

ETRAP
2009



**4th International Conference on Education
and Training in Radiological Protection**
8 - 12 November 2009, Lisbon, Portugal

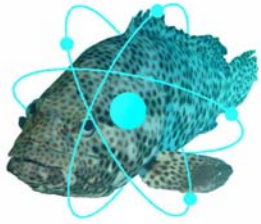
***A Network to enhance collaboration between
Higher Education Institutions on
Radiological Protection and Nuclear
Engineering***

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Polytechnic University of Valencia (Spain)***



Secretary of the CHERNE Network



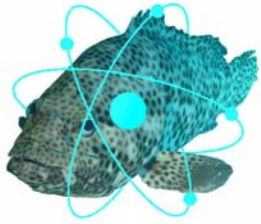
CONTENTS



CHERNE network

- *Motivation*
- *Brief history of creation*
- *Activities developed so far*
- *Last IP course: ICARO*
- *Projects for the future*



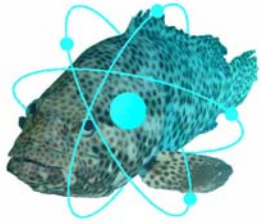


CHERNE network



- ***Cooperation for***
- ***Higher***
- ***Education on***
- ***Radiological and***
- ***Nuclear***
- ***Engineering***





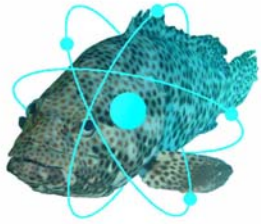
CHERNE network



Why?

- *Created in 2005.*
- *15 Institutions (mostly from Europe).*
- *Mainly focussed on **teaching and learning activities**.*
- *A wide-scope open academic network.*
- *To **enhance cooperation**, competence as well as equipment sharing between partners.*
- *A **declaration**, signed by all partners, contains details concerning organisation, membership and activities.*
(it can be found at www.upv.es/cherne/)

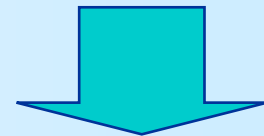


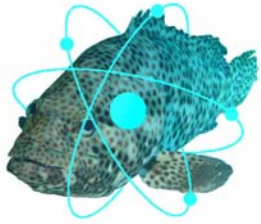


CHERNE network



- *Cooperation between partner institutions should enhance the mutual support ...*
 - ◆ *by learning from each other,*
 - ◆ *by exchanging experiences, and*
 - ◆ *by regular mutual reflections on ...*
 - *how to counteract the 'less interest among students' and the 'less interest among the academic and political authorities',*
 - *how to learn from more successful or from less successful partners.*



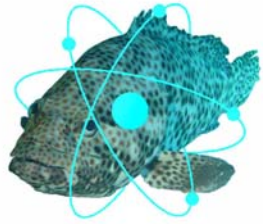


MEMBERS in 2009



- **AcUAS**, Aachen University of Applied Sciences, **Jülich** (Germany)
- *Alma Mater Studiorum - Università degli Studi di **Bologna*** (Italia)
- **ČVUT**, České Vysoké Učení Technické v **Praze** (Czech Republic)
- Dipartimento di **Fisica** ed Astronomia, Università di **Catania** (Italia)
- Dipartimento di **Fisica**, Università degli Studi di **Messina** (Italia)
- Dipartimento di **Ingegneria Nucleare**, Politecnico di **Milano** (Italia)
- Dipartimento di **Ingegneria Nucleare**, Università di **Palermo** (Italia)
- **DIQN - UPV** Departamento de Ingeniería Química y Nuclear, Universidad Politécnica de **Valencia** (Spain)
- **ETSEIB - UPC**, Escola Tècnica Superior d'Enginyers Industrials de **Barcelona**, Universitat Politècnica de Catalunya (Spain)
- **ISIB**, Institut Supérieur Industriel de **Bruxelles** (Belgique)
- **ITN**, Instituto Tecnológico e Nuclear, **Lisboa** (Portugal)
- **KSU**, **Kansas State University** (USA)
- Universidade de **Coimbra** (Portugal)
- University of Applied Sciences **Zittau/Görlitz** (Germany)
- **XIOS**, Hogeschool Limburg, **Diepenbeek** (Belgium)



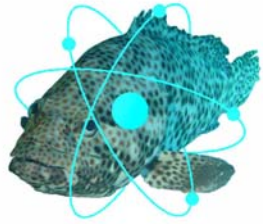


CHERNE organisation



- *A minimal administrative organisation.*
- *Secretary elected at the annual meeting.*
- *Web page through which the activities of the network are communicated: www.upv.es/cherne/*
- *Annual Meeting to evaluate the activities of the network and discuss new proposals.*
- *Annual Workshop open to non-members.*
- *For the moment no fee is foreseen for CHERNE membership.*





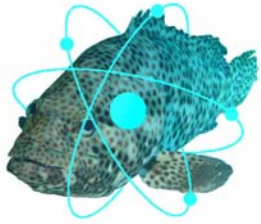
CHERNE membership



- *Academic institutions,*
- *research institutions,*
- *companies or*
- *individuals*
 - ◆ *are accepted as **members** on **presentation** by two members, including at least one European academic member.*
- *Documents for this presentation as well as the list of partners can be found at the official Web site:*

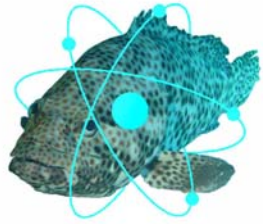


www.upv.es/cherne/



- *The **educational capacity** of many European Institutions of Higher Education in Radiological and Nuclear Engineering has decreased in the last two decades.*
- ***Less interest***
 - ◆ *among students and*
 - ◆ *among academic and political authorities.*
- ***Financial restrictions***
- *➔ difficulties to maintain and develop facilities, equipment and academic staff needed for practical training of students.*
- *Each university and country presents a different situation.*
- *Many departments had to **reduce their offer** and to concentrate it on a few specialities.*





POSSIBLE SOLUTION

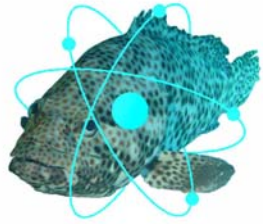


*An increasing **cooperation**
at the **international level**
on the educational efforts
in **Radiological and Nuclear Engineering***

Several networks have been developed...

*Some focused on specific domains,
concentrated on high level professional training,
strongly structured or not.*





Professor & Student exchanges

Erasmus bilateral agreements (2)

Courses and Seminars (3)

CHERNE activities

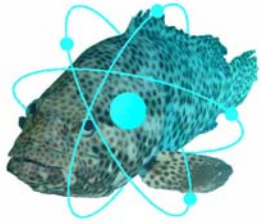
ERASMUS Intensive Programmes (5)

Workshops (4)

International INTENSIVE COURSES (7)

Presence at International (6) Conferences



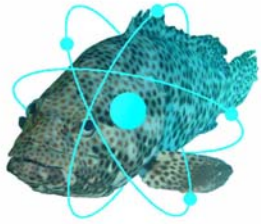


CHERNE activities



- *The scope of CHERNE is not limited and **any activity** related to Higher Education in Radiological and/or Nuclear Engineering can be proposed.*
- *A priority is given to **teaching activities for students** of member institutions (mostly at the Master level).*
- ***Teaching activities** should include at least a **one-week/2 ECTS module**.*
- *Necessity to include **practical training**, including when possible **access to large facilities**.*
- ***English** is used in CHERNE activities.*
- ***No cost, or very low fee**, for students coming from partner institutions*
- *Cheap **accommodation** for students coming from abroad.*
- *When possible, organisation of CHERNE activities will be included in **ERASMUS exchanges**.*
- *Partners are encouraged to sign **bilateral ERASMUS agreements**.*

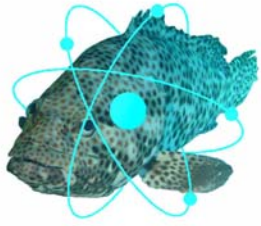




Workshops

- ❖ *Valencia (2005)*
- ❖ *Valencia (2006)*
- ❖ *Prague (2007)*
- ❖ *Favignana (2008)*
- ❖ *Jülich (2009)*
- ❖ *2010 programmed in Coimbra*



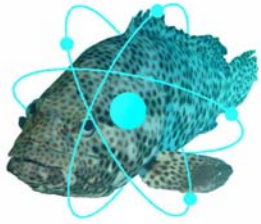


International intensive courses



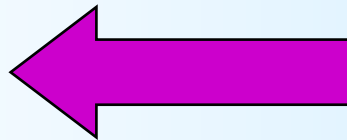
- ❖ ***Radiation protection***
 - ***RAPIX-NOCOS***
 - ***XI-MER***
- ❖ ***JUNCSS IP***
- ❖ ***ICARO IP***

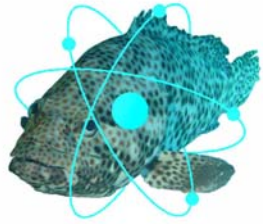




Presence at International Conferences

- ❖ ***ETRAP 2005***
- ❖ ***First EUTERP Platform Workshop 2007***
- ❖ ***European Nuclear Conference 2007***
- ❖ ***NESTet Conference 2008***
- ❖ ***IRPA-12 Buenos Aires 2008***





ERASMUS Intensive Programmes



PAN: Practical Approach to Nuclear techniques

SPERANSA: Stimulation of Practical Expertise in Radiological And Nuclear Safety

ICARO: Intensive Course on Accelerator and Reactor Operation and applications

Previous to creation of CHERNE

- 2002 PAN-1 Prague
- 2003 PAN-2 Prague
- 2004 PAN-3 Mol-Brussels

CVUT, ISIB & UPV

CVUT, ISIB, UPV, XIOS, FH Aachen

CVUT, ISIB, UPV, XIOS, FH Aachen

These courses can be considered the origin of the CHERNE network

After the creation of CHERNE

- 2006 SPERANSA-1 Mol-Jülich
- 2007 SPERANSA-2 Prague
- 2008 SPERANSA-3 Mol-Brussels
- 2009 ICARO-1 Lisboa ITN
- 2010 ICARO-2 Sicily (Catania-Palermo)
- 2011 ICARO-3 to be programmed

CVUT, ISIB, UPV, XIOS, FH Aachen

CVUT, ISIB, UPV, XIOS, FH Aachen

CVUT, ISIB, UPV, XIOS, FH Aachen, Poli Milano

XIOS, UPV, Catania, Bologna, CVUT, Coimbra, ISIB, FH Aachen, Poli Milano

XIOS, UPV, Catania, Bologna, CVUT, Coimbra, ISIB, FH Aachen, Poli Milano, Palermo

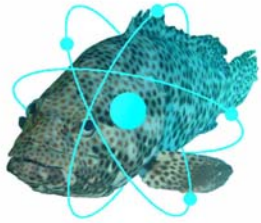


- 2008 JUNCSS-1
- 2009 JUNCSS-2
- 2010 JUNCSS-3

Jülich

Jülich

Jülich (to be organised)



RAPIX-NOCOS



Radiation protection and nuclear measurements in non conventional sectors

- *2-week course organised by ISIB Brussels and XIOS Diepenbeek (Belgium).*
- *Two editions (2007 and 2008).*
- *Students participating from UAS Aachen, Bologna, UPV, ISIB and XIOS.*

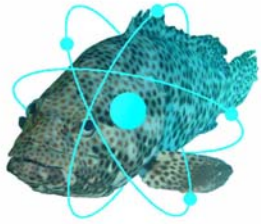
LECTURES

- ◆ *natural radiation,*
- ◆ *exposure of air crews to cosmic rays,*
- ◆ *indoor radon,*
- ◆ *natural radioactivity in building materials,*
- ◆ *radioactivity in the waste and recycling sector,*
- ◆ *exposition to NORM/TENORM in the non nuclear industry.*

PRACTICAL EXERCISES

- ◆ *software calculation of air crew dose,*
- ◆ *indoor radon measurements (charcoal, track-etch, continuous),*
- ◆ *soil radon measurements,*
- ◆ *radon risk evaluation (ECRS software),*
- ◆ *visit of detection portals for radioactivity in scrap or waste,*
- ◆ *simulation of intervention,*
- ◆ *measurement of NORM by gamma spectrometry,*
- ◆ *measurements by liquid scintillation.*





XI-MER



XIOS-ISIB Measurements of Environmental Radioactivity.

It took place at ISIB and XIOS from 11 to 20 March, 2009

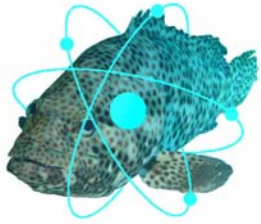
LECTURES

- *Natural radioactivity*
- *Artificial radioactivity in our environment – how to measure it*
- *Indoor radon: soil radon, measurements, risk evaluation, regulations, prevention and mitigation*
- *Environmental aspects of NORM in the non nuclear industry*

PRACTICAL MEASUREMENTS

- *Measurement of ^{137}Cs (artificial) in soil by gamma spectrometry*
- *Indoor radon measurement with charcoal collectors*
- *Soil radon measurement*
- *In situ measurement of natural radioactivity in the soil with a NaI/LaBr detector*
- *Learning to work with NaI and LaBr handheld detectors or NaI labo detectors:*
 - ◆ *measurements of standards, software tools, ...*
 - ◆ *measurement of NORM materials*
- *Preparation of in situ measurements: sampling, equipment, practical organisation*





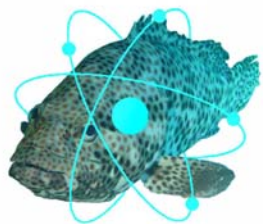
JUNCSS



JÜlich Nuclear Chemistry Summer School

- *Summer School (2-week course) organised by AcUAS Aachen in Jülich from 20 to 31 August 2007.*
- *The success stimulated to organisers together with other CHERNE partners to submit an **Erasmus IP** to the EU for academic years 2008-2010.*
- *Approved for 2008 and 2009 so far.*
- *Held on 18-29 August 2008 and 17-28 August 2009.*
- *Participants: ISIB, XIOS, UPV, Bologna, AcUAS, Coimbra.*





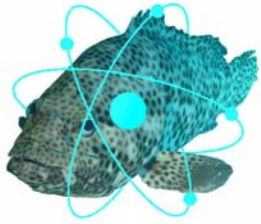
JUNCSS



*The contents of the course includes some theoretical lectures, but mainly **practical exercises** to acquire skill in working techniques in radiochemical laboratory:*

- ◆ *measurement and shielding of radioactivity*
- ◆ *radiation safety*
- ◆ *practical measurement of nuclear radiations (α , β , γ , n)*
- ◆ *working with open sources*
- ◆ *production of radionuclides*
- ◆ *radiochemical separation and radioanalytical techniques*
- ◆ *radiolabelling techniques*
- ◆ *applications of tracers*
- ◆ *chemistry of radioelements*





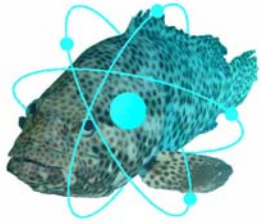
ICARO



Intensive Course on Accelerator and Reactor Operation and applications

- ***ERASMUS Intensive Programme.***
- ***Submitted for the 2009-2011 period.***
- ***Coordinated by Politecnico di Milano.***
- ***2009: organised in ITN Lisbon.***
- ***2010: organised in Catania and Palermo.***
- ***Participants (students and professors) from ...***
XIOS, UPV, Catania, Bologna, CVUT, Coimbra, ISIB, Jülich, Milano.
Palermo joined for 2010





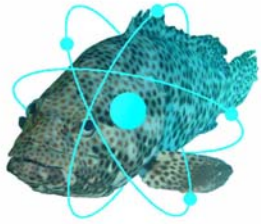
ICARO



LECTURES

- *Radiation protection*
- *Radiation shielding*
- *Radiation safety*
- *Interaction of radiation with matter*
- *Ion beam techniques*
- *Reactor physics – statics and kinetics*
- *Accelerator principles.*





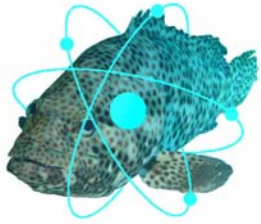
ICARO



EXPERIMENTS

- *Accelerator-related experiments (accelerator operation and calibration, Rutherford backscattering spectrometry, and PIXE –particle induced X-ray emission)*
- *Reactor-related experiments (start-up, rod calibration, and isotope production and measurement)*
- *Exercises related to radiation protection, radiation safety, radiation shielding, dosimetry, and radiation detection and measurement.*





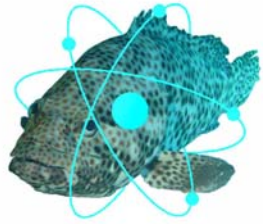
ICARO



ROUND TABLES

- *Ethical aspects of radiological and nuclear safety*
- *Nuclear/Radiological techniques and safety for sustainable development*
- *Synthesis and evaluation of the course*





Projects for the future



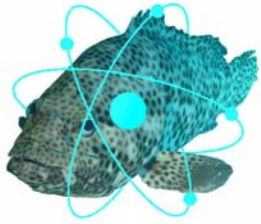
2010

- *XI-MER, Brussels – Diepenbeek (Belgium)*
- *ICARO, Catania – Palermo (Italy)*
- *JUNCSS, Jülich (Germany)*
- *6th CHERNE Workshop, Coimbra (Portugal)*

Continous exchange of ...

- *Professors (courses & seminars)*
- *Students (Master & PhD Thesis, research)*



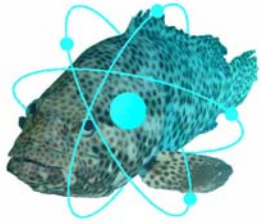


Some final remarks



- ▶ On the basis of an **existing collaboration** between some institutions, the **creation of the network** permitted to **enhance the educational cooperation** among partners.
- ▶ The main target of the CHERNE network is to develop **teaching activities for the benefit of students** of the institutions belonging to the network.
- ▶ The network is still young and small, and does not yet propose many activities, but already represents a clear **added value for the students**, in particular with the intensification of Erasmus exchanges between the partners.





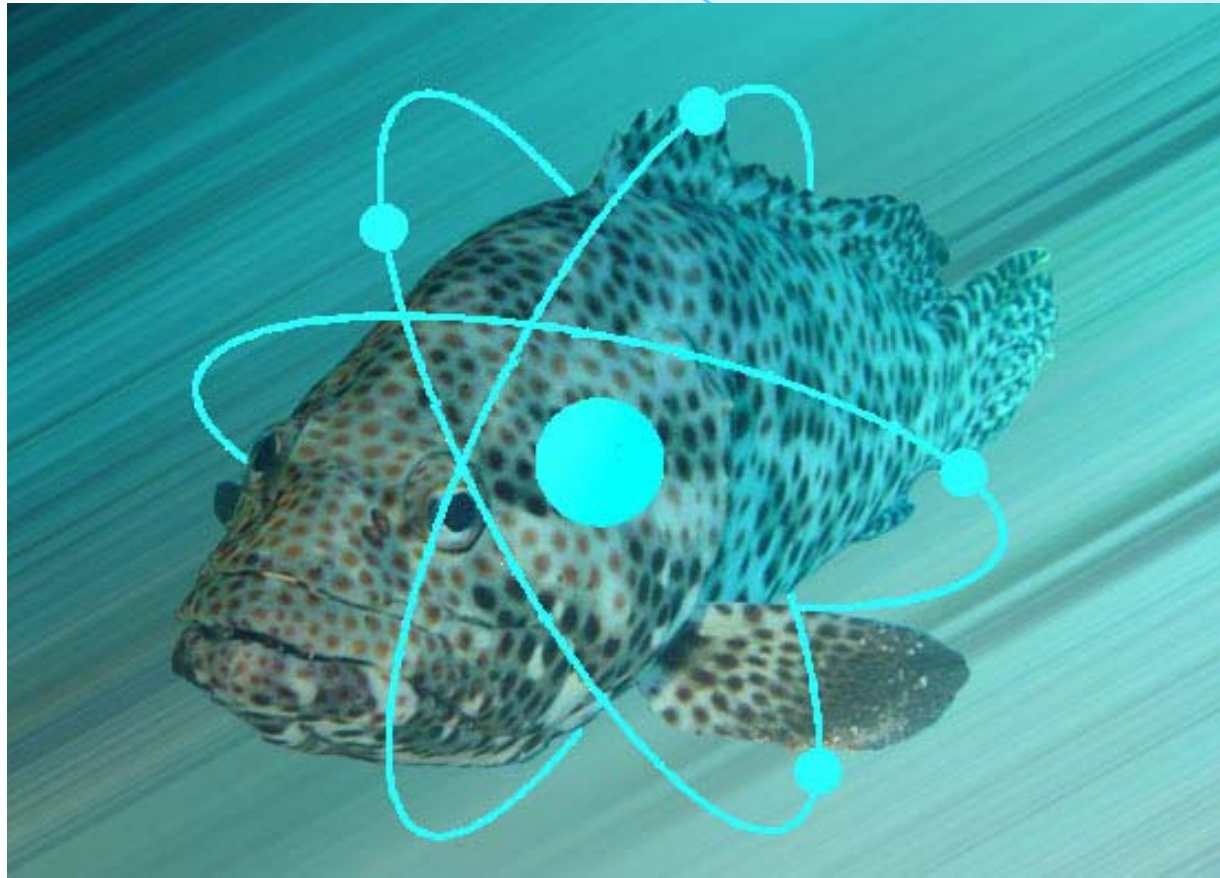
Some final remarks



- ▶ **The exchange of students has been clearly increased, giving them an access to specialised fields not developed in their own institution.**
- ▶ **A clear result obtained so far with the network, more specifically with the intensive courses already developed, is the enhancement of the interest of students and academic authorities on Nuclear Engineering.**
- ▶ **The perspective of the network is to gradually propose more activities, *while admitting new partners* who can contribute to the network's life with *new activities* and *more students benefiting of them*.**



Thank you for your attention



***CHERNE is also the name of a fish,
in Portugal and the Canary Islands***