

Organized by



UNIVERSITÀ
DI PAVIA

Pavia University, Physics
Department, Pavia, Italy



Institut de Radioprotection et
de Sûreté Nucléaire,
Laboratoire de Dosimétrie des
Rayonnements Ionisants,
Paris, France



Stockholm
University

Stockholms Universitet,
Department of Molecular
Biosciences, The Wenner.Gren
Institute, Stockholm, Sweden

Organizing Committee:

L.Lundholm, Co-Director

Y.Perrot, Co-Director

N.Protti, (local) Co-Director: nicoletta.protti@unipv.it

V.Pascali, (local) General Secretary:

valeria.pascali01@universitadipavia.it

M.Karimi Roshan, GS assistant:

mostafa.karimiroshan@su.se

How to apply

People wishing to apply should submit by e-mail the following documents:

- CV with description of the scientific career so far;
- a motivation letter;
- a supporting letter from the supervisor/head of laboratory

to the School General Secretary: Valeria Pascali, valeria.pascali01@universitadipavia.it + Mostafa Karimi Roshan, mostafa.karimiroshan@su.se

Registration

The deadline for applications is: July 30th, 2023

Information about acceptance: by August 4th, 2023

For more information:

e-mail: valeria.pascali01@universitadipavia.it & mostafa.karimiroshan@su.se

General information

School Venue

Aula E, Cascina Cravino, Università degli Studi di Pavia, via Agostino Bassi 21

Accommodations

Accommodations will be arranged and provided by the School to all the students. Single and double rooms will be available at guest-houses and Pavia University Colleges at walking distances from the School venue.



How to reach Pavia:

- *from Milano Linate Airport:* take the M4 metro, final destination Dateo; get off at Dateo metro station; take the S13 train toward Pavia (final destination);
- *from Milano Malpensa Airport:* take the train towards Milano Centrale station and get off at Milano Bovisio station; take S13 train towards Pavia (final destination);
- *from Bergamo Orio al Serio Airport:* take a Terravision bus towards Milano Centrale train station; take a regional or intercity trains towards Pavia.



Co-funded by
the European Union

PIANOFORTE TRAINING COURSE:

PRO_TREAT

**PROtecting while TREATing:
from the basic principles of the
biological effects of ionising
radiations up to their use in
neurodegenerative diseases**

18-22 September 2023

Pavia University, Pavia, Italy

Deadline for application:

30/07/2023

Apply sending:

CV

motivation letter

recommendation letter

to:

valeria.pascali01@universitadipavia.it

&

mostafa.karimiroshan@su.se

School information

Maximum number of participants: 12

Who can participate: PhD students and Post Doc fellows with backgrounds in Physics, Chemistry, Engineer, Biology and Biotechnology, Medical or related-topics and scientific interest to Radiation Biology and Radiation Protection; special evaluation will be made in case of M.Sc. students.

School fee: none

Accommodation: accommodations will be arranged and provided to all the students.

The School is connected to the NECTAR project (NEutron Capture enhanced Treatment of neurotoxic Amyloid aggRegates) funded by European Commission under the H2020 - FETOPEN - 2018 - 2020 call, Grant Agreement #964934.



[website 1](#), [website 2](#)

NECTAR aims to prove the feasibility, safety and effectiveness of a low dose, low dose-rate treatment of the human brain affected by Alzheimer's disease (AD) exploiting an external low energy neutron beam coupled to $^{10}\text{B}/^{157}\text{Gd}$ -enriched drugs selectively uptake by the β -amyloid aggregates.

School aims

The School wants to give basic knowledges on the multidisciplinary topics necessary in scenarios where acute radiation exposure is unavoidably linked to low dose exposure, such as cancer radiation therapy, targeted therapies for cancer and other diseases, in addition to the Capture Enhanced Neutron Irradiation (CENI) under development by the NECTAR project. These topics include:

- physics of ionising radiations (IR), with special emphasis on neutrons in biological matter,
- computational tools (in particular Geant4 and Geant4-DNA) to model the named interactions over a broad range of scales (from nm unto macroscopic volumes),
- experimental techniques and tools to couple and validate the named models (including neutron spectroscopy, microdosimetry and track structure nanodosimetry),
- chemistry, biology (specifically neurobiology) and radiobiological aspects driving the feasibility, safety and effectiveness of innovative treatments based on ionising radiations.

No laboratories or practical activities are planned. Anyway, several hands-on and data analysis sessions are included in the School programme. Students are required to bring their personal laptops where the softwares and tools required for the data analysis must be previously installed. Instructions and links for the installation will be shared to all the accepted students few weeks before the School start.

Tutorship is also scheduled in the School programme to further assist the participants in the data analysis and in the exercises presented during the hands-on session.

School programme

Monday 18.09.2023

9:00-9:45 Registration
9:45-10:30 NECTAR project
10:30-11:00 coffee break
11:00-12:30 Ageing and AD
12:30-14:00 lunch
14:00-15:00 IR-matter interaction
15:00-16:00 Neutron Capture Therapy principles
16:00-16:30 coffee break
16:30-18:00 Design and synthesis of therapeutic agents for the targeted delivery of B and Gd

Wednesday 20.09.2023

9:00-10:00 Vehiculation of compounds through BBB
10:00-11:00 In vivo measurement by theranostic agents
11:00-11:30 coffee break
11:30-12:30 Biological models in NECTAR
12:30-13:00 tutorship
13:00-14:00 lunch
14:00-15:30 Neutron spectrometry hands-on
15:30-16:00 coffee break
16:00-17:30 Micro- and nanodosimetry hands-on
17:30-18:30 tutorship

Friday 22.09.2023

9:00-9:30 tutorship

9:30-10:15 Radiotherapy and NCT of the brain
10:15-11:00 Clinical translation of NECTAR results
11:00-11:30 coffee break

11:30-13:00 final test, presentations/comments on data analysis

13:00-14:00 lunch

14:00-16:00 visit to IR facilities in Pavia (i)
16:00-18:00 visit to IR facilities in Pavia (ii)

Tuesday 19.09.2023

9:00-10:30 Neutron spectrometry
10:30-11:00 coffee break
11:00-12:30 Neutron dosimetry
12:30-13:30 lunch
13:30-15:00 Monte Carlo models for IR damages in biological matter
15:00-16:00 Geant4/Geant4-DNA hands-on session (i)
16:00-16:30 coffee break
16:30-18:30 Geant4/Geant4-DNA hands-on session (ii and iii)

Thursday 21.09.2023

9:00-10:00 Protein aggregates in AD
10:00-11:00 Low doses and low dose rates effects in brain tissues
11:00-11:30 coffee break
11:30-12:30 Immune effects induced by IR in brain
12:30-13:30 lunch
13:30-15:00 small animal MRI hands-on
15:00-15:30 coffee break
15:30-17:00 microscopy image hands-on
17:00-18:00 tutorship