NUCLEONICA:
A WEB PORTAL FOR THE NUCLEAR SCIENCES

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NUCLEONICA:SNAP Science Networking and Applications Portal

1. What is Nucleonica? Underlying philosophy
2. Nucleonica web portal www.nucleonica.net
3. Social networking aspects
4. Nuclear science applications
5. Training courses
6. Karlsruhe Nuclide Chart
7. Future developments: SciencePipes
Knowledge and Learning: Overview

Knowledge and learning have been the subject of study for centuries. Aristotle differentiated between various types of knowledge and how they are acquired. In the eighteenth century, Adam Smith developed a theory of knowledge to be gained through "division of labour" and based on repeating well defined tasks. However, since the early 1990s, the "knowledge economy" or "knowledge society" has gained increasing attention in management circles with many large organizations engaging in a range of knowledge and learning activities. Some of the reasons for these developments are as follows...
Knowledge and Learning: Overview...

1. The realization that the Western world (and Japan) were increasingly producing and profiting more and more from services and making fewer tangible goods. This substantial economic shift was a result of manufacturing moving to "less developed" nations because of lower costs.

2. Increasing importance is being given to an organization’s competences and capabilities rather than material and financial resources. As a consequence, organizations began to realize that their most valuable resource could be found in the brains of their employees.

3. The impact of the "learning by doing" school of thought (Constructionism), on how expertise develops in practice.

4. The geographically dispersed nature of organizations which leads to the formation of virtual teams operating in a cyber-environment.

5. Knowledge related technologies i.e. the proliferation of knowledge and learning tools. However, technology driven approaches (pushed by vendors of software for example) need to be used with care to ensure that they play only a subordinated role in the management of people and processes.
Types of Knowledge: Explicit vs. Tacit

It is generally accepted that different types of knowledge have very different characteristics. Explicit knowledge, for example, consists of facts, sets of instructions, etc. Implicit knowledge, on the other hand, is more related to know-how. These different types of knowledge have, of course, very different characteristics with regard, for example, to transferability. Explicit knowledge is transferable from person to person, across space and time. In contrast, tacit knowledge cannot be easily articulated and its transfer is slow and uncertain. As a consequence, explicit knowledge is not the basis of sustainable advantage over other organisations (except in the form of copyrights, patents, etc.). It is more the tacit knowledge that fits this role and this is notoriously difficult to transfer - even within the organization itself.
Measurement Exercise “Gamma Spectrometry”
ITU, Karlsruhe, 10th Feb. 2009

First Advanced Training Course on Illicit Trafficking and Consequence Management with
NUCLEONICA will take place on the 23-24th April 2009 at the Institute for Transuranium
Elements, Karlsruhe

Treatment head for Beatson named

The new head of treatment at the flagship Beatson West of Scotland Cancer Centre has been
named as Dr. David Dunlop. Dr Dunlop replaces Professor Alan Rogers, who retired as clinical
director of the &...

Development of uranium deposits new Russian project in Armenia this year

YEREVAN, February 5, 2009. The development of uranium deposits will be a new Russian
project in Armenia this year, Russian Ambassador to Armenia Nikolai Polkov told a press conference
at the international press center Novosti. The Armenian-Russian Mining Company established last
September is developing uranium deposits in Armenia

Obama says US, Russia must work to halt nuclear proliferation

WASHINGTON, US President Barack Obama said Monday the United States and Russia should
lead the way in preventing nuclear proliferation by restarting negotiations to cut their atomic
arsenals.

Obama says US looking for Iran talks in coming months

WASHINGTON: US President Barack Obama on Monday renewed his call for direct US dialogue
with Iran, saying he hoped to create the conditions to “start sitting across the table, face to face”
in the coming months.
JRC Karlsruhe Measurement Exercise “Gamma Spectrometry”

ITU, Karlsruhe, 10th Feb. 2009

My Community/My Profile...

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Simon Jerome
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Add to Your Contact List

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Areas of Interest: Migration of radionuclides in the environment; Effect of organisms, natural and anthropogenic, on radionuclide transport

Latest Publications:
- Muhammad Haseem Khan, Peter Warwick and Nick Evans, Spectrophotometric Determination of Uranium with Ammonium-III in Perchloric Acid, Chimia, 63, 2009, p. 1165
Nucleonica Architecture & Logical Structure...

- Calculation modules (explicit AND implicit knowledge)
- Databases (nuclear data)
- Web page
- Wiki (explicit AND implicit knowledge)

The NUCLEONICA Structure
Nuclear science portal ...

Applications centre...

Networking centre...

Knowledge centre...

Data centre...
The 9th Nuclear Science training course on Radioactivity, Radionuclides and Radiation with Nucleonica was held at the Ostendorfhaus, Karlsruhe from the 25th to 26th October, 2007. The two-day course provided a general introduction to the recently released Nucleonica, the new science networking and applications portal. Nucleonica is a powerful and versatile web-based software package for the nuclear science community. With examples and exercises, a variety of core and topical issues in nuclear science and technology were presented by experts in their respective fields.

A total of twenty-nine participants, around half of them women, with a diverse range of backgrounds attended the course. There were participants from Azerbaijan, Belgium, Bulgaria, Czech Republic, Poland, Romania and Turkey. In addition there were 10 participants from the Institute for Transuranium Elements. Among them were students, academics and industry professionals from fields such as nuclear medicine, radiation protection, environmental radioactivity and reactor physics.

Final Agenda 25th Oct. 2007

How to get from the hotel to the conference training centre

Links to the presentations and exercises:
- Networking with Nucleonica (J. Magill) Exercises
- Nuclear Data (J. Galy) Exercises
- Nuclide Charts (C. Normand) Exercises
- Decay Engine (A. Barlou) Exercises
- Dosimetry & Shielding (J. Galy) Exercises
- Nuclear Forensics & Illicit Trafficking (K. Mayer) Exercises
- Overview of the Institute for Transuranium Elements (F. Wostin)

Advanced Nucleonica Features (J. Magill)

Training Course Feedback
- QM Questionnaire
- Course Certificate
- List of Participants
- Gallery
Highlight: webKORIGEN
Modelling Activities: Radiological consequences of an RDE involving radioactive and nuclear materials with the Wedge model.
• Modelling Activities: Radiological consequences of an RDE involving radioactive and nuclear materials.

Comparison of simple analytical models (WEDGE) and complex codes (LASAIR)
**Gamma Spectrum Generator**... can be used to simulate the gamma spectrum of radioactive substances with a variety of detectors (e.g. NaI, HPGe). The simulator presents an efficient visual teaching aid that is especially useful in training facilities which have restrictions on the use of radioactive substances, or when sources of special interest are not available.

Needs for **Education & Training** in these areas are high and, obviously, they will be increasing in the future as new challenges arise, such as

- strengthening international safeguards and security,
- nuclear terrorism prevention

of interests for...

- nuclear and radio-chemists,
- health physicists,
- nuclear facility operators,
- radiation protection staff,
- safeguards inspectors,
- border police,
- customs and law-enforcement officers.
This “one-click” calculation simulates the spectrum for a 10 MBq $^{60}\text{Co}$ γ-source located at 25 cm distance from unshielded 3" x 3" NaI detector. A typical result of the calculation is shown...
The $\gamma$-spectrum modelled for a 10-year-aged natural U sample and 3"×3" NaI detector. The two diagrams show different presentations of the same spectrum. The top diagram shows the separate contributions from the parent and daughters of U-234, U-235, U-238. The bottom diagram shows the contributions from the peak and continuum components of the spectrum.
easyMonteCarlo:
easy to use, fast, accurate
dosimetry and shielding calculations
for gammas and neutrons using
Nucleonica’s powerful Monte Carlo
engine. Investigate the effects of
self-attenuation in the source, build-
up effects in the shield etc., on the
dose rate and the particle flux
distribution at the detector…

NUCLEONICA’s
easyMonteCarlo web-
page showing the
currently implemented
shielding geometry…
An example of the easyMonteCarlo calculation results is shown. The figure demonstrates the photon flux energy distribution from the $^{60}$Co source with 10 cm $\times$ 50 cm $\times$ 50 cm iron shield. The source-to-shield and source-to-detector distances are 20 cm and 40 cm respectively. The contributions of the direct and scattered photons to the total flux are indicated on the graph by the red and blue columns respectively.
webGraphics...

The Nucleonica webGraphics Features:
• No need to buy expensive commercial software
• Easy to use
• Delivers publication quality scientific graphs
• Variety of formats available (gif, jpg, emf, eps, png, svg)
• Graphics configuration can be stored for future use
• Available at any time from any location
• Under constant further development
Conclusions: Key Advantages of Nucleonica

• Keep informed with the latest news on nuclear issues
• Use internationally evaluated nuclear data in your work
• Extensive range of nuclear science applications
• Manage all your data in a single browser-based system and keep track of your recent activities
• Prepare a lecture or a training course with Nucleonica materials (graphics, etc.)
• Prepare publication quality scientific graphs
• Stay in contact with your colleagues from previous employment, workshops or conferences
• Meet scientists from your areas of interest and build up an international contact list and represent yourself and your Institute/Organisation in the international science community
Fold-out Chart & Brochure:  

Wall-chart:
New: “Roll-Chart”

New Publication:

Karlsruhe Nuclide Chart
Long-term Vision…

SciencePipes

A New Approach to Knowledge Management, Education and Training based on Modular Web Services

- can be combined from other web services from any location (+)
- can only be called up from anywhere anytime (+)
- combining web services requires no programming knowledge(+)

*Widget is a means of offering a web service in a package that is easier to integrate on a web page.
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Thanks!