
Radiation Safety Information Computational Center



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There are three things to aim at in public speaking: first to get into your subject, then to get your subject into yourself, and lastly, to get your subject into your hearers.—A. S. Gregg

Visitors Welcome.....	1
Handbook of 217Plus™ Reliability Prediction Models	2
Changes to the Computer Code and Data Collection	2
My Life as a Shielder	3
CONFERENCES, COURSES, SYMPOSIA	5
MCNPX Workshops	5
Year 2006 MCNP Class Schedule	6
Practical MCNP for the Health Physicist, Medical Physicist, and Rad Engineer	6
Hadronic Shower Simulation Workshop	7
PHYSOR 2006.....	7
ISRP-10.....	7
2 nd International Symposium on Radionuclide Therapy and Radiopharmaceutical Dosimetry ..	8
ICNCT-12	8
First European Workshop on Monte Carlo Treatment Planning	8
33rd Waste Management Conference.....	9
PHYTRA1.....	9
ND2007.....	10
International Conference on Emerging Nuclear Energy Systems (ICENES 2007).....	11
CALENDAR.....	12

Visitors Welcome

Visitors to the RSICC website this month will notice a change in the look, but not the purpose of the webpage. The staff has worked to create a page that is easier to navigate and visually pleasing. We hope you agree that we have succeeded. If you have comments about how the webpage is working for you, please let us know through the feedback link on the “Contact Us” tab.

[Handbook of 217Plus™ Reliability Prediction Models](#)

The Reliability Information Analysis Center (RIAC) has announced the availability of *Handbook of 217Plus* which is intended to replace the outdated MIL-HDBK-217, *Reliability Prediction of Electronic Equipment*. The methodology doubles the number of models previously available from the Center. For the first time, the Center has published the complete methodology and its supporting rationale in a handbook which will help users understand the 217Plus™ methodology. The new document includes all the models and lookup tables needed to calculate component, assembly, and system failure rates using the latest 217Plus™ methodology. It is available as a PDF download or as a printed document. The download and pricing information can be found at <http://quanterion.com/RIAC/ProductsAndServices/Products/index.asp?SearchType=KEYWORD&Keywords=HDBK-PLUS>.

Changes to the Computer Code and Data Collection

[CCC-684/NRCDose 2.3.8](#)

Chesapeake Nuclear Services, Inc., Annapolis, Maryland, contributed a newly frozen version of this suite of NRC computer codes used for evaluating routine radioactive effluents from nuclear power plants. NRCDose includes LADTAP II, GASPARI, and XOQDOQ with a WINDOWS interface to facilitate ease of use. The release of NRCDose 2.3.8 corrects two problems in the LADTAP module—one with BLOCK data input and another problem with usage locations for ALARA analysis. An updated user manual is also included which provides some expanded discussion of the liquid and gaseous BLOCK data functionality.

NRCDose runs on Pentium computers under Windows XP. The distributed executables were created with the Microsoft Fortran PowerStation Version 4.0 and Microsoft Visual Basic 6.0. Source files are not included, so this code system can only be run on PCs under Windows. The package is transmitted on CD in Windows format. References: User's Guide," (May 2006); NUREG/CR-4653, PNL-5907 (March 1987); NUREG/CR-1276, ORNL/NUREG/TDMC-1 (March 17, 1980); NUREG/CR-2919 (PNL-4380) (September 1982). Fortran and Visual Basic; Pentium (C000684PC58606).

[DLC-225/SINBAD 2006](#)

SINBAD is a new electronic database developed to store a variety of radiation shielding benchmark data so that users can easily retrieve and incorporate the data into their calculations. An international effort between the OECD Nuclear Energy Agency (NEA) and ORNL Radiation Safety Information Computational Center (RSICC) and invaluable contributions from many international nuclear data experts to the compilation, validation and review of the data combined to create this database. SINBAD is an excellent data source for users who require the quality assurance necessary in developing cross-section libraries or radiation transport codes. The future needs of the scientific community are best served by the electronic database format of SINBAD and its user friendly interface, combined with its data accuracy and integrity. It includes data from nuclear reactor shielding, fusion blankets and accelerator shielding experiments.

The guidelines developed by the Benchmark Problems Group of the American Nuclear Society Standards Committee (ANS-6) on formats for benchmark problem descriptions were followed. SINBAD data include benchmark information on (1) the experimental facility and the source; (2) the benchmark geometry and composition; and (3) the detection system, measured data, and an error analysis. A reference section is included with the data. Relevant graphical information, such as experimental geometry or spectral data, is included. All information that is compiled for inclusion with SINBAD has been verified for accuracy and reviewed by two scientists. The experimental results are distributed in tabular ASCII form that can easily be exported to different computer environments for further use. This

release, dated April 2006, incorporates over 60 benchmark experiments. Reference: *Radiation Protection Dosimetry* (2005), Vol.116, No.1–4, pp.558–561. HTML, PDF and ASCII text files; PC, UNIX Workstations, MAC (D00225MNYCP00).

My Life as a Shielder

W. Reed Johnson

My first real encounter with the nuclear technology came in 1953 during my senior year as a physics major at the Virginia Military Institute, where the new Superintendent, General William Milton told us about the nuclear submarine project. He had just retired from General Electric and a management position at the Knolls Laboratory in Schenectady, New York. Shortly after General Milton's talk an opportunity came up to apply to the Oak Ridge School of Reactor Technology (ORSORT), the only graduate education opportunity in the nuclear field in those days when almost all nuclear information and data were classified. I was accepted into a class of about 90, divided roughly half-and-half between men (only in those days) just out of college and practicing engineers and scientists sent by their companies.

ORSORT was a one-year program established by then-Captain Hyman G. Rickover (henceforth referred to here as "the Admiral") to provide nuclear engineers for the submarine program. Students included engineers of all disciplines, physicists and chemists. For 9 months we attended classes all morning, and the afternoons were a mixture of classes, laboratory session and problems sessions. In the summer the class was divided into groups, each assigned a design project. My group worked on a liquid metal cooled breeder system. Dr. Everitt Blizzard, the father of much of shielding technology, was our shielding instructor. He taught us, among many other things, that water was the best neutron shield, as it was cheap and had no cracks. In addition we had laboratories at the Lid Tank Facility at the Bulk Shielding Reactor (the original Swimming Pool reactor) and the 10,000 kW, X-10 reactor, and visited the Tower Shielding facility then under construction. As a physicist by education I was intrigued by the extent to which radiation shielding required an intimate knowledge of the individual gamma-ray and neutron interactions.

My first job after ORSORT was with the Shielding Group of the Electric Boat Company in Groton Connecticut, where the first nuclear submarine Nautilus (SSN 571) was about to go into initial operations, an important part of which was to be a series of measurements to determine radiation levels around the boat during reactor operations, hence the adequacy of the shield design. All employees at Electric Boat who had any training with radiation detection equipment were assigned to the shield test effort, which was run by the Shielding Group, which had only four members. So at the age of 23, one year out of college, I found myself organizing round-the-clock shifts of engineers making measurements all over the nation's first nuclear sub, inside and out, in bitter cold weather. A set of measurements were taken at each of several successively higher reactor power levels, starting at about 0.001 % of full power, to insure that none of the crew or others on board were being over-exposed due to errors or oversights in the first-of-its-kind ship-board reactor shield design. There were many other power plant measurements to be taken, and the Admiral had set a rigorous schedule for the completion of the start-up testing, so these were exciting times. One problem did emerge, and that was neutron streaming up the tubes around the reactor vessel that held the neutron flux measuring instrumentation used to determine reactor power. This caused high radiation levels in the occupied space in the compartment above the reactor and considerable consternation amongst the start-up crew. The problem was solved using a variation on Dr. Blizzard's advice. Water was not an option, since the neutron instruments had to be kept dry, but the streaming problem was solved by pouring small polyethylene balls down the instrument tubes, which filled them and effectively stopped the neutron streaming.

Once the reactor had reached full power it was run for several hours during which time a more complete radiation level survey was made inside and out. A few minutes after the reactor was shut down, and after a health physicist had entered the reactor compartment to check the radiation levels, I was honored to be the second to enter, in order to make some valve leakage measurements.

After the excitement and turmoil of the Nautilus start-up was over, the Shielding Group got back to the routine task of designing the secondary shielding for new submarine designs. The main radiation sources for these calculations were the short-lived N-16 gamma rays and N-17 neutrons resulting from fast neutrons interactions with water in the reactor core. Point kernel and analytic transformations of point sources to line and other geometries were the techniques used, all of which are well described in the *Reactor Shielding Design Manual*, edited by Ted Rockwell, and published in 1956. In those days, before computers, or even electronic calculators, the slide rule and electro-mechanical calculator were the primary tools we had to work with. The latter could add, subtract, multiply and divide, but the last two operations took time. I was getting my work done faster than my colleagues in the group, until one day the fire inspector noticed that my machine was plugged into a 220 v outlet, rather than the normal 110 v power source. After that I lost my advantage.

Some major problems arose in the design of the shielding for the Seawolf, designed to be cooled by liquid sodium, which activates to Na-24 with a couple of hard gamma rays and a 14-hour half life, greatly complicating the quick-access-to-the-reactor-compartment requirement the Admiral insisted upon. Some of the resulting geometries were so complex that we had to have the model shop build full sized mock-ups of components so that we could determine the line-of-sight distances through the proposed lead shielding. During this time I was also assigned the task of running some radiographic testing of bulkhead shielding already installed in the Seawolf. The technique is too long to include here (See however pages 211-213 in Rockwell's *Handbook*), but we did find that much of the lead, as thick as 8 inches in some places, had been improperly installed and had to be replaced.

I left Electric Boat, and the shielding field, in the summer of 1955, to join ALCO Products, Inc. to become involved with the design, criticality experiments and initial operations of the Army Package Power Reactor-1, a prototype built at Ft. Belvoir, Virginia. My shielding experience came in handy though, during the low power testing of the fuel, as we determined, using foil activations, that there would be serious thermal neutron flux peaking in certain area of the fuel. This problem was then able to be corrected prior to operation. After serving as a shift supervisor for the 700 hour performance test, I left ALCO in the fall of 1957 to enter graduate school at the University of Virginia. Projects moved much faster in those days, as I was involved in the APPR-1 project from initial core design and testing, through plant operations in just a bit over two years.

I worked my way through school serving as Project Engineer on the University's 2 mW Swimming Pool Reactor, and after receiving a doctorate in engineering-physics, joined the faculty of the newly formed Nuclear Engineering Department at Virginia. By this time most nuclear information had been declassified, ORSORT no longer existed and many universities were starting to get into nuclear engineering. The reactor served me well as a research tool, and with the help of colleagues and many hard working graduate students, I set out to investigate experimentally some of the techniques and assumptions we made in designing submarine shields. We built a special, tangential beam port that allowed us to create a strong beam of the neutron capture gamma rays from the elements titanium and nickel, which allowed the study of the penetration, buildup phenomena and albedos of gamma rays having energies of about 6 MeV and 8 MeV, respectively, from those materials. Our results indicated that for lighter shield materials, like concrete and iron, traditional calculation techniques, using buildup factors determined by moments methods calculations were petty accurate. However, for heavier shield materials, like lead, there were significant dose contributions from positron annihilation radiation and bremsstrahlung produced by higher energy secondary electrons. These results were verified numerically by William H. (Buck) Thompson whose doctoral dissertation involved the writing of what I believe was the first Monte Carlo program that included these phenomena explicitly.

The facilities at the University of Virginia's Reactor (UVAR) also allowed me, through my students, to compare deep penetration calculations with experiments, and the spatial distribution of gamma ray energies absorption in various geometries including that of fission products in simulated nuclear fuel elements. Most of this work has appeared in ANS journals and transactions and in the proceedings of several of the international shielding meetings that have been held over the years.

Age and the decision of the University of Virginia to shut down the UVAR in 1998 finally put an end to my activities as an experimental shielder, a career that I found most interesting, challenging and rewarding. The advent of modern computers and sophisticated numerical radiation transport methods have probably eliminated much of the motivation for, and interest in, experimental validations of calculations. These days I teach nuclear concepts to high school teachers, foreign affairs students interested in non-proliferation, and older folks who want to know about nuclear power. But I still use the old Civil Defense Geiger-Mueller survey meter to show how radiation can be attenuated by matter.

CONFERENCES, COURSES, SYMPOSIA

RSICC attempts to keep its users and contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers via email to riceaf@ornl.gov with "conferences" in the subject line by the 20th of each month. Please include the announcement in its native format as an attachment to the message. If the meeting is on a website, please include the url.

Every attempt is made to ensure that the links provided in the Conference and Calendar sections of this newsletter are correct and live. However, the very nature of the web creates the possibility that the links may become unavailable. In that case, please call or mail the contact provided.

MCNPX Workshops

Lead Teachers: Drs. John Hendricks, Gregg McKinney, Laurie Waters

Organizer: HQC Professional Services

Contact: bill@mcnpxworkshops.com

Information: <http://mcnpxworkshops.com> and MCNPX homepage: <http://mcnpx.lanl.gov>

2006 Schedule		
July 31–Aug 4	Intermediate	West Point, NY
Sept 18–22	Intermed./Adv.	Santa Fe, NM
Oct 30–Nov 3	Intermediate	Tokyo, Japan

MCNPX is packed with new and exciting plotting features, including numerous mesh tally options which can be superimposed on your geometry plot and plotted within the MCNPX run, eliminating the need for post-processing and costly additional plotting package(s). You can plot particle flux, tracks, dosage, and energy deposition as well as source points and many others.

The workshops include hands-on instruction, generally on PC Windows machines. Subject to participant export approval from the MCNPX beta test team, participants will be able to access the Fortran 90 version of MCNPX 2.6, the LA150 (150 MeV) cross-section data for over 40 isotopes for incident neutrons and protons and 12 for photonuclear interactions, and a notebook of viewgraphs.

Follow-up consultation for class participants will be provided.

The classes are taught by experienced MCNPX code developers and instructors. More information on code versions and capabilities is available at MCNPX Workshops web site <http://mcnpxworkshops.com>.

To register go to <http://mcnpxworkshops.com/regform.html>.

Year 2006 MCNP Class Schedule

Aug 22–24	Advanced Variance Reduction	Los Alamos National Laboratory
Aug 29–31	Advanced Criticality	Los Alamos National Laboratory

Year 2006 classes will showcase the latest release of MCNP, Version 5. All classes provide interactive computer learning with time available to discuss individual questions and problems with MCNP experts. While MCNP supports a number of platforms, LANL class computers are usually PCs. The class fee includes a notebook with all class viewgraphs and handouts, dinner the first evening, and snacks and refreshments provided during class breaks. Registration and the most current information can be found at <http://mcnp-green.lanl.gov/classinformation.html>. For information regarding the class in Japan - Contact: Dr. Tadakazu Suzuki - Research Organization for Information Science & Technology (RIST), (phone 029-282-8309, 6335, fax 029-282-4282, email tadakazu@tokai.rist.or.jp, <http://www.rist.or.jp/nucis>).

Introductory classes are for people who have little or no experience with MCNP. This class surveys the features of MCNP so the beginning user will be introduced to the capabilities of the program, and will have hands-on experience at running the code to solve simple problems. Course topics include Basic Geometry, Source Definitions, Output (Tallies) Specification and Interpretation, Advanced Geometry (repeated structures specification), Variance Reduction Techniques, Statistical Analysis, Criticality, Plotting of Geometry, Tallies, and Particle Tracks, and Neutron / Photon / Electron Physics.

Advanced classes are for people with MCNP experience who want to extend their knowledge and gain depth of understanding. Most areas of MCNP operation will be discussed in detail, with emphasis on Advanced Geometry, Advanced Variance Reduction Techniques, and other Advanced features of the program. Time will be available to discuss approaches to specific problems of interest to students.

Practical MCNP for the Health Physicist, Medical Physicist, and Rad Engineer

DATES: 17–21 July 2006 (4.5 days)

FEE: \$1,450 per person

PLACE: The MESA Complex, Room 130, University of New Mexico-Los Alamos Campus

The Los Alamos MCNP code is a general and powerful Monte Carlo transport code for photons, neutrons, and electrons. MCNP can be safely described as the “industry standard” with more than 600 person-years of development effort behind it. It is supported on a variety of platforms and is now accessible to health physicists, medical physicists, and rad engineers using desktop or laptop personal computers. This 4.5 day course introduces the basic concepts of Monte Carlo, demonstrates how to put together an MCNP input file, and illustrates some health and medical physics applications of the code. No prior knowledge of Monte Carlo is assumed.

All of the input and output files for the class demonstrations will be provided for self-study on a diskette. The course will focus on providing a practical boost toward learning the program and guiding the student toward useful applications. Extensive practice sessions are scheduled using a personal computer in class.

Registration is available online at: <http://drambuie.lanl.gov/~esh4/mcnp.htm>. Make checks (U.S. dollars on a U.S. bank) payable to the University of California and mail with name, address, and phone number to: David Seagraves, Mail Stop J573, Los Alamos National Laboratory, Group HSR-4, MCNP Class, Los Alamos, NM 87545.

Inquiries regarding registration and class space availability should be made to David Seagraves, 505-667-4959, fax 505-665-7686, email: dseagraves@lanl.gov. Technical questions may be directed to Dick Olsher, 505-667-3364; email dick@lanl.gov.

Richard H. Olsher

Hadronic Shower Simulation Workshop

Fermilab in Batavia, Illinois, will host the Hadronic Shower Simulation Workshop September, 6–8 2006. The workshop will bring together world experts in the field of hadronic shower development, to establish a collaborative effort that will lead to a better understanding and simulation of hadronic showers relevant to hadron calorimetry at the ILC and LHC, neutrino fluxes and atmospheric showers. The workshop will evaluate existing event generator and transport codes. Code developers will present the results of various hadronic shower simulation scenarios at the workshop. The workshop should identify the shortcomings of existing hadronic shower simulations and develop a collaborative plan to improve our understanding of showers and investigate the need to acquire new data to improve shower models. Contact the conference secretary Cynthia Sazama at sazama@fnal.gov for additional information or the website at <http://conferences.fnal.gov/hss06/>.

PHYSOR 2006



The Canadian Nuclear Society has announced that the ANS Reactor Physics Topical PHYSOR-2006, “Advances in Nuclear Analysis and Simulation,” will be held in Vancouver, BC, Canada, Sept. 10–14, 2006. The meeting is sponsored by the Reactor Physics Division of the ANS and co-sponsored by several international societies. The conference will be held at the Hyatt Regency in downtown Vancouver.

You are invited to visit the meeting website at <http://www.cns-snc.ca/physor2006/> to obtain updated information and to download a copy of the [call for papers](#). The conference chair is Benjamin Rouben, FCNS Manager, Reactor Core Physics Branch, AECL Sheridan Park (phone 905-823-9060 x 4550, fax 905-822-0567, email roubenb@aecl.ca). The technical program co-chair is Ken Kozier, Atomic Energy of Canada Limited (AECL), Chalk River Laboratories, Chalk River, Ontario, Canada K0J 1J0 (phone +1-613-584-8811 + ext. 5059, email physor2006@aecl.ca).

ISRP-10

The 10th International Symposium on Radiation Physics (ISRP-10) will be held at the University of Coimbra, Portugal, 17–22 September 2006. This event is organized jointly by the International Radiation Physics Society (IRPS) and the Physics Department of Coimbra University. The meeting is devoted to current trends in radiation physics research and will include a series of plenary talks given by prominent international researchers. The symposium in Coimbra is the latest in a series of triennial symposia which began in Calcutta in 1974 and continued in Penang (1982), Ferrara (1985), São Paulo (1988), Dubrovnik (1991), Rabat (1994), Jaipur (1997), Prague (2000) and Cape Town (2003). A 2½ day [Workshop on the Use of Monte Carlo Techniques for Design and Analysis of Radiation Detectors](#) will be held immediately prior to ISRP-10 (15–17 September 2006).

More information on the Symposium, the associate workshop, as well as on the venue, can be found at <http://pollux.fis.uc.pt/isrp10>.

2nd International Symposium on Radionuclide Therapy and Radiopharmaceutical Dosimetry



The 2nd International Symposium on Radionuclide Therapy and Radiopharmaceutical Dosimetry will take place in conjunction with the annual congress of the European Association of Nuclear Medicine (EANM) in Athens, Greece, September 30–October 4, 2006. As a separate track within the EANM congress this symposium will bring together disciplines concerned with radiopharmaceutical dosimetry and radionuclide therapy stimulating interdisciplinary scientific discussion. The EANM Dosimetry and Therapy Committees and colleagues from the MIRD committee of the SNM will join to coordinate the scientific committee and program for the meeting. All organizational matters will be handled by the EANM secretariat and congress office. Conference topics include:

- Clinical: mIBG and peptides
- Clinical: Radioimmunotherapy
- Clinical: Thyroid, bone pain palliation & miscellaneous
- Dosimetry: Data Collection Methods / Dosimetric Models / Pharmacokinetics
- Dosimetry: Quantitative Analysis and Treatment Planning / Dosimetry for Clinical Trials
- Biological and Long-Term Effects / Animal and in-vitro Studies
- Miscellaneous

The link to current information about the symposium can be found at http://eanm06.eanm.org/programme/prog_isrtrd.php?navigationId=19&sessNavigationId=63.

ICNCT-12

The Twelfth International Congress on Neutron Capture Therapy (ICNCT-12) will be held October 9–13, 2006, in Takamatsu, Kagawa, Japan. The meeting is sponsored by the International Society for Neutron Capture Therapy (ISNCT) with the society president, Yoshinobu Nakagawa of the Kagawa National Children's Hospital, acting as chairman of the organizing committee. The meeting will focus on the many significant developments that have been made in neutron capture therapy in biology, medicine, chemistry, medical physics and engineering, and clinical trials. One of the highlights of the presentations will be the report of results from our Japanese NCT teams of clinical trials on brain, skin and head and neck tumors. Results of recent treatments on liver and lung cancers will also be reported. These treatments have been carried out using a combination of BSH and BPA which have yielded successful results. The most up-to-date information as well as registration and submittal information can be found at the conference website: <http://icnct-12.umin.jp/index.html>.



First European Workshop on Monte Carlo Treatment Planning



The European Workgroup on MCTP (EWG-MCTP) is sponsoring the First European Workshop on Monte Carlo Treatment Planning, October 22–25, 2006, in Gent, Belgium. The conference theme is “Introduction of MCTP into the Clinic.” The workshop will offer the opportunity for scientists to exchange information, to develop new ideas and initiate international collaborative programs on the exciting and fast developing research domain of Monte Carlo treatment planning. This workshop will also provide an overview of the current state of the art to clinical physicists who are thinking of introducing MCTP into their clinic.

The venue of the meeting is “Het Pand,” a former Dominican monastery located in the historical centre of the city. The oldest parts of the building date from the 13th century and houses some valuable collections of the University such as the Museum for the History of Medicine and the ethnographical and archaeological collections.

Scientific sessions will consist of general talks and poster presentations. The research topics covered will be the following:

- Industry – MCTPS
- 4D MCTP
- General multipurpose codes
- Dosimetry
- Photon MCTP
- Electron MCTP
- Proton MCTP
- Brachytherapy MCTP
- Clinical studies
- MC in optimisation
- Portal dosimetry

Inquiries may be sent to N. Reynaert, Lab for Standard Dosimetry Gent, Gent University –FANC, Proeftuinstraat 86 – B-9000 Gent, BELGIUM (phone + 32 9 264 66 48, fax + 32 9 264 66 96, email nick.reynaert@ugent.be). Details and updated information can be found at <http://www.ewg-mctp.ugent.be/>.

33rd Waste Management Conference

The 33rd Waste Management Conference (WM'07) will be held February 25–March 1, 2007, in Tucson, Arizona. The conference is organized by WM Symposia, Inc., an Arizona non-profit corporation and hosted by the University of Arizona. Sponsoring organizations include the American Nuclear Society, the American Society of Mechanical Engineers, New Mexico State University Waste-Management Education and Research Consortium (WERC) and OECD/NEA. The conference is also organized in cooperation with the US Department of Energy (DOE), Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA) and International Atomic Energy Agency (IAEA). Registration, technical program information, and author information is available or will be added to the website as it becomes available (<http://www.wmsym.org/>).

PHYTRA1

The First International Conference on Physics and Technology of Reactors and Applications (PHYTRA1), will be held March 14–16, 2007, in Marrakech City, Morocco. This is the first International Conference organized by the Moroccan Association for Nuclear Engineering and Reactor Technology “GMTR” after a series of three national conferences. The objective is to provide scientists and engineers from different countries an opportunity to present their recent work in reactor physics and nuclear technology. Industrial vendors may exhibit their products and innovations in different domains related to reactor physics and nuclear technology. The PHYTRA1 conference will also be a celebration for the operation of the first research reactor (TRIGA Mark II) in Morocco which is expected to be commissioned in 2006.

Conference topics include:

- Deterministic and Monte Carlo Transport Theory Methods

- Reactor Core and Lattice Physics Methods
- Physics and Computational Methods for Advanced Reactors
- Reactor Theory and Reactor Concepts
- Neutron Kinetics and Dynamics
- Criticality and Safety Analysis
- Fuel Loading Optimization and Fuel Design
- Nuclear Data Analysis and Methods
- Computer Codes and Benchmarks
- Computational Methods for Research Reactors
- High Temperature Reactor Physics and Methods
- Reactor Thermal Hydraulics
- Radioactive Waste Management
- Research Reactor Utilization
- Reactor Dosimetry and Reactor Shielding

A one-page abstract should be sent by **July 15, 2006**, via email, to Pr. A. Jehouani, Faculty of Sciences SEMLALIA, Dept. of Physics, University Cadi Ayyad- Marrakech, Morocco (email PHYTRA1@fsr.ac.ma or jehouani@ucam.ac.ma, fax 212-44-43-74-10) or Pr. L. Erradi, GMTR President, Mohammed V Agdal University, Faculty of Sciences, Department of Physics, B. P. 1014 Rabat, Morocco (email erradi@fsr.ac.ma or fax 212-0-37-77-89-73) <http://www.fst.ac.ma/gmtr/phytra1/phytra1.html>.

ND2007

The International Conference on Nuclear Data for Science and Technology will be held April 22–27, 2007, in Nice, France. The conference is organized by the Commissariat à l'Énergie Atomique (CEA) under the auspices of the OECD Nuclear Energy Agency (NEA). The General Chairs are B. Bigot, Haut-commissaire à l'Énergie Atomique and L. Echávarri, NEA Director-General. Abstracts should be submitted by **September 2006** on the following topics:

- Nuclear structure and decay data
- Experimental facilities and detection techniques
- Nuclear data measurements and analysis
- Nuclear theories, models and data evaluation
- Standards
- Evaluated nuclear data libraries and processing
- Validation, benchmarking of evaluated data
- Integral experiments
- Uncertainties quantification
- Data dissemination and international collaboration
- Fission energy applications
- Accelerator-related applications
- Fusion technology applications
- Dosimetry and shielding applications
- Safeguards and security
- Space, cosmic-ray applications, radiation effects on electronics
- Astrophysics and cosmology applications
- Medical and environmental applications

The most current information will be posted on the website at <http://www-dapnia.cea.fr/Sphn/nd2007>

[/site_nd2007/](#) and questions or comments may be addressed to nd2007@cea.fr.

International Conference on Emerging Nuclear Energy Systems (ICENES 2007)

The committee for the 13th International Conference on Emerging Nuclear Energy Systems (ICENES 2007) has issued a call for papers for the conference to be held June 3–8, 2007, at Gazi University in Istanbul.

The main objective of ICENES is to provide a broad review and discussion of various advanced, innovative and non-conventional nuclear energy production systems to scientists, engineers, industry leaders, policy makers, decision makers and young professionals who will shape future energy supply and technology. ICENES 2007 will also open the forum to innovative non-nuclear technologies, such as hydrogen energy, solar energy, deep space exploration, etc. with an emphasis on *unthinkable ideas* with a sound scientific-technical basis. The program will include invited papers, submitted contributions in oral and poster sessions, as well as an industrial exhibition and social tours. Topical areas include:

- Advanced Fission Systems
- Fusion Energy Systems
- Accelerator Driven Systems
- Exotic Nuclear Reactor Concepts
- Transmutation and Fuel Cycle
- Co-Generation and Non-Electricity Production Applications
- Generation IV Reactors
- Space Power and Propulsion
- Deep Space Exploration, general
- Nuclear Hydrogen Production
- Radiation Protection & Shielding
- Hydrogen Energy, general including non-nuclear applications
- Solar Energy
- Other Alternative Energies
- Societal Issues

The official language of the conference will be English. Authors should submit abstracts of 300–500 words to abstract@icenes2007.org for review by the Program Committee. Abstracts should include sufficient information to explain and support the new and significant results to be presented in the proposed paper. The topical area appropriate to the abstract and the name and address of the author to whom correspondence should be addressed must be clearly stated at the top of the first page. Abstracts may be submitted in “pdf” or “doc” format via e-mail by **September 22, 2006**. Authors will be notified by November 17, 2006. The deadline for full papers is **March 2, 2007**. The proceedings will be produced on an interactive CD-ROM with an ISBN registration number. A selection of ICENES 2007 papers will be published in a special edition of the journal *Energy Conversion & Management*. Scientific and technical inquiries may directed to Prof Dr. Sümer Şahin, Gazi University 06500 ANKARA/TURKEY (phone +90 (312) 212 43 04, fax +90 (312) 212 43 04, email sumersahin@icenes2007.org). Updated information will be posted to <http://www.icenes2007.org/>.

CALENDAR

July 2006

American Association of Physicists in Medicine (AAPM) Annual Meeting, July 30–Aug. 3, 2006, Orlando, Florida. Contact: For general meeting information, please contact Hadijah Robertson at hadijah@aapm.org. For scientific program or exhibitor information, please contact Lisa Rose Sullivan at lrose@aapm.org. <http://aapm.org/meetings/06AM/>

September 2006

International Congress on Medical Physics, A Satellite Meeting of the World Congress 2006 -Seoul, South Korea, Sept. 3–6, 2006, Hangzhou, China. Contact: Raymond K. Wu, Ph.D., Medical Physics Department, OhioHealth Hospitals, 3535 Olentangy River Road, Columbus, OH 43016 USA (phone 1-614-566-4427, email RayKWu@GMail.com) url <http://arooj.org/hangzhou/>.

Hadronic Shower Simulation Workshop, Sept. 6–8 2006, Batavia, Illinois. Contact: Cynthia Szama (sazama@fnal.gov) url <http://conferences.fnal.gov/hss06/>.

PHYSOR-2006, “Advances in Nuclear Analysis and Simulation,” Sept. 10–14, 2006, Vancouver, BC, Canada. Contact: Ken Kozier, Technical Program Co-Chair, Atomic Energy of Canada Limited (AECL), Chalk River Laboratories, Chalk River, Ontario, Canada K0J 1J0 (phone 613-584-8811 ext. 5059, email physor2006@aecl.ca) <http://www.cns-snc.ca/physor2006/>.

Imaging as a Biomarker: Standards for Change Measurements in Therapy, Sept. 14–15, 2006, Gaithersburg, Maryland. Contact: Linda Beth Schilling (linda.schilling@nist.gov, 301-975-2887), Ram Sriram (ram.sriram@nist.gov, 301-975-3507) or Laurence Clarke (lclarke@mail.nih.gov, 301-451-4775). Updated workshop information and registration links are available on the NIST U.S. Measurement System website <http://usms.nist.gov>.

Workshop on the Use of Monte Carlo Techniques for Design and Analysis of Radiation Detectors, Sept. 15–17, 2006, Coimbra, Portugal. Contact: (email workshop@lipc.fis.uc.pt), <http://pollux.fis.uc.pt/isrp10/workshop/index.htm>.

ISRP-10, Sept. 17–22, 2006, Coimbra, Portugal. Contact: ISRP-10, Departamento de Física, Universidade de Coimbra, 3004-516 Coimbra, Portugal (fax +351 239 829158, email isrp10@pollux.fis.uc.pt, <http://pollux.fis.uc.pt/isrp10>).

First Canadian Geant4 Tutorial, Sept. 25--28, 2006, at McGill University in Montreal, Canada. Contact: Margery Knewstubb (email geant4@jmedphys.mcgill.ca, phone (514)-934-1934 x 44158) url <http://www.medphys.mcgill.ca/~geant4/Welcome.html>.

2nd International Symposium on Radionuclide Therapy and Radiopharmaceutical Dosimetry, Sept. 30–Oct. 4, 2006 Athens, Greece. The url is http://eanm06.eanm.org/programme/prog_isrtrd.php?navigationId=19&sessNavigationId=63.

October 2006

13th Workshop on Monte Carlo Simulation of Radiotherapy Treatment Sources using the BEAMnrc Code System, Oct. 2–5, 2006, Ottawa, Canada. Contact: Dave Rogers, Physics Department, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, Canada, K1S 5B6 (phone 613-520-2600x4374, fax 613-520-4061, e-mail drogers@physics.carleton.ca) <http://www.physics.carleton.ca/~drogers/BEAM/course/>.

12th International Congress on Neutron Capture Therapy (ICNCT-12), Oct. 9–13, 2006, Takamatsu, Kagawa, Japan. Contact: ICNCT-12 Secretariat, Association for Nuclear Technology in Medicine, 2 Masumoto Bldg., 1-8-16 Toranomon, Minato-ku, Tokyo 105-0001, Japan (phone 81-3-3504-3961, fax 81-3-3504-1390, email ICNCT2006@antm.or.jp) <http://icnct-12.umin.jp/>.

2nd Asian and Oceanic Congress for Radiological Protection (AOCRP-2), Oct. 9–13, 2006, Beijing, P. R. China. Contact: Mr. Chai Luquan (phone 86-351-2202030, fax 86-351-7020407, email chailuquan@cirp.org.cn) <http://www.aocrp-2.org/index.asp>.

15th Pacific Basin Nuclear Conference (15PBNC), Oct. 15–20, 2006, Sydney, Australia. Contact: PBNC 2006 Conference Managers, GPO Box 128, Sydney NSW 2001, Australia (phone + 612 9265 0700, fax + 612 9267 5443, email pbnc2006@tourhosts.com.au, url <http://www.pbnc2006.com/>).

First European Workshop on Monte Carlo Treatment Planning, Oct. 22–25, 2006, Gent, Belgium. Contact: N. Reynaert, Lab for Standard Dosimetry Gent, Gent University –FANC, Proeftuinstraat 86 – B-9000 Gent, Belgium (phone + 32 9 264 66 48, fax + 32 9 264 66 96, email nick.reynaert@ugent.be) <http://www.ewg-mctp.ugent.be/>.

November 2006

ANS Winter Meeting and Nuclear Technology Expo, “Securing the Future in Times of Change,” Nov. 12–16, 2006, Albuquerque, NM. Contact: Robert W. Kuckuck (phone 505-667-5101, email bobkuck@lanl.gov) <http://www.ans.org/meetings/index.cgi?c=n>.

17th Topical Meeting on the Technology of Fusion Energy, an embedded topical at the ANS Winter Meeting, Nov. 12–16, 2006, Albuquerque, NM. Contact: Craig Olson, General Chair, Sandia National Laboratory, Dept. 1600 MS-1190, P.O. Box 5800, Albuquerque, NM 87185-1188 (phone 505-845-7303, fax 505-845-7890) <http://tofel17.sandia.gov/>.

International Conference on Quality Assurance and New Techniques in Radiation Medicine, Nov. 13–15, 2006, Vienna, Austria. Contact: Mr. K. R. Shortt, Division of Human Health, International Atomic Energy Agency, Wagramer Strasse 5, P.O. Box 100, 1400 Vienna, Austria (phone +43 1 2600 21664, fax +43 1 2600 7 21662, email r.perricos@iaea.org) url <http://www-pub.iaea.org/MTCDD/meetings/Announcements.asp?ConfID=146>.

International conference on Radiation Biology/8th Annual Meeting of the Indian Society of Radiation Biology, Nov. 20–22, 2006, Varanasi, India. Contact: Y. B. Tripathi, Dept. of Medicinal Chemistry, Inst. Of Medical Sciences, Banaras Hindu University, Varanasi-221005, India (isrbhhu@yahoo.com) url www.bhu.ac.in or www.isrb-india.com.

92nd Scientific Assembly and Annual Meeting, Nov. 26–Dec. 1, 2006, Chicago, Illinois, sponsored by the Radiological Society of North America. Registration and program information can be found at <http://rsna2006.rsna.org>.

December 2006

International Conference on Lessons Learned from Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities, Dec. 11–15, 2006, Athens, Greece, sponsored by the International Atomic Energy Agency. Contact: Dennis Reisenweaver, Div. of Radiation, Transport and Waste Safety, IAEA, P.O. Box 100, Wagramer Strasse, A-1400 Vienna, Austria. (phone 43-1-2600-22852, fax 43-1-26007, email d.reisenweaver@iaea.org).

February 2007

Waste Management 2007 (WM 2007), Feb. 25–March 1, 2007, Tucson, Arizona. Contact: Gary Benda (phone 803-345-2170 or email gbenda@wmarizona.org) www.wmsym.org.

March 2007

First International Conference on Physics and Technology of Reactors and Applications (PHYTRA1), March 14–16, 2007, Marrakech City, Morocco. Contact: Pr. A. Jehouani, Faculty of Sciences Semlalia, Dept. of Physics, University Cadi Ayyad- Marrakech, Morocco (email phytra@ucam.ac.ma or jehouani@yahoo.com, fax 212 44 43 74 10) or Pr. L. Erradi, GMTR President, Mohammed V. Agdal University, Faculty of Sciences, Department of Physics, B. P. 1014 Rabat, Morocco (email erradi@fsr.ac.ma or erradi@hotmail.com, fax 212-0-37-77-89-73) <http://www.fst.ac.ma/gmtr/phytra1/phytra1.html>.

June 2007

ICENES 2007, June 3–8, 2007, Istanbul. Contact: Prof Dr. Sümer Şahin, Gazi University 06500 Ankara/Turkey Contact: Prof Dr. Sümer Şahin, Gazi University 06500 Ankara/Turkey (phone +90 312 212 43 04, fax +90 312 212 43 04, email sumersahin@icenes2007.org) url <http://www.icenes2007.org/>.

ANS Annual Meeting, June 24–28, 2007, Boston, Massachusetts. URL <http://www.ans.org/meetings/>.