



Few words of new division chairman Jon Petter Omtvedt

Our Division has been in a rather bumpy ride after Dr. Nick Evans unexpectedly, for personal reasons, stepped down in January 2016. Luckily our former chairman Prof. Heinz Gäggler kindly accepted to act as interim chairman until a new one could be elected. This happened in August 2016, where I had the honour of being elected as new chairman for our division. The chairmanship was not something I actively sought and I must admit I accepted it with a little apprehension with respect to the added workload. However, now that I've accepted I intend to work to the best of my ability to make our division run smoothly and more importantly contribute to promote Nuclear and Radiochemistry as an exciting research field with important contributions to society. Thankfully I have a very experienced secretary - Prof. Jan John - to keep me on the right track. He has served as secretary a long time and under many chairmen and knows "everything". I take this opportunity to thank Dr. Evans for his services during his regrettably very short chairmanship, then thank Prof. Gäggler for his efforts in keeping the division running and of course Prof. John for his support both during the bumpy transitions and past services.

Nuclear and radiochemistry is a very specialized field demanding highly specialized skills and knowledge. Furthermore it usually requires rather complex and expensive infrastructure, something that to not an insignificant degree is the result of our very high safety standards. The fight to obtain funding is as fierce as ever and this makes NRC facilities and training laboratories tempting targets when costs has to be reduced and budgets meet. It is my opinion that we have to protect the remaining training and education sites from being "exterminated" in order to meet society's future need for NRC competence and knowledge. Not only that, we also have to modernize them and make them attractive to new students in order to attract enough and the best students to enter our field. To be successful in this we need to work together and across institutional and national borders. Furthermore, there is a long range of new teaching and training tools that rapidly becomes affordable and available. Utilizing these tools in unison with the best traditions in teaching NRC gives us hope to be competitive and attractive also in the future.

Division members

Bulgary

Dr. Rositza Mihailova Kamenova-Totzeva National Centre of Radiobiology and Radiation Protection
3, Georgi Sofiiski Blv., 1606 Sofia,
Bulgary
r.totzeva@ncrrp.org

Cyprus

Prof. Ioannis Paschalidis
Dept. of Chemistry
University of Cyprus
P. O. Box 20537, 1678 Nicosia, Cyprus
pspasch@ucy.ac.cy

Czech Republic

Prof. Jan John
Secretary and Treasurer of DNRC
Dept Nuclear Chemistry
Czech Technical University in Prague
Brehova 7, 115 19 Praha 1,
Czech Republic
jan.john@jfifi.cvut.cz

Denmark

Dr Xiaolin Hou
Center for Nuclear Technologies
Technical University of Denmark
NUK-202, DK-4000 Roskilde, Denmark
xihu@dtu.dk

Finland

Prof. Jukka Lehto
Laboratory of Radiochemistry
P.O.Box 55
00014 University of Helsinki, Finland
jukka.lehto@helsinki.fi

**France****Dr. Philippe Moisy**

CEA Marcoule, DRCP
Bat. 400, BP 17171
F30207 Bagnols sur Ceze, France
philippe.moisy@cea.fr

Germany**Prof. Christoph Düllmann**

Institut für Kernchemie
Johannes Gutenberg-Universität Mainz
Fritz-Strassmann-Weg 2, D-55128 Mainz,
Germany
duellmann@uni-mainz.de

Greece**Prof. Panagiotis Misaelides**

Dept. of Chemistry
Aristotle University,
PO Box 1547
GR-54006 Thessaloniki, Greece
misailid@chem.auth.gr

Hungary**Dr Noémi Nagy**

Dept. of Physical Chemistry
University of Debrecen, Imre Lajos
Isotope Laboratory
Egyetem tér 1, H-4032 Debrecen, Hungary
nagy.noemi@science.unideb.hu

Israel**Dr Israel Zilbermann**

Chemistry Department
Nuclear Research Centre Negev
POB 9001, Beer-Sheva 84190, Israel
kurzionz@bgumail.bgu.ac.il

It is my hope that our division actively can take part in this development to help shape our field for the future. To make this happen I depend on all division members – and their colleagues – to step forward and actively use the DNRC as a tool to achieve our common goals. This will only happen if as many as possible actively participate in meetings, events, and communication. I therefore challenge all of you to actively participate and voice your opinion in Division matters and suggest new ways we can use our Division to serve our field.

Jon Petter Omtvedt

9th INTERNATIONAL CONFERENCE ON NUCLEAR AND RADIOCHEMISTRY – NRC9

The 9th International Conference on Nuclear and Radiochemistry - NRC9 - was held in Helsinki, Finland, on August 28 - September 2, 2016. The organizer of the meeting was the Laboratory of Radiochemistry, University of Helsinki and the conference chairman was professor Jukka Lehto. The conference was a great success. There we altogether 350 participants from 34 countries and 15 exhibitors. The program was of a very high scientific level. There were 23 invited lectures, 63 oral and 235 poster presentations. See <http://nrc9.it.helsinki.fi/>.

Professor Thomas Fanghänel, principal advisor of the European Commission, had an opening lecture on “Closing the nuclear fuel cycle for future sustainable nuclear energy” while the closing lecture “Nuclear and radiochemical methods in nuclear weapons non-proliferation” was given by Olli Heinonen, senior fellow of the Harvard University and former deputy director general of the IAEA. The scientific program covered all fields of nuclear and radiochemistry and during the five days there were sessions on:

- Chemistry of the nuclear fuel cycle
- Environmental radioactivity
- Actinide chemistry
- Transactinide chemistry
- Radioanalytical chemistry
- Radionuclide speciation
- Radiopharmaceutical chemistry



- Production of radionuclides
- Radiation chemistry and on
- Education and training of nuclear and radiochemistry

The venue of NRC9 was Marina Congress Centre locating on the waterfront of the central harbour to which there was a great view. The conference dinner was also in a very nice place, an old historical restaurant on an island in front of the central harbor.

At the end of the NRC9 the venue of the next meeting NRC10 was announced by the professor Melissa Denecke. NRC10 will be in Manchester in 2020 and the organizer will naturally be the University of Manchester.

The poster award winners:

- Anne Bauer, Germany, Complexation studies of modified calix[4]arenes with uranium in non-aqueous solution
- Zijian Zhang, Japan, Development of aerosol generation system for simulating dry deposition process of radioactive nuclides released from the Fukushima accident
- Heather Felmy, USA, The role of mixed solvents on the solvation and complexation of trivalent f-elements
- Lotte Lens, Germany, Single-atom flerovium chemistry at TASCA
- Anna Krzyczmonik, Finland, Utilization of VUV-photons for synthesis of high specific activity [^{18}F]F₂ gas

The winner of the oral presentation award:

- Katarina Domanich, Switzerland, ^{43}Sc Production Development by Cyclotron Irradiation of ^{43}Ca and ^{46}Ti

Sponsors and exhibitors:

- Federation of Finnish Learned Societies, Finland
- Hidex Oy, Finland
- MAP Medical Technologies Oy, Finland
- LabLogic Systems Ltd, UK
- Al4R, France
- IBA, Belgium
- Baltic Scientific Instruments, Latvia
- PerkinElmer
- Canberra
- Gammadata Instrument AG, Sweden
- Zinsser Analytic GmbH, Germany
- Eurostandard CZ, Czech Republic

Italy

Prof. Flavia Groppi

Radiochemistry Laboratory,
LASA
Via F. Ili Cervi,
20090 Segrate, Milano, Italy
Flavia.Groppi@mi.infn.it

The Netherlands

Prof. Bert Wolterbeek

Dept. of Radiation Science and
Technology
Delft University of Technology
P.O.Box 5, 2600 AA Delft
The Netherlands
H.T.Wolterbeek@tudelft.nl

Norway

Prof. Jon Petter Omtvedt

Chairman of DNRC
Dept. of Chemistry
University of Oslo
PO Box 1033 Blindern, N0315 Oslo,
Norway
j.p.omtvedt@kjemi.uio.no

Poland

Prof. Jerzy Narbutt

Dept. of Radiochemistry
Institute of Nuclear Chemistry &
Technology
Dorodna 16, 03-195 Warszawa, Poland
j.narbutt@ichtj.waw.pl

Portugal

Dr Isabel Santos

Departamento de Quimica
Instituto Tecnológico de Nuclear,
Est. Nacional 10, 2686 Sacavém,
Portugal
isantos@itn.mces.pt



Russia

Prof. Stepan N. Kalmykov

Dept. of Radiochemistry
Lomonosov Moscow State University
Leninskie Gory, 1 bld.3, 119991 Moscow,
Russia
stepan@radio.chem.msu.ru

- Von Gahlen, Netherlands
- ERM, France
- Teollisuuden Voima Oyj, Finland
- Posiva Oy, Finland
- Fennovoima Oy, Finland
- Fortum Power and Heat Oy, Finland

Serbia

Dr Divna Djokić

The Vinča Institute of Nuclear Science
PO Box 522, 11001 Belgrade
Serbia and Montenegro
djokici@vin.bg.ac.rs

Slovakia

Prof. Pavol Rajec

Dept. of Nuclear Chemistry, Faculty of
Natural Sciences
Comenius University, Mlynska dolina
842 15 Bratislava, Slovakia
rajec@fns.uniba.sk

Spain

Dr. Catalina Gascó Leonarte

CIEMAT (DIAF)(Ed3A)
Avda de la Complutense 22
Madrid 28040, Spain
cata@ciemat.es

Sweden

Prof. Christian Ekberg

Dept. of Nuclear Chemistry, Chalmers
University of Technology
S-41296 Goteborg, Sweden
che@chalmers.se

Jukka Lehto

Discovery and naming of three new elements, Moscovium (Mc, Z=115), Tennessine (Ts, Z=117) and Oganesson (Og, Z=118)

The Flerov Laboratory for Nuclear Reactions (FLNR) at the Joint Institute of Nuclear Research (JINR) in Dubna, Russia has currently the lead in discovering new elements at the upper end of the Periodic Table. The most recent successes filled the 7th period ending with the now heaviest noble gas, Oganesson. Three new elements were formed and identified in the last few years in a collaborative scientific effort between FLNR (Dubna), Lawrence Livermore National Laboratory and Oak Ridge National Laboratory, both USA. The reactions used for their synthesis were always using a highly intense beam of ⁴⁸Ca projectiles produced at the 4m cyclotron of FLNR and an actinide target, ²⁴³Am (for Mc) [1], ²⁴⁹Bk (for Ts) [2], and ²⁴⁹Cf (for Og) [3], respectively. The latter two targets were produced at the high flux reactor HIFR in Oak Ridge. For separation of formed nuclides in fusion reactions a gas-filled magnetic separator (DGFRS) was used. In the focal plane of the separator position sensitive silicon detectors were mounted that allowed to identify products in time-resolved measurements of decaying nuclides after implantation. This enabled to assay single atoms decaying by α -decay chains – a well-known technique successfully developed at GSI Darmstadt for the discovery of heavy elements with atomic numbers 107 (Bohrium, Bh) to 112 (Cn, Copernicium).

The IUPAC working group on the discovery of new elements, led by Paul Karrol, thoroughly evaluated the discovery claims and published their recommendation to accept the corresponding claims [4, 5]. In a second step a special group of the Inorganic Chemistry Division of IUPAC evaluated suggested names and



approved them with some minor corrections [6]. Based on chemical rules, the element 117, Ts, should be a halogen. Therefore the suggested name Tennessium was changed to Tennessine – in accordance with Astatine, Bromine, etc. The same principle was applied for the suggested Oganessium: it was changed to Oganesson, to be in line with Radon, Xenon etc. It is interesting to note, that at a recent Nobel symposium one contribution pointed to a surprisingly low volatility of Og, predicted by a relativistic calculation [7]. Og is expected not to be gaseous at ambient condition – such as all rare gases of course – but a liquid or possibly even a solid!

The observed isotopes of the new elements were ^{287}Mc ($T_{1/2} = 32$ ms), ^{288}Mc (87 ms), ^{289}Mc (0.22 s), ^{290}Mc (16 ms), ^{294}Ts (14 ms), ^{295}Ts (78 ms), and ^{294}Og (0.9 ms). Only for Mc, independent experimental confirmation by other research groups from GSI Darmstadt and LBNL, Berkeley, has so far been possible.

In a festive ceremony at the famous Russian Academy of Science in Moscow on 2nd March 2017 the three new elements were officially approved and the initiator of these discovery experiments, Prof. Yuri Oganessian honoured. This event was attended by delegates from Moscow region, the directors of Oak Ridge and Livermore National Laboratories, the deputy director of JINR and the presidents of IUPAC and IUPAP, to name a few.

Oganesson is now the second element named after a living person. The first case was Seaborgium.

References

- [1] Yu. Ts. Oganessian, et al, Synthesis of elements 115 and 113 in the reaction $^{243}\text{Am} + ^{48}\text{Ca}$, Phys. Rev C 72, 034611 (2005)
- [2] Yu. Ts. Oganessian et al., Synthesis of a New Element with Atomic Number $Z=117$, Phys. Rev. Lett., 104, 142502 (2010)
- [3] Yu. Ts. Oganessian, et al., Synthesis of the isotopes of elements 118 and 116 in the Cf249 and Cm245+Ca48 fusion reactions, Phys. Rev. C74, 044602 (2006)
- [4] Paul J. Karol, Robert C. Barber, Bradley M. Sherrill, Emanuele Vardaci, Toshimitsu Yamazaki, Discovery of the elements with atomic numbers $Z = 113, 115$ and 117 (IUPAC Technical Report), Pure Appl. Chem. 88(1-2), 139–153 (2016); DOI 10.1515/pac-2015-0502
- [5] Paul J. Karol, Robert C. Barber, Bradley M. Sherrill, Emanuele Vardaci and Toshimitsu Yamazaki, Discovery of the element with atomic number $Z = 118$ completing the 7th row of the periodic table (IUPAC Technical Report), Pure Appl. Chem. 88(1-2), 155–160 (2016); DOI 10.1515/pac-2015-0501

Switzerland

Prof. Andreas Türler

Dept. for Chemistry and Biochemistry
Paul Scherrer Institut
5232 Villigen, Switzerland
andreas.tuerler@dcb.unibe.ch

Turkey

Prof. Turan Unak

Ege University, Faculty of Science
Dept of Chemistry, Div Nuclear Chem
Bornova, Izmir 35100, Turkey
turan.unak@ege.edu.tr

Curricula vitae of new division members

Prof. Dr. Christoph E. Düllmann

Current position: joint appointment as university professor at Johannes Gutenberg University Mainz, Germany, and head of superheavy element (SHE) chemistry departments at GSI Darmstadt, Germany, and HIM Mainz, Germany. Principal investigator within the "PRISMA Cluster of Excellence", Johannes Gutenberg University Mainz, Germany.

Main research interests include: production and nuclear properties of superheavy nuclei; gas phase chemical studies of superheavy elements and their compounds; production and separation of radioisotopes for nuclear physics experiments; production of targets for accelerator- and irradiation experiments.

Current research projects include: SHE production and study at accelerator facilities at GSI Darmstadt, ANU Canberra, JAEA Tokai, JYFL Jyväskylä, and Texas A&M University; production, isolation and characterization of large-amount ^{163}Ho samples for neutrino-mass measurements within the Electron Capture in Holmium (ECHO) collaboration.

Representation of Germany within DNRC as the chairman of the "Nuclear Chemistry" division of the German Chemical Society (GDCh).

- [6] L. Öhrström, J. Reedijk, Names and symbols of the elements with atomic numbers 113, 115, 117 and 118; (IUPAC Recommendations 2016), *Pure Appl. Chem.* 88(12), 1225–1229 (2016); DOI 10.1515/pac-2016-0501
- [7] P. Schwerdtfeger, Towards an accurate description of solid-state properties of superheavy elements. A case study for the element Og ($Z=118$), *Proc. Nobel Symp. NS160 – Chemistry and Physics of Heavy and Superheavy Elements*, EPJ Web of Conferences 131, 07004 (2016); DOI:10.1051/epjconf/201613107004

Heinz W. Gäggeler

Minutes of the Annual Meeting of the DIVISION on NUCLEAR and RADIOCHEMISTRY held on Monday 29th August 2016 at 18.00 hrs at Marina Congress Centre, Katajanokanlaituri 6, 00160 Helsinki, Finland

Those present: Heinz W. Gäggeler (Switzerland, Chair ad interim), Jan John (Czech Republic), Xiaolin Hou (Denmark), Jukka Lehto (Finland), Christoph Düllmann (Germany), Flavia Groppi (proxy, Italy), Elisabeth Oehlke (proxy, The Netherlands), Jon Petter Omtvedt (Norway), Stepan Kalmykov (Russia), Teodora Retegan (proxy Sweden), Andreas Türler (Switzerland).

Apologies were received from: Ioannis Paschalidis (Cyprus), Philippe Moisy (France), Panagiotis Misaelides (Greece), Noémi Nagy (Hungary), Jerzy Narbutt (Poland), Isabel Santos (Portugal), Pavol Rajec (Slovakia), C. Gascó Leonarte (Spain).

Those not present: Rositza Mihailova Kamenova-Totzeva (Bulgaria), Israel Zilbermann (Israel), Divna Džokić (Serbia), Turan Unak (Turkey).

1. H. Gäggeler welcomed the participants, presented apologies from those who had reported unable to attend and asked those present to introduce themselves briefly.
2. The Group members honoured the memory of its deceased member for Italy, prof. Mauro Bonardi, by one minute of silence.
3. The Annual Meeting agreed to the Agenda as circulated.

4. The society representation was reviewed – changes, welcome of new representatives.
5. The Minutes of the previous DNRC meeting at RadChem 2014, Mariánské Lázně (Czech Republic) on the 15th May 2014 were reviewed and approved. Most of the tasks were fulfilled. However, new representatives from Belgium and Estonia have not been found. The 2015 meeting did not take place due to the exceptional situation (as described below).
6. H. Gäggeler informed the participants about the exceptional situation in DNRC that occurred on the turn of 2015 and 2016 when the then chairman of the division, N. Evans (UK) resigned and H. Gäggeler, as the immediate past chairman, was called to act as the chairman *ad interim* in accordance with DNRC procedures.
7. J. John presented the news from EuCheMS as listed in Attachment 1 to the full text of the Minutes (available at <http://www.euchems.eu/>). In the following discussion H. Gäggeler suggested that DNRC more actively involves in the organisation of European Chemistry Congresses. He proposed to organise joint tracks / blocks with other EuCheMS divisions. Now it is the right time to start the negotiations of such a programme for the ECC7 (Liverpool, 26-30th August 2018).
8. The FP7 EU-project CINCH (coordinated by prof. Jan John, CTU) aimed to coordinate and enhance NRC education in Europe. The project's initiative to establish a NRC EuroMaster label for MSc-students directly involves DNRC as the division will evaluate and grant the right to use the label (see below). J. John informed the participants about the main results of the CINCH-II project as listed in the Attachment 1 to the full text of the Minutes and about the future plans of this Collaboration – submission of the follow-up MEET-CINCH proposal with a new coordinator (Clemens Walther from IRS, Hannover).
9. J. John informed the participants about the status of NRC EuroMaster Quality Label as listed in Attachment 1 to the full text of the Minutes. Two application are with the DNRC chairman for evaluation – from the University of Helsinki and the Czech Technical University in Prague. A group of three DNRC members was formed to evaluate the applications. The members are Xiaolin Hou, Stepan Kalmykov and Christian Ekberg.

Prof. Dr. Christian Ekberg

Current position: Professor in Nuclear Chemistry and professor and holder of Stenas chair in Industrial Materials recycling. Also elected member of the Royal Swedish Academy for Engineering Science as well as elected member of the Royal Society for Arts and Science.

Research interests and profile: Over the years the research interests have varied. It started with uncertainty and sensitivity analysis of geochemical modelling as well as determination of thermodynamic parameters for actinides and other heavy elements. An ongoing field since more than 15 years is the separation of useful elements from used nuclear fuel. This has since also been developed further by production methods for novel nuclear fuels such as minor actinide containing nitrides. Parallel to this there was the founding of the materials recycling activities as a research field. This started in 2007.

The main nuclear activities today are production of advanced nuclear fuels, separation processes for used nuclear fuel, determination of the thermodynamic properties of radium and investigation into the chemistry of severe nuclear accidents.

How/why you represent your country at the DNRC? – The Chalmers laboratory is one of very few university laboratories with licences to handle substantial amounts of alpha active material. The alpha laboratory, gamma laboratory with hotcell and gamma irradiation source makes these laboratories very versatile.



**Prof. Dr. Flavia Maria Groppi
Garlandini**

Current Position: Associate Professor in Applied Physics to Cultural Heritage, Environmental, Biology and Medicine at Università degli Studi di Milano, Physics Department, LASA Laboratory, Segrate (MI), Italy; Qualified Expert for protection against ionizing radiations of II Level, included in the National EQ list.

Main interest include applied research in optimization of production by accelerators of short/medium half-life radionuclides in No Carrier Added form and with High Specific Activity by unconventional techniques for biomedical, biological, environmental and nanotoxicological applications, determination of radionuclides in biological and environmental samples by instrumental proton/neutron activation analysis and by atomic absorption spectrometry technique, radiation protection and health physics, development of new families of scintillator detectors to measure neutrons in mixed gamma/n fields, development of innovative experimental techniques with particular stress on the construction and management of laboratories for alpha beta, gamma spectrometry, for optical microscopy for the analysis of track tracers dosimeters and for calibration of radiation protection instrumentation with gamma and neutron sources.

Current projects funded by INFN – National Institute of Nuclear Physics – and MIUR – Italian Ministry for University and Research – include:

10. DNRC Newsletter 2016 – H. Gäggeler reviewed the situation: No issue after no. 51 has been written, and volunteered to compile the 2016 issue. In additions to his contributions (new elements, etc.), contributions were negotiated from J. Lehto (NRC9 conference) and J.P. Omtvedt (introduction of the new chairman, plans). Any other contributions are welcome. Deadline – November 2016.
11. Host country for NRC10. H. Gäggeler informed that only one proposal was received – University of Manchester (UK). Melissa Denecke presented the offer that has been accepted unanimously.
12. H. Gäggeler informed that only one nomination was received for the new chairman of the division – prof. Jon Petter Omtvedt, University of Oslo, Norway. After the introduction of the candidate, J. John organised the elections by secret ballots. J.P. Omtvedt temporarily left the meeting for the duration of the discussion of the candidate and the vote. H. Gäggeler acted as the scrutineer. 10 ballots were distributed, 10 ballots were YES, 0 NO, 0 abstained. Unanimously, the new chairman of the DNRC is J.P. Omtvedt.
13. The participants discussed the revision of the “DNRC Procedures and Practices” as circulated prior to the meeting. In addition to the changes proposed prior to the meeting, the frequency of the DNRC Newsletter was decreased to once per year. The changes were unanimously approved, for the final version see the Attachment 2 to the full text of the Minutes.
14. Date and place of the next Annual meeting – call for proposals for the date and place of the 2017 DNRC meeting was issued – preferably in connection with a well-attended conference. Deadline for deciding on data and place is December 2016.
15. Miscellaneous
 - a. Based on the proposal of the new chairman, J. John was approved as both the Secretary and the Treasurer.
 - b. J.P. Omtvedt thanked H. Gäggeler for accepting the role of the chairman *ad interim* in the exceptional situation that happened in the DNRC.

Jan John



Obituary: Mauro Luigi Bonardi



On the 29th March 2016, in his sixty-fourth birthday, Mauro Luigi Bonardi passed away. His untimely death, totally unexpected, reminds us, with much regret, the unique qualities of man and scientist that have always distinguished him.

Mauro Bonardi was born in Brescia, July 22 1952. A great relationship of love, even if expressed and lived in a confidential manner, tied Mauro to his hometown, where many have known him and his family, always active in the Brescia area.

Since a very young age, his interest shifted to University of Milano - UNIMI, where, since before the achievement of the degree, he started his scientific studies in the field of physical chemistry and theoretical chemistry by attending special courses and where he graduated from the Department of Chemical Physics and Electrochemistry in Industrial Chemistry in the academic year 1975-76 with 110/100 Cum Laude. He presented an experimental and theoretical dissertation on "Dynamics of phenomena of ion pairs formed by exchanging 3.4-dinitropiridina with alkali metals", through the use of highly innovative technique of Resonance Spectroscopy Electron spin (EPR).

Since 1977 he was registered in the Italian National Professional Order of Chemists.

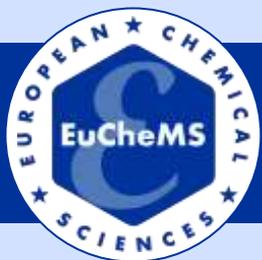
After fulfilling his military obligations as a reserve officer in the Army Complement IV Corps of the Alpine, he could begin his so much wanted university career, continuing nuclear engineering studies and radiochemistry at the Politecnico of Milano, and with a bursary of the National Research Council as part of the project aimed to biomedical technologies, specifically in the field of radiochemistry and radioisotopes production using cyclotron.

He provided, installed, equipped, and headed up to 1982 the first Radiochemistry Laboratory at the Cyclotron Laboratory of UNIMI, former Institute of Physics "Aldo Pontremoli".

LARAMED and TECHN_OSP related to the study of optimizing the generation of radionuclides by accelerators produced in No-Carrier-Added form at high specific activities for nuclear medicine for diagnostics and metabolic radiotherapy towards the more modern discipline known as theranostics. These studies are performed in collaboration with Cyclotron Centre of ARRONAX, Nantes, France, INFN Legnaro Laboratory, Italy, LENA Laboratory of Research Nuclear Reactor, Pavia, Italy;

RADIOLAB : a project devoted to High School students related to radon indoor measurements to disseminate the scientific culture among young generations;

HADROCOMBI related to study the combination of hadron radiotherapy with thermal enhancement using iron nanoparticles that are also used for diagnostics by NMR.



Dr. Philippe Moisy

After an education in analytical chemistry at the University of Paris 6, Philippe Moisy completed a thesis in the field of electrochemistry concerning the use of organic polymers for the activation of oxygen. Ph. Moisy supported his thesis at the University of Paris 6 on July 4, 1989. After a post-doctoral internship at the University of Poitiers, Philippe Moisy was recruited at the CEA on the Atomic Nuclear Center of Fontenay-Aux-Roses (France).

After a few years in the field of analytical chemistry, Philippe Moisy was interested in the chemical behavior of actinides (Pu, Np and Am) in spent nuclear fuel processing media. Philippe Moisy has been working since 1995 at the CEA Center in Marcoule in the ATALANTE facility. In the course of his work, two approaches have been developed concerning the chemistry of actinides in macro-concentration: (i) the study of solution speciation (solution chemistry) of actinide ions in aqueous solution with the determination of thermodynamic constants and the development of a thermodynamic model necessary for correcting deviations from ideality in concentrated solutions of irradiated fuel media; and (ii) Structure of these complexes in solution (coordination chemistry).

In the meantime, this Institute became the Physics Department and the Accelerators and Applied Superconductivity Laboratory - LASA - was built where Mauro has designed, organized and was in charge from the beginning of the Radiochemistry Laboratory of the new LASA.

In August of 1980 he became Researcher and in 2003 Associate Professor in Radiochemistry.

He was able to lavish all his passion and all his commitment to teaching not only in the basic courses of Bachelor, but especially in those of Specialization in radiochemistry, nuclear chemistry and radio-analytical chemistry, both for the Physics Degree both for Specialization Schools in Medical Physics and Nuclear Medicine and in numerous Masters, in particular in the European Master on Ionizing Radiation IUSS of Pavia.

His research activity was recognized at International and National level. He was:

- Lifetime Member of ANS – American Nuclear Society – nominated Italian Member of the International Committee of ANS;
- Titular Member of the Analytical Chemistry Division for Nuclear Methods in IUPAC;
- Elected Member of the Italian Radioprotection Association – AIRP – and of the International Radiation Protection Association – IRPA;
- Elected Member of Italian Chemistry Society – SCI;
- Founding member and Coordinator since its establishment of the Interdivisional Group of Radiochemistry (GIR) of the SCI;
- Member of the Commission n. 4 of the Nuclear Energy of UNI - Organization for National Standardization;
- National Scientific Coordinator of the V Group linked to Interdisciplinary Physics for Milan of National Institute of Nuclear Physics – INFN, position that he held for at least 15 years coordinating from scientific point of view about thirty experiments per year and nearly 100 researchers linked to associated experiments; and last but not least
- Nominated representative of SCI in and co-founder of the Division of Nuclear and Radiochemistry (DNRC) of the European Association of Chemical and Molecular Sciences (EuCheMS).



He was member of the Boards of the Journal of Radioanalytical and Nuclear Chemistry, the International Journal of Low Radiation, and the European Radiochemistry Newsletter of EuCheMS.

The research activity of Mauro, as documented by more than 220 scientific publications, more than 400 communications at international and national scientific conferences, including more than 70 invited lectures, chairmanship of numerous scientific congresses, and number of coordinating positions of scientific research teams, has been impressive and has ranged in various subject areas.

In particular, the research activity that has seen him most involved was optimization of the production of non-conventional No-Carrier-Added radionuclides for biomedical applications, specifically such with short half-lives and not available on the market, by means of irradiation of suitable targets in Cyclotron, LINAC and Nuclear Reactor. He was at the cradle of combining radiodiagnosis with metabolic radiotherapy with the same radionuclide – today well known under the name of theranostics.

He was the leader of the IUPAC Project 2010-030-1-500 related to "Terminology, quantities and units concerning production and applications of radionuclides in radiopharmaceutical and radioanalytical chemistry" with the objective to prepare a revised vocabulary of concepts and terms in radioanalytical chemistry related to this field, compatible with the glossary format used in the IUPAC Gold Book.

The results that Mauro obtained in his research, have been included as "recommended" in the IAEA TECDOC-2011, "Charged Particle Cross-Section database for medical radioisotope production: Diagnostic radioisotopes and monitor reactions", published by the International Atomic Energy Agency, that constitutes an international standard used for the optimization of the production of a significant number of radionuclides introduce into the clinical practice and to biomedical research during the last years.

Mauro was also dedicated to studies related to:

- Production of short lived and high specific activity radionuclides for metallobiochemical studies and occupational and environmental toxicology using cyclotron and nuclear reactor. In recent years, these activities have been applied e.g. to the study of the behaviour of organisms under exposure to nanoparticles to define the nano-toxicology or rather nanosafety.

In recent years, Philippe Moisy, has also been interested, in the chemistry of actinides in solution in biological environments. In addition, he was also interested in the behavior of actinides under ultrasound (sonochemistry of actinides).



Prof. Dr. Noémi M. Nagy

<http://kolloid.unideb.hu/en/dr-nagy-noemi/>

Current position: university professor at University of Debrecen, Hungary, Department of Physical Chemistry, head of Imre Lajos Isotope Laboratory.

Main research interests include: study of interfacial reactions of solid/solution interfaces, including rocks, minerals, soils, by radioisotopic tracer method; storage of nuclear waste.

Current research projects include: study of heterogeneous isotope exchange of phosphate ions on soils; sorption of anionic radioactive species by modified clays; structural modification of clays during cation exchange processes.

Representation of Hungary within DNRC: as a person who has a significant contribution of nuclear and radiochemistry education in Hungary. An author of Nuclear and Radiochemistry textbook (authors J. Kónya and N.M. Nagy) published by Elsevier, 2012.

- Elemental proton and neutron activation analysis, both in a purely instrumental version (IPAA, INAA), or followed by radiochemical processing (RPAA, RNAA) for the determination of trace elements in different solid matrices such as: biological samples, land, rocks, meteorites, metals, semiconductors, particulate air pollution PM10, PM2.5 (aerodynamic and fractions of them).
- Research in environmental radiochemistry – determination of radionuclides in biological and environmental matrices for radioprotection purposes. In particular, the determination of radionuclides in farmland, food and wild animal organs from fallout following the Chernobyl accident in 1986 and Fukushima one in 2011 were carried out.
- Research in the field of Radiation Protection.
- Research on fundamental nuclear physics and the physics of accelerators.
- Innovative research on photocatalysis applied to ecological and environmental issues, including new methods of kinetic modelling of these processes.

More specifically, given the shortage of demand for the research topics of his interest on the Italian territory, for him was of particular importance to maintain close international scientific collaborations. He carried out internships and learning periods at about thirty International Research Centres all over the world.

All this work enabled him not only to achieve world-class skills in the fields of interest listed above, but also to know and to be known and appreciated by professors and researchers of the highest international level in these fields, as documented by correspondence, by numerous conferences organized together, and, above all, from high demand by many colleagues to spend multiple research periods as visiting research scientist at the radiochemistry laboratory of LASA.

Mauro was also much appreciated by the students that said about him that he was a very good teacher, always very well prepared and able to arouse interest and to make the students enthusiastic, leaving a clear mark on their intellectual life: Mauro's eyes sparkled while he opened that part of Science, about which he was so passionate, to them.

Flavia Maria Groppi Garlandini



The fifth Atalante 2016 conference, held from 6 to 10 June 2016 at the Palais des congrès in Montpellier, brought together over 300 participants from around 20 nationalities. It allowed 152 oral presentations and 100 posters. About forty participants also participated in a visit to several installations of CEA Marcoule. This conference was organized in cooperation with the International Agency for Atomic Energy (IAEA) and supported by the Languedoc-Roussillon-Midi-Pyrénées Region and the European project SACSESS.

Every 4 years since its first edition in 2000, this CEA conference has emerged as the inescapable events of nuclear chemistry for the fuel cycle. Bringing together the main countries involved, Atalante 2016 offered the participants a very complete panorama, from studies on actinide materials to environmental nuclear chemistry.

