



In Retrospect of two election terms as Chairman

I vividly remember our annual division meeting at the TAN conference in Davos in 2007. Tony Ware, the initiator of our division at EuCheMS explained – not the first time – that he would like to step back from his duty as chairman. As usual, nobody raised his hand. So, I felt sorry for Tony and decided, though totally unprepared at that very moment, to suggest my name as candidate. A vote then led to my election as of January 1st 2008. The election periods for chairmanship of a division in EuCheMS are three years. Therefore, I now decided that after two turns it is time to also resign from this duty.

I am extremely happy that Dr. Nick Evans agreed upon replacing me as of January 1st 2014.

During my chairmanship I had the opportunity to get involved into EuCheMS business. During the first years this meant yearly meetings in Brussels because the chairmen of the divisions were acting members of the EuCheMS executive board. Unfortunately, it was decided that from 2011 onwards the divisions will not be represented anymore at the executive board meetings except for two delegates.

This clearly led to a loss of bottom-up impact of division interests onto the EuCheMS strategy, also because the General assemblies, where divisions heads are still invited to participate are more a political forum with little opportunity for mutual discussions.

Business of our division during the last six years proceeded well. Some concern comes from the observation that not all nominated national representatives of our division are willing to execute their mandate with sufficient personal dedication. In some cases the now-shows at business meetings can be explained by financial shortages of National Chemical Societies. But in several other cases it is distressing to realize that the nominees are simply not aware of their responsibility

It is our fortune that the well established two conference series RadChem in Marianske Lazne organized by J. John and NRC organized every four year by a different European country continued to be well attended events. For NRC the conferences were in Budapest, Hungaria, organized 2008 by late A. Vertes and in Como (Italy), organized 2012 by M. Bonardi.

Of course, there were many additional topical conferences and workshops in specialized fields of our discipline.

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Election of a new division chair

At the annual meeting of the Division of Nuclear and Radiochemistry on 11 Sept. in Brighton, held during the MIGRATION Conference from 8 – 13 Sept. 2013, Dr. Nick D.M. Evans was unanimously and without abstentions elected as division chair. Nick will start his new position in January 2014.

Nick Evans is senior lecturer in Radiochemistry at the Department of Chemistry of Loughborough University in Great Britain. His research interest is much devoted to Geological disposal of radioactive waste.

His longstanding experience in this field of nuclear sciences made him the ideal candidate to act as chairman of the 14th International Conference on the Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere, MIGRATION 2013, This conference series is held every three years at a place all over the world.

**APSORC 2013 in Japan**

From 22 – 27 Sept. 2013 the 5th Asian-Pacific Symposium on Radiochemistry, APSORC 13, was held in Kanazawa, Japan. It was attended by some 360 participants. This conference series was initiated in 1994 by Prof. T. Kishikawa and is held every four years. So far, all except two conferences were organized in Japan, the two exceptions being one in China and one in California (USA). The forthcoming APSORC will be held in 2017 in South Korea.

APSORC is designed as an event serving all disciplines in radiochemistry, similar to our European conference series RadChem and NRC. Therefore, APSORC serves as an ideal platform to discuss recent progress in Radiochemistry and in Nuclear Chemistry without going too much into details that are of interest to specialists in their respective fields only.

Since the timing of APSORC is ideally fitting into years without European Conferences, it usually a remarkable well attended by colleagues from Europe. Moreover, APSORC enables mutual personal exchange with colleagues from Asian countries who do not attend scientific events overseas regularly.

The topics covered by APSORC 13 were Fukushima issues, Application of nuclear and radiochemistry techniques, Nuclear chemistry, Nuclear forensics, Environmental radiochemistry, Nuclear energy chemistry, Actinide chemistry, Radiopharmaceutical chemistry, Nuclear medicine, Education in nuclear and radiochemistry, Nuclear probes for material sciences, and Activation analysis

Let me not finish my farewell remarks without appreciating the person *who did the real work*. It is Prof. Jan John, the secretary and an extremely motivated member of our division. Without his help and permanent support it would not have been possible to successfully act as skipper of a ship named Division of Nuclear and Radiochemistry through my time as division head. I am also very pleased to hear that Jan is willing to act as our secretary in future. I am convinced that this will help our new chairman to keep business running without any problem. In this sense I wish our division much success for the years to come.

Heinz W. Gaeggeler

CINCH-I project

In order to mitigate the effects of the declining number of qualified staff in nuclear chemistry, from 2010 to 2013 the CINCH-I project - Cooperation in Education in Nuclear- and Radiochemistry in Europe – sought to coordinate education in Nuclear Chemistry. The CINCH-I project aimed at the coordination of the rather diverse situation in nuclear chemistry education and training in Europe. The project also aimed at providing a common basis to the fragmented activities in this field and thus moving the education and training in nuclear chemistry to a higher level. The main target groups were not only the doctoral students and research workers but also students at the Master level. By introducing Master students and even bachelor students to the field of nuclear chemistry this early in their studies it should increase the awareness and attractiveness of choosing a carrier within nuclear and radiochemistry and thus enlarge the source of highly qualified professionals for the future employers.

The CINCH consortium included both academia and 'future employers', thus representing all the key players in the field. A big benefit was the participation of a Russian partner (Moscow State University) in the project that added the considerable Russian expertise in this field. The experience gained by former EU 6th FP projects like EURAC, ENEN II, ENETRAP etc. and ENEN association during the coordination of nuclear engineering education was directly applied.

The main results of the project with the broadest impact to students, teachers, industries, and research community are a set of compact joint modular courses developed in different branches of modern nuclear chemistry, an electronic tool in the form of a virtual educational platform developed and demonstrated for both education and training, and a long term sustainable strategy for the nuclear chemistry education - including a roadmap for its implementation.

**Main results***University curricula evaluation*

The objective was to collect information on nuclear and radiochemistry education in the European universities, and then to evaluate and compare the curricula of these universities. This work formed the basis for all following undertakings in the education field. Not only EU countries were involved but the whole of Europe, including Russia, was covered. The universities were categorized into various groups depending on whether they give courses at bachelor, Master or graduate levels. Another classification was based on the general area on which the university focused its education (general nuclear and radiochemistry, nuclear technology, radioecology, radiopharmaceutical chemistry etc).

This education survey was complemented with two databases. One of them is the database of existing practical exercises in nuclear and radiochemistry. A detailed database of the laboratory exercises available and/or in use at the universities in Europe has been compiled. All the providers of practical laboratory courses have been invited to contribute detailed descriptions of work for the respective exercises into a common database. This database will thus become a basic source of information for implementation of new or update of existing practical laboratory courses. As a main exploit, it may also serve as the basic resource for drafting a future textbook of practical laboratory exercises in nuclear chemistry.

Similarly, a comprehensive list of textbooks, university textbooks and other teaching aids that adequately cover all the topics within nuclear chemistry at different levels has been compiled. This survey was not limited to the European textbooks but it covers all the textbooks that have been published in English or any European languages. The titles have been grouped based on their scope – e.g. general textbooks, nuclear fuel cycle chemistry textbooks, radioanalytical textbooks, etc. Suitable textbooks have been recommended for the identified routes and levels of nuclear chemical education. One of the exploits of this evaluation is the identification of the potential gaps in the coverage of the field by available textbooks and suggestion of the correction measures. The most important example of this effort is the identified lack of comprehensive textbook of practical laboratory exercises in nuclear chemistry

University curricula development

The objective was to define a set of curricula leading to different levels of radiochemical education that would be applicable at any university. To achieve this objective, the most important target specializations of nuclear and radiochemistry education, such as actinide chemistry, nuclear fuel cycle chemistry, radioecology, radiopharmaceutical chemistry etc., were identified. Optimum routes leading to various levels (PhD, Master) of qualification in these fields were defined. The curricula were proposed for each of the various routes and levels of education identified in the form of “Minimum requirements” for the extent (number

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of ECTS credits) and contents of the nuclear chemistry courses proposed. The plan deals with essential knowledge (courses/modules/exercises) required at various levels. Entry points for trainees with different background and education levels were defined.

The main result was a set of curricula leading to different levels of nuclear chemical education. The curricula developed for the Master level of education became a basis for the future "European Master in Nuclear and Radiochemistry". This "label" should guarantee a uniform level of the university graduates bearing the title of MSc in Nuclear and Radiochemistry or MSc in Chemistry specialized in Nuclear and Radiochemistry.

Identification and evaluation of the training needs

The current nuclear industry is facing a challenge in finding and training a whole new generation of employees. As a contribution to coping with this challenge, identification and evaluation of current training needs was performed. Information on the nuclear industry (as the largest employee of the graduates) and the potential developments in the next five to ten years together with their current training aids were collected. In addition, an attempt was done to compile, review and evaluate a list of training aids used by the industries in the field of nuclear chemistry and radiochemistry.

Based on this survey, elements of optimum curricula for different target groups and different levels of radiochemical training were proposed. A plan was made for a basic nuclear and radiochemistry training programme that provides professionals educated in non-nuclear disciplines of chemistry with the necessary skills needed for enrolling the topical modular courses developed.

Joint courses and Strategies development

The primary objective was to develop several "sample" compact modular courses and design a system for student and teachers exchange (including internships). This was realized by selecting several courses from the university curricula and training courses which then were transformed into compact (1-2 weeks) modular courses. The developed courses combine lectures and practical laboratory exercises, as "hands-on" training is essential. Two types of such courses were identified, and three sample courses were developed and demonstrated; each of them for about 10 international students:

1. General purpose education/training courses in different branches of modern nuclear chemistry for the students and/or trainees with sufficient nuclear chemical background. Demonstration courses were "Chemistry of nuclear fuel cycle" (hosted by ENSCP Paris) and "Radioecology" (hosted by UMB Aas, NO).
2. Dedicated training course designed namely for delivering the basics of nuclear chemistry to non-nuclear chemists, including the "senior" ones – e.g. employees of the end users requiring requalification.



Demonstration course was “Hands-on training in nuclear chemistry” (hosted by CTU Prague).

In addition, curricula of a series of additional courses were proposed and developed. They are usually based on courses existing at CINCH partners and they can be easily brought up to the demonstration level as joint modular courses.

The secondary objective was to develop a long term strategy for the nuclear chemistry education. This task included two studies:

- Examination and comparison of alternative routes leading to a European Master in Nuclear Chemistry
- Evaluation of the options for a sustainable system for students and teachers exchange (including internships).

Two alternative routes to EuroMaster were examined – the “ECTNA route” and the “ENEN route”. The ECTNA route was selected as the preferred route, however, it was concluded that, if required, the networking associated with the NRC EuroMaster quality label awarded by ECTN Association could be developed in partnership with ENEN. As ENEN activities are not much oriented towards nuclear- and radiochemistry, the NRC EuroMaster project is not in competition which should favour a fruitful collaboration.

Among the various identified sources of financing, the programme “Erasmus for All” seems to be of high interest. In particular, the possibility of creation of “knowledge alliances” and “sector skills alliances” is highly attractive and could be a relevant way to strengthen the partnerships between higher education institutions and industrial end-users. In the same spirit, the creation of “chairs” supported by industrial end-users should be cautiously considered with a reasonable probability of success considering both the needs of recruitments and the quality of the consortium of universities involved in the NRC EuroMaster project. For the end-users, the contribution to such a chair would allow them to exchange with all the universities participating to the consortium. Also, it would allow them to easily identify and detect candidates throughout Europe. Other potential sources of financing include creation of continuing programmes based on modules available in the NRC EuroMaster, enrolment of non-EU students for which the tuition fees can be high and of course a myriad of bilateral or national programmes.

An interactive database of teaching material and the CINCH e-learning platform

The aim of this work package was to develop and launch an e-learning platform for providing distance-learning courses in nuclear chemistry. Such e-learning tools, when built up in a sensible way (based on appropriate learning methodology), may be useful and effective addition to traditional teaching. The main tasks in this regard were:



- a) Identification of the topics that would be deliverable on-line.
- b) Development of a database for sharing and distribution of e-learning tools and materials.

As the interactive database an open structure was proposed and implemented as a "Wiki" using the wiki-server of the University of Oslo. The best example of a wiki is Wikipedia (www.wikipedia.com) which is well known to most people. We wanted to create a database – implemented as a wiki system – of nuclear and radiochemistry teaching material to help teachers find and preferably also share their own teaching their material. In this way "recreating the wheel" should be avoided. Furthermore, by developing new teaching material as a collaborative effort should heighten the quality of the material developed. Our trial-server was named NukWik. Later on, as part of the follow up CINCH-II project, NukWik was moved to a commercial and thus more accessible server called NucWik (<http://www.wikispaces.com/Nucwik>).

An important part of this work was to identify an optimum sustainable e-learning management platform. As a starting point the platforms already implemented at CINCH Partners Universities were evaluated with respect to suitability for our task. Based on the results of detailed discussions of various options available, the user-friendly e-learning platform Moodle was selected and implemented; it is accessible from the CINCH web page. The platform aims at Master/PhD students and other trainees. It is available for e-learning modules or whole joint courses in nuclear- and radiochemistry. It should allow teachers and students to get information needed in the respective course in fast, interactive and sufficient form. This distance education platform should facilitate the access of the educators as well as the students to Nuclear- and Radiochemistry courses without unnecessary mobility of personnel. These are key properties needed when running international courses. A sample original e-learning course entitled "Chemistry of the circuits of the nuclear power plants", presenting the state-of-the-art of the chemistry used in nuclear power plants, along with the prospective works under study to improve the efficiency and the life time of current and future nuclear power plants, was developed and implemented on this platform by ENSCP Paris. The responses obtained in the test run were positive.

Conclusions

Significant progress has been achieved in the field of the coordination of the education and training in nuclear- and radiochemistry in Europe within the EURATOM supported project CINCH-I. Since early 2014, the efforts will continue in the frame of the follow-up project CINCH-II. Their results are of strategic importance for the maintenance of European nuclear operations and future EU energy options. They are also important for meeting the challenges presented by unpredicted nuclear events where handling the technical situation is of the same key importance as making sure that information and recommendations to the public are correct and



relevant. This is of special importance when realizing that the demand for skills in nuclear chemistry will increase even should Europe decide not to further develop its nuclear energy capacity due to the requirements for decommissioning existing nuclear installations.

The results of the project are expected to have a broad impact to students, teachers, industries, and research community. This regards particularly the compact joint modular courses in different branches of modern nuclear chemistry, the electronic tool in the form of a virtual educational platform – CINCH Moodle – available for both education and training (both conceived as applicable at the PhD, life-long learning, and MSc levels), and a long term sustainable strategy for the nuclear chemistry education including a roadmap for its implementation. Moreover, the nuclear wiki “NucWik” has been developed as a source of teaching material, information and a tool for teachers and students worldwide.

The public deliverables and reports with more detailed descriptions of the results summarized above are available from the project web page at <http://www.cinch-project.cz>.

Jan John

Obituary Prof. Petr Benes

It is with great sadness and sorrow that the Department of Nuclear Chemistry of the Faculty of Nuclear Sciences and Physical Engineering (FNSPE) of the Czech Technical University in Prague announces that **Prof. Petr Beneš** (born on 13. 7. 1938), professor of the Department of Nuclear Chemistry, our dear colleague and friend, passed away on the 7th June 2013, only five weeks before his 75th birthday anniversary.

Prof. Petr Beneš, a renowned radiochemist, spent all his professional life at the Faculty of Nuclear Sciences and Physical Engineering. Over five decades he was an active member of the Department of Nuclear Chemistry since 1960 when he, as one of the very first group of graduates from this department, was hired and stayed involved till his death. During that period, he became a worldwide recognised authority in the field of nuclear chemistry. He authored several monographs and chapters in monographs. The best known is the “Trace Chemistry of Aqueous Solutions” which won the creative award of the Czech Literary Fund.

Since 1970s his research was devoted to the development of methods for speciation studies and to the behaviour of toxic elements and radionuclides in surface waters and other components of the biogeosphere. Petr Beneš is ranked among the pioneers in this research area all over the world. Towards the end of his career he became interested in the applications of spectroscopic methods in speciation analyses and initiated the introduction of Time resolved laser fluorescence spectroscopy (TRLFS) at FNSPE.



As a university teacher, he was a gifted educator, and he is fondly remembered by several generations of students, namely with his profile lecture course in “Nuclear Chemistry”. From seven additional courses he taught during his professorship at CTU, the most notable was “Trace Chemistry of Aqueous Solutions: General Chemistry and Radiochemistry” which was essential topic of both his educational and research interest. He supervised numerous diploma and doctoral students. He had held numerous positions in both the research and education fields at our Faculty. For 17 years (1986–2003) he served as a head of our department.

The international acknowledgement of his creative capabilities resulted in invited editorial board memberships of several international scientific journals, including *Radiochimica Acta*. In 1989 he became a member and in 1998–2001 he served as the Secretary of the IUPAC Commission for Radiochemistry and Nuclear Techniques. For many years, he was an active member of the International Union of Radioecology (IUR) that appointed him an Honorary Member of the IUR for his merits.

With Petr Beneš, we are losing an unforgettable teacher, colleague, and friend. He will remain in our minds and memories. He will be missed, and remembered fondly by the whole Faculty and university community.

God rest his soul!

Jan John



Forthcoming Conferences and Workshop

Fifth Symposium on Nuclear Analytical Chemistry (NAC-V), 20 – 24 January 2014, Bhabha Atomic Research Centre, Mumbai, India.

www.barc.gov.in

17th Radiochemical Conference, RadChem 2014, 11 – 16 May, 2014, Mariánské Lázně, Czech Republic,

<http://www.radchem.cz>

8th International Conference on Isotopes and Expo, 24-28 Aug. 2014, Chicago, Illinois, USA

www.8ici.ans.org

5th EuCheMS Chemistry Congress, 31 Aug. – 4 Sept. 2014, Istanbul, Turkey

www.euchems2014.org

ERA12: An International Symposium on Nuclear & Environmental Radiochemical Analysis, 17-19 Sept. 2014, Assembly Rooms, Bath, England

<http://rsc.li/ERA12>

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