

ICRS-13 & RPSD-2016

13th *International Conference on Radiation Shielding*
&
19th *Topical Meeting of the Radiation Protection & Shielding Division*
of the American Nuclear Society -2016

Speech of Dr. Giovanni Bruna

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General Co-Chair



Ladies and Gentlemen,

It is a pleasure & a honor for me to welcome you at this ICRS 13-RPSD 2016 joint Conference on behalf of the IRSN, the French *Institute for Radioprotection and Nuclear Safety*, which is widely involved in its organization, cares of a stand, contributes to the technical sessions through Jean-Christophe Gariel's, along with Masashi Hirano's (from Nuclear Regulation Authority of Japan)]'s coordination of the special session on "Fukushima 5 years after", as well as through some chairmanships, and presents several papers in different fields of endeavor.

I feel that the choice of addressing Monte-Carlo computing and Radioprotection in this joint Conference is really a lucky one, because the links between the two disciplines are very tight and both can get big advantage from gathering, exchanging and working together.

Actually, Monte-Carlo computing techniques are widely adopted in the Radioprotection field for a large range of applications, including the evaluation of the particles propagation in NPPs - both in normal operation, incidental & accidental conditions - but also, and I would say even more, for Medical Facilities design, Radiotherapy & Medical Applications, with use spanning from the production of isotopes to the development of specific measurement devices and metrology.

In my youth, I've personally been involved in Monte-Carlo computing, in the field of reactor design and operation. From my personal past experience, I just remember:

- The computation of suitable cross-section data-set for design calculations (in this field, further improvements are expected to account for temperature feedback),
- The double heterogeneity cases, such as in the PB – Pebble Bed – graphite moderated, gas cooled reactors, where both the particle walking process and geometry are random. Micro-particles are distributed randomly and, in accidental states, the media have got fuzzy boundaries. The coupled Monte-Carlo depletion provides with an accurate description of the time behavior of the pebbles to optimize safety and operation,
- The evaluation of the cross-sections of the SPND - Self Powered Neutron Detectors - adopted for in-core on-line reactor monitoring, which require very accurate Monte-Carlo description to account for the space and time effect of shell depletion for compensation purposes.

In the field of Propagation of Particles and Radiation, I recall the accurate focusing techniques, which allow appreciating the contribution of very specific energy ranges to the activation & the damage of materials, to the measurement device counting rates, and so on... In the VR - Variance Reduction - the importance is identified

with the adjoint flux. Among the way of providing an estimate of it, I have been familiar with a separate deterministic calculation. But it is likely using Monte Carlo itself. All these topics are extensively addressed in this Conference.

In the field of Radioprotection, I mention the wide contribution of the Monte-Carlo techniques to the simulation of irradiation effect on the tumors and the impact on their vicinity which allows predicting the collateral damage of irradiation, like radiation-induced secondary cancers, or the monitoring and the development of specific measurement devices and fakes.

All those very important topics and many others are discussed in this Conference, which moreover addresses the very crucial aspects of:

- The availability of experimental devices (which are often very expensive to build and operate) and sometimes shared, but which are definitely mandatory for the validation of the simulations in a wide range of topics addressed during this conference,
- The nuclear data, a crucial topic both for reactor and medical applications.

I am very impressed by the comprehensiveness and the exhaustiveness of the Conference program, and I wish to congratulate the General Chair, the Organizers, the Sponsors, the Contributors for their effort and commitment to make this Conference a success.

A last word to conclude: I am fully aware that innovation is a mandatory key for progress... and innovation can be achieved and speeded-up only through gathering forces and sharing knowledge among Organizations and Countries, worldwide.

That is the objective of the initiatives, platforms and R&D associations (such as, in Europe, NUGENIA for Reactors, OPERRA for Radioprotection), which are burgeoning and growing-up everywhere in the world. Among them, last but not least, I would mention the NI2050 initiative sponsored and supported by the NEA - Nuclear Energy Agency - which is presently underway. It intends to identify some high level challenges and main topics for R&D in the short & medium term, which can sustain the development of the peaceful applications of nuclear energy (not only for electricity production) and can increase its civil acceptance, which is a major issue today in many countries. Computation and radioprotection aspects are part of the initiative objectives.

I trust that attractive Conferences such as the present joint ICRS 13-RPSD 2016 one contribute efficiently to the emergency of new and innovative ideas and to the creation of collaboration frameworks which are to enhance and support effectively innovation in the reactor and radioprotection field.

I wish you all a very useful and profitable Conference and a pleasant stay in this charming end-of-summer Paris.