

Initiatives of the Belgian SCK•CEN Academy to attract young talent in nuclear research and technology

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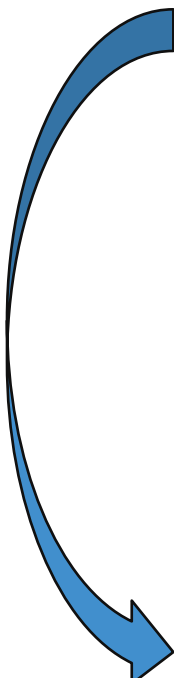


SCK•CEN: Belgian nuclear research center

- Belgian Nuclear Research Center is a foundation of public utility
- ° 1952, cradle of nuclear research, applications and energy development in Belgium
- major international player in the field of nuclear R&D
- today: ~700 staff, > 50% with academic degree + 65 PhD students
- annual turnover: 140 M€
 - 45% government support
 - 55% contract work





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- SCK•CEN = **research center**
 - > 60 years of **experience** in nuclear research and technology
 - Most **recent** knowledge and development
 - **Innovative** projects
 - Availability of **large and unique nuclear facilities**

 - SCK•CEN = **education and training** center
 - °2012: SCK•CEN Academy for Nuclear Science and Technology, coordinates all E&T activities, in broadest sense
 - Major nuclear training provider in Belgium, complementary to universities



- 1. Guidance young researchers**
 - Thesis (PhD, Master, Bachelor level), post-docs, internships, visits for students, (CPD – scientific visitors)
- 2. Organization of courses**
 - Academic courses for students
 - Customized training for professionals
- 3. Policy support with regard to E&T matters**
 - European Framework Programs, expert groups IAEA, OECD, EHRO-N, ENEN Association, ...
- 4. Caring for critical-intellectual capacities**
 - Scientific/technical + context! (philosophical, ethical, economical, political, ...)



Support young students in their need to gain and maintain high-level nuclear knowledge

Three highlighted topics for this presentation:

- supervising young students from Bachelor to PhD level
- contributing to academic courses like the ones of the Belgian Nuclear higher Education Network (BNEN), the Radiation Protection Expert (RPE) course and others
- familiarizing high school pupils and their teachers with the state of the art of nuclear research and with the daily activities performed at our research center



Your thesis/internship @ SCK•CEN

- Scientific topics determined by SCK•CEN mentors, within the priority R&D of our research center
 - (also more general topics in supporting disciplines e.g. office management, ICT, ... – lower levels, local schools)
- Published on Academy website after approval process
- Application: submission of candidates' file via the website
- Selection procedure
 - Straightforward for Bachelor/Master/internship
 - More complex/demanding for PhD and post-doc positions



Your thesis/internship @ SCK•CEN

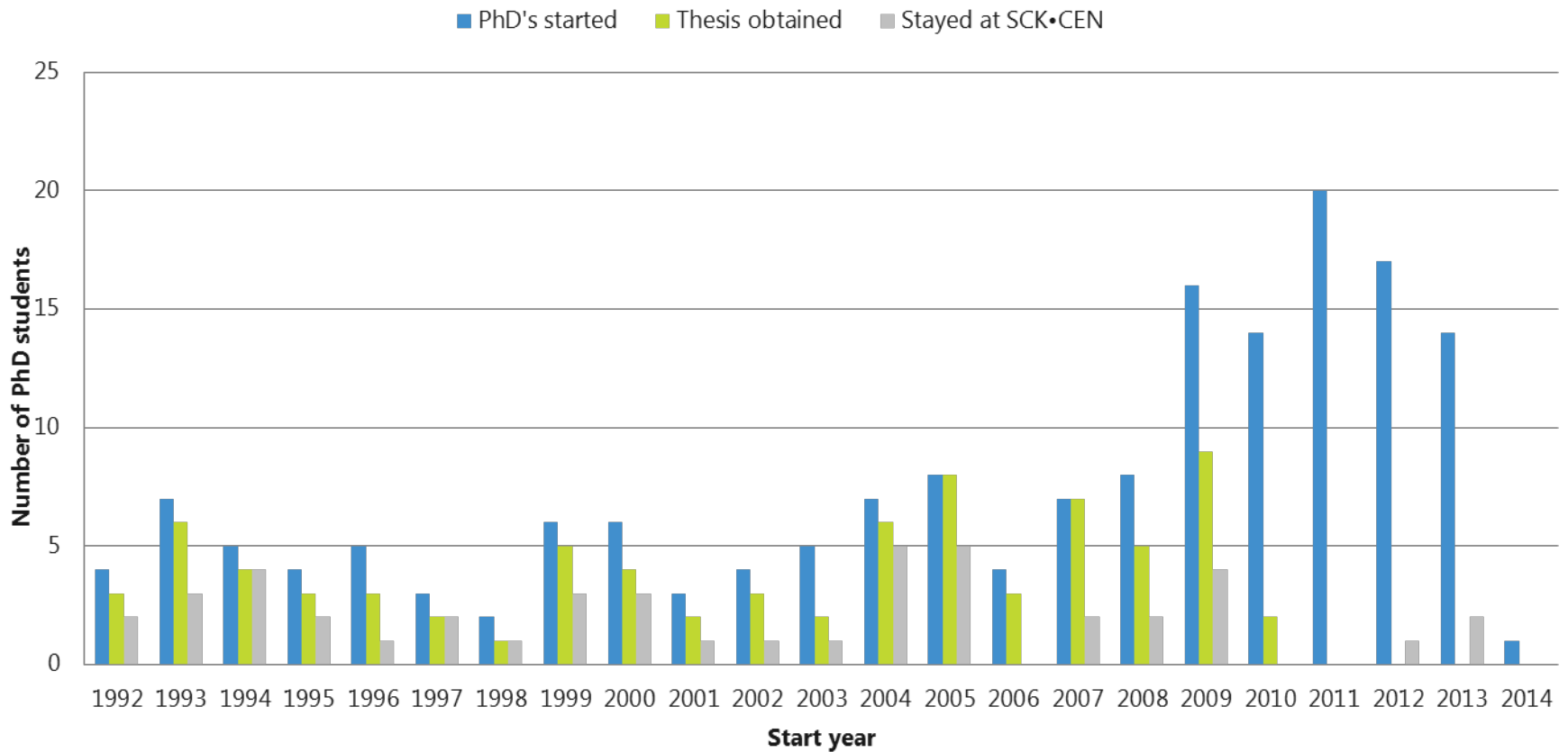
- Financial support by SCK•CEN for **Bachelor/Master/internship** is limited
 - Limited to monthly allowance + cheap housing (dormitory) in specific cases
- Nevertheless, we receive about 80 students on annual basis
- Few weeks – few months
- From Belgium and abroad
- They are guided by our experts, in close collaboration with the university promoter, make use of nuclear installations
- Annual award “best Master thesis”
- Few of them proceed with PhD research



- **PhD / post-doc program** exists since 1992, “boosted” in 2006
- Growth in number since 2006, mainly due to more involvement of third parties: FWO/FNRS, IWT, Belspo, ESA, 7FP, industry, ...
- Dedicated pro-active search for external finances more and more important / difficult
 - Collaboration
 - Sponsoring



PhD's: 170 started, 79 finished PhD's, 45 stayed at SCK•CEN (status May 1st, 2014)





- Currently, about **80 Bachelor/Master/internships** and **65 PhD** students are performing their research on a topic of SCK•CEN. Successful PhD students can apply for a limited number of post-doc positions at SCK•CEN, or a permanent position.
- We **work closely together** with **Belgian and international universities**, and with **end-users** (industry, medical sector, ...).
- Organization of “Day of the PhD”s and other events for SCK•CEN PhD’s: **cross-polonization, transdisciplinarity**.
- This combination provides **an exceptional learning opportunity**: students stay in close contact with the academic world + they enjoy a unique international research environment.



Contribution to academic courses

- The Academy organizes courses in all research topics of SCK•CEN:
 - Radiation protection, nuclear technology, nuclear materials issues, emergency management, decommissioning and decontamination techniques, waste and disposal issues, nuclear safety, safety culture, safeguards, nuclear security, ethical aspects, nuclear technology assessment, ...

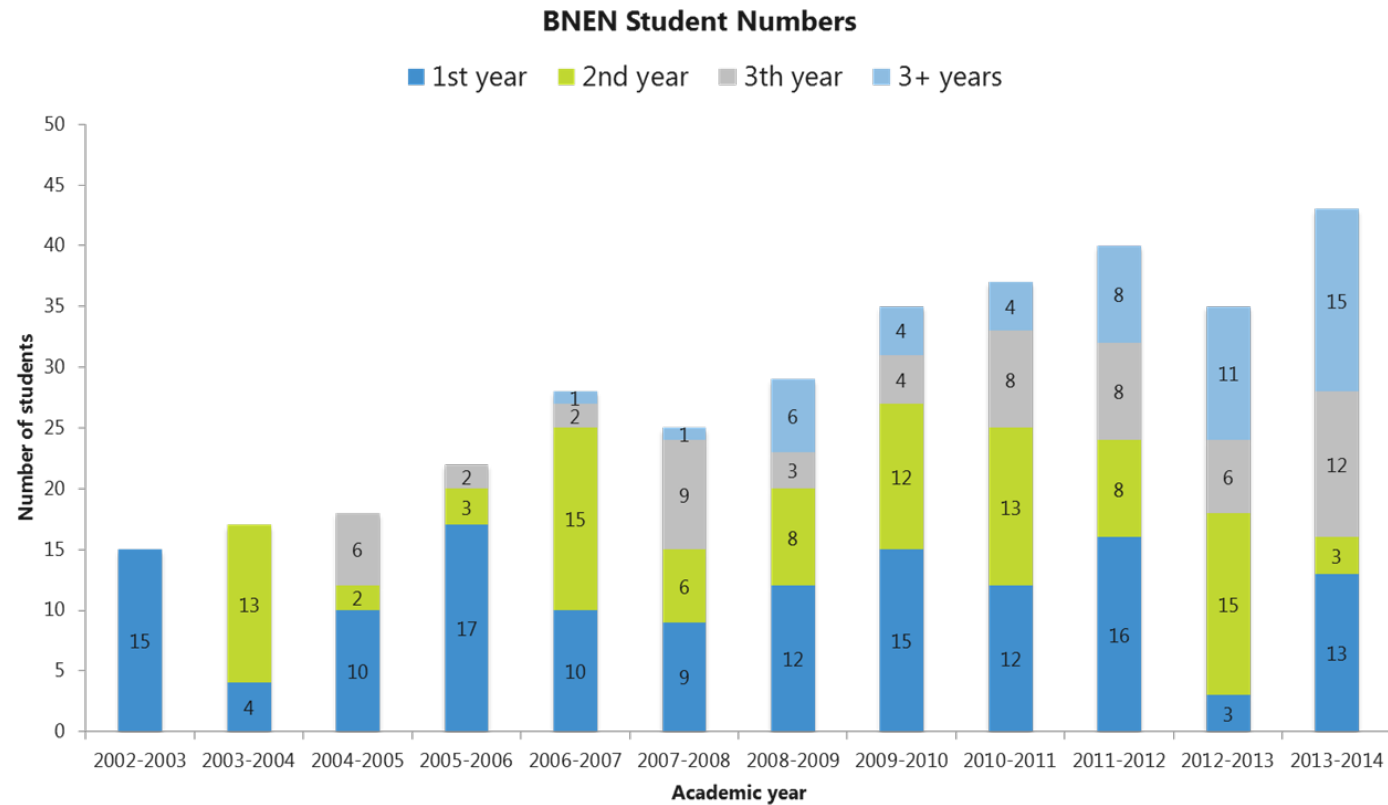
- Took initiatives to start cooperation in order to increase students and make nuclear education more attractive
 - BNEN
 - RPE course

- “Master-after-Master” degree of 60 ECTS, in English
- °2002, BNEN program intends to remodel the nuclear education in Belgium, catalyze networking between academia, research centers, public utilities, etc.
- Organized by 6 Belgian universities and SCK•CEN, support from industry
- Venue: SCK•CEN
- Modular → allows for optimal time management for teachers and students; facilitates individual participation in selected courses and foreign students participation in blocs of courses (ENEN program)





- About 10-15 new students (full program) each year
- Total about 75 graduates





Post-graduate course for Radiation Protection Expert

- In line with legal requirements for RPE
- °2003, 20 ECTS, in Dutch and French

universiteit
hasselt
KNOWLEDGE IN ACTION

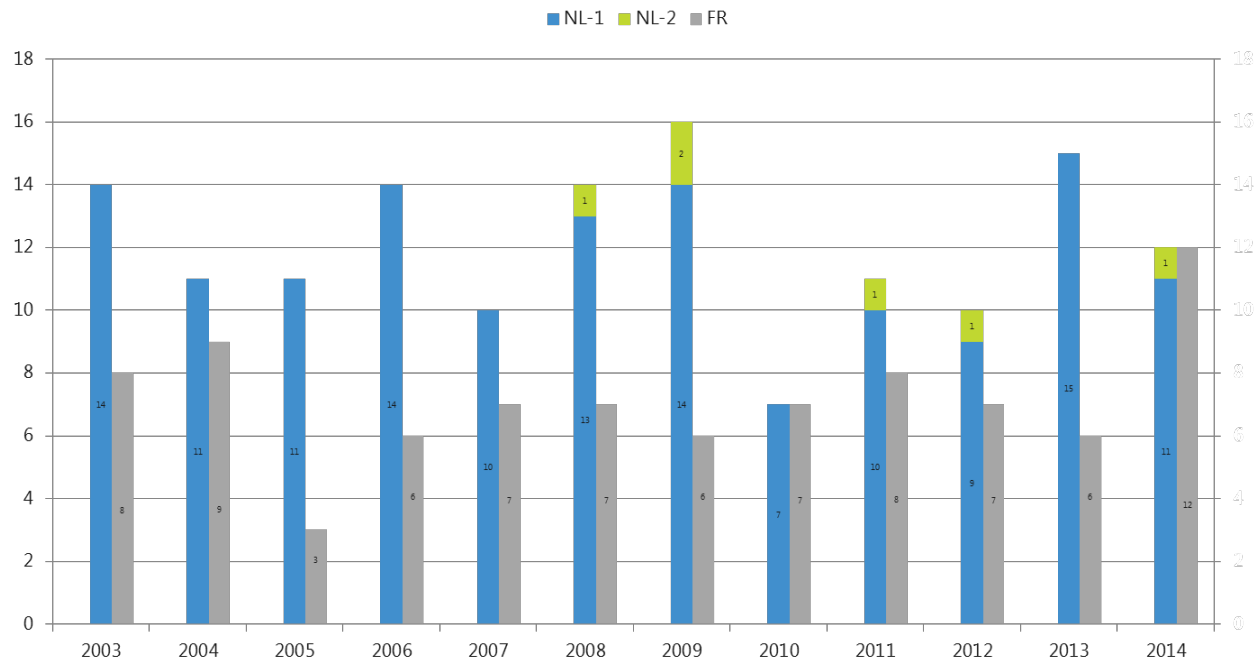


institute for
radioelements **RE**



STUDIECENTRUM VOOR KERNENERGIE
CENTRE D'ETUDE DE L'ENERGIE NUCLEAIRE

Evolution of student numbers in the UHasselt/ISIB programme





Other contributions to education

- European Master in Radiation Protection
- European Master in Radiation Biology
- Summer school in Radiation Biology
- Contributions to Erasmus programs like SPERANSA / SARA (CHERNE Network)
- Founding member of the ENEN Association
- Some of our scientists/engineers are part-time professor at university
- ...



Specific target public: high school pupils and their teachers

■ Pupils

- Last year(s) of high school – 17/18 years old
- Wide attention span, eager to learn, curious
- Start to realize complexity of certain issues
- Develop an open and critical mind in order to gain more insight in risks and benefits of radioactivity and nuclear technology

■ Teachers

- (one of) First source of information to pupils
- Need to understand very well, before being able to transfer knowledge
 - Understand technical/scientific part; have most recent information
 - Be able to deal with the societal debate



- Explain/refresh basics of radioactivity
- Discuss several examples of nuclear applications
 - In nuclear, medical, non-nuclear industry, daily life, ...
- Present research activities of SCK•CEN, justify why nuclear research is important, how does it contribute to well-being of society in general
- Discuss with teachers how the standard education programs can integrate a pluralistic approach to complex technical issues such as applications of radioactivity



1. Dedicated website
 - <http://jongeren.sckcen.be>
 - In Dutch and French
2. Thematic guided tours at SCK•CEN
 - Four generations of nuclear reactors
 - Radiation in space
 - Radioactive waste and disposal
 - Reactor technology – from idea to practice
3. Workshops for teachers (“teacher’s days”)
 - “four generations of nuclear reactors”
 - “your daily portion of radioactivity: from sea-level to space”
 - ...



- For all above mentioned activities the Academy can count on a **pool of about 100 top-level scientists, engineers and technicians of SCK•CEN** who all bring insights and ideas from their specific background and transfer this to the next generation.
- Next to the scientific and technical issues, attention is given to practical exercises and **“real-life” situations**.
- **Attention is also given to** the societal aspects of nuclear applications. With this approach we aim at providing pupils, students and early-stage researchers **insight in the wider context of nuclear applications**.
 - Ethical aspects of radiological risk
 - Nuclear technology assessment
 - Organization of reflection groups



- Focus on knowledge, understanding, skills, attitudes, ... and show “real-life” situations = added value
- Mention the whole picture:
 - ALL application fields, ALL issues
- Motivate to choose for scientific or technical studies can be one aim, but equally (or more) important: discuss risks and benefits of nuclear applications in general, **develop an open and critical mind in order to gain more insight in multi-faceted issues** such as risks and benefits of radioactivity and nuclear technology, and contribute in serene way to the societal debate
- **Contribution to critical-intellectual nuclear capacities for society**