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The University is currently updating its websites, which includes our IRPS being transferred to a new site. The above address is still active and most of the information has been transferred, but there are some files yet to travel across which I have been advised will be there early in the new year. Although the new basic layout is that of the University, we will be keeping it updated with IRPS information !

And we have a developing "sister website " !! : http://radiationphysics.org/

Contents of this Journal

New Memberships, Membership Renewals

Membership form for new members, and details for payments by cheque for new and renewing members are on the last 2 pages of this journal and information for payment by credit card is given below

If you are unsure when your renewal is due, contact

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See Page 6 for Membership Payments by Credit Card Information

From the Editors

The time has arrived to close the book on 2013, and as well, your IRPS Bulletin. Recalling the exploding meteor over Chelyabinsk in February and the ignominious fizzling out of Comet ISON just a few weeks ago, one could say that it was a year that started with a cosmic bang and ended with an astronomical whimper – the first having caught the world unawares and ill prepared; the second, while something of a disappointment to sky watchers among us, was otherwise remarkable for following a course and fate foretold with uncanny precision by professional astronomers plying tools developed painstakingly over many decades of sustained effort.

We are moved at this time of year to reflect similarly on sustained efforts in radiation physics that have contributed so greatly across diverse areas of human interest and how contributions from you, our readers, help to tell that story. While our first issue of the year included an article by Professor Dudley Creagh (Australia) chronicling the birth and growth of a vibrant synchrotron radiation community in Australia, here in the concluding issue he has provided a status report on part of that very community, from a first Australian Synchrotron Users Meeting at the new Australian National Facility for Synchrotron Science. We are also grateful to Gordana Zauhar and Ines Krajcar Bronic (both of Croatia) for a second installment on radiation physics work, present and past, in Croatia; to Richard Hugtenberg (UK) for an overview of the growth of Monte Carlo modeling in radiation dosimetry; and to Ziyu Wu (P.R. China) for reporting on preparations underway for ISRP-13, to be held in Heifei, Anhui, P.R. China in 2015.

As Professor Ladislav Musilek emphasizes in his President's Column for this issue, sustaining such work requires broad cultivation of people who can motivate students and foster public support, and thus we encourage submissions about society members who demonstrate such interests and capabilities. For this, a special note of thanks goes to Professor David Bradley (UK) for contributing both an appreciation of Shakardokht Jafari (his graduate student from Afghanistan) and a remembrance of former member and IRPS cofounder Professor PK Iyengar, shown below in a picture taken at ISRP-4, in Sao Paulo, Brazil in 1988.

We conclude with our best wishes for a happy and prosperous new year!

Ron Tosh and Larry Hudson

IRPS cofounder PK Iyengar attending ISRP-4, 1988, in Sao Paulo, Brazil, shown with IRPS contemporaries Prof. A.M. Ghose, Prof. Richard Pratt and Prof. Didier Isabelle

President's Column

Dear Colleagues

The IRPS, as a professional association, focuses on science and research. Nevertheless, a large proportion of our members are on the staff of universities, and an important part of their work involves educating and developing young scientists, researchers and engineers. There are strong synergies between carrying out research projects and educating the next generation of scientists and engineers. For many of us, combining teaching with research is a pleasant and fruitful way of working. Others find research more rewarding than teaching or teaching more rewarding than research – this should not surprise us, as these two traditional basic missions of a university staff member can require quite different sets of skills. We will not talk here about the management, administrative and fundraising roles that are time-consuming and often severely limit the ability of university researchers to give their full attention to science and research.

The supply of future specialists to maintain and develop the field of science and research that they perform is an issue that concerns all researchers, particularly those working intensively with young people at universities. We IRPS members think that radiation physics is a very promising and important field for science and research. Nevertheless, it is a hard science, needing a lot of mathematics, physics and chemistry. And these subjects do not enjoy much popularity among secondary school students. This is a general issue, not related only to nuclear and radiation physics. *E.g.*, the SEFI Council (SEFI is the Société Européenne pour la Formation des Ingénieurs – European Society for Engineering Education), of which I am a member, is very aware that technical and natural sciences are attractive only for a small part of the young generation, and the supply of high quality future engineers is a very general problem, which must be solved.

Preparing modern teaching programmes, especially in experimental physics, is an expensive task, and in the current difficult economic situation, many countries not only provide poor funding for science and education, but are trying to make further cuts in this area. We need to concentrate our efforts not only on obtaining better financing for our own laboratories, but also on obtaining better financing for the whole education system, from kindergartens, through elementary schools, through high schools to universities and beyond.

For so many years, the acronym ESR meant for me "Electron Spin Resonance". Now, for better or for worse, it also means "Early Stage Researcher", *i.e.* doctoral students, postdocs and other young researchers. We need to push the public authorities to set up, and fund, more positions for research fellowships for ESRs in top scientific institutions. We need to convince companies that fresh graduates from universities are able to learn new skills rapidly, although they have only limited experience with practical problems. We also need to convince the general public that science and technology is the "*spiritus agens*" that leads to a more comfortable, more cultured and more interesting life.

IRPS members, I am sure, overwhelmingly believe that better scientific education and better support for ESRs is the way forward. Unfortunately, we seem to be up against powerful forces that try to project and promote a different kind of "reality". Young people see a brighter future through enrolling for law or management or finance than through the hard sciences. They see themselves as successful and rich lawyers or company directors, not realising that only a few of them can achieve this dream, and the majority will find themselves in unfulfilling, moderately paid jobs, or even unemployed. As an expert on consumerism put it, we live in strange times when people borrow money to spend it on things they do not want or need. With encouragement from the media, young people see footballers, singers and even celebrities who have contributed little of lasting value relative to role models such as Albert Einstein or Marie Curie.

Michal Morte, in the Czech internet daily The Invisible Dog, 30 November 2013, wrote about the unrealistic dreams of young people who see

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themselves as environmentalists. "Young "gold-mining" girls used to be on the look-out for a standard-class family life, with a villa in a good part of the city, a couple of cars, a wardrobe, and a beach vacation. These goldminers are now being replaced by "eco-miners", who seek the many times more expensive bio brand of the petty bourgeoisie – a low-energy villa, an electric car, fair trade food and clothes, and vacations in an exotic Ecoland, while the young men fortify themselves by drinking beer in pubs and at festivals, where they constantly analyse the state of human rights at home and abroad, and are eager for a new political system in which they will feel no existential anxiety, will not have to go to work, and the state will take on the role of parents, with a purse that is always full."

Delusions are nothing new. What is new is the intensity with which delusions are promoted through the media. Scientists, researchers, engineers and teachers need to counteract this nonsense, and offer something more solid for our ESRs. We need to take them as real colleagues. Sometimes, when I invite young people to join IRPS, they tell me "I am too young and do not have enough experience". We need to reverse such thinking. Young scientists are very welcome in our Society, and they are also invited to use our Bulletin to inform us about their activities and scientific results, if they are in a form that can be of interest for the radiation physics community. We will continue in our practice of offering a reduced membership fee in the Society and a reduced registration fee at our conferences for students.

I urge all of us to pay maximum possible attention to our scientific successors.

Ladislav Musilek

Membership Payments by Credit Card

Internet payments by credit card (Visa, Mastercard, AMEX, Discover) can be made via the IRPS website

http://www.canberra.edu.au/irps

You do not need a PayPal account to use this method of payment

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If you have any queries or problems contact :

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The Adventures of Shakardokht Jafari

Submitted by Professor David Bradley
as a follow-up report from ICDA-1, 2013

Shakardokht was born in the Bandar district of the Afghan province of Daikundi. At 6 years old the family had to leave their homeland and head for safer areas within the country. In 1983 the Soviets invaded Afghanistan; with the bombing of their home, the family emigrated to Iran. Shakardokht says of her background that she was one of the few lucky girls who had a father intent on sending their daughter to school rather than to work at a brick kiln. She finished school and entered the Tehran Medical University, studying radiation technology, obtaining a BSc in radiation technology in 2000.

Fig 1: *Shakardokht's birth place, Daikundi province of Afghanistan*.

She returned to Afghanistan in 2003 and worked as a teacher in Kabul Medical University (KMU) and also as a supervisor of the Radiology Department of the French Medical Institute for Children in Kabul. Subsequently she was to become one of the founder and honorary members of the Afghanistan Atomic Energy High Commission (AAEHC), representing the Ministry of Higher Education when the AAEHC was launched on 21st March 2008. The commission works closely with International Atomic Energy Agency (IAEA) as the only official Afghan organization to manage all radiation related projects inside Afghanistan. Shakardokht was the counterpart of Kabul Medical University in the IAEA from 2008 to October 2012, being responsible for the project "Establishment of a radiotherapy centre in the Aliabad Hospital of Kabul Medical University". During this time she also managed to obtain IAEA approval for two further projects; establishment of a radiology diagnostic centre and of a brachytherapy facility.

Fig 2: *Oct/2012 with an IAEA technical cooperation team and Afghanistan delegates, including the head of AAEHC, the Chancellor of KMU, colleagues from the radiology department and representatives of the Afghanistan ambassador in Vienna.*

Fig 3: *Afghanistan delegates and the IAEA technical cooperation team working on initiation of the cancer control program in Afghanistan. Oct/2012, IAEA, Vienna*.

In Afghanistan there has been no radiotherapy treatment available since before the war with the Soviets, meaning that cancer patients face a poor prognosis if they are unable to afford to travel to neighbouring countries and pay for treatment. Seeing her own father die prematurely from cancer, this prompted Shakardokht to specialize in the area of radiotherapy in order to do something about cancer care in Afghanistan.

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She came to the University of Surrey under an IAEA scholarship to study medical physics in Sep/2010, graduating with Distinction from the MSc program in Medical Physics. She was then awarded an Overseas Research Scholarship from the University of Surrey under the supervision of Prof. Nicholas Spyrou and Prof. David Bradley to work on nanoparticles as radio-sensitizers in radiotherapy. At the same time the IAEA arranged to support a 9 month duration practical training for her as a trainee clinical medical physicist. The latter was obtained at the radiotherapy department of the Royal Surrey County Hospital under the supervision of Prof. Andrew Nisbet, an undertaking she resolved to complete while continuing to work on her PhD project. With this practical clinical training she realized she had need of further specialization in clinical radiotherapy in order to boost her knowledge and qualification for future work in radiotherapy and hence she changed her PhD subject to work on radiation dosimetry.

Based in the University of Surrey Center for Nuclear and Radiation Physics, Shakardokht's research project has been to find an alternative to commonly-used dosimeters, overcoming both their high cost and many other limitations. Using Professor David Bradley's research on the thermoluminesence of silica glass fibers inspired her to consider other forms of glass that are robust and offer good spatial resolution in three dimensions for use as dosimeters.

"When I was a child, I used to make necklaces from glass beads to earn a little money," she says. "This gave me the initial idea of using these cheap beads as TL (thermoluminescent) dosimeters." Putting her theory to the test, Shakardokht found that not only are glass beads far less expensive than traditional dosimeters – costing mere pennies – they also offer a far better performance across a range of parameters.

Radiotherapy aims to achieve optimal tumour control with minimal damage of normal tissue. Recent developments in radiotherapy demand radiation detectors of very small size with high accuracy and precision, but most detectors fall short of this because they are unable to pinpoint the tumour area accurately, or because their measurement is affected by a number of factors such as low dose rate or angular response to the incident radiation. Shakardokht found that the glass beads enabled a higher level of accuracy than competing technologies, with less variation of results caused by external factors, and a better linear response over a wide dynamic range.

She also found that the light sensitivity of beads – which could potentially cause the radiation dosage to be overestimated – was drastically reduced by storing them in the dark following an initial baking process. Measured by a TLD reader commonly used in most hospitals, the glass beads also have a "fading rate" (whereby the measurement information is lost) of only 10% compared to between 25% and 60% for other materials.

Shakardokht is now planning to test her dosimeter in the national dosimetry audit programme being led by the Royal Surrey County Hospital, and is currently approaching participating centres around the UK.

Having presented her research paper at the First International Conference on Dosimetry and its Applications (ICDA1 2013) in Prague in June, Shakaradokht's story has since attracted the interest of high profile media. She has been interviewed by a number of Afghani and international TV and radio stations, including BBC Farsi and the Voice of America TV.

Fig 4: *ICDA 2013, the conferees having their group photograph taken on the steps of the Czech Technical University.*

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While Shakardokht's radiotherapy solution has many potential uses, such as measuring radiation following a nuclear accident or in industry, healthcare is the area where she believes it could change lives most significantly. Following the completion of her PhD, she plans to return to Afghanistan to establish the country's first radiotherapy centre since the war with the Soviets, in collaboration with the International Atomic Energy Agency (IAEA).

Shakardokht has recently been awarded a Faculty for the Future grant to help fund the final year of her PhD. Sponsored by the Schlumberger Foundation, Faculty for the Future grants provide support for women from developing and emerging economies to pursue PhD studies in the physical sciences, and are awarded to around 60 talented scientists around the world every year.

The Afghanistan embassy in London invited Mrs. Jafari to give a talk there at an event for the celebration of 94 years of Afghan independence where the London ambassadors of many countries were invited. The Afghanistan embassy in London presented to Shakardokht an appreciation letter after her talk in recognition of her efforts towards the development of Afghanistan. Mark Philip Sedwill, who served as the United Kingdom Ambassador to Afghanistan from 2009–10 and the NATO Senior Civilian Representative in Afghanistan in 2010 was the UK representative to this event.

Fig 5: *Afghanistan Embassy, London, Sep/2013.*

Fig 6*: Shakardokht receiving an appreciation letter from the Afghanistan Ambassador in London.*

The Afghan Advisory Board in London was another association who presented an appreciation letter and referred to Shakardokht as a symbol of scientific honour for Afghanistan.

Shakardokht is married and has two daughters, both of whom are currently living with her and going to school in Guildford.

Fig 7: *Shakardokht and family*

The Australian Synchrotron Users Meeting 2013

Professor Dudley Creagh

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The Australian Synchrotron hosted its 2013 Users meeting at its new National Facility for Synchrotron Science on 21 and 22 November. This facility is located adjacent to the Synchrotron building and incorporates a 300 person lecture theatre, meeting rooms, display spaces, and a café. Conference delegates, both international and interstate, stayed at the new dormitory facility which provides high quality bedrooms with en-suite, and a communal kitchen and sitting rooms.

Two hundred and ten participants attended the meeting. This was the first Users meeting to be presided over by **Andrew Peele**, the newly appointed Director. With **Michael James**, the Head of Science, he gave an overview of the current operational state of the Australian Synchrotron.

It is five years since the first experiments were undertaken. And all of the nine beamlines except for the imaging and medical beamline are now built and fully utilized (and over-subscribed). Available beamlines are: IR Micro-spectroscopy, Far IR and High Resolution Spectroscopy, Protein Crystallography (2), Soft X-ray Spectroscopy, SAXS/WAXS, Powder Diffraction, X-ray Absorption Spectroscopy, X-ray Fluorescence Microscopy. The imaging and medical beamline is currently undergoing final tests.

The predominance of users (41%) come from the state of Victoria in which the Australian Synchrotron is located. 42% scientists travel to the AS from other Australian States, 10% come from New Zealand, and the remainder are international scientists. Since 2008 the number of users has increased from 500 to 3500. Of these, half are either students or early career researchers.

Some 1200 publications (15% in high impact journals) have been produced. Major fields of research publication are: biology (25%), physics (30%), and engineering (21%). As well, significant publications have been produced in the fields of medicine/health, archaeology, earth sciences, and multidisciplinary science.

The meeting itself took the usual form of plenary lectures, parallel sessions, and poster sessions. Plenary speakers were **Brian Stephenson** (Director, Advanced Photon Source) who spoke on the "Current science and future plans at the APS" and **Harald Reichert** (Director, European Synchrotron Radiation Facility) who spoke on "Science with synchrotron radiation from a 6 GeV source". Three parallel oral sessions were programmed, the subject matter of which covered the whole range of research opportunities at the Australian Synchrotron.

Of special interest were the presentations by four students who had been funded to attend the Cheiron School (http://cheiron2012.spring8.or.jp). Their presentations were very well produced and presented. **Jessica Velescek Carolan** (CSIRO), **Eshan Tavakholi** (University of Adelaide), **Jin Shang** (University of Melbourne), and **Bree Morgan** (CSIRO) gave presentations respectively on "Separations at the back end of the nuclear fuel cycle", "Functional characterization of environmental key elements using synchrotron-based micro-spectroscopy techniques", "Molecular-sieving: does size really matter?", and "Decomposition of mineral hosts for CO2: a time-resolved powder diffraction study".

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A prize was awarded for the best thesis presented by a doctoral student. This is called the "The Australian Synchrotron Stephen Wilkins Thesis Prize". Stephen Wilkins was, along with Dudley Creagh, one of the founders of Synchrotron Radiation Science in Australia. The image on the medal captures Stephen in one of his typical poses.

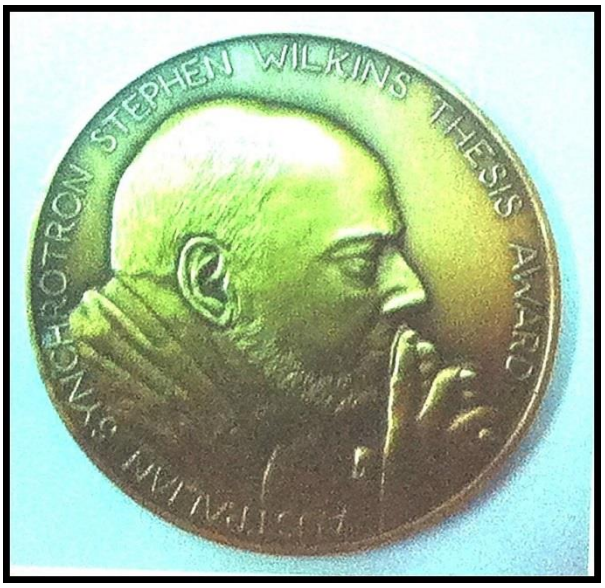

Fig.1. *Medal given with the Australian synchrotron Stephen Wilkins Prize.*

Stephen's chief involvement in the past decade had been in the development of the techniques of X-ray Phase Contrast Imaging, and in parallel, the development of the Medical Imaging Beamline at the Australian Synchrotron.

It is fitting the prize went to **Stephen Dubsky** (Monash University) for his work on the phase contrast imaging of lungs. Phase contrast imaging enables the soft tissue (lungs) to be imaged strongly and the bones, which obscure the lungs in conventional radiography, to be rendered less strongly. The work has significant application to the study of such ailments as asthma, emphysema, and pulmonary fibrosis. It is possible to map the airflows through the lungs, as shown in Fig.2.

Red indicates no flow; blue the maximum flow. This kind of imaging can be performed in real time, and gives a real understanding of the functioning of a particular patient's lungs.

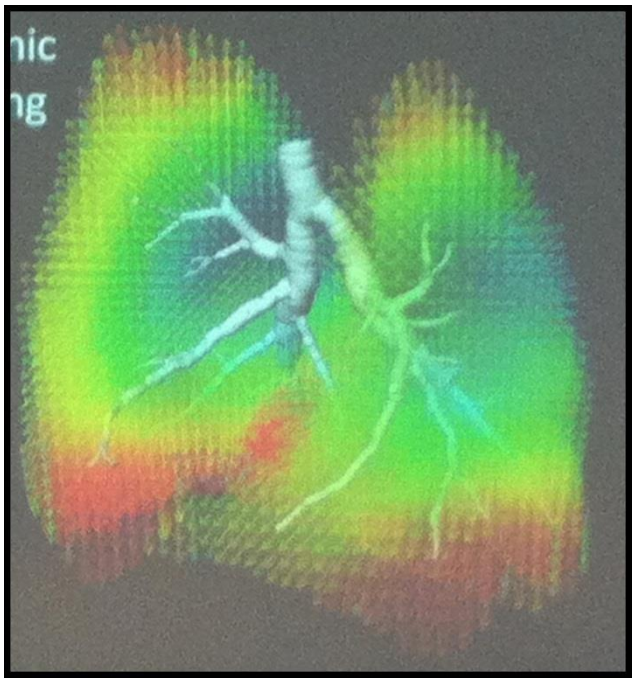

Fig.2. *One image of the airflows in a patient's lungs using phase contrast imaging.*
Red = stationary air: blue = maximum flow.

Lest this report should seem to be too euphoric, operational funding is assured only for the next 2.5 years. And no funding has been allocated to the installation of new beamlines. These are essential if the facility is to grow with the user community and generate new scientific outcomes.

Radiation Physics Groups In Croatia (Part 2)

Radiation Physics Groups in Rijeka

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In the first part of a series devoted to radiation physics groups in central and Eastern Europe, we presented three groups from the Ruđer Bošković Institute in Zagreb, Croatia, which is the largest scientific research center in the country. In this issue we move to the North-Adriatic city of Rijeka and start with a few historical notes from the dawn of the radiation era – the end of the 19th century.

The beginning of radiation science and radiation protection in Croatia can be traced to the end of the 19th century. *Peter Salcher* (1848-1928) was a professor of physics and mechanics at the Naval Academy (*K.u.K. Marine-Akademie*) in Rijeka, who held a lecture about the Röndgen's discovery already on the 20th of February 1896 [1], just a few weeks after W. C. Röndgen announced the discovery of new kind of rays in Würzburg, Germany. On this occasion P. Salcher showed to his astonished public one of the first radiographs obtained by applying the new X-rays – the hands of Baroness Vranyczany with a recognizable ring (Figure 1) [2].

Thanks to P. Salcher, Rijeka was the first Croatian city that purchased the Röndgen apparatus in 1897 (while Zagreb had to wait for its first X-ray machine until 1901) and therefore he can be considered as the founder of the radiology department of the municipal hospital in Rijeka [3]. P. Salcher is also known to the academic community for taking ultrafast photographs of the flying bullet in collabortion with prof. Ernst Mach. This work is still reported in histories of physics and aeronautics, as well as photography [3].

Fig 1. Radiograph of the hands of the Baroness Josefine Molinary-Vranyczany, taken by Peter Salcher in Rijeka 1896.

Radiation physics in Croatia today is not limited to the capital, but several groups of physicists dealing with radiation physics exist in the city of Rijeka, too. They joined the International Radiation Physics Society in its early years and participated on International Symposia on Radiation Physics (ISRP) held in Ferrara, Sao Paulo, Dubrovnik, Jaipur, Prague, Cape Town, Coimbra, Melbourne and Rio de Janeiro (Figure 2).

The activities of the groups at the University of Rijeka and the University Hospital are summarized below.

More than 30 physicists work at the University of Rijeka, and nearly one-third of them are active in radiation-related research. The largest group exists at the Department of Physics of the University of Rijeka. At first, they contributed at the International Symposia of Radiation Physics (ISRP) their fundamental investigations of electron capture decay.

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Fig 2. Group of physicists from Rijeka at International Symposium on Radiation Physics (ISRP-10) in Portugal 2006.

From left: Ivana Jelovica, Zoran Kaliman, Gordana Žauhar, Nada Orlić

Later, nuclear excitations during positron annihilation were presented as well as polarization effects in Compton scattering and calculations of effective atomic number. Finally, X-ray and Raman spectroscopy were used in analyses of environmental, archaeological and other samples [4]. Some physicists from that group are working on projects related to theoretical calculations of cross sections for photon-atom interactions. That includes Compton scattering on atoms in the independent particle approximation for single ionization, double ionization of helium via Compton scattering [5], and photoabsorption, as well as photoionization of positronium. They have also calculated different effects in nuclear excitation during positron-bound-electron annihilation.

The physicists working at the University Hospital Rijeka and the Medical Faculty of the University deal with the use of radiation in radiotherapy and diagnostic imaging. Use of radiation as a medical diagnostic began in Rijeka soon after the discovery of X-rays, while application of radiation in therapy began in the 1930's. In 1965, Cobalt therapy was introduced in Rijeka's hospital and the first medical physicist was employed. Today, the University Hospital Rijeka has the Medical Physics Department which covers the whole area of implementation and medical applications of ionizing radiation. The major part of their work is related to radiation therapy, nuclear medicine and radiology, but they are also strongly involved in the enforcement of quality assurance programs related to use of ionizing radiation at the hospital and national levels. A special interest of the medical physics group is the implementation of advanced radiation therapy techniques [6] as well as different dosimetry issues. Since 2009, the Medical Physics Department is a counterpart in various IAEA projects related to quality assurance in radiotherapy.

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Monte Carlo Modelling in Radiation Dosimetry Exhibited at European Meetings

Richard Hugtenburg

Swansea University, U.K

Monte Carlo modelling is increasingly the standard approach in the modelling of radiation dosimetry systems, as evidenced by a doubling in the number of scientific publications referring to this use in the last decade. This standardisation is partly due to the increasing accessibility of codes. Several 2013 meetings serve to demonstrate this growing interest in Monte Carlo modelling in the world of radiation dosimetry.

MCNEG (pronounced McNeg) is an annual meeting held in the UK that started out as a workshop for trouble-shooting problems written up in the popular codes, EGS4 and MCNP, but now routinely exhibits a wide range of codes and approaches. This year's MCNEG meeting at the University of Suffolk in Ipswich was no exception with Alfredo Ferrari of CERN, a principal developer of the FLUKA code, providing keynote talks.

The use of FLUKA was described by several other contributors, with spirited discussion contrasting its ease of use with the potential for misuse, a maxim that applies to any Monte Carlo code. FLUKA was shown to be particularly valuable in linear accelerator bunker design; Ihsan Al-Affan of the University of Swansea suggesting in his talk that the code would be particularly suited to the training of physicists in radiation protection.

A second keynote address was given by Zine El-Abidine Chaoui, of the University of Setif in Algeria who discussed the use of Monte Carlo to model small transactions in energy in the detectors such as those used in the KATRIN spectrometer. Zine is among a growing number of physicists employing event-by-event modelling of electron transport for certain classes of problems. The KATRIN project aims to determine the mass of the electron anti-neutrino from fine detail in the tritium beta decay spectrum. Participants were amused by slides of the tight squeeze, and associated festival atmosphere, that accompanied the passage of the spectrometer through the streets of Karlsruhe.

Presentations included the use of familiar codes such as BEAMnrc (an EGS4 derivative) and PENELOPE, for the modelling of linear accelerators, detectors and novel dosimeters. Gavin Crowe of AWE described the use of MPI enabled MCNP for parallel computing, where the geometry mesh is sufficiently large to warrant distributing the problem over multiple nodes.

The topic of Monte Carlo modelling in the context of training was taken up by Colin Baker of the University of Liverpool, who demonstrated their home-grown, VisualMC code, used with their medical physics students to help them understand, and visualise, fundamental particle interactions.

The inaugural International Conference on Dosimetry and its Applications (ICDA) held in Prague, Czech Republic further demonstrates the growth of Monte Carlo modelling with nearly a third of the 180 papers presented featuring Monte Carlo modelling as a principal method of analysis, and included oral and poster sessions devoted to the topic.

Clinical applications included the in-vivo monitoring of Am-241 in a skull phantom, with Tomas Vrba of the Czech Technical University in Prague, demonstrating its use as a EURODOS intercomparison exercise. Peter Yeh of the National Tsing Hua University in Hsinchu, Taiwan, described using BEAMnrc in the commissioning of a stereotactic radiosurgery modality, utilising a dual-resolution skull phantom.

Simulations of breast tomosynthesis with MCNPX by Mariana Baptista of the IST/ITN in Lisbon, contrasted with their modelling of radiological and nuclear terrorist threat scenarios,

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demonstrating the range of applications and the versatility of the latest codes.

The use of MCNP in the training of nuclear engineers was discussed by José Ródenas of the Universidad Politécnica de Valencia, who described modelling of neutron activation in stainless steel samples with MCNP5. Milan Štefánik and Jan Frybort also of the Czech Technical University described their own training scenarios, including the use of MCNP to simulate the radiological hazard associated with used thorium nuclear fuel.

The presence of familiar and highly accessible codes, such as PENELOPE, EGSnrc, EGS5, GEANT4, at the meeting further demonstrates their improved accessibility. Several user-developed codes were also presented, including the MCPPU code for multi-shape pulse pile-up correction, described by Jorge Fernandez of the University of Bologna.

These meetings indicate a growing trend in the use of general-purpose and purpose-built Monte Carlo codes as a standard methodology in dosimetry. With such widespread use of Monte Carlo modelling techniques, its use will become a central feature of training in radiation dosimetry. Its introduction into post-graduate course material will continue to be contemplated by academics and developers of curricula in government and industry.

References

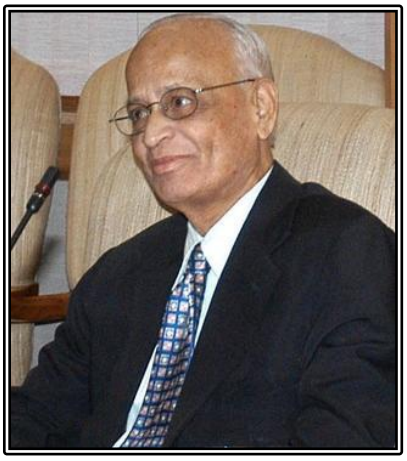
The MCNEG website: http://mcneg.org.uk

Website of the 1st International Conference on Dosimetry and its Applications http://icda.fjfi.cvut.cz/

Richard Hugtenburg is Associate Professor of Medical Physics at Swansea University

Obituary of P.K. Iyengar
29 June, 1931 – 21 December, 2011

Submitted by Prof. David Bradley



It is with great sadness that we call to attention the passing of Dr Padmanabha Krishnagopala Iyengar, the first President of this Society. More fondly referred to as PK, he served two terms as President of IRPS (1985 to 1991), being the only one of our Presidents to have done so.

A lasting memory was that during an IRPS Council meeting hosted by PK at BARC (the Bhabha Atomic Research Centre) he was kind enough to invite this writer to join him in his official car to enter BARC. While it was not a surprise to find myself showing ID, I could not fail to be impressed that he, as Chairman of the Indian Atomic Energy Commission, was equally happy to be asked to show his ID. Well-respected for his work in neutron physics (reflecting his early work with Bertram Brockhouse at Chalk River), he enjoyed the respect of a great many scientists for his work at BARC and to the contributions he made to Indian nuclear science and technology.

News accounts indicate his involvement in India's 1974 nuclear explosion, in which he was viewed to be the second leading responsible person, the other person being Raja Ramanna. PK became Director of BARC in 1984, the year before he became President of IRPS and then became Chair of the Indian AEC in 1990, just before his term at IRPS ended. How he came to be President of IRPS is almost certainly due to his name being proposed by Professor A.M. Ghose, one of the two founding fathers of the IRPS (the other founding father being John H. Hubbell, of NIST fame). At the end of his term, PK proposed Dan Benninson as his successor, a person of somewhat similar international stature and reputation (Dan was Chair of the ICRP at the time).

Richard Pratt, the first Secretary of IRPS recalls that it was PK who asked him to serve as Secretary of IRPS, a position which Professor Pratt went on to hold for some twenty years.

Dr Iyengar was the second signatory on the primary IRPS bank account, which was set up in Pittsburgh. He remained so in all the subsequent years, the account being finally closed last year, after the death of PK (transferred to Bill Dunn).

In the Hindustan Times of December 21, 2011, it was reported that PK Iyengar was one of the key figures in the Operation Smiling Buddha — the first peaceful nuclear explosion at Pokhran on May 18, 1974. PK began his career with a brief period at the Tata Institute of Fundamental Research (TIFR) following which he joined the Department of Atomic Energy in Trombay. PK was focal in the development of a number of experimental (neutron) facilities around the APSARA and CIRUS research reactors at BARC. A further high point in his career came when he successfully led a team that developed the indigenous PURNIMA - 1 reactor, commissioned in 1972. In 1975, he was awarded the Padma Bhushan (the third highest civilian award in the Republic of India), recognising the work he had done in identifying the need for large-scale development of advanced science and technology. After his retirement PK served in a number of academic roles, including chairman of the Council for Science and Technology and President of the Indian Nuclear Society.

Information About the State of Preparation of ISRP 2015

Submitted by Ziyu Wu for the November 2013 Council meeting

The ISRP-13 International Symposium on Radiation Physics is going to be held in Hefei, Anhui, P.R. China on the last week of July or September, 2015. It will be organized by University of Science and Technology of China (USTC), the world's 50th top university in Natural and Physical Sciences and 3rd in China.

The intended list of topics is as below:

- Theoretical investigation and Quantitative analytical techniques in radiation physics
- New radiation sources, techniques & detectors
- Absorption and Fluorescence spectroscopy (XAFS, XANES, XRF, Raman…)
- Applications in quantum control
- Applications in Material science, Nano-science and Nanotechnology
- Applications in Biology and Medical science
- Applications in Space, Earth, Energy and Environmental sciences
- Applications in Cultural heritage and Art
- Applications in Industry
- Radiation physics and Nuclear fuel cycle

At present, there are two tentative venues. One is the Empark Grand Hotel (5-Star), located in Lakefront new area with 635 rooms, 13 conference halls, and a column-free thousand banqueting hall for 1200 people. The other is Grand Metro Park Resort Anhui (5-Star), located under Zi-Peng Mountain, with more than 100 deluxe rooms and 4 villas.

The estimated conference fee is about 500 US$ per person, with supporting grants for students and participants from developing countries and special support to selected young scientists. The estimated hotel fee is ~100 US$ per room in Venue and ~50 US$ per room in guest-house of NSRL.

There will also be an interesting tourist opportunity offered to Yellow Mountain (one of the best natural spots in China) and/or ancient village, as well as a visit to the Anhui Museum and dedicated theatre performances. Of course, there are many kinds of delicious Chinese foods that will round out your experience.

Looking forward to meeting you in Hefei !

Night Landscape of Swan Lake in Hefei

West campus of USTC

Tentative Venue: Empark Grand Hotel

Calendar

2014

15 - 20 June, 2014

EUROPEAN C0NFERENCE ON X-RAY SPECTROMETRY

Bologna, Italy

Contact : jorge.fernandez@unibo.it ***Web Site :*** http://exrs2014.ing.unibo.it

Further information on following page …

6 - 11 July, 2014

IRRMA-9

9th Industrial Radiation and Radioisotope Measurement Applications

Valencia, Spain

Contact : irrma-9@upv.es ***Web Site :*** http://irrma-9.webs.upv.es

Full (updated) information on following page …

1 – 5 September 2014

ICHLNRRA 2014

8th International Conference on High Levels of Natural Radiation and Radon Areas

Prague, Czech Republic

Web Site : http://www.ichlnrra2014prague.cz

Full information on following page …

13 – 17 September, 2014

AFRIRPA 04

4th Regional African Congress of International Radiation Protection Association

Rabat, Morocco

Web Site : http://www.afrirpa04.com

First announcement and full information in September Bulletin, pages 19 - 20

European Conference on X-Ray Spectrometry 2014

Bologna, Italy

15 - 20 June 2014

The European Conference on X-Ray Spectrometry (EXRS) has become a traditional meeting for European and non-European scientists working in x-ray spectrometry or using one of its several techniques: X-ray fluorescence (conventional, micro-fluorescence, synchrotron-based and total-reflection), electron microprobe, PIXE, etc. It represents an exciting discussion forum for basic research and applications of x-ray spectrometry in a rich variety of fields like materials science, chemistry (analysis of materials, quantification), radiation physics, medicine (medical physics, medical imaging), biology, environment, cultural heritage, technology and industry.

In 2014, the European Conference on X-Ray Spectrometry will take place from 15th - 20th June in Bologna, an important and lively city in Northern Italy, rich of history and cultural attractions, which is easy to reach by train, car and plane.

The conference is hosted by Alma Mater Studiorum University of Bologna, founded in 1088, the first university of the western world.

The scientific program consists of invited lectures from distinguished scientists, oral presentations, poster contributions given by the participants and industrial exhibition and presentations given by the sponsors. Selected contributions will be published in the scientific journal X-Ray Spectrometry (John Wiley & Sons).

The official language of the conference is English.

Scientists, engineers and exhibitors are invited to join the conference and share not only their ideas and current results but also their valuable experience, contributing to the enrichment of the international community.

Contact Person: Prof. Jorge E. Fernandez *Email :* mjorge.fernandez@unibo.it


Valencia 2014
IRRMA-9
Universidad Politécnica de Valencia
Valencia (Spain)
6 - 11 July 2014
9th International Topical
Meeting on Industrial
Radiation and Radioisotope
Measurement Applications
http://irrma-9.webs.upv.es
Topics
• Industrial Applications of Radiation
• Radiation Sources, Detectors and Measurements for Applications
• Monte Carlo Methods and Applications
• Biological and Medical Applications of Radiation
• Use of Radiation in Environmental Sciences
• Applications to Archaeometry, Art and Cultural Heritage
• Detection of Threat Material and Contraband
• Radiation Effects on Materials
• Emerging Radiation Technologies
• Shielding, Radiation Protection and Dosimetry in Applications
IRPS

ICHLNRRA 2014

8th International Conference on High Levels of Natural Radiation and Radon Areas

September 1 – 5, 2014

Hotel Diplomat, Prague, Czech Republic

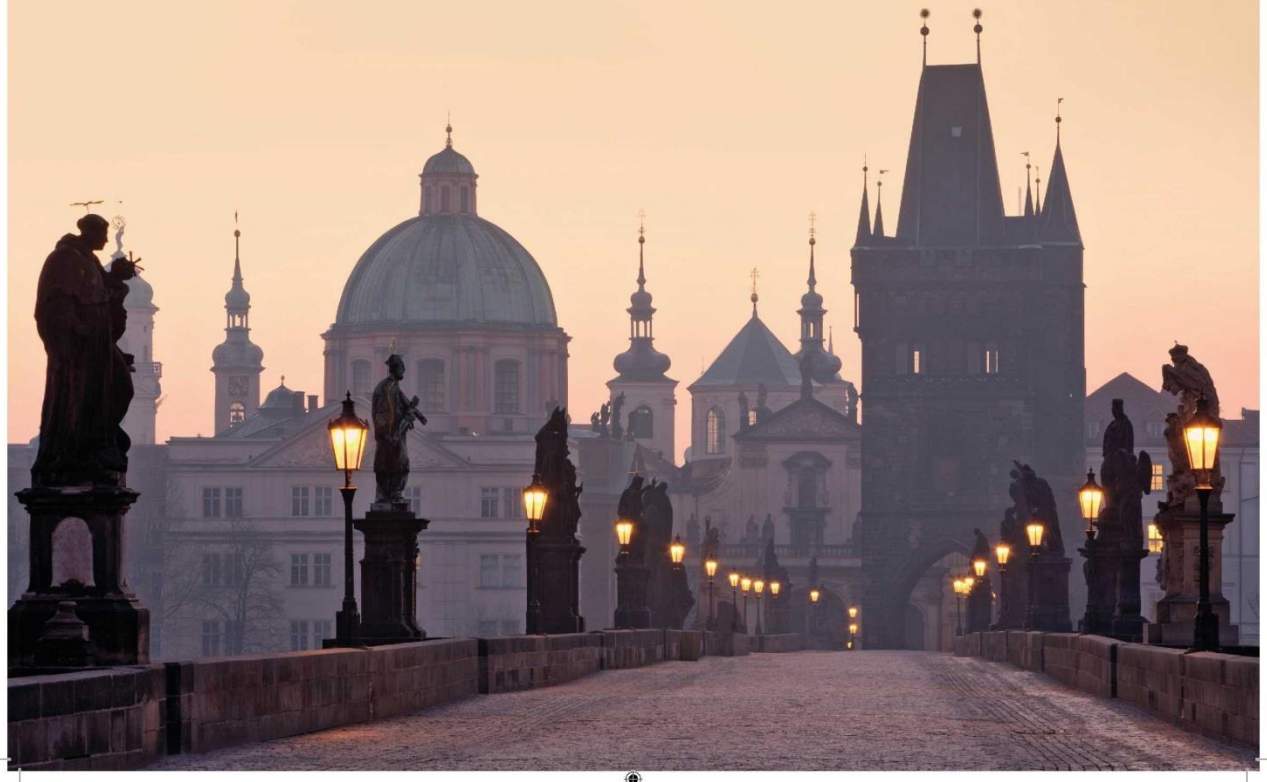
General Scientific Topics:

- Environmental Monitoring
- Environmental Modelling for Radiation Safety
- NORM, TENORM
- Radon, Thoron and Decay Products Measurement
- Biological Effects, Health Impact
- Risk assessment from low dose chronic exposures
- General Exposure and Dose Assessment
- Regulatory Control
- Other topics

Bonus:

Comparison measurement in Radon-Aerosol Chambers

www.ichlnrra2014prague.cz



INTERNATIONAL RADIATION PHYSICS SOCIETY

The primary objective of the International Radiation Physics Society (IRPS) is to promote the global exchange and integration of scientific information pertaining to the interdisciplinary subject of radiation physics, including the promotion of (i) theoretical and **experimental research in radiation physics,** (ii) investigation of physical aspects of interactions of radiations with living systems, (iii) education in radiation physics, and (iv) utilization of radiations for peaceful purposes.

The Constitution of the IRPS defines Radiation Physics as "the branch of science which deals with the physical aspects of interactions of radiations (both electromagnetic and particulate) with matter." It thus differs in emphasis both from atomic and nuclear physics and from radiation biology and medicine, instead focusing on the radiations.

The International Radiation Physics Society (IRPS) was founded in 1985 in Ferrara, Italy at the 3rd International Symposium on Radiation Physics (ISRP-3, 1985), following Symposia in Calcutta, India (ISRP-1, 1974) and in Penang, Malaysia (ISRP-2, 1982). Further Symposia have been held in Sao Paulo, Brazil (ISRP-4, 1988), Dubrovnik, Croatia (ISRP-5, 1991) Rabat, Morocco (1SRP-6, 1994), Jaipur, India (ISRP-7 1997), Prague, Czech Republic (ISRP-8, 2000), Cape Town, South Africa (ISRP-9, 2003), Coimbra, Portugal(ISRP-10, 2006), Australia (ISRP-11, 2009) and ISRP-12 in Rio de Janiero, Brazil in 2012. The IRPS also sponsors regional Radiation Physics Symposia.

The **IRPS Bulletin** is published quarterly and sent to all IRPS members.

The IRPS Secretariat is : Prof. Jorge E Fernandez (IRPS Secretary),
Universita di Bologna, Laboratorio di Ingegneria Nucleare di Montecuccolino
I-40136 Bologna, Italy
Phone : +39 051 2087 718 *Fax:* +39 051 2087 747
email: jorge.fernandez@unibo.it

The IRPS welcomes your participation in this "global radiation physics family."

INTERNATIONAL RADIATION PHYSICS SOCIETY

Membership Registration Form

1. Name : _____
(First) (Initial) (Last)

2. Date and Place of Birth : _____

3. Business Address : _____

_____
(Post Code) (Country)

Telephone:_____ Email: _____ Fax: _____

4. Current Title or Academic Rank (Please also indicate if Miss, Mrs., or Ms.): _____

5. Field(s) of interest in Radiation Physics (Please attach a list of your publications, if any, in the field:

_____

_____

6. Please list any national or international organization(s) involved in one or more branches of Radiation Physics, of which you are a member, also your status (e.g., student member, member, fellow, emeritus):

_____

_____

../Continued

7. The IRPS has no entrance fee requirement, only triennial (3-year) membership dues. In view of the IRPS unusually low-cost dues, the one-year dues option has been eliminated (by Council action October 1996), commencing January 1, 1997. Also, dues periods will henceforth be by calendar years, to allow annual dues notices. For new members joining prior to July 1 in a given year, their memberships will be considered to be effective January 1 of that year, otherwise January 1 of the following year. For current members, their dues anniversary dates have been similarly shifted to January 1.

Membership dues (stated in US dollars - circle equivalent-amount sent):

Full Voting Member: 3 years	**Student Member: 3 years**
Developed country $75.00	Developed country $25.00
Developing country $30.00	Developing country $10.00

Acceptable modes of IRPS membership dues payment, to start or to continue IRPS membership, are listed below. Please check payment-mode used, enter amount (in currency-type used), and follow instructions in item 8 below. (For currency conversion, please consult newspaper financial pages, at the time of payment). All cheques should be made payable to :

International Radiation Physics Society.

(For payments via credit card - http://www.irps.net/registration.html)

[ ] *(in U.S. dollars, drawn on a U.S. bank)*: Send to Dr W.L. Dunn, Dept. Mechanical and Nuclear Engineering, Kansas State University, 3002 Rathbone Hall, Manhattan, KS, 66506-5205. U.S.A.
Amount paid (in U.S. dollars) _____

[ ] *(in U.K. pounds):* Send to Prof. Malcolm J. Cooper, Physics Dept., University of Warwick, Coventry, CV4 7AL, U.K.. Bank transfer details:
Account number: 30330701. Bank and Branch code: Barclays, code 20-23-55.
Eurochecks in U.K. pounds, sent to Prof. Cooper, also acceptable.
Amount paid (in U.K. pounds) _____

8. Send this Membership Registration Form ***AND*** a copy of your bank transfer receipt (or copy of your cheque) to the Membership Co-ordinator:

Dr Elaine Ryan
Department of Radiation Sciences
University of Sydney
75 East Street, (P.O. Box 170)
Lidcombe, N.S.W. 1825, Australia
email: elaine.ryan@sydney.edu.au

9. _____ _____

Signature *Date*