Health Physics Society Midyear Meeting

"Medical Health Physics and Accelerator Dosimetry"

and

Professional Development School (PDS)

"Lessons We are Learning from Fukushima"

2013 Topical Meeting of:
Health Physics Society
(The Forty-Sixth Midyear Topical Meeting of the Health Physics Society)
American Academy of Health Physics

Midyear Meeting:

Sunday 27 January - Wednesday 30 January 2013
PDS: 30 January - 1 February 2013

Preliminary Program

DoubleTree Resort Paradise Valley, Scottsdale, Arizona

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WELCOME TO SCOTTSDALE!

Scottsdale is a city of extraordinary treasures. From the rugged beauty of the sundrenched Sonoran Desert landscape and the upscale amenities, to the vibrant energy that hums through downtown both day and night, Scottsdale's many facets will intrigue, surprise and delight you. Scottsdale is home to an internationally renowned arts and culture scene with more than 100 art galleries and museums. Visitors to Scottsdale also can enjoy premier shopping, special events, beautiful year-round weather, and a multitude of outdoor adventures and activities including hot air balloon rides, off-road desert tours, horseback riding, rafting, hiking and more.

WEATHER

Scottsdale's 330 days of annual sunshine, idyllic temperatures and low humidity are sure to please. The average temperatures in Scottsdale in January range from a low of 39°F to a high of 69° F. Be sure to bring a light jacket, but there should be nice temperatures indeed for all!

HEADQUARTERS HOTEL

Doubletree Paradise Valley Resort/Scottsdale

The Doubletree Paradise Valley Resort/Scottsdale Hotel, winner of the prestigious AAA Four Diamond Award, offers luxury, resort amenities, and visually stunning Sonoran Desert views on 22 acres of lush, tropical paradise in Scottsdale, Arizona. This Diamond in the Desert is just minutes from Scottsdale Fashion Square Mall (the largest mall in the Southwest), Arizona State University, and the hundreds of shops, boutiques, galleries, pubs, and eateries in historic Old Town Scottsdale.

The Doubletree Paradise Valley Resort/Scottsdale Hotel is located only 12 miles from Phoenix Sky Harbor International Airport, at 5401 N. Scottsdale Rd., Scottsdale, Arizona, 85250-7090; phone: 1.800.222.8733.

Click **here** for the HPS hotel reservation link. The rate for the HPS block is $155, and the deadline for hotel registration is 3 January, or until the HPS block is sold.

TRANSPORTATION

Super Shuttle is a shared transportation service from the Phoenix airport to the Doubletree, which costs approximately $16 one way. Contact Super Shuttle at 800.258.3826 for reservations. Taxi fare from the airport to the Doubletree will cost approximately $45 one way.

SUBSTITUTION/CANCELLATION POLICY

Substitutions of meeting participants may be made at any time without penalty. All conference and tour cancellations must be in writing and must reach the HPS Office by January 6 to receive a refund. All refunds will be issued after the meeting minus a $50 processing fee. Refunds will not be issued to no-shows.

FOR REGISTERED COMPANIONS

Registered spouses and companions can enjoy the benefit of a Hospitality Suite during the 2013 Midyear meeting. See the final program for exact room and times.

The 2013 Midyear Meeting
is presented by the
Health Physics Society
and co-sponsored by the
American Association of Physicists in Medicine

It is sponsored by:
the Accelerator Section of the HPS,
the Medical Section of the HPS,
and the
Arizona Joint Chapter of the HPS and AAPM

WELCOME RECEPTION

Sunday, January 27

6:00-7:30 PM Doubletree Paradise Valley, North Pool

EXHIBITOR RECEPTION

Monday, January 28

5:00-6:30 PM Doubletree Paradise Valley, Forum

TECHNICAL TOUR

Tuesday, January 29

PETNET Solutions - Phoenix

3:30-5:30 PM Preregistration $25/Onsite $30

Tour is limited to 25 participants; first come, first served.

PETNET Solutions is the world's largest provider of PET biomarkers with over 50 sites world-wide producing and delivering PET biomarkers on a daily basis. This tour of the Phoenix location will include the cyclotron room, the biomarker manufacturing area, and the nuclear pharmacy area. In each of these areas we will highlight the operational and radiation protection issues that are unique to this industry.

OOPS!
We cancelled it because we didn't know you wanted it!

Sometimes excellent courses with super instructors are cancelled when too many people wait until the last minute to register. We need a minimum number of participants enrolled before a class can take place in order to cover costs. This applies to tours as well as classes. Don't wait - avoid disappointment - Register Early!

REGISTRATION

Registration Hours

Sunday 27 January . . . . . 3:30-6:30 PM
Monday 28 January. . . . . 7:30 AM-3:00 PM
Tuesday 29 January. . . . . 8:00 AM-3:00 PM
Wednesday 30 January . . . . . 8:00 AM-Noon

Registration Information

- Preregistration Deadline: 3 January 2013
- Registration fees for members and non-members include the Welcome Reception and Exhibitor Reception
- Purchase orders are not accepted for PEP, AAHP or Tour Registration

Register now to reserve your place!

Register online at www.hps.org

OR:

Register by fax: Fax your completed form with credit card information to (703) 790-2672

OR BY MAIL:

Mail your completed form with payment to:
HPS Headquarters
1313 Dolley Madison Blvd., Suite 402
McLean, VA 22101

Mail completed registration form with check made payable to Health Physics Society, purchase order or credit card information. You are considered registered when full payment or purchase order has been received.

Again this Year

The Professional Enrichment Program (PEP) handouts for the Midyear Meeting will not be available in hard copy. For those who pre-register, you will be provided with an access code for downloading the handouts approximately two weeks prior to the meeting. For those who register for courses on-site, you will be provided the code when you register.

EXHIBITS

Exhibit Hours

Monday . . . . . 5:00-6:30 PM Opening Reception
Tuesday . . . . . 9:30 AM-3:30 PM
Tuesday . . . . . Noon Lunch in Exhibit Hall
Wednesday . . . . . 9:30 AM-2:00 PM
Wednesday . . . . . Noon Lunch in Exhibit Hall

2013 Meeting Exhibitors

(as of November 2012)

To request a booth for the Midyear Topical Meeting, contact Jennifer Rosenberg at HPS Headquarters, JRosenberg@BurkInc.com

Ameriphysics
Arrow Tech
Best Medical
Bionomics
Canberra
Chase Environmental
Creative Electron
Dade Moeller
Eckert & Ziegler
Energy Solutions
F&J Specialty Products
Fuji Electric Corporation of America/Apantec
GEL Group
G/O Corporation
Hi-Q
Hopewell Designs
JL Sheperd
Lab Impex
Lab Logic Systems
Landauer
Ludlum
Mazur Instruments
Mirion
MJW Technical Services
Ortec
Philotechnics
QAL-TEK
Radiation Safety Assoc
Radiation Safety & Control Services (RSCS)
Radiation Solutions
Saphymo GmbH
SE International
Technical Associates
Thermo Fisher
Thomas Gray & Assoc
Tracerco
WB Johnson

Preliminary Technical Program

If a paper is going to be presented by other than the first author, the presenter's name has an asterisk (*)

All Sessions will take place in the DoubleTree Resort Paradise Valley

MONDAY

7:00-8:00 am **Four Peaks**
CEL 1 How We Make Decisions for Radiation Safety and are Prone to Errors
Ray Johnson

7:00-8:00 am **Chaparral**
CEL 2 Interpreting the Dose Index in Diagnostic Imaging
Rebecca Marsh

8:15 AM - 12:15 PM **Grand Ballroom**

MAM-A Developments in Medical/ Accelerator Technology and Regulation

Chair: Armin Ansari

8:15 am **Introductions/Welcome**
Armin Ansari, HPS President

8:45 am **MAM-A.1**
The Role of Risk Communication and Stakeholder Engagement in NRC Medical Policy Issues
Ostendorff, W.
US Nuclear Regulatory Commission

9:45 am **MAM-A.2**
Health Physics Society: Impacts of Recent Medical and Accelerator Developments on Staff and General Public Radiation Protection
Vetter, R.
Health Physics Society

10:15 am **BREAK**

10:45 am **MAM-A.3**
The Impact of New FDA Regulations for PET Drug Manufacturing on Radiation Protection Topics
Zigler, S., Moroney, W.
PETNET Solutions

11:15 am **MAM-A.4**
Impacts of Developments in Medical and Accelerator Technology on Regulation
Bruedigan, L.
Conference of Radiation Control Program Directors

11:45 am **MAM-A.5**
AAPM Society: Impacts of Recent Medical & Accelerator Developments on Patient Radiation Protection
Ezzell, G., Seibert, J.
Mayo Clinic Arizona, University of California, Davis

1:30 PM - 4:45 PM

MPM-A Issues in Diagnostic Studies

Co-Chairs: V. Morris, L. Dauer

1:30 pm **MPM-A.1**
Six Sigma and Informatics - Tools for Patient Dose Reduction
Pavlicek, W., Paden, G., Boltz, T., Tollefson, C., Panda, A.
Mayo Clinic AZ

1:45 pm **MPM-A.2**
Six Sigma Tools for Patient Dose Reduction with PET Imaging
Paden, R., Boltz, T., Tollefson, C.
Mayo Clinic Arizona

2:00 pm **MPM-A.3**
Bismuth Shield Usage in Multi-Detector Computed Tomography (MDCT) Thoracic Scans: Organ Dose vs. Image Quality
Januzis, N., Nguyen, G., Lowry, C., Yoshizumi, T.
Duke University

2:15 pm **MPM-A.4**
Statistical Approach to Medical Image Errors Analysis
Aceil, S.
Alcorn State University

2:30 pm **MPM-A.5**
Measurements of CT Exposure Doses during Diagnostic Whole Body PET/CT Scans in a Hospital
Lai, Y.C., Chen, Y.W., Lee, C.S.
Kaohsiung Medical University, Kaohsiung Medical University Hospital

2:45 pm **BREAK**

3:15 pm **MPM-A.6**

Radiation Safety and Regulatory Issues for Development of a Radioactive Seed Localization Program

Sheetz, M., Steiner, C., Mannella, K.
University of Pittsburgh

3:30 pm **MPM-A.7**

Radiation Safety Issues for Use of an Automatic Injector for Epilepsy Ictal Brain SPECT

Mannella, K., Steiner, C., Sheetz, M.
University of Pittsburgh

3:45 pm **MPM-A8**

Monitoring Computed Tomography Examinations for Radiation Dose Control and Quality Assurance

Paden, R., Pavlicek, W., Boltz, T., Loprino, S., Wellnitz, C., Hara, A., Kriegshauser, J., Mango Kaiser, J., Leyk, L., Ledoux, E.
Mayo Clinic

4:00 pm **MPM-A.9**

VA Initiative for Radiation Safety in Medical X-ray Imaging

Huston, T., Burkett, D., Williams, G., Leidholdt, E., Anderson, C.
US Department of Veterans Affairs

4:15 pm **MPM-A.10**

Correlation of Digital Mammography Compression Force, Patient Pain Threshold, and Image Quality

Peter, M., Panda, A., Pizzitola, V., Pavlicek, W.*
Mayo Clinic, Arizona

4:30 pm **MPM-A.11**

Finalizing Radiation Protection Guidance for Diagnostic and Interventional X-Ray Procedures

Keith, L., Sears, CAPT, S., Hamdy, R., Leidholdt, E., Miller, D., Paunovich, E., Torring, COL, E., Bower, COL, M., Boyd, M., Fletcher, D.
DHHS, ATSDR, US Navy, Department of Veterans Affairs, Food and Drug Administration, US Army, Environmental Protection Agency

5:00-6:30 pm **Exhibit Hall**

Exhibitor Opening Reception

TUESDAY

7:00-8:00 am **Grand Ballroom**
CEL 3 The Current FDA Regulation of Radioactive Drug Products Used for Positron Emission Tomography
Dennis Swanson

7:00-8:00 am **Chaparral**
CEL 4 How to Detect and Suppress Fuel Failures at Boiling Water Reactors
Joshua Vajda

8:15 AM - 12:00 PM

TAM-A Issues in PET/Cyclotron & cGMP Part 1

R. Maroney, D. Banghart

8:15 am **TAM-A.1**
Current Challenges in Radiation Protection For Production of PET Radiopharmaceuticals
Moroney, W., Krueger, D.
Siemens

8:30 am **TAM-A.2**
PET Cyclotron Contamination Hazards from Routine Target Maintenance
Banghart, D., Rostel, E.
Stanford University

8:45 am **TAM-A.3**
New ISO Standard - Monitoring Emmissions of Radioactive Gas From Medical PET Cyclotron Facilities
Rivers, J.
Lab Impex Systems Inc

9:00 am **TAM-A.4**
NRC Experience in Licensing Cyclotrons under the Energy Policy Act - 'Licenses for Production of Radioactive Material Using an Accelerator'
Null, K., Roldan, L., Ullrich, E.
USNRC Region III, USNRC Region IV, USNRC Region I

9:15 am **TAM-A.5**
NRC Experience in Licensing and Inspection of Commercial Radiopharmacies that Distribute Accelerator-Produced Radiopharmaceuticals
Null, K., Roldan, L., Ullrich, E.*
USNRC Region III, USNRC Region IV, USNRC Region I

9:30 am **TAM-A.6**
NRC Financial Assurance Requirements for Licenses for Production of Radioactive Material Using an Accelerator
*Null, K., Roldan, L., Ullrich, E.**
USNRC Region III, USNRC Region IV, USNRC Region I

9:45 am **BREAK**

10:15 am **TAM-A.7**
Implementation of Current Good Manufacturing Practices (cGMPs) for the Submission of Abbreviated New Drug Applications (ANDAs) for PET Radiopharmaceuticals
Soffing, M., Divgi, C., Koren, A., Wills, E., Akhtiorskaya, Y.
Columbia University

10:30 am **TAM-A.8**
Obtaining NRC License for Cyclotron Production in a University Setting
Langhorst, S.M.
Washington University in St. Louis

10:45 am **TAM-A.9**
Current Good Manufacturing Practice (CGMP) for Clinical PET Drug Production
Schwarz, S.W.
Washington University in St. Louis

11:00 am **TAM-A.10**
Occupational Exposure of PET Radiopharmacy Staff: A Case Study
Gillenwalters, E., Kinne, C.
Ameriphysics, LLC, Triad Isotopes, Inc

11:15 am **TAM-A.11**
Measurement of Collection Efficiency in Activated Charcoal Cartridges for Air Samples of Volatile F-18 Releases from PET Radiopharmaceutical Manufacturing
Krueger, D.
PETNET Solutions, Inc.

11:30 am **TAM-A.12**
Positron Emission Tomography Radiotracer Production in Clinical Research and United States Pharmacopeia <823>
Mason, N.S., Kendro, S.E., Mathis, C.A.
University of Pittsburgh

11:45 am **TAM-A.13**
Radiation Safety Issues with At-211 Production at the NIH Cyclotron Facility
*Roberson, M.P., Hull, S.L.**
National Institutes of Health

Noon - 1:30 pm **Exhibit Hall**

Complimentary Lunch for Registered Attendees

TUESDAY

1:30 PM - 2:30 PM

TPM-A Issues in PET/Cyclotron & cGMP Part 2

Co-Chairs: M. Williamson, S. Konerth

1:30 pm **TPM-A.1**

The Radioactive Drug Research Committee Approval Process for Basic Research Studies Involving Non-Approved Radioactive Drugs

Swanson, D.P.
University of Pittsburgh

1:45 pm **TPM-A.2**

Activity Thresholds for Patient Instruction and Release for Positron Emission Tomography Radionuclides

Williamson, M., Dauer, L.
Memorial Sloan-Kettering Cancer Center

2:00 pm **TPM-A.3**

The Current Food and Drug Administration Regulation of Radioactive Drug Products Used for Positron Emission Tomography

Swanson, D.P.
University of Pittsburgh

2:30 pm **BREAK**

3:00 PM - 4:15 PM

TPM-B Issues in Radiation Transport Codes and Shielding

K. O'Brien, R. Metzger

3:00 pm **TPM-B.1**

Layered Shielding in PET Clinics

Metzger, R., Van Riper, K.
RSE, Inc, White Rock Science

3:15 pm **TPM-B.2**

Dose to Non-Targeted Tissues of the Eye During Stereotactic Radiosurgery

Cantley, J., Chell, E., Hanlon, J., Bolch, W.
University of Florida, Oraya Therapeutics, Inc.

3:30 pm **TPM-B.3**

Attenuation Evaluation of 0.5 and 0.75mm Lead Protective Glasses

Snyder, D., Young, L., Yorks, P., Simpson, D., Wieand, E.*
Geisinger Health System, Bloomsburg University of Pennsylvania

3:45 pm **TPM-B.4**

Experience with Electrodeposited Cf-252 Ion Sources

Baker, S., Butala, S., Greene, J., Levand, A., Moore, E., Pardo, R., Savard, G.
Argonne National Lab

4:00 pm **TPM-B.5**

Evaluation of Shielding for a Proton Treatment Room by Monte Carlo Calculations

Van Riper, K.A., Moyers, M.F.
White Rock Science, Consultant

6:00 PM - 8:00 PM

TPM-C Special Presentation: The Interface Between Elementary Particle Physics and Cosmology

Chair: TBD

6:00 pm **TPM-C.1**

Life, the Universe and Nothing...A Cosmic Mystery Story

Krauss, L. (Dade Moeller Lecturer)
Arizona State University

Have you submitted your abstract for the 2013 HPS Annual Meeting?

Abstract Deadline:
6 February 2013
http://hpschapters.org/2013AM/abstracts/index.php

Join us in Madison, Wisconsin
7-11 July 2013

WEDNESDAY

7:00-8:00 am **South Ballroom**
CEL 5 The Current FDA Regulation of Radioactive Drug Products Used for Positron Emission Tomography
Dennis Swanson

7:00-8:00 am **North/Center Ballroom**
CEL6 ANSI N43.1 - Radiation Safety for the Design and Operation of Particle Accelerators
Scott Walker

8:15 AM - 10:45 AM North/Center Ballroom

WAM-A Role of the RSO

Co-Chairs: S. King, D. Elder

8:15 am **WAM-A.1**
Developing a Partnership Between Radiation Safety and Risk Management
Elder, D., Stephens-Wallman, L.
University of Colorado Hospital, University of Colorado Denver

8:30 am **WAM-A.2**
Replacement of a Gamma Knife Radiotherapy Treatment Unit
Erdman, M.C., King, S.H.
Penn State Hershey Medical Ctr

8:45 am **WAM-A.3**
Mutual Benefits of a Health Physics Presence in a Radiation Therapy Department
Erdman, M.C., King, S.H.
Penn State Hershey Medical Ctr

9:00 am **WAM-A.4**
Radiological Safety Lessons Learned Associated with the Therapeutic Use of Yttrium 90
Mis, F.
Universtiy of Rochester, Rochester, NY

9:15 am **WAM-A.5**
Challenges with US Food and Drug Administration (FDA) Oversight Matters at a Positron Emission Tomography (PET) Cyclotron Research Center
Stemen, T.
Yale University

9:30 am **WAM-A.6**
A Primer on Written Directives and the Curious Case of Three Non-Medical Events
Banghart, D., Kwofie, J.
Stanford University

9:45 am **WAM-A.7**
Why Medical Patients Accept the Words 'Deadly Radiation' as the Truth
Johnson, R.H.
Radiation Safety Counseling Institute

10:00 am **WAM-A.8**
Magnetic Resonance Safety: A Health Physics Approach
Quinton, A.
Geisinger Health System

10:15 am **WAM-A.9**
Shielding Considerations and Challenges Associated with Relocation of Gamma Knife Unit to a New Facility
Strzelczyk, J., Henderson, J.
Rocky Mt Gamma Knife, LLC

10:30 am **WAM-A.10**
That's a Do Over-Evaluating Repeats, Rejects and Misdministration in Nuclear Medicine
Mozzor, M., Gerard, P., High, M.
NYMC/Westchester Medical Center, Westchester Medical Center

10:45 am **BREAK**

8:15 AM - 12:30 PM South Ballroom

WAM-B Emerging Issues in Accelerator and Medical Physics

Co-Chairs: M. Grissom, M. Bues

8:15 am **WAM-B.1**
A Review of Staff Radiation Protection Issues for Electron, Proton, and Heavy Ion Accelerators
Grissom, M.
MPG—HP, Inc.

8:45 am **WAM-B.2**
Conventional PTV-Based Optimization Lacks Robustness for IMPT Head & Neck (H&N) Planning
Liu, W., Frank, S., Li., X., Zhu, R., Mohan, R.
MD Anderson Cancer Center

9:00 am **WAM-B.3**
National Laboratory Qualification Program
Voss, J.
Voss Associates

9:15 am **WAM-B.4**
Dose Calibrators - How Low Can You Go?
Williamson, M., Dauer, L.
Memorial Sloan-Kettering Cancer Center

9:30 am **WAM-B.5**
A Low-Dose-Rate Environment for Biological Samples
Uhlemeyer, J., Bi, R., Ford, J., Perez, D.
TAMU

9:45 am **BREAK**

10:15 am **WAM-B.6**
Photo-Nuclear Production of Ac-225
Rane, S., Starovoitova, V., Harris, J.
Idaho State University

10:30 am **WAM-B.7**
Safety Systems and Event Reporting in Radiation Therapy
Ezzell, G.
Mayo Clinic Arizona

10:45 am **WAM-B.8**
Assessment of Timer Error of a Small Animal X-Ray Irradiator: Derivation of the Ramp-up Exposure and Stable Exposure Rate
Wang, C., Yoshizumi, T.
Duke University

11:00 am **WAM-B.9**
Development of a Computational Eye Model for Use with Whole-Body Phantoms
Rhodes, A., Fiedler, D., Caracappa, P.
Rensselaer Polytechnic Institute

11:15 am **WAM-B.10**
Developing of Quality Assurance Program for an Amorphous Silicon Electronic Portal Imaging Devices for Dosimetry Purposes Using Two Developed Phantoms
Jomehzadeh, A., Shokrani, P., Mohammadi, M., Amouheidari, A.
Isfahan University of Medical Sciences, Iran, Royal Adelaide Hospital, Australia, Isfahan Milad Hospital, Iran

11:30 am **WAM-B.11**
Experiences Building an In-House Supercomputing Cluster for Monte Carlo Particle Transport Code
McBeth, R., Oertli, D., Johnson, T., Brandl, A.
Colorado State University

11:45 am **WAM-B.12**
A New Method of Reducing the Patient Dose Equivalent from Photoneutrons Produced by High Energy Medical Linacs
Hashemi, S., Raisali, G., Jafarizadeh, M., Taheri, M.
Agricultural, Medical and Industrial Research School, Radiation Applications Research School, Atomic Energy Organization of Iran

11:15 am **WAM-B.14**
Evaluation of Neutron Contamination on the Patient Plane of Three Linac Using Three Passive Techniques
Badreddine, A.W., Imatoukene, D., Ait-ziane, M. , Mebhah, D., Yennoun, A., Hattali, B. , Lounis-Mokrani, Z., Boucenna, A.*
Nuclear Research Centre of Algiers, Algiers, Mohamed Essighir Nekkache Hospital, Algiers, Anti-Cancer Center, Ferhat Abbas University, Setif

11:15 AM - 12:30 PM

WAM-C Issues in Brachytherapy and Radionuclide Therapy

Co-Chairs: J. Nunn, S. Saparetto

10:45 am **BREAK**

11:15 am **WAM-C.1**
Experiences in Establishing and Managing an I-131 MIBG Therapy Program
Lorenzen, W., Walsh, M., Liddle, C.
Boston Children's Hospital

11:30 am **WAM-C.2**
Radiation Therapy for Differentiated Thyroid Carcinoma in Chronic Hemodialysis
Frampton, S., Dean, D., Hammes, J.
Naval Medical Center San Diego

11:45 am **WAM-C.3**
Anatomy of Stanfordís Yttrium-90 Microsphere Program
Amoroso, L., Kwofie, J.
Stanford University

12:00 pm **WAM-C.4**
Discriminal Analysis of the Total Scatter Factor in Water Phantom for Photon Dose Calculation Using the Eclipse Treatment Planning System
Al-Ayed, M., Moftah, B.
King Saud University, Saudi Arabia

12:15 - 2:00 pm **Exhibit Hall**

Complimentary Lunch for Registered Attendees

AAHP1 Time Saving Spectroscopy Models

Lucas AC, Newman HJ, Lucas BK
Lucas Newman Science and Technologies, Inc.

Methods for deconvolution of spectra having distributed fingerprints will be presented in detail. Principle methods apply to thick sample alpha spectroscopy, recursive gamma ray spectroscopy, and recursive beta ray spectroscopy. Emphasis will be placed on sensitive measurement of natural radionuclide chains so as to minimize time and cost in widespread sampling in environmental decommissioning operations.

Thick sample alpha spectroscopy will be developed from fundamental principles to operational procedures. Models will be demonstrated which account for infinite thickness with estimating methods for sample thicknesses intermediate between infinite and thin. Examples of field results and lab intercomparisons will be presented.

The fundamentals of recursive gamma ray spectroscopy will be presented. The nature of recursion and the importance of the several, both simple and advanced, recursion methods will be discussed. The importance of the method in reducing calibration assumptions and dependence on strict spectrometer performance will be discussed. Examples of deconvolution of spectra from natural radionuclide chains, enriched uranium, depleted uranium, and disequilibrium will be presented.

In a similar manner, deconvolution of mixed beta ray spectra will be discussed. Examples of both laboratory and field samplings will be presented. In particular, extraction for surveys involving both uranium and thorium daughters, technicium in the environment, and searches for strontium/ytrium in the environment will be presented.

In situ methods for surface and downhole spectroscopy are presented along with preparation of field standards. The field scans are supported by the laboratory methods so as to link the total release program to well standardized source materials.

While the elemental constituents of the soils are not often challenged, we will present a new program to routinely analyze large numbers of soil or ore samples thereby feeding back on the laboratory and scanning measurements. Soil analysis is performed with a miniature, laboratory situated x-ray fluorescence instrument. Details of its containment construction, licensing experience, and calibration will be presented along with typical spectral analysis for the major constituents of the soils containing the radioactivity.

AAHP2 Radiation Shielding for Medical Facilities

Methe B

Radiation shielding. It is basic to the practice of health physics. So basic in fact, that it is one of the three instruments in every health physicist's ALARA toolkit. The application of shielding to medical sources of radiation has several characteristics that make it an unique challenge in radiation protection. First, there is a periodicity to the source. Many medical sources are intense, but present for milliseconds. Others have a half-life of hours, but remains in the clinic a fraction of that time. Second, the sources are in the middle of the community, at hospitals and medical clinics, and the public is always in close proximity. Third, a medical health physicist will typically find themselves the institutional resource to field all shielding questions.

Although challenging, the medical health physicist will find their armamentarium stocked with a number of valuable weapons designed to assist them in approaching and answering the question "how much shielding is needed?" These tools include reports and associated shielding methodologies from august bodies devoted to medical therapy and diagnostic radiation sources (e.g., NCRP Reports 147 and 151). During this course, we will examine the published methods apply them to actual shielding problems. Therapy vaults, computed tomography rooms, nuclear medicine suites and even DEXA scan rooms are on our list. We will determine what we must know to start a shield design, what we will likely never know, what we must find out, and what we can ignore in order to make shielding a useful instrument in our ALARA toolkit.

Sunday 27 January 2013, DoubleTree Resort Paradise Valley

Again This Year...Again This Year

The Professional Enrichment Program (PEP) handouts for the Midyear Meeting will not be available in hard copy. For those who pre-register, you will be provided with an access code for downloading the handouts approximately two weeks prior to the meeting. For those who register for courses on-site, you will be provided the code when you register.

Sunday, 8:00 - 10:00 am

PEP 1A The Impact of BWR Plant Water Chemistry on Refueling Outage Dose Rates and Fuel Failure Rates

Joshua Vajda

Improper water chemistry can pose detrimental effects to the safe operation of a nuclear power plant, including reduced plant efficiency because of corrosion products on fuel surfaces, to a catastrophic failure of primary piping and release of fission products to the environment. This presentation covers important aspects of maintaining chemistry systems in Light Water Reactors, which can mitigate fuel failures in the reactor core. These failures can lead to gross contamination and elevated dose rates in the reactor and turbine buildings of nuclear power plants. The costs associated with improper chemistry can be far reaching. Not only are replacement costs for materials and labor increasing, but replacement power and radwaste costs need to be factored into the equation too. In the age of deregulation, utilities are asking themselves if they can afford to continue to operate with such huge capital expenditures, and several have answered the question with "NO". As you can see, improper chemistry could mean more than a little plant efficiency or some minor increases in radiation dose rates, it ultimately could mean your job!

PEP 1B Recent Updates from the ICRP that Provide Detailed Advice Related to Radiological Protection in the Medical Applications of Ionizing Radiation

Larry Dauer

Over the last several years, the International Commission on Radiological Protection (ICRP) has published a number of documents, prepared by Committee 3, that provide detailed advice related to radiological protection in the medical applications of ionizing radiation. Each of the publications addressed a specific topic defined by the type of radiation source and the medical discipline in which the source is applied, and was written with the intent of communicating directly with the relevant medical practitioners and supporting medical staff. Recent guidance underpins the 2007 Recommendations of the ICRP with regard to the medical exposure of patients, including their comforters and careers, and volunteers in biomedical research. The ICRP emphasizes the proper application of the fundamental principles of justification, optimization of protection, and application of dose limits. This PEP will summarize the main points from the recent ICRP recommendations and guidance documents and will addresses the following topics: radiological protection in medicine, pregnancy and medical radiation, avoidance of radiation injuries from medical intervention procedures, prevention of accidental exposures to patients undergoing radiation therapy, managing patient dose in CT, diagnostic reference levels in medical imaging, managing patient dose in digital radiology, release of patients after therapy with unsealed radionuclides, prevention of HDR brachytherapy accidents, radiation safety aspects of prostate seed brachytherapy, managing dose in multi-detector CT applications, radiation dose to patients from radiopharmaceuticals, adult reference computational phantoms, prevention of accidents from new external beam radiation, education and training for diagnostic and interventional procedures, conversion coefficients for external exposures, radiological protection for fluoro guided procedures outside the radiology department, and threshold doses for tissue reactions in a radiation protection context. Ongoing and future work will also be discussed.

PEP 1C ABHP Part II - Accelerator Health Physics Problems

Scott Walker

This class does an overview of past and future ABHP accelerator health physics problems and proposed solutions. Problems are drawn from past ABHP exams and include several problems completed by Ken Skrable in the HPS News Letter. The author has also added several practical problems he has encountered during his career in accelerator health physics. It is the intent that those

taking the class obtain a copy of the problems covered in the class at the time they sign up for the class so that they can prepare their own approach to solving the problems. There is ample time to discuss problem solutions during the class but not much time to allow class participants to solve the problems during the two hour session. Generally, accelerator health physics problems encountered on the ABHP Part II exam are simple and can be solved with a basic background. The difficult problems take much more time than the exam would allow.

Sunday, 10:30 am - 12:30 pm

PEP 2A Fundamentals of Gamma Spectroscopy
Ken Embury

This course offers a fast-paced review of the basic principles of gamma spectroscopic analysis. The course includes a review of the nature and origins of gamma-emitting radioactivity, basic physics of gamma interaction with matter, consequences of gamma interactions on gamma spectra, gamma spectroscopy system components and calibrations, gamma spectroscopy analysis methods, and interpretation of gamma spectroscopy data. The course is two hours in duration and the American Academy of Health Physics will grant 4 Continuing Education Credits for completion. There is no cost for attendance at this seminar.

PEP 2B Training First Responders on Radiological Dispersal Devices (RDDs) and Improvised Nuclear Devices (INDs) Events
Ken Groves

This PEP will present an overview of the current training the author is presenting to First Responders (firefighters, emergency medical technicians, law enforcement and others) who may encounter either a Radiological Dispersal Device (RDD or Dirty Bomb) or an Improvised Nuclear Device (IND) as a part of their Emergency Response activities. The emphasis of the training is putting the radiological/nuclear material in perspective as compared with other Weapons of Mass Destruction (WMD) materials such as chemical and/or biological weapon agents. A goal of the training is to help this First Responder Community understand that under almost all conditions, they can perform their primary mission of "putting out fires, rescuing and treating injured persons, and chasing bad guys" even in the presence of relatively large amount of radiological/nuclear contamination. The rare cases of high activity unshielded sources will be reviewed and explained. Current National/International guidance on dose "limits" will be discussed. The use of information contained in the NCRP Report No. 165 entitled, "Response to a Radiological or Nuclear Terrorism Incident: A Guide for Decision Makers", NCRP Commentary No. 19, "Key Elements of Preparing Emergency Responder for Nuclear and Radiological Terrorism", , and the CRCPD "First Responders Handbook" will be used extensively in the presentation.

A discussion of the use of Time, Distance and Shielding as well as appropriate Personal Protective Clothing and how it will provide the needed protection while immediate actions take place early in an RDD/IND event will be reviewed. The use of appropriate radiation detection instrumentation, documented Standard Operating Procedures along with realistic training, drills and exercises are the key to a successful response to an RDD/IND event for this community of critical emergency responders.

PEP 2C Operational Accelerator Health Physics I
Scott Walker

The Operational Accelerator Health Physics I class covers an overview of medium and high energy accelerators, Electron accelerators configuration, Electron Accelerator radiation production, electron accelerator shielding, electron accelerator radioactive material production, and Electron accelerator environmental impacts. The class then begins to focus on proton accelerator configuration, proton accelerator radiation production, accelerator produced isotopes, accelerator interlock systems, general health physics practices at accelerators, general accelerator health physics rules of thumb, high energy radiation physics for the health physicist, and useful references.

Sunday, 2:00 - 4:00 pm

PEP 3A Fundamentals of Alpha Spectroscopy
David Pan

This course offers a fast-paced review of the basic principles of alpha spectroscopic analysis. The course includes a review of the nature and origins of alpha-particle emitting radioactivity, basic physics of alpha particle interaction with matter, considerations and consequences of sample preparation for alpha spectroscopy, alpha spectroscopy system components and calibrations, and a primer on interpretation of alpha spectroscopy data. The course is two hours in duration and the American Academy of Health Physics will grant 4 Continuing Education Credits for completion. There is no cost for attendance at this seminar.

PEP 3B Medical Laser Safety Program Development and Improvement

Deirdre Elder

Medical laser systems are used in many clinical settings, including ophthalmology and dermatology clinics, interventional radiology and cardiology and the operating room. Whether it is a small clinic or a large academic medical center, a health care facility with laser applications should have a program in place to ensure the safety of patients and personnel. Regulatory requirements for laser safety in general and medical laser safety in particular vary widely across the country, but medical facilities in every state face accreditation inspections by The Joint Commission or similar organizations. Compliance with the ANSI standards is an expectation of accreditation organizations and the American National Standard for Safe Use of Lasers in Health Care (ANSI Z136.3) was revised in 2011. Many of the modifications to ANSI Z136.3 will give laser safety officers justification for improvements in management of the program. The elements of a medical laser safety program and the changes that may be needed to conform to the revised ANSI standards will be discussed.

PEP 3C Operational Accelerator Health Physics II

Scott Walker

Operational Accelerator Health Physics II focuses on specific medium and high energy accelerator related design, control and health physics problems. The topics include: Spallation targets, handling high dose rate targets, beam dump design, isotope production, cooling water systems, shutters, radiation detection instrumentation, personnel dosimetry, high dose dosimetry (measuring radiation damage to equipment), high energy neutron spectroscopy, skyshine, releases of airborne radionuclides accelerator related electrical hazards, and the accelerator health physics program.

CELs take place in the Scottsdale DoubleTree

Monday 28 January 7:00-8:00 am

CEL1 How We Make Decisions for Radiation Safety and are Prone to Errors

Ray Johnson

Have you found yourself puzzled by people's decisions and reactions about radiation? Have you felt that their decisions were not rational or based on any real understanding of radiation risks? How much do workers or the public really know about radiation risks when they express concerns for radiation safety? Are you willing to accept that radiation fears are OK, when the basis of those fears seems to be mythology which is not technically defensible? Psychologists tell us that all feelings (fears) are OK. We have survived as a species by paying attention to our fears. While our subconscious minds are programmed from birth for certain universal fears, such as fear of the dark, heights, snakes, spiders, closed spaces, and submersion, we are not naturally programmed for fear of radiation. However, we seem to be in an era where radiation fears are instinctive. Perhaps hearing repeatedly about "deadly radiation" our subconscious minds have included radiation along with snakes and spiders. Our programmed response to imminent physical dangers is to fear first and think second. While an instinctive immediate reaction is appropriate to avoid a striking snake, this response mechanism does not do well for issues such as radiation safety. However, studies in neurosciences are showing that we have learned how to make decisions and cope with dangers for which we have little understanding. The author, David Ropeik, describes Bounded Rationality as our approach to making decisions when we do not have all the data, time to acquire more data, or the intellectual ability to process the data. Ropeik shows that we are constantly making judgments without perfect knowledge, but doing the best that we can at the time. We process, sort, compare, categorize, and analyze information in relation to our immediate circumstances, experiences, and life factors, such as health, wealth, traditions, and lifestyles. With all these inputs we can come up with instant judgments. Such quick judgments are crucial to our survival. However, because they are based upon limited information, these decisions may not always be best for us in the long run.

CEL2 Interpreting the Dose Index in Diagnostic Imaging

Rebecca Marsh

There is an increased interest in monitoring the radiation dose patients receive from diagnostic imaging exams, particularly in Computed Tomography (CT) and interventional procedures performed under X-ray guidance. When an imaging exam is performed, the system reports a dose index. While this information can be valuable in assessing the risk associated with an imaging exam, there is often confusion about how these metrics relate to patient dose and how this information can be used when making decisions about patient care.

This presentation will discuss the dose metrics most commonly reported in CT – the Computed Tomography Dose Index (CTDI) and Dose Length Product (DLP) – and those most commonly reported in interventional X-ray procedures, including Air Kerma and Dose Area Product. The relationship between these values and patient dose will be discussed, along with how these values relate to the risk of stochastic and deterministic effects. Also discussed will be the role of the Physicist in working effectively to help clinicians use these metrics when making decisions regarding patient care and follow-up.

Tuesday 29 January 7:00-8:00 am

CEL3 The Current FDA Regulation of Radioactive Drug Products Used for Positron Emission Tomography

Dennis Swanson

The U.S Food and Drug Administration (FDA) has recently issued regulations specific to the regulatory approval processes and manufacturing of radioactive drug products used for Positron Emission Tomography (PET). Effective June 12, 2012, all PET drug products sold commercially or prepared within a medical facility for clinical (i.e., patient care) use must be manufactured in accordance with the PET cGMP regulations at 21 CFR Part 212, and the respective production facility must register with the FDA and submit a New Drug Application or Abbreviated New Drug Application for the PET drug product. Medical facilities that purchase PET drug products from an external vendor for subsequent clinical use should obtain documentation from the vendor that these requirements have been addressed. The submission of a corresponding Investigational New Drug (IND) application or, when applicable, approval by a FDA-registered Radioactive Drug Research Committee (RDRC; 21 CFR Sec. 361.1) is re-

quired for PET drug products being used or evaluated in human research studies; unless the PET drug product is currently FDA-approved for commercial marketing and its research evaluation for an "off-label" use meets the FDA regulatory criteria (21 CFR Sec. 312.2(b)(1)) for an IND exemption. Non-approved PET drug products being used or evaluated under an IND application or RDRC approval must be manufactured in compliance with either the PET cGMP regulations or United States Pharmacopeia (USP) Chapter , "Positron Emission Tomography Drugs for Compounding, Investigational, and Research Uses". With enactment of these regulations, the "compounding" of PET drug products under the practices of pharmacy and medicine should be limited to only special circumstances such as temporary non-availability of the FDA-approved product or the need to modify the FDA-approved drug product to address concerns (e.g., allergy to a certain component of the approved drug product) related to a specific patient.

CEL4 How to Detect and Suppress Fuel Failures at Boiling Water Reactors

Joshua Vajda

The primary responsibility of all nuclear utilities is to protect the fuel and preserve fuel integrity. It is important to know what factors affect fuel integrity and how these factors can be controlled. Operators must be able to determine if fuel integrity has been compromised, how to determine the location of failed fuel, and how to minimize further degradation of the fuel defect. This presentation will detail how to identify a fuel failure, the methods used to identify the location in the reactor core of the failure, and methods used to minimize degradation and spread of radioactivity throughout the plant.

Wednesday 30 January 7:00-8:00 am

CEL5 The FDA's RDRC Approval Process for Basic Research Studies Involving Non-Approved Radioactive Drugs

Dennis Swanson

FDA regulations (21 CFR Sec. 361.1) permit certain human research studies involving non-approved radioactive drugs to be approved by a FDA-registered, institutional Radioactive Drug Research Committee (RDRC). To qualify for RDRC approval, the research study must be intended to obtain basic information on the metabolism (including kinetics) of the radioactive drug or regarding human physiology, pathophysiology, or biochemistry. The RDRC approval process is not, however, applicable to studies directed at obtaining diagnostic or therapeutic information or to determine the safety and effectiveness of the radioactive drug for such purposes. The radioactive drug must be known, based on prior valid human studies, to not cause any clinically detectable pharmacological effects at the administered mass dose. For a single study, the radiation dose to adult subjects cannot exceed 3 rems to the whole body, active blood-forming organs, lens of the eye, and gonads (i.e., the "critical organs"); or 5 rems to any other organ. For multiple studies conducted within a given year, the cumulative radiation dose to the research subject cannot exceed 5 rems to the "critical organs"; or 15 rems to any other organ. For research studies involving children, the radiation dose limits are 10% of these adult limits. The research study must be approved by a quorum (> 50%) of the RDRC membership (n > 5) to include individuals with expertise in radiation dosimetry, the formulation of radioactive drugs, and nuclear medicine. The RDRC approval of research studies involving children or > 30 adult subjects must be reported immediately to the FDA; and all RDRC-approved research studies must be reported to the agency on an annual basis. In summary, the RDRC approval process is particularly amenable to the research use of non-approved PET drug products for biomarker applications and avoids the additional regulatory requirements and oversight associated with the submission of IND applications.

CEL6 ANSI N43.1 - Radiation Safety for the Design and Operation of Particle Accelerators

Scott Walker

The CEL for ANSI N43.1 is an overview of the recently approved Accelerator Safety document that replaces the 1985 version of the standard. Each section of the new standard is highlighted as well as the five Appendixes. Several new sections were added that were not included in the old standard. These include: Radiation Safety Program, Radiation Safety System, Access Control System, Radiation Control System and Accelerator Operations. The Appendixes address: Development of Safety Assessment Document (SAD), Interlocked-Type Access Control Systems, Decommissioning Program, Measurements of Radiation and Radioactivity, and Safety Standards for Commercially Available and/or Production-Type Accelerators. The last appendix is normative (not optional) and was written to summarize the requirements for small industrial accelerators.

Professional Development School (PDS)

"Lessons We Are Learning from Fukushima"

Scottsdale, AZ
30 January - 1 February 2013
Immediately following the HPS Midyear Meeting

Academic Dean: William E. Kennedy, Jr.
Administrative Dean: Ray Johnson

Although the world watched the first few weeks of the Fukushima accident unfold on the nightly news, the accident and its effects are far from over. Scheduled close to two years after the event, this professional development school (PDS) will have the benefit of 20/20 hindsight about the event and insights into the planned recovery. The goal of this PDS is to provide concise and useful information to health physicists and other professionals interested in the Fukushima Daiichi reactor accidents, focusing on the lessons we are learning and their impact on current and future nuclear power applications. The PDS will immediately follow the 2013 Health Physics Society (HPS) Midyear Meeting, "Accelerator Health Physics," at the same hotel in Scottsdale, Arizona. The Doubletree Paradise Valley Resort/Scottsdale Hotel, winner of the prestigious AAA Four Diamond Award, offers luxury, resort amenities, and visually stunning Sonoran Desert views on 22 acres of lush, tropical paradise. This Diamond in the Desert is just minutes from Scottsdale Fashion Square Mall (the largest mall in the Southwest), Arizona State University, and the hundreds of shops, boutiques, galleries, pubs, and eateries in historic Old Town Scottsdale. The Doubletree Paradise Valley Resort/Scottsdale hotel is located only 12 miles from Phoenix Sky Harbor International Airport, at 5401 N. Scottsdale Rd. in Scottsdale.

The tuition for this PDS is $550 and will include breaks, a Wednesday evening reception, and lunch and night out on Thursday. Registration will be done in conjunction with the midyear program. The school will begin at 1 p.m. on Wednesday and go to noon on Friday. CHPs will receive 32 ABHP credits for this 16-hour school. Handout materials for this PDS (PowerPoint slides, etc.) will be available for registrants online prior to the PDS. Students should bring laptops, and power strips will be provided.

The instructors shown in the agenda below are all industry, government, or academic experts. They include:

- Ralph Andersen, Nuclear Energy Institute, who will describe the perspectives of the U.S. nuclear industry, including the response, impacts, policy changes, and lessons learned.
- Dr. John Boice, National Council on Radiation Protection and Measurements President, who will discuss the radiation dose estimates for the exposed Japanese population, efforts to establish radiation registries to follow the health impacts to that population, and the projected human health risks.
- Dr. Steven Rademacher, U.S. Air Force, who will describe an ongoing radiation dose assessment for the Department of Defense (DOD) for nearly 70,000 individuals in a DOD-affiliated population (defined as service members, civilian employees, family members of service members, and civilian and contractor employees) who were exposed to radiation in Japan during the first 60 days following the accident.
- Dr. Steven M. Becker, Old Dominion University, College of Health Sciences, who will describe his experiences during a 10-day mission to Japan as part of a special nongovernmental Radiological Emergency Assistance Mission, which provided radiological information and training to more than 1,100 Japanese hospital and health care personnel and first responders.

This school will attract health physicists, nuclear engineers, nuclear power utility operators, and other professionals who are seeking reliable information about the reactor accidents and their aftermath.

"Lessons We Are Learning from Fukushima"
Professional Development School Schedule

Wednesday 30 January 2013

PDS Day One

1:00 pm **PDS 1.1**
Welcome, Introduction, Handouts, Logistics
Kennedy, Jr, W.E.
Dade Moeller & Associates, Academic Dean

1:15 pm **PDS 1.2**
Accident Overview - Initial US Actions
Kennedy, Jr, W.E.
Dade Moeller & Associates, Academic Dean

3:00 pm **BREAK**

3:15 pm **PDS 1.3**
Matching Capabilities to Needs, Creating a Timely Solution for the Emergency Water Clean-Up
Raymont, J.
Kurion, Inc. Founder and President

4:45 pm **PDS 1.4**
Questions and Answers for the Opening Session

5:30 pm

Evening Reception

Thursday 31 January 2013

PDS Day Two

8:00 am **PDS 2.1**
Operation Tomodachi - Military and Dependent Doses following Fukushima
Rademacher, S.
US Air Force

9:45 am **BREAK**

10:00 am **PDS 2.2**
US Perspectives and the Impact on the US Industry (NEI/NRC)
Andersen, R.
Nuclear Energy Institute

11:45 am
Questions and Answers for the Second Session

12:00 pm **Lunch (Provided)**

1:00 pm **PDS 2.3**
Community Impacts and Responses
Becker, S.M.
Old Dominion University, College of Health Sciences

2:45 pm **BREAK**

3:00 pm **PDS 2.4**
Health Risks to the Japanese Public
Boice, J.
NCRP

4:45 pm
Questions and Answers for the Third Session

6:00 pm

Night Out (Included in Registration)

Friday 1 February 2013

PDS Day Three

8:00 am **PDS 3.1**
Instrumentation and Dosimetric Challenges
Bronson, F.
Canberra

9:45 am **BREAK**

10:00 am **PDS 3.2**
Radiation Fears in Response to Fukushima
Johnson, R.
Radiation Safety Counseling Institute

11:45 am
Final Questions and Answers

Professional Development School Attendance
Requires Registration

See Registration Form
to get signed up!

Health Physics Society Midyear Topical Meeting, Co-Sponsored with AAPM – Registration Form
27-30 January 2013, Scottsdale, Arizona

CHP? ❑ Yes ❑ No
NRRPT? ❑ Yes ❑ No

Name for badge: (Last)_____(First) _____(Nickname) _____
Affiliation (for badge)(limit to 18 characters and spaces): _____
Address : _____HPS Member #: _____
City:_____ State: _____ Zip/Postal Code: _____
Business Phone:_____FAX:_____E-mail: _____
If Registering - Companion Name: _____

Preregistration Deadline: 3 January

REGISTRATION FEES: (Mark Appropriate Boxes)	Preregistration	On-Site Fees
❑ HPS Member (Receptions, Exhibitor Lunch)	$430.00	$530.00
❑ AAPM Member (Receptions, Exhibitor Lunch)	$430.00	$530.00
❑ Non-Member* (Receptions, Exhibitor Lunch)	$550.00	$650.00
❑ HPS Member (Receptions, Exhibitor Lunch) + Annual Dues	$595.00	$695.00
❑Emeritus Member (Receptions, Exhibitor Lunch)	$215.00	$215.00
❑One Day ❑Mon ❑Tues ❑Wed	$275.00	$275.00
❑ HPS Student (Receptions)	$ 70.00	$ 70.00
❑ AAPM Student (Receptions)	$ 70.00	$ 70.00
❑One Day Student ❑Mon ❑Tues ❑Wed	$ 40.00	$ 40.00
❑ Companion (Receptions, Hospitality Room)	$110.00	$110.00
❑ Emeritus Companion (Receptions, Hospitality Room)	$ 55.00	$ 55.00

*Includes HPS Associate Membership for year 2013 - First Time Members Only

PROFESSIONAL DEVELOPMENT SCHOOL (PDS) immediately following Midyear Meeting:

❑ Lessons We Are Learning from Fukushima (30 Jan-1 Feb)	$550.00	$600.00

TECHNICAL TOURS:

❑ PETNET (Tues 3:30-6:00 pm, 29 January) # of Tickets ____ X $25 # of Tickets ____ X $30 _____

AAHP COURSES (Saturday, 26 January):

❑ Course 1 – Time Saving Spectroscopy Models (AC Lucas, HJ Newman, BK Lucas)	$275.00
❑ Course 2 – Radiation Shielding for Medical Facilities (B Methe)	$275.00

PEP COURSES (Sunday, 27 January) -
8:00–10:00 AM (3 concurrent courses)

1-A How to Reduce Refueling Outage Dose Rates and Minimize the Potential of Fuel... (J Vajda)
1-B Recent Updates from the ICRP that Provide Detailed Advice Related... (L Dauer)
1-C ABHP Part II - Accelerator Health Physics Problems (S Walker)

10:30 AM–12:30 PM

2-A Fundamentals of Gamma Spectroscopy (K Embury)
2-B Training First Responders on Radiological Dispersal Devices (RDDs) and... (K Groves)
2-C Operational Accelerator Health Physics Part I (S Walker/R May)

2:00–4:00 PM

3-A Fundamentals of Alpha Spectroscopy (D Phan)
3-B Medical Laser Safety Program Development and Improvement (D Elder)
3-C Operational Accelerator Health Physics II (S Walker, R May)

8:00-10:00 AM
___/___ = $90.00
1st 2nd
❑Yes, stand by

10:30 AM-12:30 PM
___/___ = $90.00
1st 2nd
❑Yes, stand by

2:00-4:00 PM
___/___ = $90.00
1st 2nd
❑Yes, stand by

PAYMENT INFORMATION–Purchase Orders NOT Accepted for AAHP/PEP or Tour Registration
If paying by check, make payable and mail to:
Health Physics Society, 1313 Dolley Madison Blvd., Suite 402, McLean, VA 22101

❑ VISA ❑ MasterCard ❑American Express

Card Number: _____ CV2#: _____Exp. Date: _____
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Signature: _____
Cardholder Address: _____
Cardholder email: _____ Cardholder Phone: _____

If you are sending this by FAX, (703) 790-2672,
PLEASE do not mail the original

Federal TAX ID
#04-6050367

Registration Section Total	$_____
PDS Total	$_____
Technical Tour Total	$_____
AAHP & PEP Section Total	$_____
TOTAL FEES	**$**_____