Bryan Schaly, Ph.D., MCCPM
Medical Physicist

Education

- Medical Physics Residency: Odette Cancer Centre
- Ph.D.: Medical Biophysics, UWO
- M.Sc.: Physics and Astronomy, McMaster University
- B.Sc.: Physics and Astronomy, UWO

Research interests

- Image-guided radiation therapy
- Adaptive radiation therapy
- Exit dosimetry using electronic portal imaging device (EPID)

Selected publications

M. Wierzbicki, **B. Schaly**, T. Peters and R. Barnett, “Automatic Image Guidance for Prostate IMRT Using Low Dose CBCT,” *Med. Phys.* **37**: 3677-86 (2010)

B. Schaly, V. Varchena, P. Au and G. Pang, “Evaluation of an anthropomorphic male pelvic phantom for image-guided radiotherapy,” *Rpt Med Imag*. **2**: 69-78 (2009)

W. Song, **B. Schaly**, G. S. Bauman, J. J. Battista and J. Van Dyk, “Image-guided adaptive radiation therapy (IGART): radiobiological and dose escalation considerations for localized carcinoma of the prostate” *Med Phys.* **32**: 2193-203 (2005)

B. Schaly, G. S. Bauman, W. Song, J. J. Battista and J. Van Dyk, “Dosimetric impact of image-guided 3D conformal radiation therapy of prostate cancer” *Phys. Med. Biol*. **50**: 3083-3101
(2005)

B. Schaly, J. A. Kempe, G. S. Bauman, J. J. Battista and J. Van Dyk, “Tracking the dose distribution in radiation therapy by accounting for variable anatomy” *Phys. Med. Biol.* **49**: 791-805 (2004)

Doug Hoover

Background

I'm currently a medical physicist at the London Regional Cancer Program. Previously, I studied Engineering at Queens University, and then high-energy theoretical physics at McGill University and Perimeter Institute. In order to transition to the field of medical physics, I moved on to a one-year Postdoctoral position at the University of Western Ontario. Besides teaching and performing my clinical duties, I'm also actively involved in a number of projects related to both Brachytherapy and External Beam Radiation Therapy.

Current Research Projects

High-Dose-Rate Prostate Brachytherapy

Brachytherapy for intermediate- and high-risk prostate cancer is a treatment modality that will likely see a rise in usage due in part to recent results from the ASCENDE-RT trial which showed improved relapse-free survival in a combined EBRT/Brachytherapy approach to the management of prostate cancer. Our group is currently working with a device originally developed at the Robarts Research Institute for use in low-dose rate brachytherapy. We are in the process of translating this technology for use in high-dose-rate, intra-operatively planned prostate brachytherapy. Initial results show that the improved imaging afforded by this device result in greater accuracy of needle positioning, leading to a corresponding improvement in dose delivery accuracy (1).

Functional Imaging and Radiation Planning for Lung Cancer

Radiation pneumonitis is a potentially life-threatening toxicity associated with radiation treatment for lung cancer. The volume of normal lung that receives a radiation dose of at least 20 Gy has been shown to be one of the best predictors for pneumonitis, although one limitation of this metric is that it assumes all lung tissue is equivalent. On the other hand, lung cancer patients often have COPD and emphysema, resulting in very heterogeneous lung function. Recent studies have shown that predictors of pneumonitis which incorporate lung function may be superior to those which assume homogeneous lung function (2). By identifying healthy, well-functioning lung, we can then adapt our radiation treatment plans to avoid healthy lung tissue at the expense of less healthy regions of the lung. It is hypothesised that this type of "functional lung planning" will lead to improved quality of life in lung cancer patients receiving radiation therapy. I am currently one of the lead investigators in the world's first double-blind, randomized, controlled trial examining whether this hypothesis is borne out (3).

Optimization Algorithms for External Beam Radiation Therapy

Delivery techniques for external beam radiation therapy has evolved tremendously over the last two decades. Modern linear accelerators are now capable of sculpting dose around critical structures, while still delivering a conformal, uniform dose to the tumour. Two modern techniques which make this possible are intensity modulated radiation therapy (IMRT) and volume modulated arc therapy (VMAT), with each technique having its own advantages and disadvantages. In a recent publication by my group, we showed that it is possible to combine these two methods into a single, unified optimization and delivery technique. The proof-of-concept algorithm was developed on the Philip's Pinnacle^3 treatment planning system (4). We are currently working with Philips to develop an improved algorithm, with an eventual goal of commercialization.

Collaborators

Dr. Eugene Wong, Associate Professor, Department of Physics and Astronomy, UWO
Dr. Jeff Chen, Medical Physicist, London Regional Cancer Program
Dr. David Palma, Radiation Oncologist, London Regional Cancer Program
Dr. Brian Yaremko, Radiation Oncologist, London Regional Cancer Program
Dr. Grace Parraga, Research Scientist, Robarts Research Institute

References

1. Hrinivich WT, Hoover DA, Surry K, Edirisinghe C, Montreuil J, D'Souza D, et al. Three-dimensional transrectal ultrasound guided high-dose-rate prostate brachytherapy: A comparison of needle segmentation accuracy with two-dimensional image guidance. Brachytherapy. 2016.
2. Hoover DA, Reid RH, Wong E, Stitt L, Sabondjian E, Rodrigues GB, et al. SPECT-based functional lung imaging for the prediction of radiation pneumonitis: a clinical and dosimetric correlation. J Med Imaging Radiat Oncol. 2014;58(2):214-22.
3. Hoover DA, Capaldi DP, Sheikh K, Palma DA, Rodrigues GB, Dar AR, et al. Functional lung avoidance for individualized radiotherapy (FLAIR): study protocol for a randomized, double-blind clinical trial. BMC Cancer. 2014;14:934.
4. Hoover DA, MacFarlane M, Wong E, Battista JJ, Chen JZ. Feasibility of a unified approach to intensity-modulated radiation therapy and volume-modulated arc therapy optimization and delivery. Med Phys. 2015;42(2):726-34.

Dr. Hatim Fakir, Ph.D., MCCPM
Medical Physicist (Radiation oncology), LRCP.
Assistant Professor, department of Medical Biophysics, Schulich School of Medicine & Dentistry, University of Western Ontario.

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London Regional Cancer Program
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London, ON N6A 4L6
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Clinical interests:
Frameless cranial stereotactic radiosurgery (SRS)
Image guided stereotactic body radiation therapy (SBRT) with special focus on VMAT treatments of the brain, prostate and lung.
High dose rate brachytherapy

Research interests:
Stochastic modeling of cancer progression and tumour control probability (TCP)
Biology based optimization of radiation therapy protocols
Treatment planning and quality assurance for linac based multiple lesion SRS treatments

Education and background:
Ph.D., Ibn Tofail University (Morocco), Nuclear physics.

PostDoc, Institut de Radioprotection et de Sûreté Nucléaire (France): development of a Monte Carlo code for the microdosimetry of alpha particles in the lung.

PostDoc, Institute of Physics and Biophysics (Salzburg, Austria): Mathematical modeling of radiation-induced DNA damage and oncogenic transformations.

PostDoc, Center for Pure and Applied Mathematics, UC Berkeley (USA): Biologically-based mathematical modeling of radiation-induced carcinogenesis with focus on tumor progression and factors that modulate it such as dormancy and angiogenesis.

Selected publications:

- Fakir H, Hlatky L, Li H, Sachs R. Repopulation of interacting tumor cells during fractionated radiotherapy: stochastic modeling of the tumor control probability. Med Phys. 2013, 40(12):121716.

- Fakir H, Hofmann W, Sachs RK. Modeling progression in radiation-induced lung adenocarcinomas. Radiat Environ Biophys. 2010 May; 49(2):169-76.

- Fakir H, Tan WY, Hlatky L, Hahnfeldt P, Sachs RK. Stochastic population dynamic effects for lung cancer progression. Radiat Res. 2009 Sep; 172(3):383-93.

- Fakir H, Gaede S, Mulligan M, Chen JZ. Development of a novel ArcCHECK(™) insert for routine quality assurance of VMAT delivery including dose calculation with inhomogeneities. Med Phys. 2012 Jul; 39(7):4203-8.

- Fakir H, Hofmann W, Tan WY, Sachs RK. Triggering-response model for radiation-induced bystander effects. Radiat Res. 2009 Mar; 171(3):320-31.

- Fakir H, Sachs RK, Stenerlöw B, Hofmann W. Clusters of DNA double-strand breaks induced by different doses of nitrogen ions for various LETs: experimental measurements and theoretical analyses. Radiat Res. 2006 Dec; 166(6):917-27.

- Sachs RK, Shuryak I, Brenner D, Fakir H, Hlatky L, et al. Second cancers after fractionated radiotherapy: stochastic population dynamics effects. J Theor Biol. 2007 Dec 7; 249(3):518-31.

Dr. Jerry Battista

Dr. Battista completed his Ph.D. degree at the University of Toronto in 1977 under the supervision of Dr. Michael Bronskill. The thesis project dealt with “Compton tomography”, enabling slice-by-slice 3D imaging of the human body (similar to CT scans). As a post-doctoral resident in medical physics he then gained clinical physics experience at the Princess Margaret Hospital, under the guidance of Dr. “Jack” Cunningham – a pioneer in computerized dose computations. Jerry moved to the Cross Cancer Institute and University of Alberta in 1979. With graduate students, his team pioneered the introduction of a new breed of ‘convolution/superposition’ algorithms for three-dimensional (3D) dose computations used today for radiation treatment planning of cancer patients.

Current research interests include 3D dose measurements in gels using optical CT scans, and algorithms for adaptive dose re-optimization for CT-guided radiotherapy. He has published over 120 peer-reviewed articles and has co-authored major research grants, including one from the Ontario government (ORF) to support the “Ontario Consortium for Adaptive Interventions in Radiation Oncology” (OCAIRO), in collaboration with his previous graduate students and with industry.

Jerry is an award-winning teacher at Western and he is known for his clear presentations. His enthusiastic style and vivid analogies brings physics concepts to a wide range of audiences with diverse backgrounds, including clinicians, students, and the general public. He has received a Schulich School of Medicine Award (2013) and Western’s Pleva Award (2014) for excellence in teaching. He was nominated to the “Top 100” lecturers in Ontario Universities and was nominated for a national 3M Teaching Fellowship at Western (2012, 2014). Dr. Battista has served as external Ph.D. examiner at other Universities - from Quebec City to Stockholm. He has mentored many graduate students, some who now lead the field of modern radiotherapy. They collectively have received over 20 awards from Canadian, and international organizations, for excellence in publications or presentations. Recently, he has turned his attention to developing small-scale medical imaging systems (e.g. CT) dedicated to teaching via interactive demonstrations and laboratory exercises.

Jerry is a Fellow of the Canadian College of Physicists in Medicine (FCCPM), Canadian Organization of Medical Physics (FCOMP) and American Association of Physicists in Medicine (FAAPM). Since 1988, Dr. Battista has been driving Physics Research at the London Regional Cancer Program, in London, Ontario, Canada. He is Professor of Medical Biophysics at Western, with cross-appointments to the Departments of Oncology, Physics, Diagnostic Imaging and Nuclear Medicine, and the Biomedical Engineering Program. He became Head of the Division of Radiation Oncology at Western in 1994, and Chair of the Medical Biophysics Department in 2004. He has served as an external grant reviewer to national granting agencies such as the National Cancer Institute of Canada, Canadian Health Research Institutes, National Science and Engineering Research Council, and National Institutes of Health in the US. He serves as advisor to the Ontario Ministry of Health and Cancer Care Ontario, as provincial coordinator for postgraduate residency training programs and undergraduate studentships in clinical physics. He advises the provincial government on radiation emergency procedures, including participation in an educational 2-day course for “first responders”.

In his spare time, Jerry enjoys playing guitar of all styles and is a member of the London Jazz Orchestra, a community group of 17 musicians dedicated to “big band” music. The group has been acclaimed as “London’s Best Jazz Band” for several years running.

Jeff Z. Chen PhD, MCCPM, FCCPM
Senior Medical Physicist

Academic appointment:

Associate Professor
Department of Oncology
Department of Medical Biophysics
University of Western Ontario

Current Practice:

Dr. Jeff Chen is a senior medical physicist specializing in radiation physics. He is a resource physicist for treatment planning and quality assurance program.

Education:

PhD Physics, New York University
M.S. Physics, New York University

Research Interests:

Development of new radiation therapy techniques
Radiotherapy plan adaptation with online imaging
Development of functional image-guided radiation therapy
Optimization of radiobiological effects in time and spatially fractionated radiation therapy
Improvement of the quality and efficiency of radiation treatment planning process with automated planning techniques

Kevin Jordan, PhD

Personal Quote: “I am interested in all things optical”

Personal interests: anything that involves light, photomedicine, photochemistry, photography, solar power, solar cooking, electric bicycles, electric cars, water sports, telemark skiing,

Position: Medical physicist, London Regional Cancer Program/London Health Sciences Centre, assistant professor, Departments of Medical Biophyics and Oncology, at the Schulich School of Medicine and Dentistry, University of Western Ontario in London

Education: B Sc, Co-op Honours Physics, Univ of Waterloo; M Sc, Applied Physics, Texas Tech Univ; Ph D, Chemical Physics, Washington State Univ; post-doc Dept. of Chemistry, Univ of Western Ontario; Medical Physics residency, London Regional Cancer Centre

Research interests: photomedicine, photochemistry, radiochemistry, radiobiology, radiotherapy (grid therapy), quantitative optical imaging, applied spectroscopy, development of optical computed tomography scanners and 3D gel dosimetry, clinical implementation of photodynamic therapy (skin cancer),

Dr. Kathleen Surry, BESc MASc PhD MCCPM

Dr. Kathleen Surry is a Clinical Medical Physicist at the London Regional Cancer Program. Dr. Surry holds a PhD in Medical Biophysics from Western University, a MASc in Mechanical (Biomedical) Engineering from University of Toronto and a BESc in Mechanical Engineering from Western University. She obtained MCCPM certification in 2010. Dr. Surry is primary physicist for the HDR brachytherapy program at LRCP, as well as having other clinical responsibilities in the external beam therapy program. Dr. Surry's research interests are in the clinical HDR brachytherapy program and particularly in the treatment of gynecological cancers. She is also very interested in the education portion of her role: Dr. Surry teaches a course on Practical Radiotherapy Physics (MBP 9672B) to Radiation Oncology Residents, Medical Physics Residents and CAMPEP graduate students; she participates in the clinical teaching of Residents; and she acts on Advisory Committees for Medical Biophysics and Biomedical Engineering graduate students. Kathleen is also a busy Mum of two, a well-intentioned gardener, a special-diets baker and an avid reader.

Stephen Sawchuk
Sen. Medical Physicist at LRCP

Major Clinical Duties:

Treatment Planning QA, Linac responsibility, Tomotherapy unit responsibility, Dep. Radiation Safety Officer

Daily Clinical:

Treatment Planning Checks, Linac and tomotherapy responsibilities, radiation safety, Low Dose Rate prostate brachytherapy, Total Body Irradiation

Medical Physics Career Path:

Monte Carlo Methods at LRCP as research assoc; Medical Physics Residency in Kingston ON (1993-1996); Kingston (KRCC), Calgary (TBCC), Seattle (Swedish Medical Inst.) and LRCP as Medical Physicist

Certifications:

F.CCPM, M. CCPM, D. ABR

Education:

Ph.D. Applied Mathematics Western (1990), M.Sc. Appl. Math Western (1985), B. Sc. Hon Appl. Math Western (1983)

Academic Interests:

Educational: Medical Physics Certification Examiner and Question Composer

Research: Monte Carlo Methods and Algorithms for Treatment Planning and particle transport, radiation safety

Slav Yartsev, PhD, DSc, MCCPM

Research Areas:

Tomotherapy planning of small brain tumors, image guidance in radiation therapy, adaptive radiotherapy planning on decreasing gross tumor volumes

Selected recent publications:

Survival prediction in high-grade gliomas using CT perfusion imaging, Yeung TPC, Wang Y, He Y, Urbini B, Gafà R, Ulazzi L, Yartsev S, Bauman G, Lee TY, Fainardi E. J Neurooncol 123, N 1, 93-102 (2015).

Separating the dosimetric consequences of changing tumor anatomy from positional uncertainty for conventional fractionated lung cancer patients, Yartsev S, Chen J. Pract Radiat Oncol 5, N 5, e579-e580 (2015).

Image guidance procedures in radiotherapy for prostate cancer and the influence of BMI, Piotrowski T, Kaczmarek, Jodda A, Ryczkowski A, Bajon T, Rodrigues G, Yartsev S, J Radiother Pract 13, N 4, 410-417 (2014).

Assessment of inter-patient heterogeneity in tumor radiosensitivity for non-small cell lung cancer using tumor-volume variation data, Chvetsov AV, Yartsev S, Schwartz JL, Mayr N, Med Phys 41, N 6, 064101(2014).

Treatment planning studies in radiotherapy, Yartsev S, Muren LP, Thwaites DI, Radiother Oncol 109, N 3, 342-343 (2013).