



EUROPEAN COMMISSION
RESEARCH DIRECTORATE-GENERAL

MADEIRA
Project



RADIATION PHYSICS for NUCLEAR MEDICINE

First MADEIRA Training Course
In memory of Prof. Niki Molho

A four-day theoretical and practical course oriented to university students and young researchers with a strong interest in radiation physics applied to medicine organised by:



UNIVERSITÀ
DEGLI STUDI
DI MILANO

HelmholtzZentrum münchen

German Research Center for Environmental Health

in collaboration with:



Lund University
Malmö University Hospital

Institut de
Física Corpuscular



Jožef Stefan Institute

University of Michigan



Scivis Wissenschaftliche Bildverarbeitung



Sponsorships:



Istituto Nazionale
di Fisica Nucleare

Milano, Italy

18-21 November 2008

www.madeira-training.org

Training Course Topics

The spread of diagnostic techniques, as PET and SPECT, has contributed in the last years to the growth of the individual dose due to medical exposures. The MADEIRA Project (Minimizing Activity and Dose with Enhanced Image quality by Radiopharmaceutical Administrations), co-funded by the European Commission within the Seventh Euratom Framework Programme, aims to reduce the exposure of the patient to radiation in nuclear medicine, through the improvement of the imaging process.

This training course on radiation physics for nuclear medicine is the first of a series of three courses organized in the frame of the training and dissemination activities of the MADEIRA project. The course will deal with fundamental aspects and current research trends in radiation physics, detector technology and medical imaging from the point of view of nuclear medicine applications. Specific topics of the course will include interaction between radiation and matter, radiation transport with Monte Carlo analysis, production and quality control of radiopharmaceuticals, radiation detectors for nuclear medicine, reconstruction algorithms in medical imaging, biokinetic modelling and voxel phantoms for internal dosimetry.

The course is scheduled for four days and will be set in the prestigious Napoleonic Hall of the University of Milan. It will also offer one technical visit to the laboratories of the Joint Research Centre of Ispra, including the cyclotron and the radioisotope production facilities, and a tour to discover the beauties of Milan: Leonardo's "Cenacolo" (Last Supper), the "Duomo", the world renowned "Teatro alla Scala" and the "Castello Sforzesco".

Chairs

Marie Claire Cantone
Christoph Hoeschen

Università degli Studi di Milano, INFN
Helmholtz Zentrum München

Committee

Neal Clinthorne
Gernot Ebel
Carlos Lacasta
Sören Mattsson
Marko Mikuž

University of Michigan
Scivis Wissenschaftliche Bildverarbeitung
Consejo Superior de Investigacion Cientificas
Lund University
University of Ljubljana and Jožef Stefan Institute

Secretaries

Federico Tavola
Ivan Veronese

Tel: +39 02 50317709
Tel: +39 02 50317432

E-mail: federico.tavola@unimi.it
E-mail: ivan.veronese@unimi.it

Università degli Studi di Milano, INFN - Physics Department

Fax: +39 02 50317630



Syllabus

Tuesday, 18 November 2008

Radiation-matter interaction, photons, charged particles, Monte Carlo radiation transport calculations, voxel models, segmentation, organ dose conversion coefficients, dose distribution.

Wednesday, 19 November 2008

Radionuclide production, quality control of radiopharmaceuticals, IUPAC terminology, specific activity, ionizing radiation, medical radioisotopes, nuclear reactions, accelerator produced isotopes, characteristics of radioisotopes for diagnosis and therapy.

Thursday, 20 November 2008

Scintillators, semiconductor detectors, efficiency, resolution, signal processing, PET, imaging systems, imaging reconstruction algorithms, functional imaging, photodetectors.

Friday, 21 November 2008

Magnifier probe, noise reduction, biokinetic modeling, voxel phantoms, internal dosimetry, realistic anatomy, segmentation, Specific Absorbed Fraction, individual variability.

Timetable

	Tuesday 18/11	Wednesday 19/11	Thursday 20/11	Friday 21/11	
	Fundamental processes in radiation physics	Radiation sources and radiopharmaceutical production	Radiation detectors for medical applications	New frontiers in nuclear medicine	
9.00	Welcome address	Radiation sources for medical applications (S.Leide-Svegborn)	Basic principles of detection for ionizing radiation (M.Mikuž)	The PET magnifier probe (C.Lacasta)	9.00
9.15	Keynote Lecture (F.Nüsslin)			Algorithms for image reconstruction and noise reduction (C.Hoeschen-M.Rafecas)	9.45
10.00	Mechanisms of the interactions between radiation and matter (G.Battistoni)	Radiopharmaceutical production (U.Holzwarth)	Semiconductor and scintillator detectors (I.Veronese)		
10.45	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	10.45
11.15	Principles of MonteCarlo calculations and codes (A.Ferrari)	Analytical and radioanalytical quality control of radiopharmaceuticals (M.Bonardi)	Research in radiation detectors (N.Clinthorne)	Biokinetic models for radiopharmaceuticals (H.Uusijärvi)	11.15
12.00	Principles of MonteCarlo-based voxel dosimetry (H.Schlattl)	Research and development for new radiopharmaceuticals (C.Reininger)	New trends in radiation detectors for life science (M.G.Bisogni)	Voxel phantoms for internal dosimetry (M.Zankl)	12.00
12.45	LUNCH	LUNCH	LUNCH	Course evaluation and conclusion	12.45
14.00	Guided exercises on MonteCarlo radiation transport calculations	Visit to JRC Ispra	Guided visit to Milan	LUNCH	13.15

Lecturers

Giuseppe Battistoni

Maria Giuseppina Bisogni

Mauro Bonardi

Neal Clinthorne

Alfredo Ferrari

Cristoph Hoeschen

Uwe Holzwarth

Carlos Lacasta

Sigrid Leide-Svegborn

Marko Mikuž

Fridtjof Nüsslin

Magdalena Rafecas

Cornelia Reininger

Helmut Schlattl

Helena Uusijärvi

Ivan Veronese

Maria Zankl

Istituto Nazionale di Fisica Nucleare, Milano (Italy)

Università degli Studi di Pisa and INFN, Pisa (Italy)

Università degli Studi di Milano and INFN, Milano (Italy)

University of Michigan, Ann Arbor (USA)

CERN, Geneva (Switzerland)

Helmholtz Zentrum München, Neuherberg (Germany)

JRC-IHCP, Ispra (Italy)

Institut de Fisica Corpuscular, Valencia (Spain)

Lund University and Malmö University Hospital, Malmö (Sweden)

University of Ljubljana and Jožef Stefan Institute, Ljubljana (Slovenia)

Klinikum r.d.Isar - Technische Universität München, München (Germany)

Institut de Fisica Corpuscular, Valencia (Spain)

Bayer Schering Pharma, Berlin (Germany)

Helmholtz Zentrum München, Neuherberg (Germany)

Lund University, Malmö (Sweden)

Università degli Studi di Milano and INFN, Milano (Italy)

Helmholtz Zentrum München, Neuherberg (Germany)

Registration

The course is open to a maximum of 40 participants who must submit a complete Registration Form which must be filled in online on the website www.madeira-training.org (registration deadline 25 October 2008).

Registration fees:

until 30 September 2008: € 120.-

from 1 October 2008: € 180.-

Registration fees include:

- | | |
|--------------------------------|-------------------|
| - Access to all the lectures | - Fulltext CD-ROM |
| - Coffee breaks | - Lunches |
| - Technical visit to JRC Ispra | - Tour of Milan |

A restricted number of grants will be offered to the participants. To apply for grants please fill in the Grant Application Form online (www.madeira-training.org). Deadline for grant applications: 20 August 2008.

How to pay:

- See the Registration Form online.

How to get to the course venue

The Napoleonic Hall of the University of Milan is in the city centre close to the Duomo area, in Via S. Antonio, 12. It's possible to get there:

By metro: M1 (Stop: *Duomo*) - M3 (Stop: *Missori*)

By bus: N.54 (Stop: *Larga-Verziere*)

By tram: N.12 (Stop: *Larga-Verziere*) - N.15 (Stop: *Larga-Fontana-Albricci*) - N.27 (Stop: *Larga-Albricci*)

From Malpensa Airport: Malpensa Express Train has departures every 30 min and it takes 40 min to get to Cadorna Train Station (Metro: M1 - M2) close to the city centre in the "Castello Sforzesco" area.

From Linate Airport (closer to Milan centre): Shuttles leave every 30 min to Centrale Train Station (M2 - M3) and Bus N.73 leaves every 10 min to city centre, close to "Duomo" area (Piazza San Babila - M1).

Hotel Information

Hotel Sant'Ambroeus - Viale Papiniano, 14 - Close to Navigli area - (M2 - Bus N.50-54)

Tel. +39 02 48008989 - website: www.hotelsantambroeus.it - Room rates: single/double € 65/98

Hotel Ibis Centro Milan - Via Finocchiaro Aprile, 2 - Close to Centrale Train Station (M2 - M3)

Tel.: +39 02 6570534 - website: www.ibiscentromilan.com - Room rates: single/double € 97/106

