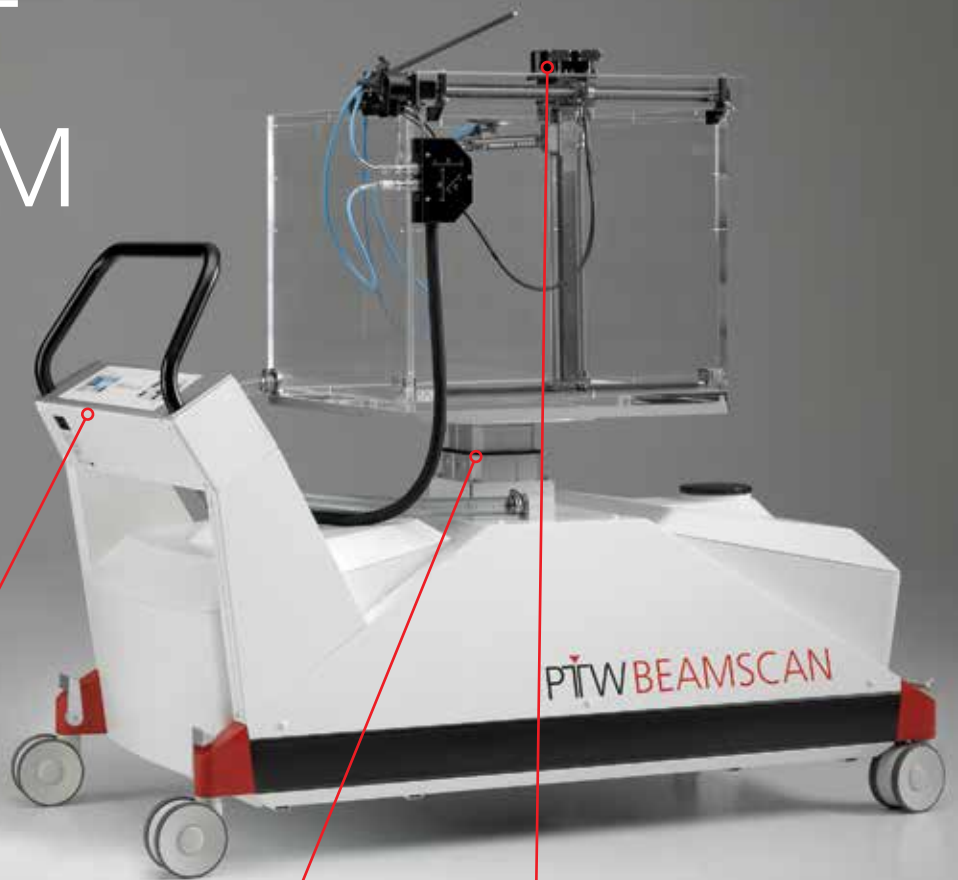
Mammography Workshop: February 1st – 3rd, 2017

Gold Medal Award deadline: February 3rd, 2017

Imaging Winter School: February 2nd – 5th, 2017

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PTW

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