EURADOS TRAINING COURSE

Application of Monte Carlo Methods for Individual Monitoring and Dosimetry of Ionizing Radiation

Saturday 23rd April 2022:

09:00	Welcome, Introduction, Housekeeping (Eakins)
09:05	'*Dose Quantities*' lecture (Van Hoey)
10:00	'*Instruments, Detectors and Dosemeters*' lecture (Van Hoey)
11:00	*Coffee Break*
11:15	Introduction to the *Albedo Dosemeter* exercise (Eakins)
11:30	Practical Session 1: Surfaces, cells, materials, tallies etc. (Eakins)
13:00	*Lunch*
14:00	Practical Session 1 (*continued*)
14:30	Discussion of input / output file for photon-only dosemeter (Eakins)
15:00	'*Including Neutrons*' lecture: materials, cross-sections, tallies, additional physics etc. (Petit)
15:15	Practical Session 2: Combined photon / neutron dosemeter (Petit)
16:15	*Coffee Break*
16:30	Discussion of input / output file for photon/neutron dosemeter (Petit)
17:00	Practical Session 3: The effects of backscatter (Van Hoey)
17:30	Practical session 3 discussion (Van Hoey)
17:45	Q&A / discussion of day (All)
18:00	End

Sunday 24th April 2022:

09:00	'*Calculating dose quantities in radiological protection*' lecture (Petit)
09:15	Practical Session 4: Calculating $H_p(10,0°)$ for ^{137}Cs (Petit)
10:45	*Coffee Break*
11:00	'*Albedo Response: absorbed doses to $H_p(10)$'* lecture (Eakins)
11:15	'*Common successes and pitfalls*' lecture (Petit)
11:30	Exercise completion and discussions
12:30	*Lunch*
13:30	'*New ICRU quantities and their impacts for dosimetry*' lecture (Eakins)
14:00	'*Further applications of MC for dosimetry*' lecture (Van Hoey)
14:30	Practical Session 5: Example applications in dosimetry (Van Hoey)
15:30	*Coffee Break*
15:45	Practical Session 5: Example applications in dosimetry (*continued*)
17:30	Introduction to optional test exercise (Eakins)
17:45	Discussions and Q&A (All)
18:00	End

Notes:

- *The course is intended to be relatively informal and flexible, so the times and durations of the sessions may change to match the needs of the group.*
- *Participants have the option of bringing their own problems or applications to work on during Practical Session 5, which the course tutors will endeavour to assist with.*
- *Participants will have 1 month to submit solutions to the optional test exercise, success in which will gain a 'Pass' certificate for the course.*

About the lecturers:

Dr. Jon Eakins is a physicist working at the Radiation, Chemical and Environment Division (RCE) of the United Kingdom Health Security Agency (UKHSA). He has an MSci degree in physics from the University of Bristol, a PhD in mathematical physics from the University of Nottingham, and seventeen years' postdoctoral research experience in the dosimetry of external ionizing radiation with a particular focus on Monte Carlo modelling techniques using the MCNP family of codes. He has published over 50 peer-reviewed papers, on topics including: passive dosemeter and active instrument design; field characterization; shielding applications; dose quantities; dosimetry of microparticles; and emergency and retrospective dosimetry. He leads task groups in EURADOS Working Group 6 (*Computational Dosimetry*) and Working Group 10 (*Retrospective Dosimetry*), and is a member of the UK Shielding Forum. (jonathan.eakins@phe.gov.uk)

Dr. Michaël Petit is a physicist working at the Laboratory of Micro-irradiation, Metrology and Neutron Dosimetry (LMDN) of the (French) Institute for Radiation Protection and Nuclear Safety (IRSN). He holds a master's degree and a PhD in physics. He has five years of experience in the field of nuclear engineering as head of a calculation department (radioprotection/criticality). He has a solid postdoctoral research experience of twelve years in the nuclear physics measurement. He is now conducting research in neutron metrology and dosimetry. He is the computational referent of LMDN and has published more than 10 peer-reviewed papers. He has extensive experience in MCNP for dosimetry and shielding applications and regularly gives courses on radiation protection calculation codes for the (French) National Institute for Nuclear Science and Technology (INSTN). He is a member of the French Society for Radiation Protection (SFRP) as well as a full member of the EURADOS 6 working group (Computational Dosimetry). (michael.petit@irsn.fr)

Dr. Olivier Van Hoey is a physicist working at the Radiation Protection Dosimetry and Calibration (RDC) expert group of the Belgian Nuclear Research Centre (SCK CEN). He has a MSci degree in Physics and Astronomy and a PhD in Engineering Physics from Ghent University and seven years postdoctoral research experience in different fields of dosimetry at SCK CEN. He conducts research in computational dosimetry, accident dosimetry, neutron dosimetry, space dosimetry and radiotherapy dosimetry and is responsible for the scientific support and quality control of the SCK CEN personal dosimetry service and has published more than 30 peer reviewed papers. He has wide experience with MCNP for dosimetric and shielding applications and regularly gives courses on dosimetry and radiation measurements for the SCK CEN Academy. He is also full member of EURADOS Working Groups 6 (Computational Dosimetry), 9 (Radiation Dosimetry in Radiotherapy) and 10 (Retrospective Dosimetry). (olivier.van.hoey@sckcen.be)