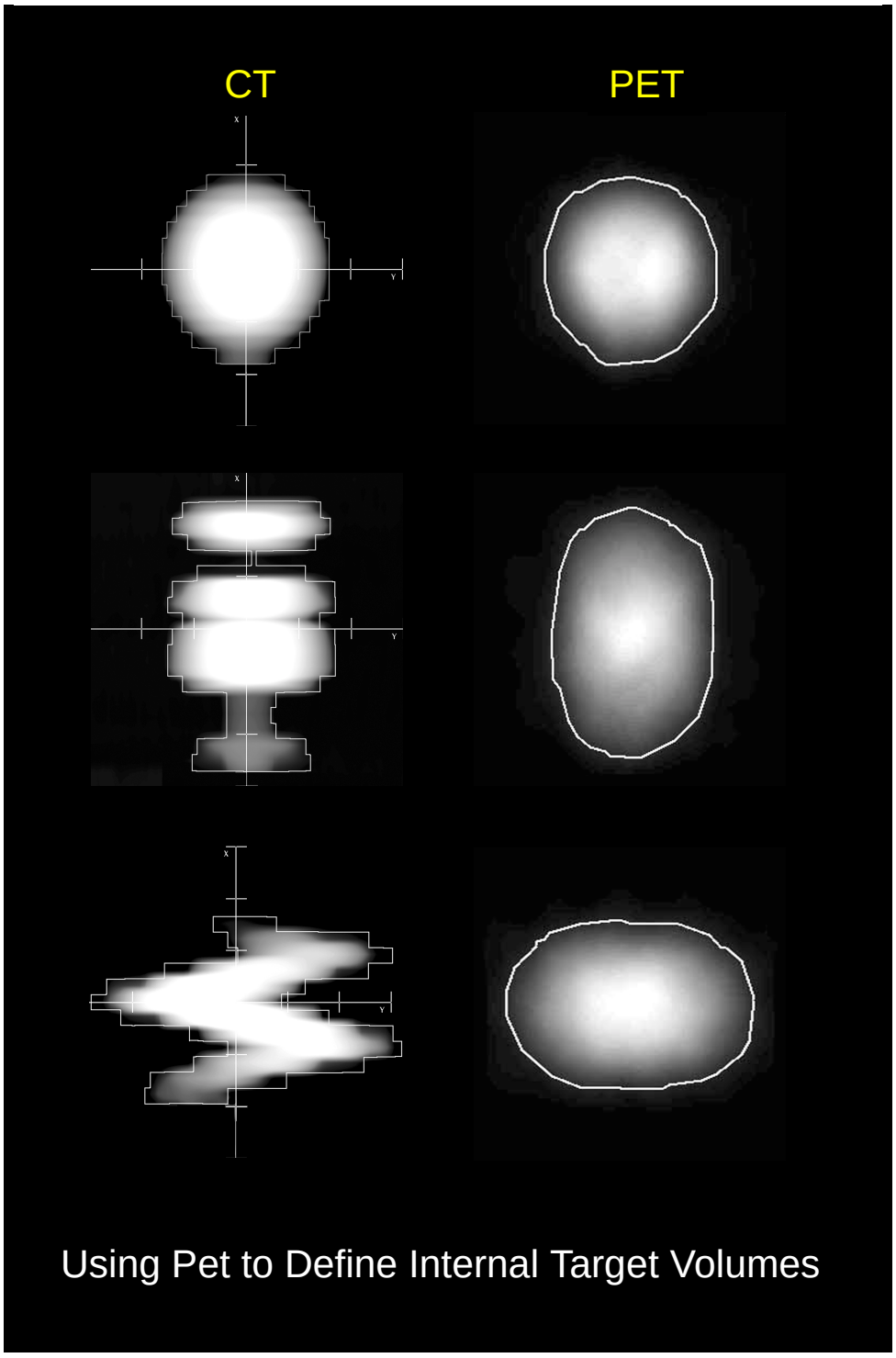
InterACTIONS

CANADIAN MEDICAL PHYSICS NEWSLETTER
Le BULLETIN CANADIEN de PHYSIQUE MÉDICALE



Using Pet to Define Internal Target Volumes

COMP OCPM

A publication of the Canadian Organization of Medical Physicists and the Canadian College of Physicists in Medicine

http://www.medphys.ca

ISSN 1488-6847

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

49 (3) juillet/July 2003

About our Cover

Spiral CT acquisitions "freeze" lung tumours at different locations depending upon breathing motion and x-ray scan plane and result in a distorted 3D representation of the tumour. Unfortunately, clinical practice assumes that the tumour imaged is representative of the 'static' GTV and the subsequent PTV is generated from this GTV using population-based margins. Knowledge of an individual tumour's motion would allow a tumour-specific internal target volume (ITV) to be generated, reducing the risk of geographic miss while minimizing normal tissue toxicity. PET imaging may provide time-averaged motion information for individual tumours. At Toronto-Sunnybrook Regional Cancer Centre, we are investigating the potential of PET to can predict an individualized Internal Target Volume (ITV).

Spheres filled with the positron emitter, 22Na, were imaged by spiral CT and hybrid-PET. Images were acquired with the spheres stationary and moving at physiological magnitudes in either cranio-caudal or medial-lateral directions. CT- and PET-imaged volumes were defined quantitatively using voxel values.

Marked distortions in shape and volume were seen in 3D representations generated from spiral CT images. In all cases, CT-imaged volumes were larger than that for the stationary sphere, but smaller than that for the true motion volume. PET images captured the expected shapes and on average, provided more accurate volumes. Conforming radiation beams to a moving target based on spiral CT is not ideal. PET imaging has the potential to provide an accurate and patient-specific ITV.

Images provided by Kathy Mah, Curtis Caldwell, Matt Skinner and C. Danjoux from the Toronto-Sunnybrook Regional Cancer Centre.

Figures reprinted with permission from International Journal of Radiation Oncology Biology Physics, 55(5): 1381-1393, 2003 "Can PET provide the 3D extent of tumour motion for individualized internal target volumes? A phantom study of the limitations of CT and the promise of PET", Caldwell CB, Mah K, Skinner M, Danjoux CE, Copyright 2003 Elsevier Inc.

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, article submissions can be made to:

Pat Cadman
Saskatoon Cancer Centre
20 Campus Drive
Saskatoon, Saskatchewan, S7N 4H4
Email: pcadman@scf.sk.ca
Phone: (306) 655-2696
Fax: (306) 655-2701

Members of the Editorial Board include:

Peter Munro: peter.munro@varian.com
Michael Kolios: mkolios@acs.ryerson.ca
Horacio Patrocinio horacio@medphys.mcgill.ca

Please submit stories in Publisher 98, Word 6.0, Word 97, or ASCII text format. Hardcopy submissions will be scanned to generate an electronic document for inclusion in the Newsletter. Images in Tiff format at 300 dpi resolution are preferred.

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Michael Henry
Email: henry@abellshenry.com
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COMP/CCPM Office

Ms. Barb Callaghan
COMP Secretariat
COMP/CCPM Office
PO Box 39059
Edmonton, AB, T5B 4T8
Telephone: (780) 488-4334
Facsimile: (780) 482-4425
compoffice@shaw.ca

Message from the COMP Chair:

For those of you who are considering getting involved in COMP, the positions of Chair-Elect and Secretary of COMP will be available in 2004. So, keep a close eye out for the Call for Nominations in January!

After many months of preparation, the COMP Annual Meeting was finally held last week in Edmonton. The organizing committee was very pleased with the participation, with over 170 registrants. The Local Arrangements Committee did a fabulous job in coordinating all of the activities during the meeting. Our thanks to Sherry Connors and her team. We greatly appreciate their commitment and the long hours they worked at organizing the meeting. I would also like to thank all the exhibitors and sponsors for participating in our meeting, who had only glowing comments about the exhibit area they were provided.

The highlight of the meeting was certainly the CCPM Symposium on Image-Guided and Adaptive Radiotherapy (IGAR). Our thanks to John Schreiner for organizing the symposium and to the speakers for providing us with an overview of the developments in this exciting field of radiation therapy. Quite fittingly, the meeting ended with a tour of the Centre for Biological Imaging and Adaptive Radiotherapy so we could get a glimpse of what IGAR is all about.

During the COMP AGM, some important issues were discussed. Firstly, the 2004 Budget was approved which targeted funds to development of a new website. Work will now begin on moving the management of our present website to our new web service provider, the AAPM. Although their bid was more expensive, their clear knowledge of our needs and glowing comments from another organization using their services made them the obvious choice. Our treasurer presented a proposal from our bank, which would allow us to do online payment of membership dues and registration fees for the Meeting. Discussions will continue and this service will hopefully be in place at the same time as our new website. During the AGM, Joseph Hayward from the Hamilton Regional Cancer Centre presented a motion to hold our 2005 Meeting at Brock University. With great enthusiasm, the motion was accepted. I guess the gentle bouquet of Chardonnays from the Niagara Wine Country was hard to resist!

Your Executive has also taken on a few new faces following our Edmonton Meeting. David Wilkins, Councillor for Professional Affairs, and Michael Kolios, Councillor for Communications, have both completed their terms and are stepping down. I would like to sincerely thank David and Michael for their tremendous work and participation during their time on the Executive. It was a pleasure to work with you. They will be replaced by Peter McGhee (Professional Affairs) and Darcy Mason (Communications). I welcome you both to the Executive and look forward to working with you during these exciting times

for our Organization. For those of you who are considering getting involved in COMP, the positions of Chair-Elect and Secretary of COMP will be available in 2004. So, keep a close eye out for the Call for Nominations in January!

Finally, since this is our Editor's last issue, I would like to thank Pat for his many contributions to InterACTIONS. Our newsletter has continued its improvements during his time at the helm. The quality and professionalism with which InterACTIONS is produced is a testament of Pat's dedication to the newsletter. Boyd McCurdy of Winnipeg will be replacing Pat as Editor. On behalf of the COMP Executive and your fellow Canadian medical physicists, thank you both for volunteering your time and experience to serve our Organization.

Message from the CCPM President:

First I must thank ***Pat Cadman*** for his excellent work as editor of InterACTIONS during the last three years. This publication serves to represent our profession and is frequently used to advertise and promote medical physics in Canada. Pat has done an outstanding job which clearly deserves recognition. I look forward to working with ***Boyd McCurdy*** and wish him well in his new role as Editor.

On behalf of the Board, I would like to express thanks to two Board members who have come to the end of their term of office. ***Ting-Yim Lee*** was our Chief Examiner for three years and ***Chris Thompson*** has been our Registrar for the last three years, a time period which has seen the workload increase with the introduction of recertification. Thanks to Ting and Chris for all their hard work and dedication to the College. ***Wayne Beckham*** will be taking on the role of Registrar.

I welcome ***Dick Drost*** and ***John Rowlands*** who were elected to the Board at the meeting in Edmonton and look forward to working with them over the next few years.

I extend a welcome to our newly elected Members: ***Ian Cameron, Gordon Chan, James Chow, Alexei Chvetsov, Frédéric Dubé, Ermias Gete, Elizabeth Henderson, Scott Karnas, Tomas Kron, Richard Lee, Cathy Neath, Chor-Yi Ng, James Robar, Giles Santyr, Stephen Sawchuck, Carrie-Lynne Swift*** and ***Christine Yu*** and Fellows: ***Tony Falco, Jeff Chen, Robert Corns, Wieslaw Wierzbicki, Tomas Kron*** and ***Paul Ravindran***. Congratulations to them all.

I also encourage all of our younger colleagues to consider applying for a ***Harold E. Johns Travel Award for Young Investigators***, details of which are described on the web page. The award this year goes to ***Karl Otto*** and we look forward to reading about his trip in a future edition of InterACTIONS.

At the Annual General Meeting of the CCPM in Edmonton in the first week in June, several changes to the Bylaws were approved which will result in two specific ***changes to the Membership examination process***. From next year, this examination will have a written and an oral component. The written examination will be similar to that of previous years except that Section II will be devoted to radiation safety. The material formerly addressed in Section II, ie, the assessment of practical experience, will now be addressed during the oral examination. All candidates who are successful in the written examination will be required to take an oral examination to complete their certification. This examination will be scheduled within a few months of the written examination to ensure that the time period required to complete certification is not extended beyond a few months. For next year, the cost of this extra examination will be borne by the CCPM. We will be bringing forward a proposal to increase the examination fee accordingly at next year's AGM. For future years the Board will be investigating the possibility of using video conferencing facilities for this oral examination. At all times, the Board is conscious of the requirement to minimise costs for the candidates. However the mandate taking priority is to maintain credibility and legitimacy of the certification.

Other changes approved to the Bylaws will hopefully add clarity to the Fellowship examination process. The modified Bylaws will be published in this year's membership directory which is scheduled for August.

As always, I encourage you all to contact any Board member if you have any questions, concerns or suggestions. We rely on input from our membership to guide the direction of the organisation.

Have a great summer,
Brenda Clark

All candidates who are successful in the written examination will be required to take an oral examination to complete their certification. This examination will be scheduled within a few months of the written examination to ensure that the time period required to complete certification is not extended beyond a few months.

Message from the Executive Director of COMP/CCPM

Congratulations to Sherry Connors and her Local Arrangements Committee for organizing an excellent AGM in Edmonton! Sherry brought her significant organizational experience to the task and recruited an excellent team to deliver a smooth, well-organized and fun event.

In between the sessions, exhibitor displays, and the night out on the Riverboat Queen, both COMP and CCPM made some significant decisions that will be implemented over the next year.

The CCPM Board followed up on the direction given at the last AGM in Montreal to further develop the process and options for adding an oral exam to the membership process.

Following a year long consultation with the membership, the Board presented a proposal for changing the bylaws to incorporate the oral exam. Members had the option of participating in the decision-making at the AGM or through a mail-in ballot. Twenty-nine members submitted mail-in ballots and an additional 53 participated in person at the meeting.

There was overwhelming support for the bylaw changes needed to include an oral component in the membership exam. The Board will now take the direction of the membership and deal with the logistical and operational issues of how and when the oral component will be delivered. This planning will take into account exam content, timing and location, and the potential for multiple sites or electronic participation. Watch InterACTIONS and the website over the next year for more details as they are finalized.

The Board will now take the direction of the membership and deal with the logistical and operational issues of how and when the oral component will be delivered

The COMP AGM dealt with the issue of website management. Over the past year, Michael Kolios and the Communications Committee have worked hard to develop options for managing our website. This has been a challenging task, especially in the context that our provider went out of business and the committee had some re-juggling in order to ensure continuous service.

Michael has been working with AAPM to see if they can provide the design and management services to provide website services. AAMP responded to our RFP that included requirements to provide the current services as well as some significant enhancements such as abstract management, membership renewals, e-commerce, and features for committee, board, executive, and membership use.

AAMP's staff, under contract to COMP,

handled the 2003 abstract process. From all accounts, the process was successful, with some minor glitches, which is to be expected under the circumstances.

There is a significant increase in cost associated with moving to an enhanced web service. At the AGM, the proposed budget that included this cost was approved by the membership.

Many thanks to Michael Kolios and the Communications Committee for their hard work on this process.

It was a pleasure to see everyone who attended the Edmonton meeting. I know that it was also a great opportunity for Barb, our Secretariat to meet the many members that she has worked virtually with over the past years.

We look forward to continued work with the Board and Executive. As always, your suggestions, comments and advice are welcome.

Michael Henry
Executive Director
COMP/CCPM

WESCAN 2003

By Brad Gill
BC Cancer Agency-Fraser Valley
Surrey, BC

This year, the annual WESCAN conference was held in Winnipeg Manitoba. For those readers not familiar with this conference (those of you East of Thunder Bay), WESCAN is a small, largely-informal gathering of the radiation therapy community working at centres between Victoria and Thunder Bay. The atmosphere is friendly, and provides a great venue for making new acquaintances, and learning about what a large part of the Canadian Radiation Therapy community is doing, both through technical presentations, and informal chats at any of the many social functions. The attendees and presenters are colleagues from Medical Physics, Electronics, Physics Assistants, Radiation Therapy, students, and support staff.

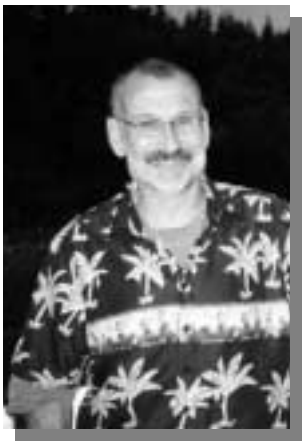
The first day of the conference featured presentations on a wide variety of subjects. Competition for the honour of being named best talk was fierce (especially in the RT category), but the audience came out the true winners at the end of the day. The day's winners were Leo Moriarity for the technical competition, Shelly MacDonald for the radiation therapist competition and Peter Potrebko won the student competition. At the end of the sessions, we all headed out to the newly-built centre for dinner and a tour of the facility. The centre was gorgeous, and will be a great comfort to the citizens of Manitoba, and a wonderful work environment for the staff for years to come. Sadly though, the assembled masses were crushed to learn that Canada's first Gamma Knife was still unassembled, and unavailable for viewing. The day ended with a lively round table discussion on treatment planning protocols for prostate cancer in western Canada. A tired, but still enthusiastic group then returned to the hotel for a little more socializing and some people-watching in the hotel lobby bar before retiring for the evening.

The second day of the conference was "Theme Day", and the topic was Prostate Cancer. The day's talks were all excellent, and ranged from biology and the basics of the disease, to economics and even ethics. The most unusual features of the day were Dr. Fowler's hotly-anticipated presentations on radiobiological considerations in prostate treatments. Due to circumstances beyond his control, Dr. Fowler was unable to attend the conference, but arrangements were made, and he was able to deliver his presentation remotely. Kudos go to the organizing committee and Dr. Fowler for their resourcefulness, as it would have been a great loss to all in attendance if the presentations were missed.

The banquet following Theme Day's presentations, was not-to-be-missed, and everyone was buzzing about what the mysterious after-dinner entertainment would be. The secret was soon revealed when Tyzan, a local hypnotist strode out onto the stage. A good number of volunteers answered the challenge (not including Your Humble Narrator), and the fun began in earnest. The show was a spectacular success, and the sore sides of the audience (from laughing) were soon forgotten as evening plans with new friends were made, and the attendees headed off in various directions.

A more-subdued crowd attended the Saturday morning session, and flight-home attrition was noticeable. The quality of presentations was kept up right until the end, and mercifully there was lots of juice and coffee available for the revelers from the previous evening. A big thanks goes out to and the organizers in Winnipeg for putting on such a first-rate meeting. I hope to see everyone next year in Victoria.

From the Editor



Well, as they say in the restaurant business, "I'm toast". This is my last issue as editor of InterACTIONS and where have the past three years gone? It really has been gratifying for me to see your appreciation for the newsletter and to see your submissions jump out from the page.

If InterACTIONS has been successful it is perhaps because of a simple recipe: let the newsletter reflect the membership. The editor's job is really just to gather submissions and lay them out (plus a lot of nagging). So if an issue has been particularly good it is because of the quality and mix of contributions. These have ranged from feisty, to factual, to downright hilarious. However, it would seem that the hardest material to get is perhaps the easiest to write—the brief communications of the kind that we cram into the coffee breaks at the COMP meeting until they shuffle us back to our formal sessions. I also hope that the younger members of the Canadian medical physics community will overcome their shyness and use InterACTIONS to speak out.

Finally, I would like to thank Peter Munro for providing me with a wonderful template that was so easy to jump right into and for his encouragement and continued help. Boyd McCurdy, from Winnipeg, will begin as the new editor for the next issue. I know Boyd and I am certain he will do an excellent job. I would ask that you help him out and help out YOUR newsletter by being a contributor. It is fun and rewarding to see your material in print.

Thanks again—it has been fun

Pat Cadman

2002 Professional Survey

By Richard Hooper
For the Professional Affairs Committee, COMP/CCPM

The format and data collection procedure for the 2002 COMP Professional Survey was similar to that used for the 2001 survey. Approximately 250 questionnaires were mailed out to all COMP full members currently residing in Canada, and 132 surveys were returned. All survey responses were handled in the strictest confidence so as to ensure the anonymity of respondents. Responses are summarized by geographic area and degree/certification in tables 1 and 2 below. Some surveys were incomplete and could not be used in all or parts of the remaining analysis.

Salaries

A summary of the salary data for Medical Physicists working in Canada is provided in table 3 below. Full statistics are provided for groups with at least 11 respondents. Only average and median results are provided for groups of 5 to 10 respondents. Data for groups of fewer than 5 could jeopardize confidentiality and thus are not listed.

A comparison of average and median salaries for 2001 and 2002 is provided in table 4. Only groups with at least 11 respondents in both years are included in this table. Figure 1 depicts percentile ranges of primary income from 1998 through 2002 for all Medical Physicists working in Canada, and also for subgroups by degree and certification.

Individuals were asked to specify by what percentage their salaries increased or decreased between 2001 and 2002. Of the respondents who had at least three years experience in medical physics, worked as full-time employees, and had not changed jobs in the past two years, 2% reported that their salary decreased, 14% reported that their income did not change, and 84% reported that their income increased. For all these individuals the average increase was 5.3% and the median increase 3.5%. For the 84% who reported an increase in income the average increase was 6.5% and the median increase 5.0%.

The regular hours of work specified in employment contracts for full-time employees was, on average, 37.4 hours per week.

Benefits

The average annual vacation allotment was 23.6 days per year.

Some employers allocate each of their physicists an annual personal travel and/or professional expense allowance, while other employers reimburse these expenses on an ad-hoc basis. Of all the respondents who listed themselves as full-time employees, 70% reported receiving reimbursement of at least $1,000 while 26% either did not answer the question or reported receiving no reimbursement. For those receiving at least $1,000 the average allocation was $3,074 and the median allocation $2,500.

Other benefits data is summarized in table 5.

Retirements

A new question on the survey this year asked COMP members to indicate if they expected to retire from the full-time practice of medical physics within the next 10 years, and if they did, to indicate the expected year of retirement. The results from this question are summarized in table 6.

REGION	Number of Responses
British Columbia (BC)	16
Alberta (AB)	17
Saskatchewan (SK)	5
Manitoba (MB)	12
Ontario (ON)	51
Quebec (PQ)	19
New Brunswick (NB)	4
Nova Scotia (NS) and Prince Edward Island (PE)	6
Newfoundland (NF)	1
Not Specified	1
Total	132

Table 1: COMP 2002 Professional Survey responses by geographical region.

Additional information regarding survey data, such as a detailed summary for a particular geographical region, is available upon request provided the data can be reported without jeopardizing confidentiality. Requests for further information or comments regarding the survey should be directed to Richard Hooper (rick.hooper@cancerboard.ab.ca).

	Certification				
Degree	None	CCPM(M)	CCPM(F)	Other	Total
Bachelors	4	0	0	0	4
Masters	14	13	12	5	44
Doctorate	27	17	32	7	83
Other	1	0	0	0	1
Total	46	30	44	12	132

Table 2: COMP 2002 Professional Survey responses by degree and certification

1999 Professional Survey cont.

			PRIMARY INCOME				TOTAL INCOME			
		Ave Yrs	Average	Percentiles			Average	Percentiles		
	Number	Exper	Income	20th	Median	80th	Income	20th	Median	80th
OVERALL (Canada)	127	13.5	96.4	73.8	96.0	120.1	99.3	74.9	100.0	123.0
PROVINCE										
BC + AB + SK + MB	49	12.2	98.0	71.8	104.0	119.5	99.1	71.8	105.0	120.0
ON	48	15.2	103.1	77.0	109.5	125.0	107.8	82.0	111.0	132.0
PQ	18	14.1	78.4	72.6	79.0	87.9	79.9	72.9	79.5	88.9
NB + NS + PE + NF	11	10.8	88.6	59.6	92.0	115.1	94.3	64.0	92.0	115.1
EMPLOYER										
General Hospital	32	14.2	89.7	73.8	86.5	107.2	96.4	73.9	88.5	120.8
Cancer Institute	77	12.5	100.8	76.4	107.0	122.1	101.9	76.4	108.9	123.0
University or Government	15	15.2	88.9	64.4	76.0	117.5	93.3	71.2	82.0	128.5
FUNCTIONS (>= 50%)										
Clinical Service	77	10.8	93.7	76.0	94.0	115.0	95.6	76.0	96.2	117.0
Teaching + R&D	33	14.6	94.1	70.0	89.0	125.0	100.5	70.6	100.0	131.8
Administration	18	21.0	111.4	75.7	128.8	134.9	115.1	75.7	130.5	140.4
SPECIALTIES (>= 50%)										
RT	93	12.5	98.7	76.0	100.0	120.9	99.8	76.0	104.0	120.9
DR + NM + MR	25	16.7	95.0	75.0	90.0	121.0	102.9	75.0	104.0	129.0
RP	4									
YEARS EXPERIENCE										
< 5	23	3.0	67.6	55.1	70.0	79.8	69.1	55.1	70.0	79.9
5 - 9.9	26	6.9	86.7	63.5	86.0	109.8	88.9	64.0	89.0	114.9
10 - 14.9	27	11.8	102.0	89.9	105.0	112.4	102.8	89.9	105.0	112.4
15 - 19.9	18	16.7	109.5	86.1	116.5	131.6	111.2	88.7	116.5	132.4
20 - 24.9	11	21.5	118.1	102.7	118.2	130.6	131.7	117.7	128.0	143.4
25+	22	28.0	109.6	79.5	112.5	135.5	113.0	79.5	118.2	137.5
DEGREE/CERTIFICATION										
Bachelors/all	3									
Masters/all	41	13.7	85.3	66.4	85.0	105.8	86.3	66.4	87.0	110.6
Masters/no cert.	13	7.8	67.0	50.5	65.0	86.4	67.6	50.5	65.0	88.8
Masters/CCPM(M)	11	11.5	82.4	69.4	78.5	97.7	82.4	69.4	78.5	97.7
Masters/CCPM(F)	12	19.3	105.5	88.6	104.2	123.5	106.8	88.7	105.0	123.5
Masters/CCPM(M or F)	23	15.6	94.5	76.2	92.0	114.7	95.2	76.2	94.0	114.7
Masters/other cert.	5	20.0	91.0		87.1		94.2		87.1	
Doctorate/all	82	13.5	103.2	77.8	107.5	125.0	107.3	79.9	110.0	130.2
Doctorate/no cert.	27	8.7	87.8	57.9	90.0	118.2	90.0	57.9	90.0	118.2
Doctorate/CCPM(M)	17	9.5	98.9	84.1	105.0	114.3	102.8	89.5	107.0	117.1
Doctorate/CCPM(F)	31	19.7	117.9	105.0	120.0	133.9	124.4	106.4	124.0	137.9
Doctorate/CCPM(M or F)	48	16.1	111.2	95.1	110.0	125.9	116.8	101.7	117.5	132.0
Doctorate/other cert.	7	14.0	108.4		106.0		108.5		106.0	
DEGREE/YEARS EXPER.										
Masters/< 10	16	4.9	71.1	55.0	70.0	87.7	72.6	55.0	70.0	89.0
Masters/10+	25	19.3	94.5	78.0	90.0	115.0	95.1	78.0	92.0	115.0
Doctorate/< 5	16	3.1	70.1	54.2	75.0	90.0	72.3	54.2	75.2	90.0
Doctorate/5 - 9.9	15	7.2	95.7	71.0	96.0	119.0	97.8	77.0	100.0	119.0
Doctorate/10 - 19.9	29	13.7	113.4	105.0	114.0	127.8	114.6	105.0	114.0	128.1
Doctorate/20+	22	25.2	119.2	104.1	120.7	140.0	129.4	109.6	129.0	145.6

Table 3: Salary data for Medical Physicists working in Canada. Salaries are in thousands of dollars. In order to ensure confidentiality, data are not listed for subgroups of less than 5, and only average and median values are reported for groups of 5 to 10 respondents.

1999 Professional Survey cont.

	PRIMARY INCOME				CHANGE IN PRIMARY INCOME (% of 2001 Income)	
	2001		2002			
	Average	Median	Average	Median	Average	Median
OVERALL (Canada)	92.3	92.0	96.4	96.0	4.4%	4.3%
PROVINCE						
BC + AB + SK + MB	96.2	100.0	98.0	104.0	1.9%	4.0%
ON	95.9	100.5	103.1	109.5	7.5%	9.0%
PQ	73.3	74.5	78.4	79.0	7.0%	6.0%
EMPLOYER						
General Hospital	83.1	79.0	89.7	86.5	7.9%	9.5%
Cancer Institute	97.6	103.0	100.8	107.0	3.3%	3.9%
University or Government	86.4	87.5	88.9	76.0	2.9%	-13.1%
FUNCTIONS (>= 50%)						
Clinical Service	89.1	92.0	93.7	94.0	5.2%	2.2%
Teaching + R&D	91.0	90.0	94.1	89.0	3.4%	-1.1%
Administration	114.6	119.8	111.4	128.8	-2.8%	7.5%
SPECIALTIES (>= 50%)						
RT	92.3	92.0	98.7	100.0	6.9%	8.7%
DR + NM + MR	90.3	91.1	95.0	90.0	5.2%	-1.2%
YEARS EXPERIENCE						
< 5	64.6	65.5	67.6	70.0	4.6%	6.9%
5 - 9.9	87.5	91.0	86.7	86.0	-0.9%	-5.5%
10 - 14.9	96.8	100.0	102.0	105.0	5.4%	5.0%
15 - 19.9	106.4	112.5	109.5	116.5	2.9%	3.6%
20 - 24.9	109.0	116.6	118.1	118.2	8.3%	1.4%
25+	111.6	110.0	109.6	112.5	-1.8%	2.3%
DEGREE/CERTIFICATION						
Masters/all	84.2	80.4	85.3	85.0	1.3%	5.7%
Masters/no cert.	66.0	61.7	67.0	65.0	1.5%	5.3%
Masters/CCPM(M or F)	101.8	105.0	94.5	92.0	-7.2%	-12.4%
Doctorate/all	97.0	100.0	103.2	107.5	6.4%	7.5%
Doctorate/no cert.	82.3	82.2	87.8	90.0	6.7%	9.5%
Doctorate/CCPM(M or F)	107.3	107.0	111.2	110.0	3.6%	2.8%
DEGREE/YEARS EXPER.						
Masters/< 10	64.2	61.7	71.1	70.0	10.7%	13.5%
Masters/10+	99.4	105.0	94.5	90.0	-4.9%	-14.3%
Doctorate/< 5	65.2	68.4	70.1	75.0	7.5%	9.6%
Doctorate/5 - 9.9	95.6	98.0	95.7	96.0	0.1%	-2.0%
Doctorate/10 - 19.9	104.6	107.0	113.4	114.0	8.4%	6.5%
Doctorate/20+	114.3	115.1	119.2	120.7	4.3%	4.9%

Table 4: Comparison of average and median values for primary income in 2001 and 2002. Income values are in thousands of dollars, and change in income is specified as percentage of primary income in 2001. Only groups with at least 11 respondents in both years are included in this table.

1999 Professional Survey cont.

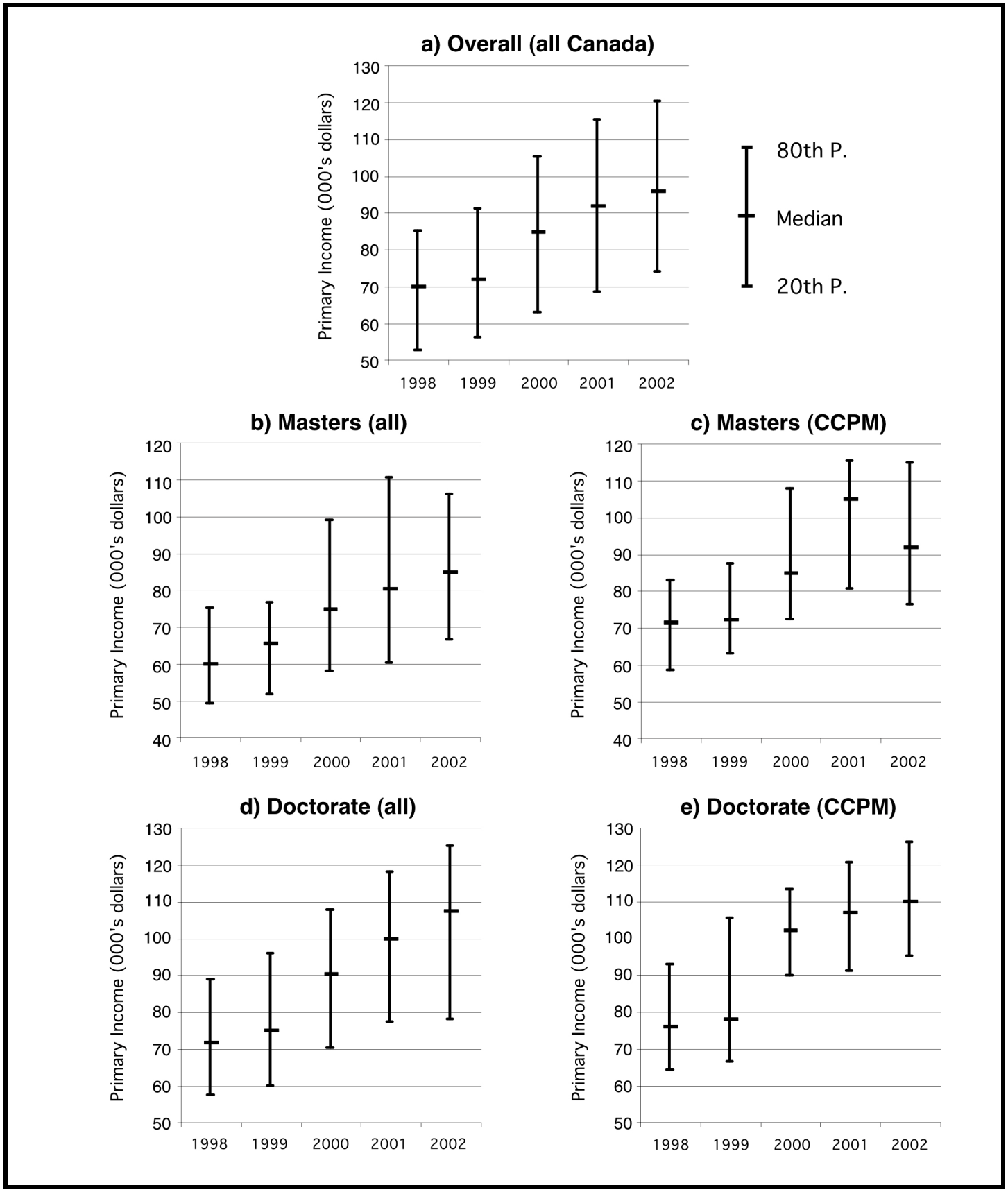


Figure 1: Percentile ranges of primary income from 1998 through 2002 for all Medical Physicists living in Canada, and for subgroups by degree and certification. CCPM designation includes both members and fellows.

1999 Professional Survey cont.

Benefit	Yes (%)	No (%)	Unknown or N/A (%)
Basic and/or supplementary medical coverage	86	7	7
Dental coverage	82	9	8
Term life insurance	73	13	14
Disability insurance	77	13	10
Retirement pension plan (exclusive of CPP or QPP)	89	4	7
Sabbatical leave	28	47	25
Tuition benefits (self)	16	59	25
Tuition benefits (dependent)	7	70	23

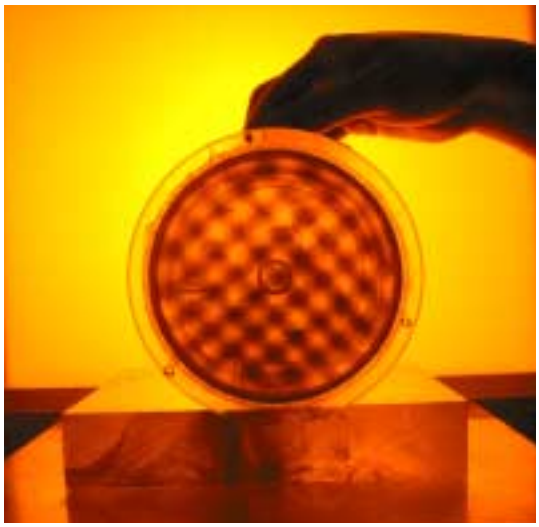
Table 5: Percentage of full-time employees who received at least 50% funding from their employer for the listed benefits. Due to roundoff error, totals do not necessarily add up to 100%.

Category	Count	%
Do not expect to retire within the next 10 years	84	73.0
Do expect to retire within the next 10 years		
2003 through 2007	13	11.3
2008 through 2012	15	13.0
Yes, but no year specified	3	2.6

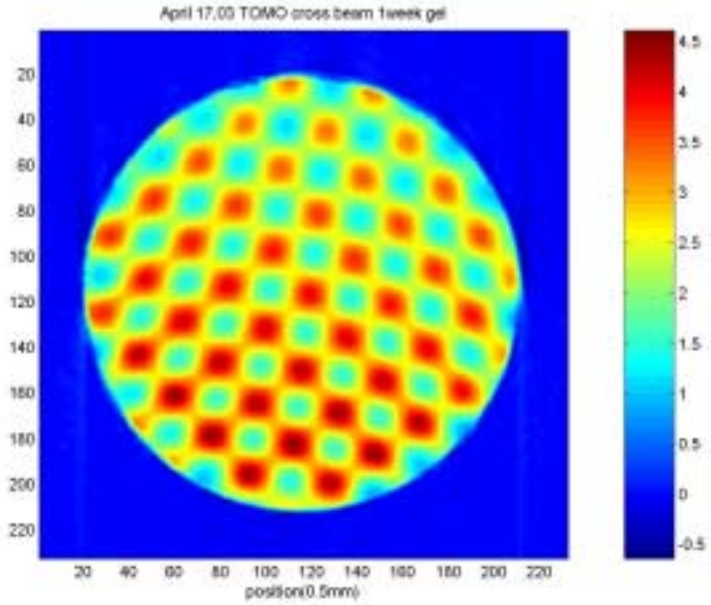
Table 6: Expected retirements in medical physics over the next 10 years. Only individuals who answered the survey question and were either full-time employees or consultants are included in this table.

Tomotherapy Gel Images from London

By T. Kron, K. Jordan and J. Battista, London Regional Cancer Centre, University of Western Ontario
London, Ontario



The gel was irradiated with two fanbeams of 5x40cm^2 from a helical tomotherapy unit. In the fanbeam every second leaf of a 64 leaf MLC was closed. The beam is a 6MV X-ray beam with a source to center of phantom distance of 85cm. The gel phantom was exposed twice with two static beams 90degree apart. In the pictures these would have been two 'posterior oblique' incidence angles. One can see both the divergence of the beams and the dose fall off in the picture.



The gel contained : 4% gelatin, 0.3mM ferrous ammonium sulphate, 0.05mM xylenol orange and 50mM sulfuric acid. The photograph was a transmission image through the gel recorded 15 minutes post irradiation with a low pressure sodium light. Optical CT scan: 594nm He-Ne laser, beam diameter <1mm, 360 projections, 0.5 degree steps, effective scan time: 5 min per slice, scanning initiated 30 minutes post irradiation. Reconstruction: Matlab, data spatially averaged to 0.5mm per point and reconstructed with filtered back projection. Calibration: a gel sample from the same batch was irradiated with a 12 MeV beam to 3 Gray at depth of maximum dose and scanned with optical CT, the dose response from the calibration gel provided the linear scaling factor for the TOMO therapy gel (note doses> 3 Gray are extrapolations).

The BioMedical Imaging Therapy Synchrotron Program at the Canadian Light Source Inc.

By C.R. Christensen[1], M. Renier[2], L.D. Chapman[3]
[1]BMIT Program, [2]European Synchrotron Radiation Facility, [3]Illinois Institute of Technology

The Canadian Light Source (CLS) is a world class research facility centered on the use of highly intense synchrotron light for a wide range of fundamental and applied research areas. The CLS is located on the University of Saskatchewan campus in Saskatoon and is the largest science project in Canada in the last 30 years. It is Canada's first synchrotron (www.lightsource.ca) and is being built through a Canada Foundation for Innovation national facility grant. Currently 18 Canadian universities are partnering with the University of Saskatchewan in the construction of the CLS. The CLS will open in early 2004 with six operating beamlines. When at capacity, there will be an estimated 30 operating beamlines at the CLS.

The synchrotron will provide unprecedented opportunities for a many areas of biological and medical research. Recent discoveries at other synchrotron facilities in which synchrotron radiation has been used to develop new sources of soft tissue contrast that far exceed that possible using conventional technology, the ability to deliver highly targeted radiation to tumors, and many other examples have lead a team of researchers to propose that a dedicated facility for bio-medical research be developed at the CLS. The BioMedical Imaging Therapy (BMIT) Beamline is proposed as one of the next seven beamlines to be built at the CLS during the next phase of construction. The BMIT Beamline will be built to conduct experimental radiation therapy techniques (photon activated therapy, microbeam radiation therapy and tomotherapy) as well as imaging techniques (dual energy k-edge subtraction, diffraction enhanced imaging, computed tomography, fluorescence imaging and combinations of these methods). For more detailed information on these techniques please see our website at: www.lightsource.ca/bioimaging.

The Canadian Light Source Inc. is located at the North end of the University of Saskatchewan campus

CLS *(Continued from page 100)*

Beam and detection requirements to conduct these techniques are summarized below:

Technique	Beam Width	Resolution	Energy Range
KES	200 mm	300 μm	20 – 60 keV
	20 mm	50 μm	20 – 60 keV
DEI	150 mm	50 μm	20 – 90 keV
	15 mm	10 μm	20 – 90 keV
CT	150 mm	50 μm	20 – 90 keV
	15 mm	10 μm	20 – 90 keV
μ-CT	Should not be performed on this beamline		
CT Therapy	Uses the KES configuration and specification		20 – 60 keV
MRT	Needs high flux, high energy, minimal vibration amplitude and accurate positioning (5 μm peak-to-peak).		80 – 120 keV

Summary of techniques with required beam size, resolution, and spectral range required of the source. The sensitivity requirement for all techniques (both contrast agent and refraction density contrast is approximately 1mg/cm^3.

The CLS has to provide the photon beam for two different classes of experiments on the same beamline:

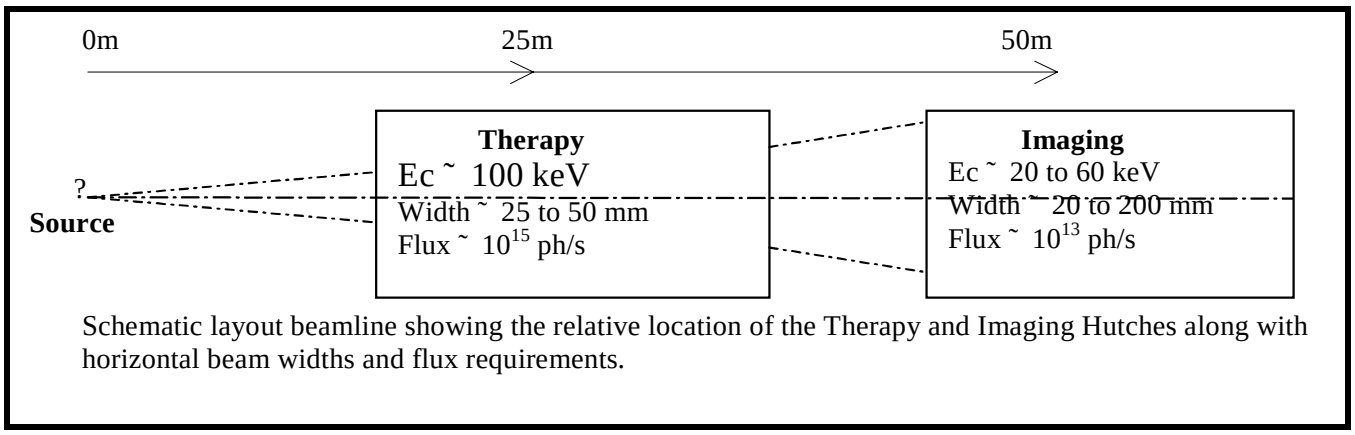
a- Imaging and CT-therapy: the beam energy spectrum must range from 20 to 90 keV; its maximum width must be 200 mm with an intensity profile not dropping more than 20% of the maximum central intensity in the two sides; and the total flux in the monochromatic beams must be at least 10^{13} ph/s.

b- Therapy: the beam energy spectrum must range from 80 to 120 keV; its width must reach 50 mm; and the flux in this energy range must reach 10^{15} ph/s in order to achieve a dose rate of around 300 to 500 Gy/s in the target.

The electron energy in the storage ring is fixed at 2.9 GeV for a stored current which will rapidly reach 200 to 250 mA in the next year and which will be increased to 500 mA after several years of operation. Given the space limitation in the Experimental Hall the following configuration is proposed for the experimental hutches.

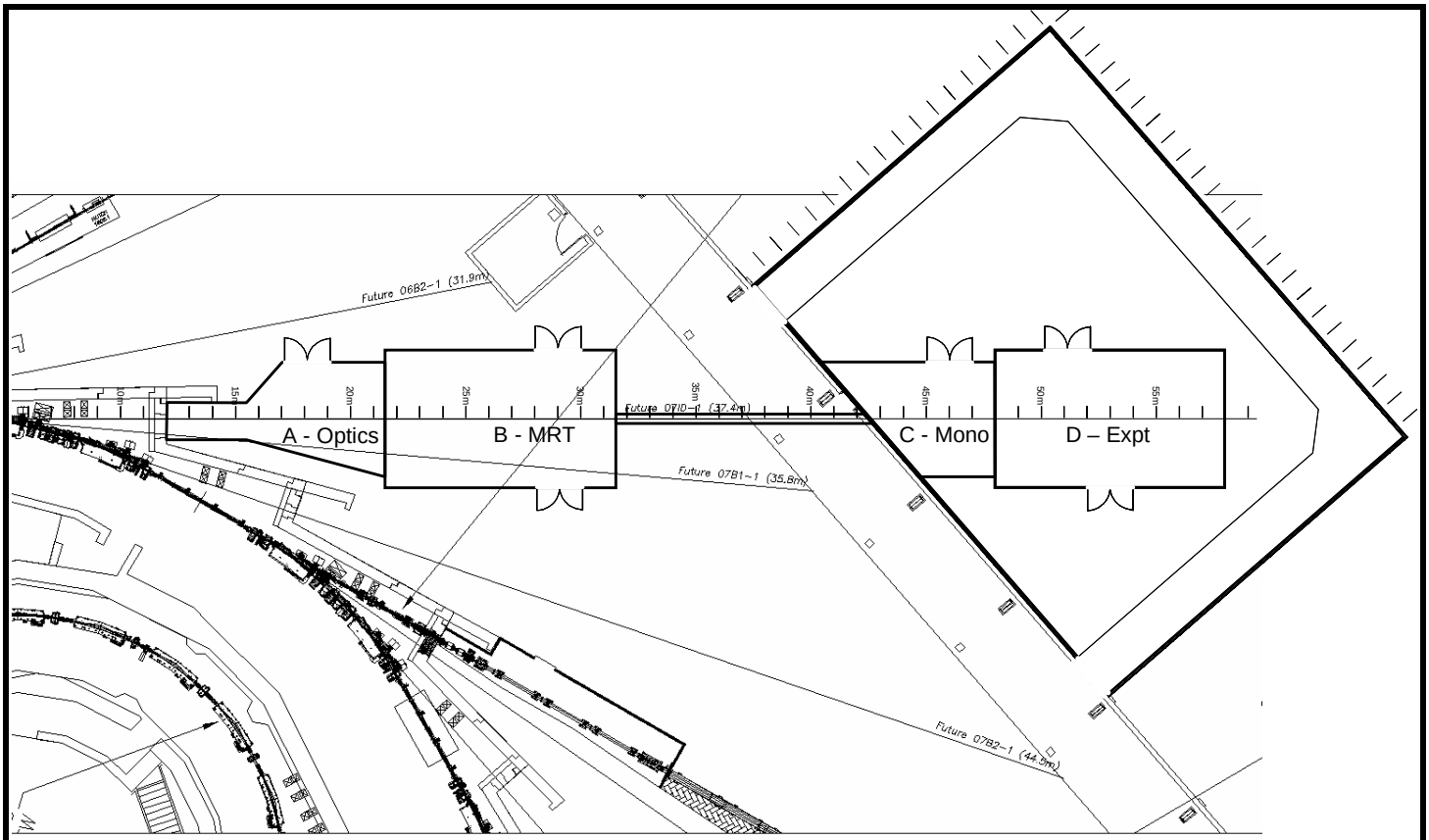
The source has to provide a symmetrical beam fan of 2 mrad (4 mrad total) minimum in order to achieve a 200 mm width in the imaging hutch and the Ec must be in the 20 to 30 keV range. The source therefore has to have a K above 20 and must be a Superconducting Wiggler. The parameters for a single operating condition device that satisfies the conditions for both imaging and therapy are incompatible for the CLS storage ring, therefore it is proposed that either two insertion devices or a single device with two operating fields is designed for the BMIT facility. Perturbations of a proposed variable field SC wiggler on the SR current has been simulated and found to be within acceptable limits.

(Continued on page 102)



Schematic layout beamline showing the relative location of the Therapy and Imaging Hutches along with horizontal beam widths and flux requirements.

CLS *(Continued from page 101)*



Proposed layout of the BioMedical Beamline facility comprised of a white beam optics hutch (A), a radiation therapy hutch (B), a dual energy monochromator and CT monochromator hutch (C), and imaging hutch (D).

The hutch layout is comprised of two hutches in the current Experimental Hall and two hutches in an extension building to be built on the side of the main building.

- The first hutch, A, (upstream) is the optics hutch. It will host the primary slits and filters as main components.
- The second hutch, B, is intended for MRT applications. It will include the multi-slit collimator and the sample (human or animal) positioning device.
- The third hutch, C, is the monochromators hutch which will include the KES and CT monochromators, and finally:
- The fourth hutch, D, will be the experimental hutch for the human, animal or inert samples on their positioning systems, the detectors and the DEI system.

The three first hutches must be built to accommodate the white beam spectrum and intensity. The fourth hutch is a monochromatic beam hutch, but with energies up to 90 keV. The thickness of the walls will be of the order of 20 mm of lead (to be confirmed). The extension building (~834 m^2) will include a deviation pathway around the facility, the animal preparation, biology facilities and the control room.

The BMIT beamline is at the proposal stage; a national Canada Foundation for Innovation infrastructure grant for this facility will be submitted during the next granting period. If the grant application is successful, the facility is projected to open in 2008. The flexibility of the BMIT facility design and the availability of monochromatic, highly collimated, intense, polarized light offer an exciting new world-class experimental facility for Canadian biological and medical researchers. To become involved in the development of the BMIT project or to learn more about synchrotron-based biomedical imaging and therapy research, visit our website at www.lightsource.ca/bioimaging.

And the Award goes to ...

We had two excellent competitions at the 2003 COMP Annual Scientific meeting in Edmonton. The winners of the J.R. Cunningham Young Investigator's Symposium were:

1st Place: Stephen Steciw, Brad Warkentin, Satyapal Rathee and Gino Fallone, "A Monte Carlo Based Method for Accurate Measurement of Fluences Using the aS500 EPID".

2rd Place: Mohammad Sabati *, M. Louis Lauzon, Nirupama Nagarajappa and Richard Frayne, "Interactive Large Field-of-View Real-time Peripheral Magnetic Resonance Angiography".

3nd Place: Jeremy Hoisak, Katharina Sixel, Romeo Tirona, Jean-Philippe Pignol and Patrick Cheung, " A Methodology for the Assessment of Surrogate Indicators of Lung Tumour Motion".

The Poster Awards are given to the two best posters presented at the meeting. This year's winners are:

Nada Tomic, Christopher J. Thompson, and Francois Cayouette, "Investigation of the origin of the "Block Effect" which blurs the images obtained with commercial PET scanners".

Greg Salomons *, Andrew Kerr, George Hajdok, Myron Rogers, Christine Dyck, L. John Schreiner, "Further Progress in Cobalt-Tomotherapy at KRCC".

Honorable Mention poster competition:

William Y. Song and Peter Dunscombe, "The trade-off between margins and prescribed doses using the Equivalent Uniform Dose: a phantom study".

Nirupama Nagarajappa and Richard Frayne, "Endovascular MR: Measurements of Relaxation Parameters for Visualization of Contrast-enhanced Catheters at 3.0 T".

YIS winners: Stephen Steciw, Mohammad Sabati and Jeremy Hoisak with John Schreiner

Nada Tomic and John Schreiner

Greg Salomons

Sylvia Fedoruk Award—2002

In 1986, the Saskatchewan Cancer Agency established the Sylvia Fedoruk Prize in Medical Physics to honor Sylvia Fedoruk for her 35 years of dedicated and distinguished service to Saskatchewan's cancer program as a Medical Physicist.

This award is presented for the best paper on a subject falling within the field of medical physics, relating to work carried out wholly or primarily within a Canadian institution and published during the past calendar year. This is the sixteenth year the prize has been awarded.

Winner:

"A framework for noise-power spectrum analysis of multidimensional images"
Med. Phys. 29 (11), pp 2655-2671 (2002)
J.H. Siewerdsen, I.A. Cunningham and D.A. Jaffray,

Honorable Mentions:

"Material-specific analysis using coherent-scatter imaging"
Med. Phys. 29 (8), pp. 1651-1660 (2002)
D.L. Batchelar and I.A. Cunningham

"On the de-noising of Monte Carlo calculated dose distributions"
Phys. Med. Biol. 47, pp. 3087-3103 (2002)
I. Kawrakow

A note about the selection process:

Papers are grouped into six categories: radiation therapy; dosimetry and Monte Carlo; MRI; CT; ultrasound; and various subjects. Each category is evaluated by an expert and the best paper in each category is identified. The six winners (one from each category) were sent back to all committee members who ranked the whole group to the best of their ability.

!!! Congratulations !!!

2003 COMP/CCPM Annual Meeting
Edmonton, Alberta

By Marc MacKenzie
Cross Cancer Institute
Edmonton, AB

This year's COMP and CCPM AGM and scientific sessions were held in the beautiful city of Edmonton, Alberta, from June 5th to June 7th. The theme for this year's meeting was "The Move to Image-Guided and Adaptive Radiation Therapy", and this was certainly reflected in the presentations. For those like me with shortened attention spans, let me give you the "Reader's Digest" condensed version: the dominant themes for the symposium and many sessions seemed to be tomotherapy and radiobiology, as well as numerous talks and posters on other advanced treatment, imaging and verification techniques. Advances in the state of the art mean we've got increasingly complex imaging and delivery tools at our disposal and we're on the cusp of formulating biological models to use these tools better. There was also a banquet and a tour. For those of you with longer attention spans, read on.

Temperatures in Edmonton started out a little unseasonably cold for this time of year, but this did little to cool the enthusiasm of the opening CCPM symposium. John Schriener ably served as the moderator for this opening session of the conference. For the opening talk of the symposium we were fortunate to have Dr. Jack Cunningham, someone who requires no introduction and is currently an adjunct in the medical physics department in Edmonton. Dr. Cunningham gave us a historical overview of the advances in radiation oncology, and Dr. Raul Urtasun, emeritus radiation oncologist of the Cross Cancer Institute, followed with a discussion on the improved outcomes that accompanied these advances. Dr. Gino Fallone, director of the medical physics department of the Cross Cancer Institute, gave us an overview of the convergence imaging and therapy in image guided adaptive radiation therapy. Thomas Kron of the London Regional Cancer Centre gave us an interesting look at some of the issues that ability to deliver highly conformal fields raises, namely our ability to plan and deliver the treatment as accurately as is desired. Finally, Dr. Rufus Scrimger, a radiation oncolgist at the Cross Cancer Institute (and son of medical physicist John Scrimger, former director of the Cross and Vancouver Island centres), discussed how improved delivery and radiobiological modelling can be implemented in clinical trials and used for testing new fractionation schemes.

A panel discussion followed this symposium, and it was animated, with lively exchanges between the panellists and the audience, as well as between the panel members themselves.

The first day also included, in addition to the symposium, a scientific session, a business meeting and posters. The session was chaired by Dr. Gino Fallone, and focused on image guided radiotherapy and tomotherapy, and although half the talks were on tomotherapy specifically, there were also presentations on modelling EPID response, a new PET/CT fiducial, a new MVCT detector and daily prostate imaging. The CCPM business meeting was interesting, with the contentious question from last year of orals for CCPM membership easily passing, amidst some continuing dissent. In the evening, a wine and cheese event accompanied the poster sessions. The posters were well received, with 16 on display, covering a wide variety of therapy and imaging topics, as well as a submission from the Canadian Light Source group.

Friday had three sessions, one focusing on radiotherapy, another on diagnostic imaging, with the Young Investigator's Symposium in between. The talks in the J. R. Cunningham Young Investigator's Symposium (YIS) were of excellent quality, and it was a real honour to have Dr. Cunningham himself preside over the session. The afternoon ended with renowned University of Alberta biophysicist Jack Tuszynski presenting the CAP lecture on the use of fractal to model the non linear pharmokinetics of anticancer drugs.

The Friday banquet and awards ceremony was held aboard the Edmonton Queen riverboat. The riverboat cruise was pleasant and memorable, providing a great view of the river valley. The meal was outstanding and musical entertainment provided by the String Bean Quartet, one of whom happens to be the daughter of Rick Hooper of the Cross Cancer Institute.

(Continued on page 106)

COMP/CCPM Annual Meeting *(Continued from page 105)*

John Schreiner helped out as the presenter for the awards portion of the banquet. The awards must have been a difficult choice given the high quality of the YIS presentations and posters, but the top YIS presentation honours went to Dr. Steven Steciw for his talk entitled "A Monte Carlo Based Method for Accurate Measurement of Fluences Using the aS500 EPID"; runners up were "A Methodology for the Assessment of Surrogate Indicators of Lung Tumour Motion" presented by J. Hoisak from Toronto and "Interactive Large Field-of-View Real-time Peripheral Magnetic Resonance Angiography" presented by M. Sabati from Calgary. The poster awards went to "Investigation of the origin of the "Block Effect" which blurs the images obtained with commercial PET scanners" by Nada Tomic of Montreal and "Further Progress in Cobalt-Tomotherapy at KRCC" by G. Salomons, which was presented with some self consciousness by our MC for the evening, John Schreiner (the PI for the work in question).

The Saturday sessions focused on radiobiology, diagnostic imaging and treatment planning, with a tour of the Cross Cancer Institute and CBIAR (Centre for Biological Imaging and Adaptive Radiotherapy) following in the late afternoon. The tour was well attended and well received, with people getting a chance to see the PET scanner, the new cyclotron and helical tomotherapy unit, as well as future site of our new MR suite. The tomotherapy demonstration featured an example radiation delivery on a clear phantom containing scintillating fluid viewed via video camera, making for a fairly impressive demonstration.

In all, it was a well attended and well organised conference, with very interesting and high quality presentations. Many thanks are due to the organizers for a job well done, and thanks to all the delegates for attending.

Next year's conference is being held in lovely Winnipeg, and I know we're all looking forward to yet another outstanding program in 2004.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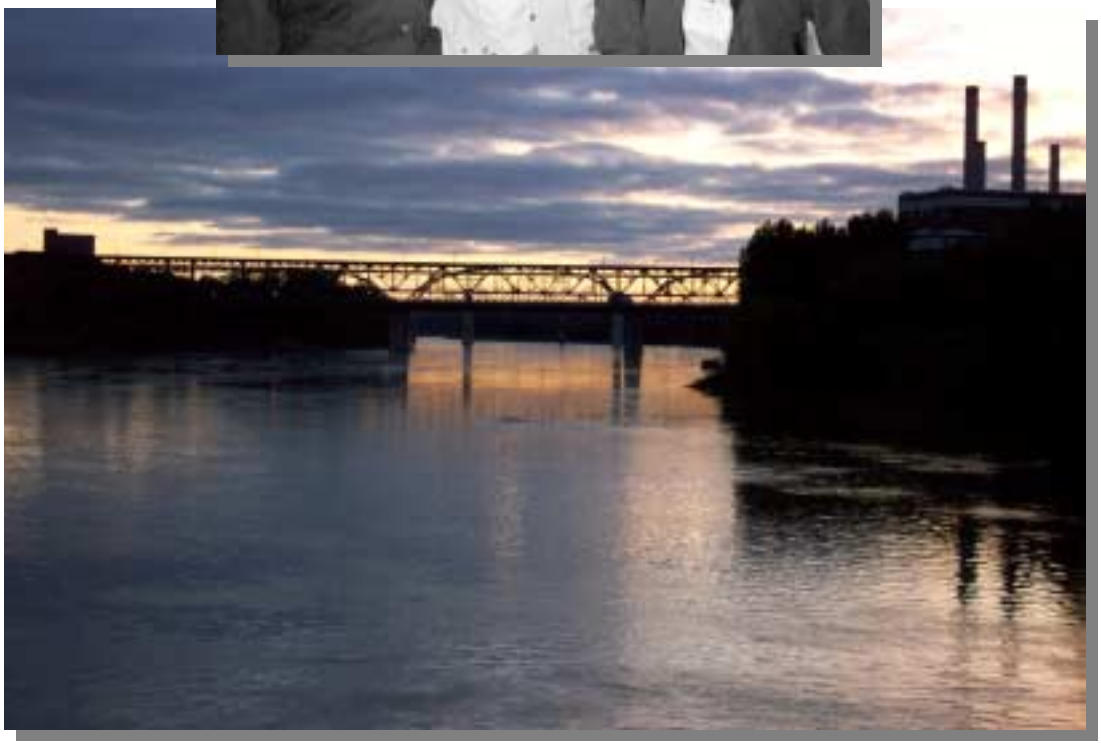

CORPORATE MEMBERS

Best Medical International
7643 Fullerton Road
Springfield VA 22153 USA
Phone: (703) 451-2378
Fax: (703) 451-8421
website: www.bestmedical.com
Contact: Mr. Krishnan Suthanthiran
krish@bestmedical.com

CNMC Company Inc.
2817-B Lebanon Pike
Nashville TN 37214 USA
Phone: (615) 391-3076
Fax: (615) 885-0285
website: www.cnmcco.com
Contact: Mr. Ferd Pusl
CNMCsales@earthlink.net

Computerized Medical Systems Inc
Ste 100, 1145 Corporate Lake Dr
St. Louis MO 63132 USA
Phone: (314) 812-4308
Fax: (314) 993-0075
website: www.cms-stl.com
Contact: Mr. Tim Rooney
tim.rooney@cmsrtp.com

Donaldson Marphil
3465 Cote des Neiges #602
Montréal QC H3H 1T7 Canada
Phone: 1-888-933-0383
Fax: (514) 931-5554
website: www.donaldsonmarphil.com
Contact: M. Michel Donaldson
donaldson.marphil@qc.aibn.com

Elekta Canada
114 Gartshore Drive
Whitby ON L1P 1N8 Canada
Phone: (514) 298-0744
Fax:
website: www.elekta.com
Contact: Mr. Jacques Verhees
jacques.verhees@elekta.com

Harpell Associates Inc.
1272 Speers Rd, Unit 2
Oakville ON L6L 2X4 Canada
Phone: (905) 825-2588
Fax: (905) 825-0234
website: www.harpellassociates.com
Contact: Mr. David Harpell, P.Eng.
David@harpellassociates.com

Hilferdine Scientific Inc.
85 Denzil Doyle Court
Kanata ON K2M 2G8 Canada
Phone: (613) 591-5220
Fax: (613) 591-0713
website: www3.sympatico.ca/hilferdine
Contact: Mr. Sean Eckford
hilferdine@sympatico.ca

Kodak Canada Inc.
3500 Eglinton Ave W
Toronto ON M6M 1V3 Canada
Phone: (416) 766-8233
Fax: (416) 760-4487
website: www.kodak.ca
Contact: Ms. Jamie-Ellen MacDonald
jamie.macdonald@kodak.com

Landauer, Inc.
2 Science Road
Glenwood IL 60425 USA
Phone: (708) 755-7000
Fax: (708) 755-7016
website: www.landauerinc.com
Contact: Mr. William Megale
sales@landauerinc.com

LAP of America
1755 Avenida Del Sol
Boca Raton FL 33432 USA
Phone: (561) 416-9250
Fax: (561) 416-9263
website: www.lap-Laser.com
Contact: Mr. Neil Johnston
naj@lap-laser.com

Mentor Medical Systems Canada
1333 Boundary Rd, Unit 10
Oshawa ON L1J 6Z7 Canada
Phone: (800) 668-6069
Fax: (905) 725-7340
website: www.mentorcorp.com
Contact: Ms. Linda Desjardins
ldesjardins@mentorcanada.com

Modus Medical Devices Inc
17 Masonville Crescent
London ON N5X 3T1 Canada
Phone: (519) 438-2409
Fax:
website: www.modusmed.com
Contact: Mr. John Miller
jmiller@modusmed.com

Nucletron Corporation
7080 Columbia Gateway Drive
Columbia MD 21046 USA
Phone: (410) 312-4127
Fax: (410) 312-4126
website: www.nucletron.com
Contact: Ms. Kelly Simonsen
kellys@nucusa.com

Scanditronix Wellhofer North America
3150 Stage Post Drive, Ste 110
Bartlett TN 38133 USA
Phone: (901) 386-2242
Fax: (901) 382-9453
website: www.wellhofer.com
Contact: Mr. Leon Eglezopoulos
leglezopoulos@iba-group.com

Siemens Canada Limited
2185 Derry Road West
Mississauga ON L5N 7A6 Canada
Phone: (905) 819-5747
Fax: (905) 819-5884
website: www.siemens.ca
Contact: Mr. Dean Willems
dean.willems@siemens.ca

Standard Imaging Inc
7601 Murphy Drive
Middleton WI 53562-2532 USA
Phone: (608) 831-0025
Fax: (608) 831-2202
website: www.standardimaging.com
Contact: Mr. Eric DeWerd
edewerd@standardimaging.com

Thomson Nielsen
25B Northside Road
Nepean ON K2H 8S1 Canada
Phone: (613) 596-4563
Fax: (613) 596-5243
website: www.thomson-elec.com
Contact: Ms. Mairi Miller
mmiller@thomson-elec.com

TomoTherapy Canada Inc
327 Cavendish Drive
Ancaster ON L9G 3Z1 Canada
Phone: (905) 308-2735
Fax:
website: www.tomotherapy.com
Contact: Mr. M. Dean Willems
dwillems@tomotherapy.com

Varian Medical Systems
3100 Hansen Way, M/S 263
Palo Alto CA 94304-1038 USA
Phone: (650) 493-4000
Fax: (650) 493-5637
website: www.varian.com
Contact: Ms. Jan Roth
jan.roth@varian.com

Hilferdine Scientific Inc.

85 Denzil Doyle Court, Kanata, ON K2M 2G8 Ph: (613) 591-5220 Fax (613) 591-0713 Email: Hilferdine@sympatico.ca

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A message from Sean Eckford, President and General Manager

In late 2002, Saint Gobain Crystals and Detectors RMP was purchased by Thermo Electron Corporation. A new company was created: Thermo Electron Radiation and Measurement and Protection.

As a result of this acquisition, on April 30th, 2003, Hilferdine Scientific Inc ceased to be the exclusive Canadian representative for Harshaw TLD, Bicron, MINI and NE Technology. That role has now been taken on by Gamble Technologies Limited.

If you placed an order with Hilferdine Scientific before April 30th, it will be delivered by us as usual.

If you have any questions about these changes, please feel free to contact us at 613 591-5220.

All of us at Hilferdine Scientific would like to thank you for your business over the past 14 years and for the important part you've played in making Hilferdine Scientific a success.

New Members of the COMP Executive

Councillor for Professional Affairs:

Dr. Peter McGhee
Northwestern Ontario Regional Cancer Centre

I am currently the Chief Physicist at the Northwestern Ontario Regional Cancer Centre located in Thunder Bay, Ontario. I have been an active member of the CCPM and COMP for over 10 years, and I am currently a Fellow of the College. Having functioned at the provincial level at a variety of levels, including the CCPM representative to the provincial radiation protection commission, I hope to bring an added dimension to the position of Councillor for Professional Affairs.

Councillor for Communications:

Mr. Darcy Mason
Cancer Centre for the Southern Interior

I did my undergraduate and M.Sc. at the University of Western Ontario, then completed a residency in Toronto at the Toronto-Sunnybrook centre. I continued as a physicist at Toronto-Sunnybrook until the fall of 1997, when I moved to the newly built cancer centre in Kelowna, B.C. I was previously a member of the Communications Committee from 1998 to 2001, helping set up the original medphys.ca web site.

cancer care ontario | action cancer ontario

London Regional Cancer Centre

POSITION: RADIATION ONCOLOGY PHYSICIST

LOCATION: London Regional Cancer Centre
London, Ontario, Canada

The London Regional Cancer Centre is committed to providing leadership in cancer treatment, research, and education. Current treatment resources include 8 megavoltage therapy machines, several with MLC and portal imaging, 2 simulators, a CT-simulator, HDR and LDR units, and specialty programs in IMRT, prostate brachytherapy with 3-D ultrasound, stereotactic radiosurgery, and photodynamic therapy. A prototype helical tomotherapy system is being installed and will be a major focus for R&D activity. Related research is underway in IMRT, gated tomotherapy, 3-D gel dosimetry, optical CT, dose optimization, radiobiological modeling, treatment uncertainty propagation and the use of imaging in oncology. The successful candidate will join one of Canada's top Medical Physics teams and will participate in clinical service, research, teaching, and graduate student supervision.

Minimum qualifications include a Ph.D. with several years of related clinical experience, and Canadian certification (CCPM) or equivalent. The successful candidate must be eligible for an appointment at the University of Western Ontario with productivity in research or education.

London, Ontario is a pleasant and affordable university and health care city of 350,000 people nestled in south-western Ontario within a short drive to Toronto, Windsor (Detroit), and Niagara Falls (Buffalo). Proximity to Canada's Great Lakes region offers a wide range of recreational activities during all seasons.

In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. Cancer Care Ontario is an equal opportunity employer. We thank all those who apply; however, only candidates chosen for interview will be contacted.

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London Regional Cancer Centre
790 Commissioners Road East
London, Ontario, Canada, N6A 4L6
Phone: 519-685-8607 Fax: 519-685-8658
E-mail: jake.vandyk@lrcc.on.ca Website: http://www.lrcc.on.ca/

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