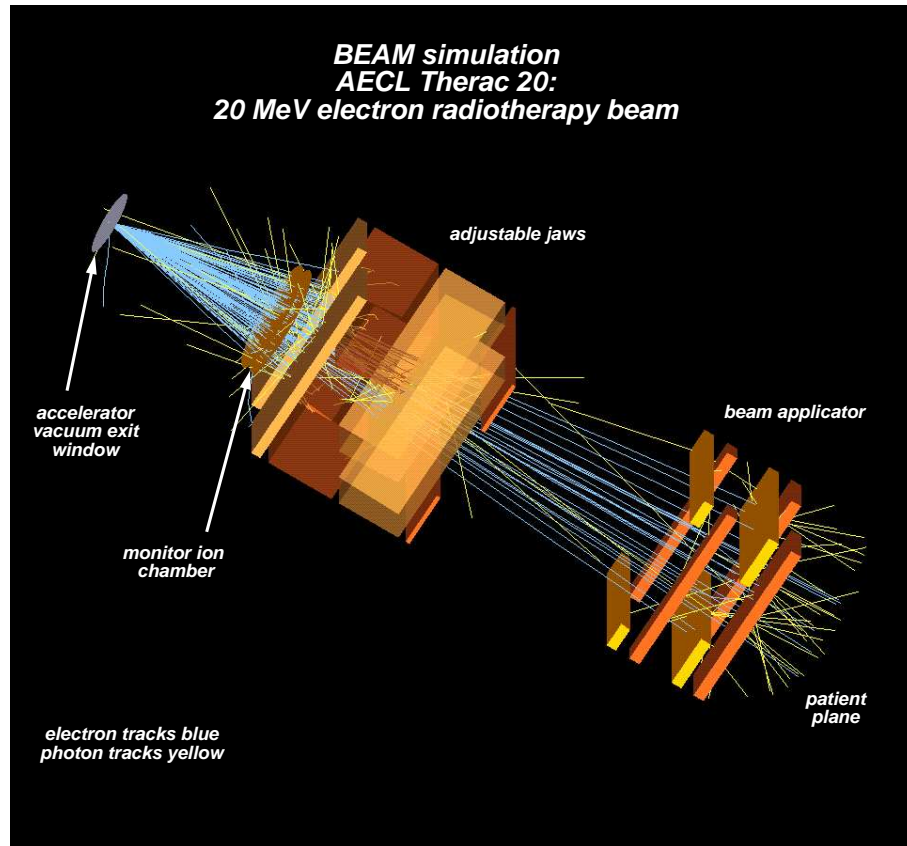


# BEAMnrc Workshop

Nov 2 – Nov 5, 2009

Jointly organized by NRC and Carleton University,  
Ottawa, Canada



## Principal Instructors

D. W. O. Rogers

B. R. B. Walters

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BEAMnrc is the current version of the popular BEAM code for simulating linear accelerators (see Med Phys **22** (1995) 503 - 524, or <http://www.physics.carleton.ca/~drogers/pubs/papers/Ro95.pdf>). BEAMnrc makes use of the improved radiation transport physics in the new EGSnrc Monte Carlo system and various other enhancements. The current release of the BEAMnrc code system works with the EGSnrcMP system and thus can be run on Microsoft Windows although some of the auxiliary programs are not available on Windows (in particular EGS\_Windows and the standard plotting packages).

In addition to the BEAMnrc code, we have also developed software to characterize the output of BEAMnrc, and software to transport the simulated beams through a phantom specified by a computed tomography dataset. For further information see the BEAM Homepage

An educational workshop is being held to train investigators and educators in the use of BEAMnrc and related codes. The course includes lectures and hands-on laboratories. Those attending are encouraged to bring detailed information about an accelerator they wish to model. The style of the workshop will be similar to the many previous EGS courses and BEAM/BEAMnrc workshops. Although the BEAMnrc code system will work on Windows, the course itself will be run on Linux-based systems.

The cost is \$Cdn3,500 (currently about \$US3,300) per person and includes all educational materials, lunches, and one evening meal. The cost does not include any charge for the software. The software is distributed under the terms of the BEAMnrc general licence

**The BEAMnrc software is not intended for clinical radiation therapy treatment planning. It consists of software tools which can be used for research and education only. The use of this software for clinical or commercial use is not permitted without permission from its authors and appropriate governmental authorities. THERE ARE NO GUARANTEES OR WARRANTIES FOR THIS SOFTWARE OR ITS DOCUMENTATION EITHER EXPRESSED OR IMPLIED.**

To facilitate instruction at the hands-on workshop, enrollment will be limited. Registration is now open and will be on a first come, first served basis.

A deposit of \$Cdn150 must accompany the registration. The deposit will not be refunded for cancellations after Oct 7, 2009. Final payment must be received by Oct 23, 2009. **Registration will be strictly on a first-come basis.** If we do not have adequate registration by Oct 7, 2009 we will cancel the workshop and refund the tuition, including deposit (so do not make firm travel arrangements prior to an announcement that the course is going ahead). Please register early, and send us an indication of serious interest even earlier.

#### Timetable

TIME	Mon. Nov 2	Tues. Nov 3	Wed. Nov 4	Thurs. Nov 5
8:30-10:00am	Overview and BEAMnrc Example	Tools to Analyze Results from BEAMnrc	Beam characterization	Related software
10:30-12:30pm Hands-on	<i>BEAMnrc simulation: Example accelerators</i>	<i>Analyze Results from Previous Night</i>	<i>BEAMDP: beam representations</i>	<i>Install at home across Internet</i>
12:30-1:30pm	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>	<b>Lunch</b>
1:30-3:00pm	Using BEAMnrc System	Variance Reduction	DOSXYZnrc: dose in a CT phantom	
3:30-5:30pm Hands-on	<i>BEAMnrc Simulation: your accelerator</i>	<i>BEAMnrc Simulation: variance reduction</i>	<i>Set Up a Treatment simulation</i>	
7:00-11:00pm			<b>Banquet</b>	

**For registration information, contact**  
**Dave Rogers: Tel: 613 520-2600x4374**  
**Blake Walters: Tel: 613 993-2715 x242**  
**Iwan Kawrakow: Tel: 613 993-2715 x241**  
**Common e-mail: BEAM\_Workshop@irs.phy.nrc.ca**

## Registration

Go to <http://www.physics.carleton.ca/~drogers/BEAM/course/brochure.html> and follow the link to the registration form. Please fill in all the applicable fields then print it out.

A \$Cdn150 deposit must accompany the registration. The rest of the tuition to a total of \$Cdn3,500 must be paid in full by Oct 23, 2009. Deposit and tuition are payable by credit card (VISA, Mastercard or AMEX, fill in relevant information on registration form)

Information on accommodation will be mailed with your registration confirmation.

Send the completed form to:  
BEAMnrc Workshop  
c/o Ms Elizabeth Lambe  
Institute for National Measurement Standards  
National Research Council Canada  
1200 Montreal Road, M-36 Room 1136  
Ottawa, ON, K1A 0R6

email: [Elizabeth.Lambe\(not\\_this\)@nrc-cnrc.gc.ca](mailto:Elizabeth.Lambe(not_this)@nrc-cnrc.gc.ca)  
Telephone : 613-993-5976  
Fax : 613-952-1394

## Schedule for the NRC/Carleton University BEAMnrc Workshop in Ottawa, Nov 2 – 5 2009

### Monday, November 2

Lecture or Lab #	Time	Lecturer	Title
	8:00		Registration/Refreshments/Coffee
1	8:30	Rogers	Course overview and evaluation
2	9:00	Rogers	Doing It with BEAMnrc: example of a complete accelerator simulation
	10:15		Coffee break
Lab I	10:30		Familiarization with system; run BEAMnrc examples
	12:00	Lunch	
3	13:30	Rogers	Overview and Design of Beam: (EGSnrc system, specifying, building, compiling, LATCH, dose zones)
4	14:30	Walters	Inputs to main in BEAMnrc, including source options
	15:15		Coffee break
5	15:30	Walters	The CMs: their capabilities and inputs
Lab II	15:45		Create your own accelerators
	18:00		End of formal session: lab remains open
	19:00		Lab closes

**Tuesday, November 3**

Lecture or Lab #	Time	Lecturer	Title
	8:00		Refreshments/Coffee
6	8:30	Walters	Phase Space files: what is in them, how to read/write, utilities to handle (readphsp, BEAMDP, xmgr)
7	9:15	Rogers	The Physics in BEAMnrc: parameter selection (AE, ECUT,SMAX, BCA,PRESTA-I or -II etc), brem ang dist'n etc
	10:00		Coffee break
Lab III	10:15		Analyze overnight calcs. with BEAMDP, do more BEAMnrc simulations
	12:00	Lunch	
8a	13:00	Kawrakow	Variance Red'n in BEAMnrc: range rejection, brem splitting, forcing, Russian Roulette, ECUT selection
8b	13:40	Kawrakow	Variance Red'n in BEAMnrc: Directional Brem Splitting
9	14:10	Walters	Statistics in the BEAMnrc code system
Lab IV	14:30		BEAMnrc: Investigating variance reduction
	15:00		Coffee break
	17:30		Report back on lab IV
	18:00		End of formal session: lab may remain open
	19:00		Lab closes

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**Wednesday, November 4**

Lecture or Lab #	Time	Lecturer	Title
	8:00		Refreshments/Coffee
10	8:30	Kawrakow	New Physics in EGSnrc
11	9:00	Rogers	Beam characterization models
Lab V	9:45		Using BEAMDP multiple source models
	10:00		Coffee break
12	11:30	Walters	DOSXYZnrc (stand alone) dose calculations in a phantom, STATDOSE
	12:00	Lunch	
13	13:30	Walters	DOSXYZnrc with CT input
Lab VI	14:00		Dose calculation in phantoms
	15:00		Coffee break
	17:30		Lab ends

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**Thursday, November 5**

Lecture or Lab #	Time	Lecturer	Title
	8:00		Refreshments/Coffee
14	8:30	Kawrakow	EGSnrc: overview & installation
15	9:15	Rogers	Course evaluations and installation of BEAMnrc
	9:45		Coffee break
Lab VII	10:15		Practice installation or free choice
	12:00	Lunch	
	13:00		tout fini

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