

BUILDING EUROPEAN NUCLEAR COMPETENCE THROUGH CONTINUOUS ADVANCED AND STRUCTURED EDUCATION AND TRAINING ACTIONS



ENEN#Bulletin

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Focus

Course on "Innovative Radionuclides and Radiopharmaceuticals" (CTN, Bobadela, Portugal – 24-28 June, 2024)

The course "Innovative Radionuclides and Radiopharmaceuticals" is organized by the Department of Nuclear Sciences and Engineering (DECN) from Instituto Superior Técnico (IST)/ University of Lisbon, a multidisciplinary academic unit focused on research, education, and innovation in the field of nuclear sciences, under the scope of the ENEN2plus project, funded by the European Union's Euratom Research and Training Programme (EURATOM) (grant agreement No 101061677).



• Overview/Programme

The course gathers a group of national and international experts that will present theoretical lectures on hot topics of Radiopharmaceutical Sciences, comprising radionuclide production, radiolabelling chemistry, in silico approaches, methods for preclinical studies with cellular and animal models, and applications of radiopharmaceuticals. The course contains also several laboratory sessions to exemplify the several steps involved in the synthesis and evaluation of a potential radiopharmaceutical. It is planned a one-day visit to the facilities of the Institute for Nuclear Sciences Applied to Health (ICNAS, Coimbra), which is the leading institution in Portugal in the production of medical radionuclides and radiopharmaceuticals.



The full programme can be found at this LINK.

At the end of the course, the trainees will be acquainted with practical skills and scientific knowledge useful to understand the most important aspects required to bring medical radionuclides and radiopharmaceuticals from the bench to the bedside.

• Audience/Language

MSc, PhD students and junior scientists interested in the field of "Radiopharmaceutical Sciences". Due to the practical nature of the course, a maximum number of 20 participants will be considered. All the classes will be taught in English.

• Registration Deadline: 31st May 2024

There are no fees but the registration is obligatory. Application should be sent by e-mail to patricia.russo@ctn.tecnico.ulisboa.pt, and must include a brief motivation letter (max. 200 words) and a short academic CV. Due to the practical nature of the course, a maximum number of 20 participants will be considered. After the registration period, the local organizers will select the participants that will be informed of their acceptance or non-acceptance to participate in the course by the 5 th June 2024.



ISSUE 01/2024 Spring



• Venue

Radiopharmaceutical Sciences Group, Campus Tecnológico e Nuclear Estrada Nacional 10 (km 139,7), 2695-066 Bobadela LRS, Portugal



To support their participation, participants can apply for the ENEN2plus mobility grant program.



António PAULO has got a degree in Chemical Engineering at Instituto Superior Técnico (IST)/Universidade de Lisboa (UL) in 1986 and completed his PhD in Chemistry at the same University in 1998. Currently, he is Coordinator Researcher at the "Centro de Ciências e Tecnologias

Nucleares" (C2TN) and "Departamento de Engenharia e Ciências Nucleares" (DECN) from IST-UL. His main research interests are focused on the study of molecular and nanosized tools for PET and SPECT imaging and/or therapy of cancer, based on peptidic molecules, gold nanoparticles, and beta- and Auger-emitting radiometals.

Lurdes GANO is a Researcher at the Radiopharmaceutical Sciences Group from the C2TN/IST. She graduated in Pharmaceutical Sciences and has got a PhD in Pharmacy (Pharmaceutical Chemistry) by the Faculty of Pharmacy of the University of Lisbon (FFUL), with a thesis about



Radiolabelled Monoclonal Antibodies and Receptor Specific Peptides. Her main scientific activity is focused on the development of specific radiopharmaceuticals for molecular imaging, targeted therapy and theranostics of cancer especially on the preclinical biological evaluation of radioactive compounds in cellular and small animal models. She is responsible for the animal housing facilities of IST/ CTN and is member of the Animal Welfare Committee (ORBEA) in scientific research using animals.





Analysing and benchmarking existing E&T programs

As new builds are expected within Europe, old nuclear facilities are decommissioned and the use of nuclear technology in non-power applications keeps growing, it is expected that the workforce in the nuclear sector will increase in the coming years. To keep up with this growth and to assure highly skilled employees in the broad nuclear sector now and in the future, education and training complementary to academic education will remain necessary.

Considering this, an overview was made of education and training opportunities resulting from current and past European projects. The selected data was analysed and benchmarked by a quality committee established within this ENEN2plus project. The complete overview including methodology, analysis, review, and conclusions is presented in the public deliverable 'Reporting on analysing and benchmarking existing E&T programs'. A summary of the analysis and review is presented in this article. In total 171 existing E&T opportunities were reported. As shown in the map below, the organization of E&T opportunities within European projects spreads nicely over most of the EU countries with an exception for the eastern regions. It should be noted that this map is based on the country of venue of an E&T opportunity and therefore involvement of other countries and cooperation between partners is not included.



The courses organized by the different countries which mostly range from a couple of days to two weeks training are distributed over the different nuclear topics as follows: Nuclear engineering and safety (29%), Waste management and disposal (27%), Radiochemistry (13%), Radiation protection (9%), Decommissioning (8%), Other (7%), Nuclear materials, nuclear fuels, and fuel cycle (5%) and Medical applications (2%). In the past, almost all courses were organized face-to-face but certainly since the COVID pandemic other modalities such as online training (live teacher paced learning), blended learning and e-learning (online self-paced





learning, e.g., MOOC) are becoming more common. To attract an international audience, 98% of the courses are organized in English. The main target group are graduate and postgraduate individuals.

To inform learners on the quality of the past, present, and future courses a benchmarking approach is set-up. Eight questions based on previous experience from EC projects, the IAEA's SAT and the EQF, were designed to assess the quality of the courses.

- Are there selection criteria and/or prerequisites for the trainees?
- Are these criteria available for trainees in advance?
- Are learning outcomes expressed in terms of knowledge, skills and responsibility and autonomy or equivalent?
- How does the training institution officially recognize the achievement of the learning outcomes?
- Does the institution have any QA processes in place regarding E&T?
- How is the training staff in charge qualified according to expertise and didactic/pedagogic experience?
- How does the institution obtain, process, and implement feedback from the trainees?

From the current reviewed courses, only 19% of the courses scored positive on all eight questions. For most courses incomplete data can explain for the above-mentioned number as 92% of the courses where all data was available scored positive on all eight criteria.

However, this proves that the work of the quality committee isn't yet done and that analysis and review of new courses remains valuable. Collection of the data necessary for this task will be collected through the ENEN2plus HUB currently under development in this project.

It is of paramount importance that all providers of courses in nuclear topics share their E&T opportunities via the ENEN2plus HUB. In this way, learners from all European countries with different backgrounds and educational levels will be informed on the available E&T opportunities and the quality of these courses. Policy makers and training providers, in turn, can become aware of the critical areas where E&T opportunities are missing.



Jakob LUYTEN has a teaching degree and a MSc in Chemistry from the Catholic University of Leuven. He worked at the Avans University of Applied Science as a lecturer and within the L&D group of Sanofi Geel as site training specialist. He is currently working at the SCK CEN Academy focusing on education and training, policy support and outreach activities.



Event Schedule 2024



New ENEEP courses in 2024

The ENEEP association in 2024 is expanding its educational activities offered to students and young engineers. The successful **Autumn Reactor Physics Courses** will continue in the same format, with short and intensive hands-on exercises. Traditional <u>'Safety of reactor operation</u> and <u>Fundamentals of isotope production'</u> are supplemented by a new topic devoted to <u>'Nuclear-based diagnostic methods'</u>. Thus, the Autumn Reactor Physics Courses will cover nuclear fields including reactor physics, nuclear medicine, and material science.





Additionally, ENEEP will organize the first Summer School. The **Summer School in Environmental Monitoring** will be held at the University of Pavia in the L.E.N.A centre. Over the course of five days, participants will become familiar with sampling methods, control, and treatment of various matrices. A highlight of the program includes a visit to a local site undergoing decommissioning, where an environmental monitoring system is in operation. We are also preparing two special courses. The first will be a joint venture between ENEEP and Gre@t-Pioneer, combining the traditional flipped classroom format of Gre@t-Pioneer with ENEEP's course management. The *'Hybrid Course on Reactor Physics Experiments and* <u>Modelling'</u> will be organized at the Budapest University of Technology and Economics during the autumn period. The second course will serve as a follow-up to the Eastern Europe Research Reactor Initiative (EERRI), focusing on training future professionals for experimental and research reactors under the auspices of the IAEA.



If you are interested, click on the following link, to find more information about the new ENEEP courses: <u>https://www.eneep.org/courses/new-courses/</u>.

The registration for the above-mentioned courses is now open: <u>https://www.eneep.org/application/courses-generalinfo/application-form/</u>. All courses are supported by ENEN2plus mobility grants.







Cross-YGN Activities – The Social Media Competition and future workshops

The cross-sectional cooperation, made by the young sections of EFOMP (European Federation of Organisations for Medical Purposes), IRPA (International Radiation Protection Association), FuseNet (The European Fusion Education Network) and ENS (European Nuclear Society) as part of the ENEN2plus work package WP3 - Task 3.4, inaugurated the new year by finalising and launching the Social Media Competition "Nuclear around us".

The contest called for students and young professionals (under 35) to elaborate creative contents (visual,



video, posts, multimedia...) to demystify the terms 'nuclear' and 'radiation'. Participants had to submit their artworks to the working group by email by 15th February 2024. After having received almost 30 applications, the jury made up of members of the individual young sections selected the ten finalists to go through to the next round. The final stage has been the public, online voting for the best contribution, which has widely been shared on social networks by all members of the collaboration. The vote, open from 5th to 13th March, collected more than 1.1k preferences.

The call for voting the best artwork among the 10 finalists. It has been shared on all YGNs channels, and attracted more than 1.1k votes.

The winner of the contest is Jishant Talwar (35.5% of preferences), MSc student in Fusion Energy and Physics

Engineering at the University of Stuttgart, who submitted <u>a short videoclip</u> explaining the basics of fission and fusion energy. The winner is awarded with the publication of his contribution on all the young sections' social media platforms, a travel and participation grant to the European Research Reactor Conference (RRFM) in Warsaw, Poland, from 21 to 24 April 2024, and an Amazon voucher. Alongside this initiative, the cross-YGN cooperation continued brainstorming intensively about future projects such as meetings, sponsorships, working groups, etc. The group is currently discussing the organisation of workshops at different conferences and targeting different audiences.

The first workshops will take place in Bratislava, Slovakia, on 1st July 2024, during the 1st BSc and MSc Nuclear Competition and Summer School 2024.

Representatives of the YGNs involved in the project will share their stories with the BSc and MSc students attending the event, to let them explore the multiple opportunities that nuclear education paths can offer, as well as to present the active networks that gather nuclear youth all over Europe. Indeed, the *Workshop* I - Your Future in Nuclear: Exploring a World ofCareer Opportunities will aim to present the severaljob opportunities that the nuclear sector offers,sharing the personal experiences and stories of theYGNs representatives. By learning more about theirprofessions, we aim to highlight multiple educationpaths, different career opportunities, but also the interconnections between the many sectors of nuclear science and technology. The *Workshop II -YGNs in Nuclear* wants to introduce the existence and the activities of Young Generation Networks, which gather nuclear students and young professionals all over Europe. The session aims to inform the students about these organisations and their role in supporting and activating young generations. By involving the young participants, we want to make them share their expectations, their interests, their future goals, and talk together about youth in nuclear and its potential.





Furthermore, the Cross-YGN team is planning to organise one more workshop in September, in the occasion of the EFOMP Annual Conference (5th European Congress for Medical Physics) and the parallel ENEN PhD Event & Prize, taking place in Munich, Germany. The session's goals are to get in contact with the community and discuss the multiple opportunities in the fields of research and innovation. Furthermore, Leticia Irazola, representing EFOMP in the cross-sectoral initiative, will present the Cross-YGN project and activities during one of the Early Career sessions. Finally, the Cross-YGN team is expected to sign a Memorandum of Understanding (MoU) to strengthen the support base of a common vision and strategy on how to attract next generation to nuclear studies and professions.

The different organisations partaking the collaborations are:

- EFOMP: The European Federation of Organisations for Medical Physics (EFOMP) was founded in 1980 with the aim of being an umbrella for all European National Member Organisations (NMOs). The current membership (December 2023) covers 36 National Member Organisations, representing more than 10000 medical physicists and clinical engineers working in the field of medical physics, Individual Associate and Company Members. EFOMP aims to harmonize and advance medical physics both in its professional clinical and scientific expression throughout Europe and to strengthen and make more effective the activities of the NMOs by bringing about and maintaining systematic exchange of professional and scientific information, by the formulation of common policies, and by promoting education and training programmes.
- FuseNet: The FuseNet Association facilitates networking and education in the field of nuclear fusion. As such it supports educational endeavours in all stages of education (primary to post-gradual). The most important group it supports however are university (especially master) students. Over its 13 years of existence, it developed into a solid network of over 60 research institutions and universities from 26 European countries. A new and most welcome addition to the network in the past few years are the fusion start-up companies. Apart from networking, The FuseNet Association organizes, to name a few, the Teacher's day and the MSc and PhD events.
- IRPA: The IRPA Young Generation Network is an international network of "Young Professionals" across the field of Radiation Protection. Its primary function is to promote communication, collaboration and professional development of Students and Young Professionals in the area of Radiation Protection and its allied fields. Attracting and retain new talents, supporting the development of students and young professionals studying / working in the field, and promote the understanding of Radiation Protection and its allied fields across the world are among the IRPA-YGN objectives.
- ENS YGN: Founded in 1996, the ENS YGN (European Nuclear Society Young Generation Network, section of the European Nuclear Society) represents around 4000 members in 21 countries as well as six observers (as of November 2023). The organisation promotes and contributes by all appropriate means to the advancement of science and technology in the peaceful use of nuclear technology. The organisation hosts several different events, including the European Nuclear Young Generation Forum (ENYGF), the European final of I4N, workshops, and more. The ENYGF is a biennial conference for students and young professionals to exchange research results, network and broaden participants' horizons with regard to nuclear energy in Europe. In addition to organising, the network also participates in dialogues concerning the young generation in the nuclear field, thus giving students and young professionals a voice at conferences, meetings, etc.



Mattia BALDONI is Communications Officer at the European Nuclear Society, which promotes the development of nuclear science and technology and the understanding of peaceful nuclear applications. Based in Brussels, ENS brings together more than 12,000 professionals from the academic world, research centres, industry, and authorities. ENS is also a long-standing partner

of ENEN and it is participating in the ENEN2Plus project, leading the Task 3.4. (*Setting up networking cross-YG and cross-professional organizations*).





Nuclear Days 2024

NUCLEAR **DAYS 2024 Student poster** competition 12.-13.9.2024 for the conference 1_{st} www.jadernedny.cz/en Nuclear power - Europe's carbon-free future If you wish to introduce your thesis or research in the field of nuclear power engineering, this is the opportunity you have been waiting for! The conference, which forms part of the 14th Annual Nuclear Days, will be held on 12-13 September 2024 at the University of West Bohemia in Pilsen. Submitted posters will be divided into three categories according to the study or thesis and will be subsequently evaluated by an expert jury. The creators of the best three posters in each category will be awarded a monetary prize. Register your poster for the competition by Sunday, June 30, 2024













Reminder

ENEN2plus BSc and MSc Nuclear Competition and Summer School 2024



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Made by Szilvia Gazdag-Hegyesi





Every year the ENEN MSc and BSc Competition is organized to promote and support the work of young researchers in Europe.

The **ENEN MSc and BSc Competition** is an action of the European Nuclear Education Network to support the Research and Science in the Nuclear fields promoting the works of the BSc and MSc students. The **ENEN MSc and BSc Competition** will consist of about 20 MSc and 20 BSc presentations nominated by ENEN Members or other universities and selected by the ENEN2plus Jury. The event will be divided into several sessions according to the subjects. The participants will make a presentation of their research work for 10 minutes followed by 5 minutes of questions and discussion in a competitive but friendly environment.

All presentations will be judged by the Jury members considering the quality of the submitted paper as well as the quality of the presentation itself. Moreover, the participation in the discussion and the clarity in answering the questions received will also be considered in selecting the winners. The best presentations will be awarded the ENEN awards. Please see the "Criteria and Procedure for the ENEN Awards" in Annex I. All nuclear topics and fields are welcome: Nuclear Engineering and Safety, Medical Applications, Radiation Protection, Waste Management and Disposal, Radiochemistry, Nuclear Materials, or any other nuclear-related topic.

Financial Support

For the ENEN2plus BSc and MSc award ENEN Association will grant a 750€ the winners. Selected applicants will receive financial support for their travel expenses, and they can participate on the summer school organized by the ENEN2plus.

Deadline for submitting your application: 2nd May 2024







ENEN2Plus 14C Workshop (15-19 July 2024)

The ENEN2plus master students' workshop on radioactive carbon isotope ¹⁴C will be organized by Nuclear Physics Institute (NPI) in 15-19 July 2024.

The isotope ¹⁴C is produced naturally, artificial production is associated with atmospheric nuclear bomb testing and nuclear fuel cycle. Measurements of tiny amounts of ¹⁴C serve for radiocarbon dating, wildlife crime control, forensic analysis of works of art, differentiation between fossil and bio-fuels, monitoring of nuclear power plant releases, to list just a few examples. The most sensitive method for ¹⁴C today is accelerator mass spectrometry (AMS). In addition to theoretical lectures, the workshop will focus on extensive hands-on training for sample preparation, AMS measurements, and data evaluation. Students will get the opportunity to study their own materials. Due to the capacity of AMS laboratory, the workshop is limited to eight participants. Interested candidates will submit proposals that will describe research goals, materials for analysis and how the samples will

Interested candidates, please visit event WEBPAGE

be obtained. Authors of the selected proposals will be invited for the workshop that will be hosted by NPI at Prague and Řež near Prague. The workshop and cross-border mobility of workshop participants is **supported by ENEN2plus project** founded by the European Union.



AMS system at Nuclear Physics Institute, Czech Republic





Jan KAMENÍK is a researcher at Nuclear Physics Institute of the Czech Academy of

Sciences. He is focused on accelerator mass spectrometry for measurement of minute amounts of certain longlived radionuclides. Jan is particularly interested in 10Be and 26Al that can provide valuable information about processes on our planet. Jan has been active in neutron activation analysis, a robust method for measurement of elemental composition of various solid and liquid samples.





European Congress of Medical Physics (11-14 September 2024)

The next edition of the ENEN PhD Event and Prize will take place in as a side event of the ECMP2024, organised by the European Federation of Medical Physics (EFOMP) and hosted by the Medical Physicist Societies of Austria, Germany and Switzerland. Munich (Germany), from 11 to 14 September 2024.

This year we are opening up for a few novelties. It will be the first time the event will be held during a Medical Physics type of event, because we wish to open to PhD Candidates of all nuclear applications and fields! We hope this choice will also encourage applicants from various fields to apply and take part. Furthermore, we also increased the number of participants that we can welcome. This year we are selecting up to 18 finalists to come to Munich. The basic structure of the event stays the same though, since this looks like being a winning choice: each finalist will present their PhD thesis work and after each presentation, there will be time for questions, both from the jury and from other finalists. The PhD event will be on September 11th (whole day) and the award ceremony for the winners, the best three, will take place in the evening, during the congress welcome reception. All finalists are



more than encouraged however to take part to the whole event (as usual financial support will be made available to support travel, accommodation and congress fee expenses) and even to submit their abstracts to be published in a European Journal of Medical Physics special issue.

On a final note, we draw your attention to the workshop that will be held during the ECMP2024 as well. Dedicated to PhD students. This is an ENEN2plus initiative organized by EFOMP. All ENEN PhD finalists are more than welcome to join!



Roberta CIRILLO is the former Director of Communication and Strategy of ENEN. Physicist and Nuclear Engineer by training, she complemented her education with Energy Management and Innovation & Business Creation courses.





ENEN# Webinars

Continuing ENEN# Webinars on Nuclear Energy managed by the University of Pisa. In the frame of the activities for WP3 of the ENEN# project, the <u>MSc in Nuclear</u> <u>Engineering of the University of Pisa</u> as member of CIRTEN has organised a new series of webinars for the Academic Year <u>2023-2024</u>.







Walter AMBROSINI is Full Professor in Nuclear Plants at the University of Pisa, Italy. His Research interests involve the field of Nuclear Reactor Thermal-hydraulics. He has been President of the Research Doctorate in Nuclear Engineering in Pisa (2008-2016), President of the MSc in Nuclear Engineering in Pisa (2011-2018), President of the European Nuclear Education Network (2013-2016), Member of the ASN Commission for Energetics and Nuclear Engineering (2018-2021), Present Member of the CDs of CIRTEN and of the Associazione Italiana Nucleare (AIN). His relevant Memberships: AIN, ENS, ANS, ASME.







European Nuclear Education Network

MISSION The mission of ENEN is the preservation and the further development of expertise in the nuclear fields by higher Education and Training.





APPLY.ENEN Platform To apply for education and training courses.



ENEN PhD Event & Prize It is cosponsored by ENEN, the European Commission Joint Research Centre (JRC), and the organizer of an international conference.





EMSNE Certification The European Master of Science in Nuclear Engineering (EMSNE) is endorsed by all ENEN members.







ENEN Newsletter A quarterly publication with regular updates about projects ENEN is involved in, news, partners initiatives, etc.



PROJECTS PORTFOLIO ENEN manages European Commission funded projects both as Coordinator and as Consortium Partner. Main activities include:



Dissemination & Communication Exploitation of results

International Mobility travel fund



- Universities,
- Research organizations,
- Regulatory bodies, .
- Nuclear industry

ENEN welcomes as well, International Members and Partners.





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