HPS

HEALTH PHYSICS SOCIETY

68th Annual Meeting

Gaylord National Resort and Conference Center
National Harbor, MD • 23-26 July 2023

Conference Program

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68th Annual Meeting

HEALTH PHYSICS SOCIETY

Gaylord National Resort and Conference Center • National Harbor, MD • 23-26 July 2023

Registration Hours and Location

Prince George's A&B Exhibit Hall

Sunday, 23 July
1:30 PM – 6:00 PM

Monday, 24 July
7:30 AM – 4:00 PM

Tuesday, 25 July
8:00 AM – 4:00 PM

Wednesday, 26 July
8:00 AM – 2:30 PM

Exhibit Hours and Location

Prince George's A&B Exhibit Hall

Monday, 24 July
11:30 AM – 7:00 PM

Tuesday, 25 July
9:30 AM – 5:00 PM

Wednesday, 26 July
9:30 AM – 12:00 PM

All events take place at the Gaylord National Resort and Conference Center.

Table of Contents

SCHEDULE AT-A-GLANCE

All events at the Gaylord National Resort and Conference Center unless otherwise noted.

Saturday, 22 July

AAHP Courses

AAHP 1 Radiation Risk Assessment
8:00 AM – 5:00 PM Annapolis 1

AAHP 2 Y-90 Boot Camp
1:00 PM – 5:00 PM Annapolis 2

AAHP 3 Advances in *Over* and *Under* Land Surveys in Support of MARSSIM-based Characterizations and Final Status Surveys
11:00 AM – 3:00 PM Annapolis 3

AAHP 4 A Review of the CHP exam Part 2 Useful Formula Sheet
3:30 PM – 5:30 PM Annapolis 3

Sunday, 23 July

All PEP Courses take place at the Gaylord National Resort and Conference Center

Annapolis 1-4 and Woodrow Wilson B

PEP 1-A thru 1-E
8:00am – 10:00am

PEP 2-A thru 2-E
10:30am – 12:30pm

PEP 3-A thru 3-E
1:00pm – 3:00pm

PEP 4-A thru 4-E
3:30pm – 5:30pm

HPS Board of Directors
8:00 AM – 5:00 PM Magnolia 1

ABHP Part II Panel
8:00 AM – 5:00 PM Baltimore 1

AAHP Executive Committee
8:00 AM – 5:00 PM Fort Washington Boardroom

HPS Science Support Committee
1:00 PM – 5:00 PM Baltimore 2

Science Teachers Worskhop
2:00 PM – 6:00 PM Camellia

IRPA 16 Planning Committee
3:00 PM – 5:00 PM Baltimore 2

Student Kick-Off Reception
3:30 PM – 5:00 PM Azalea 3

Society Support Committee
5:00 PM – 6:00 PM Baltimore 2

Quiz Bowl
5:00 PM – 6:30 PM Magnolia 2

Sunday PEP Locations

PEP A = Annapolis 1
PEP B = Annapolis 2
PEP C = Annapolis 3
PEP D = Annapolis 4
PEP E = Woodrow Wilson B

Monday, 24 July

CEL Courses 6:45 AM – 7:45 AM

CEL-1 Woodrow Wilson B
Case Studies in "Radiation Deception": Practical Strategies for Avoiding Fraud Based on Lessons Learned

CEL-2 Woodrow Wilson C
The Art of Presenting

CEL-3 Woodrow Wilson D
A Hospital Radiological Incident Response Plan

CEL-4 Baltimore 1-2
Decommissioning a Wet Storage Panoramic Irradiator

Elda Anderson Breakfast
6:45 AM – 8:00 AM Magnolia 1

Challenging Health Physics Questions
7:00 AM – 8:00 AM Azalea 3

Welcome and Plenary Session
8:00 AM – 9:30 AM Woodrow Wilson A

MAM-A Accelerator Health Physics
9:45 AM – 11:30 AM Woodrow Wilson A

MAM-B Regulations/Licensing
10:00 AM – 11:15 AM Woodrow Wilson B

MAM-C Non-Ionizing Radiation (NIR)
10:00 AM – 11:00 AM Woodrow Wilson C

MAM-D Special Session: Homeland Security Part 1
9:30 AM – 12:10 PM Woodrow Wilson D

MAM-E So You're Thinking of Retirement?
10:00 AM – 12:00 PM Baltimore 1-2

MAM-F Radon in the Oil and Gas Industry Part 1
10:00 AM – 11:45 AM Baltimore 3

Exhibitor Sponsored Lunch
11:30 AM – 1:00 PM Prince George's A&B Exhibit Hall

PEP Program 12:15 PM – 2:15 PM

M-1 Baltimore 1-2
Dose Estimates to Workers From Y-90 Excluding Fluoroscopy During Microspheres Treatments

M-2 Woodrow Wilson B
An Introduction to Nuclear Security for the Health Physicist

M-3 Woodrow Wilson C
Electromagnetic Energy Field Surveys for Comparison with Implanted Medical Device Manufacturers' Maximum Allowable Field Strengths

M-4 Woodrow Wilson D
Design and Optimization of Ambient Air Monitoring Networks using Atmospheric Dispersion Modeling and Frequency of Detection Methods

M-5 Baltimore 3
Quantitative Environmental Risk Analysis for Human Health

MPM-A Early-Career Professional Special Session
2:30 PM – 6:00 PM Woodrow Wilson A

MPM-B Special Session: The Rhisotope Project - Using radioisotopes to combat illicit wildlife trafficking
2:30 PM – 5:00 PM Woodrow Wilson B

MPM-C Government Relations in the Health Physics Society
2:30 PM – 5:00 PM Woodrow Wilson C

MPM-D Special Session: Homeland Security Part 2
2:30 PM – 6:00 PM Woodrow Wilson D

MPM-E Special Topics in Health Physics
2:30 PM – 5:00 PM Baltimore 1-2

MPM-F Radon in the Oil and Gas Industry Part 2
2:30 PM – 5:00 PM Baltimore 3

Welcome Reception
5:30 PM – 7:00 PM Prince George's A&B Exhibit Hall

Poster Session
5:30 PM – 7:00 PM Prince George's A&B Exhibit Hall

Tuesday, 25 July

CEL Courses 6:45 AM – 7:45 AM

CEL-5 Woodrow Wilson B
Biodosimetry: What It Is, Why We Need It

CEL-6 Woodrow Wilson C
Bootcamp for Medical Broadscope RSO

CEL-7 Woodrow Wilson D
Airborne Plutonium and Airborne VirusesHave Enormously DifferentSources, Properties, Behaviors, and Protective Actions

CEL-8 Baltimore 3
An Overview of Cybersecurity Threats and Related Risk Assessment Methods in the Nuclear Sector

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TAM-A Medical Health Physics 1
8:15 AM – 12:00 PM Woodrow Wilson A

TAM-B Special Session: Rad NESHAP
8:00 AM – 12:00 PM Woodrow Wilson B

TAM-C Special Session: Decommissioning
8:00 AM – 12:00 PM Woodrow Wilson C

TAM-D.1 Waste Management
8:00 AM – 8:30 AM Woodrow Wilson D

TAM-D.2 External Dosimetry
9:30 AM – 11:45 AM Woodrow Wilson D

TAM-E AAHP Special Session Part 1
8:00 AM – 12:00 PM Baltimore 1-2

TAM-F HPS Standards Organization Part 1
8:20 AM – 11:30 AM Baltimore 3

AAHP and ABHP Awards Luncheon
12:00 PM – 2:00 PM Annapolis 1-2

SCHEDULE AT-A-GLANCE

All events at the Gaylord National Resort and Conference Center unless otherwise noted.

PEP Program 12:15 PM – 2:15 PM

T-1 Woodrow Wilson A
Nuts and Bolts of Lutetium 177 (Lu-177) Therapies

T-2 Woodrow Wilson B
Boot Camp for Radiation Safety ProfessionalsFocusing on the Basics of Security, Biological and Chemical Safety

T-3 Woodrow Wilson C
The Case Against The LNT

T-4 Woodrow Wilson D
Introductory R programming with the 'radsafer' package

T-5 Baltimore 3
Pixelated, 3D CZT Detection Systems New Developments for Nuclear Power Plants, IAEA Safeguard Inspectors & Medical Imaging

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TPM-A Medical Health Physics 2
2:30 PM – 4:45 PM Woodrow Wilson A

TPM-B Risk Assessment
2:30 PM – 5:15 PM Woodrow Wilson B

TPM-C Decontamination and Decommissioning
2:30 PM – 6:00 PM Woodrow Wilson C

TPM-D Internal Dosimetry
2:30 PM – 5:45 PM Woodrow Wilson D

TPM-E AAHP Special Session Part 2
2:00 PM – 6:00 PM Baltimore 1-2

TPM-F HPS Standards Organization Part 2
2:30 PM – 4:30 PM Baltimore 3

Wednesday, 26 July

Plenary Session
8:00 AM – 9:30 AM Woodrow Wilson A

CEL Courses 6:45 AM – 7:45 AM

CEL-9 Woodrow Wilson B
Geiger-Mueller Counters 101

CEL-10 Woodrow Wilson C
What it's like to be a Health Physics Professor

CEL-11 Woodrow Wilson D
Is Far-Ultraviolet UV-C Safe For Human Exposure ‚Äì But How Do We Measure It!?

CEL-12 Baltimore 1-2
Is Far-Ultraviolet UV-C Safe For Human Exposure – But How Do We Measure It!?

Professional Development School
8:00 AM – 5:00 PM Baltimore 4-5

WAM-A Million Person Study Dosimetry
10:00 AM – 12:00 PM Baltimore 3

WAM-B Environmental Monitoring
10:00 AM – 11:15 AM Woodrow Wilson B

WAM-C Military Health Physics Part 1
8:00 AM – 11:20 AM Woodrow Wilson C

WAM-D Special Session: Women in Radiation Protection
9:40 AM – 12:10 PM Woodrow Wilson D

WAM-E Instrumentation 1
10:00 AM – 12:00 PM Baltimore 1-2

HPS Awards Lunch
12:00 PM – 2:00 PM Woodrow Wilson A

WPM-A Million Person Study and Agency Perspectives on Importance of Occupational Epidemiology
2:30 PM – 5:00 PM Baltimore 3

WPM-B Academic Health Physics
2:15 PM – 5:15 PM Woodrow Wilson B

WPM-C Military Health Physics Part 2
2:40 PM – 5:00 PM Woodrow Wilson C

WPM-D Emergency Response and Homeland Security
2:30 PM – 5:00 PM Woodrow Wilson D

WPM-E Instrumentation 2
2:30 PM – 4:45 PM Baltimore 1-2

Thursday, 27 July

Professional Development School
8:00 AM – 5:00 PM Baltimore 4-5

Friday, 28 July

Professional Development School
8:00 AM – 5:00 PM Baltimore 4-5

KEY

MAM = Monday AM Session
MPM = Monday PM Session
TAM = Tuesday AM Session
TPM = Tuesday PM Session
WAM = Wed. AM Session
WPM = Wed. PM Session

Registration Hours

Gaylord National Resort and Conference Center
Prince George's A&B Exhibit Hall

Sunday	1:30 PM – 6:00 PM
Monday	7:30 AM – 4:00 PM
Tuesday	8:00 AM – 4:00 PM
Wednesday	8:00 AM – 2:30 PM

Exhibit Hall Hours

Prince George's A&B Exhibit Hall

Monday	11:30 AM – 7:00 PM
Tuesday	9:30 AM – 5:00 PM
Wednesday	9:30 AM – 12:00PM

Business Meetings

Monday, 24 July 2023

Non-Ionizing Radiation Business Meeting
11:00 AM – 12:00 PM Woodrow Wilson C

Chapter Council Meeting
1:15 PM – 2:15 PM Woodrow Wilson A

Section Council Meeting
2:30 PM – 3:30 PM Camellia

Radon Section Business Meeting
4:30 PM – 5:00 PM Baltimore 3

Homeland Security and Emergency Response Section Business Meeting
5:00 PM – 6:00 PM Woodrow Wilson D

Early-Career Professional Business Meeting
5:20 PM – 6:00 PM Woodrow Wilson A

Tuesday, 25 July 2023

Decommissioning Section Business Meeting
5:00 PM – 6:00 PM Woodrow Wilson C

AAHP Business Meeting
5:00 PM – 6:00 PM Baltimore 1-2

NOTE FOR CHPs

The American Academy of Health Physics has approved the following meeting-related activities for continuing education credits for CHPs:

- Meeting attendance is granted 1 CEC per contact hour, excluding meals and business meetings;
- AAHP 8-hour courses are granted 16 CECs each;
- HPS 2-hour PEP courses are granted 4 CECs each;
- HPS 1-hour CELs are granted 2 CECs each.

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68th Annual Meeting

HEALTH PHYSICS SOCIETY

Gaylord National Resort and Conference Center • National Harbor, MD • 23-26 July 2023

Welcome

The Baltimore-Washington Chapter of the Health Physics Society (BWCHPS) welcomes you to our Nation's Capital region as we host the 68th Annual Meeting of the Health Physics Society at the Gaylord National Resort & Convention Center in the National Harbor.The National Harbor is a multi-use development located along the Potomac River near the Woodrow Wilson Bridge and just south of Washington, D.C. Opened in 2008, the National Harbor is a convention center hub with everything from busy outlet mall shopping to a casino and live music at the MGM National Harbor hotel. The waterfront is home to a vibrant carousel and a unique sculpture, plus a ferry terminal and a marina with a Ferris wheel. It also offers many bars and restaurants, including a painting studio serving wine. Everything you need to enjoy your time here! We encourage you to look over the tours and activities the local arrangements committee has planned for the week. We will publish, both in the HPS newsletter and on the meeting website, information on how to get around the metro area, and attractions you may consider in your planning before, during, or after the meeting—particularly if you intend to bring your entire family!

PEP/CEL Ready Room

The PEP/CEL Ready Room will be combined with the Speaker Ready Room in Azalea 2 in the Gaylord National Resort and Conference Center from Sunday-Wednesday

Speaker Information

Technical Sessions Speaker Instructions

You are allotted a total of 12 minutes of speaking time unless you have been notified otherwise.

The Speaker Ready Room (Azalea 2) will be open Sunday from 2:00 PM – 5:00 PM, Monday through Tuesday from 7:30 AM – 5:00 PM, and Wednesday from 7:30 AM – 12:00 PM. You must check in at the Speaker Ready Room (even if you have already submitted your presentation) no later than the following times:

Location: Azalea 2

Presentation Time	Check-In Deadline
Monday AM-PM	5:00 PM Sunday
Tuesday AM-PM	5:00 PM Monday
Wednesday AM-PM	5:00 PM Tuesday

Please report to your session room 10 minutes prior to the session start to let your session chair(s) know that you are there.

Posters in Prince George's A&B Exhibit Hall must be put up for display between 10:00 AM and 12:00 PM on Monday and removed on Wednesday by 11:00 AM.

Childcare

Monday - Wednesday, 7:30 AM – 5:30 PM, Magnolia 2

HPS will provide complimentary childcare this year at Camp HPS 2023 - A Travelers Adventure!

SAVE THE DATE

2024 IRPA 16th International Congress

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HPS 71st Annual Meeting

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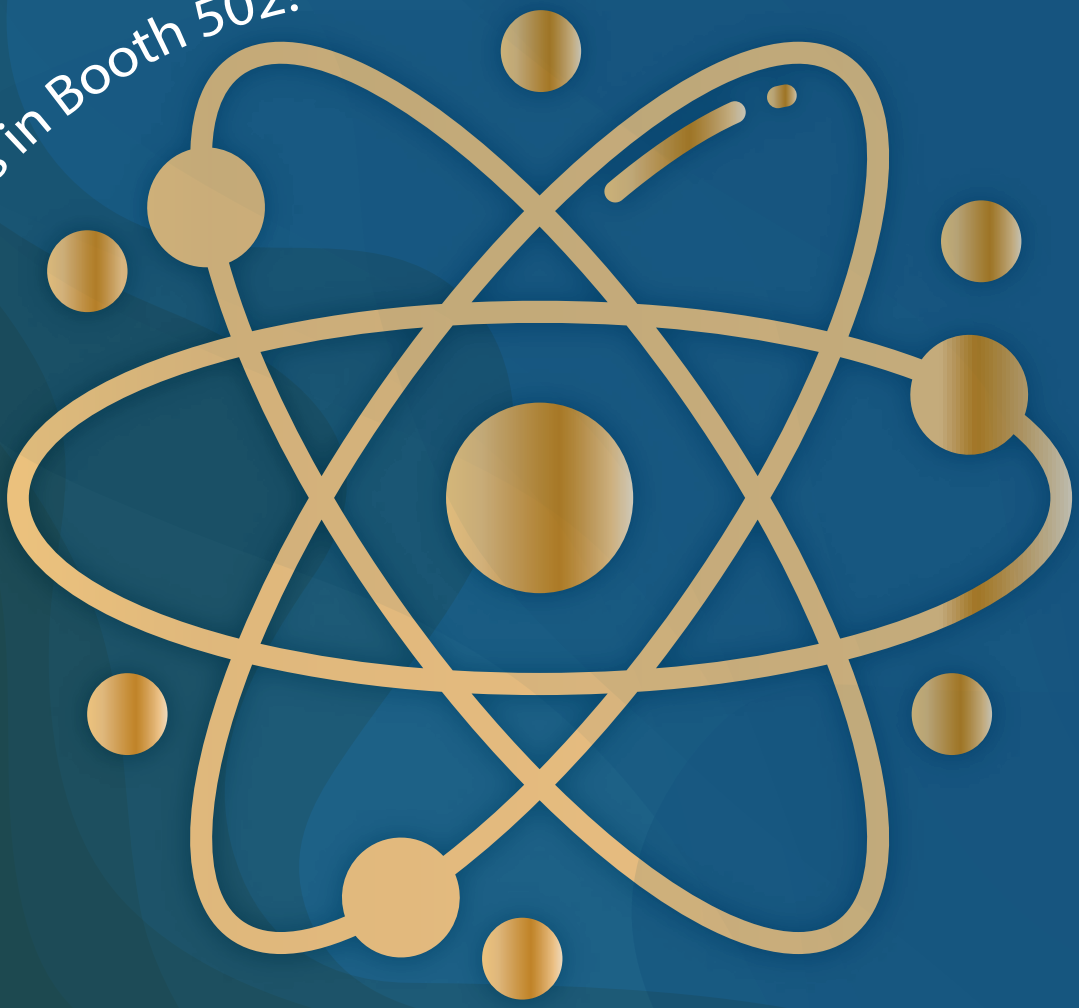

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COMPANION PROGRAM

Information for Registered Companions

Companion Registration cost is $130 and includes the Welcome Reception, Monday-Wednesday breakfast buffet at the Gaylord National Resort and Conference Center, and lunch and breaks in the Exhibition Hall. There will not be a separate Hospitality Room, however the Local Arrangements Committee staff will be happy to answer your questions or assist in finding the answer.

Sunday, 23 July

Welcome to National Harbor Companion Orientation

National Harbor Representative – 9:00 AM - 10:00 AM, Fort Washington Boardroom

The city orientation takes place Monday, 23 July from 9:00 AM to 10:00 AM. A representative from National Harbor will be on hand to describe some of the many opportunities, provide maps, and answer questions.

Monday, 24 July

Welcome Reception

5:30 PM – 7:00 PM, Prince George's A&B Exhibit Hall, Gaylord National Resort and Conference Center

Come see old friends and make new ones! Enjoy hors d'oeuvres with a cash bar, 5:30 PM – 7:00 PM.

Monday, 24 - Wednesday, 26 July

Companion Breakfast

7:00 AM - 10:00 AM, Gaylord National Resort and Conference Center

Companion Registration includes vouchers for Breakfast Monday – Wednesday in Market Place.

Registered companions are welcome to come to the lunch and breaks in Prince George's A&B Exhibit Hall.

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Committee/Business Meetings

Meetings take place at the Gaylord National Resort and Conference Center unless otherwise noted.

Friday, 21 July 2023

ABHP Board Meeting
8:00 AM – 5:00 PM — Baltimore 3

Saturday, 22 July 2023

Finance Commmittee Meeting
8:00 AM – 12:00 PM — Magnolia 1

ABHP Part II Panel
8:00 AM – 5:00 PM — Baltimore 1

ABHP Board Meeting
8:00 AM – 5:00 PM — Baltimore 3

NRRPT Meeting
8:30 AM – 4:30 PM — Magnolia 3

Executive Committee Meeting
12:00 PM – 4:00 PM — Magnolia 1

Student Orientation
5:30 PM – 6:30 PM — Annapolis 4

Sunday, 23 July 2023

NRRPT Meeting
8:00 AM – 5:00 PM — Magnolia 3

HPS Board of Directors
8:00 AM – 5:00 PM — Magnolia 1

ABHP Part II Panel
8:00 AM – 5:00 PM — Baltimore 1

ABHP Board Meeting
8:00 AM – 5:00 PM — Baltimore 3

AAHP Executive Committee
8:00 AM – 5:00 PM — Fort Washington Boardroom

HPS Science Support Committee – Science Teachers Worskhop
1:00 PM – 6:00 PM — Camellia

IRPA 16 Planning Meeting
3:00 PM – 5:00 PM — Baltimore 2

Student Kick-Off Reception
3:30 PM – 5:00 PM — Azalea 3

Society Support Committee
5:00 PM – 6:00 PM — Baltimore 2

Quiz Bowl
5:00 PM – 6:30 PM — Magnolia 2

Monday, 24 July 2023

Elda Anderson Breakfast
6:45 AM – 8:00 AM — Magnolia 2

Challenging Health Physics Questions Activity
7:00 AM – 8:00 AM — Azalea 3

NRRPT Meeting
8:00 AM – 5:00 PM — Magnolia 3

Mentorship Committee
12:00 PM – 1:00 PM — Annapolis 1-2

Speed Networking
1:00PM – 2:15 PM — Annapolis 1-2

Chapter Council Meeting
1:15 PM – 2:15 PM — Woodrow Wilson A

Section Council Meeting
2:30 PM – 3:30 PM — Camellia

OSU Alumni Reception
6:00 PM – 8:00 PM — Baltimore 5

Tuesday, 25 July 2023

Challenging Health Physics Questions Activity
7:00 AM – 8:00 AM — Azalea 3

NRRPT Meeting
8:00 AM – 4:00 PM — Magnolia 3

Public Information Committee
10:00 AM – 11:00 AM — Camellia

Membership Committee
10:00 AM – 12:00 PM — Presidential Boardroom

Academic Education Committee
12:00 PM – 1:00 PM — Presidential Boardroom

AAHP and ABHP Awards Luncheon
12:00 PM – 2:00 PM — Annapolis 1-2

Health Physics Society Standards Committee
12:30 PM – 2:30 PM — Fort Washington Boardroom

AEC Hosting HP Program Directors
1:00 PM – 2:00 PM — Presidential Boardroom

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Committee/Business Meetings

Meetings take place at the Gaylord National Resort and Conference Center unless otherwise noted.

Intersociety Relations Committee
2:00 PM – 3:00 PM — Presidential Boardroom

Student Support Committee
5:00 PM – 6:00 PM — Camellia

Women in Radiation Protection Section Reception
5:00 PM – 7:00 PM — Lower Atrium

CSU Alumni and Friends Reception
5:00 PM – 7:00 PM — Baltimore 4

Purdue Reception
5:30 PM – 7:30 PM — Baltimore 5

Wednesday, 26 July 2023

Challenging Health Physics Questions Activity
7:00 AM – 8:00 AM — Azalea 3

President Meeting with BOD Designates
10:00 AM – 4:00 PM — Fort Washington Boardroom

Health Physics Society Standards Committee
12:30 PM – 2:30 PM — Magnolia 3

HPS Awards Lunch
12:00 PM – 2:00 PM — Woodrow Wilson A

Academic, Industrial, and Research Radiation Safety Section Business Meeting
3:00 PM – 4:00 PM — Camellia

HPS Business Meeting
5:30 PM – 6:30 PM — Baltimore 3

Thursday, 27 July 2023

HPS Board of Directors Meeting
8:00 AM – 12:00 PM — Magnolia 1

Program Committee Meeting
8:30 AM – 9:30 AM — Magnolia 2

IMPORTANT EVENTS

Quiz Bowl

You and your friends can test your knowledge against other HPS members (members are encouraged to group with students and young professionals). Join in on the fun Sunday, 23 July, 5:00 PM– 6:30 PM, at the Gaylord National Resort and Conference Center, Magnolia 2.

Speed Networking

This event will serve as a way for students and early career health physicists to meet potential mentors within the society who can help guide their growing career with industry/academia recommendations and suggestions. Join in on Monday, 23 July, 1:00 PM – 2:00 PM, at the Gaylord National Resort and Conference Center, Annapolis 3-4.

Welcome Reception

The Welcome Reception this year will be held on Monday, 23 July from 5:30 PM – 7:00 PM in Prince George's A&B Exhibit Hall. Join fellow attendees for a time to socialize and renew old acquaintances. A cash bar will be available with appetizers.

Speaker Ready Room

Location: Azalea 2

- Sunday: 2:00 PM – 5:00 PM
- Monday: 7:30 AM – 5:00 PM
- Tuesday: 7:30 AM – 5:00 PM
- Wednesday :7:30 AM – 12:00 PM

Exhibits

Free Lunch! Free Lunch! – 11:30 AM-1:00 PM, Monday, 24 July and Tuesday, 25 July. All registered attendees are invited to attend a complimentary lunch in Prince George's A&B Exhibit Hall. *The free lunches are not included in the registration fee, but were paid for by our sponsors & exhibitors.*

Breaks Monday–Wednesday – Coffee Breaks in the morning and afternoon will be available in the exhibit hall. Be sure to stop by and visit with the exhibitors!

Sessions and Course Locations

Sunday PEPs are in the Gaylord National Resort and Conference Center; PEPs, CELs, and all sessions Monday through Wednesday will take place at the Gaylord National Resort and Conference Center.

AAHP and ABHP Awards Luncheon

Join us Tuesday, 25 July, for the AAHP and ABHP Awards Luncheon in Annapolis 1-2 at the Gaylord National Resort and Conference Center from 12:00 PM –2:00 PM.

HPS Awards Lunch

Join us Wednesday, 26 July, for the HPS Awards Program. We look forward to seeing you by 12:00 PM for the presentation in Woodrow Wilson A at the Gaylord National Resort and Conference Center. There will be a buffet lunch provided that begins at 12:00 PM.

Again this YEAR!

PEP Courses will have presentations posted online for those who have signed up for them prior to the meeting. There will be no hard copy handouts.
See page 58 for course information.

Things to Remember!

All speakers are required to check in at the Speaker Ready Room (Azalea 2) in the Gaylord National Resort and Conference Center, at least one day prior to their assigned presentation.

HPS Awards Luncheon

Wednesday, 26 July • 12:00 PM – 2:30 PM
Gaylord National Resort and Conference Center, Woodrow Wilson A

Join us Wednesday, 26 July, for the HPS Awards Program. We look forward to seeing you by 12:30 PM for the presentation at the Gaylord National Resort and Conference Center. There will be a buffet lunch provided that begins at 12:00 PM.

Sunday-Wednesday

PEPs, CELs, Committee Meetings, Exhibits, and Sessions (all events) take place at the Gaylord National Resort and Conference Center.

Speaker Ready Room

Gaylord National Resort and Conference Center • Azalea 2

Sunday: 2:00 PM – 5:00 PM
Monday-Tuesday: 7:30 AM – 5:00 PM
Wednesday: 7:30 AM – 12:00 PM

You must check in at the Ready Room (even if you have already submitted your presentation).

Note For CHPs

The American Academy of Health Physics has approved the following meeting-related activities for continuing education credits for CHPs:

- Meeting attendance is granted 1 CEC per contact hour, excluding meals and business meetings;
- AAHP 8-hour courses are granted 16 CECs each;
- HPS 2-hour PEP courses are granted 4 CECs each;
- HPS 1-hour CELs are granted 2 CECs each.

The HPS program committee has applied to CAMPEP for MPCEC credits for appropriate sessions.

Please contact Marcie Ramsay, marcie.ramsay@versantphysics.com for more information.

Student Events

Student Orientation
Saturday, 22 July, 5:30 PM – 6:30 PM
Annapolis 4

Quiz Bowl
Sunday, 23 July, 5:00 PM– 6:30 PM
Magnolia 2

Speed Networking
Monday, 24 July, 1:00PM – 2:15 PM
Annapolis 1-2

Exhibitor Luncheons
Monday, 24 July, 12:00 PM
Tuesday, 25 July, 12:00 PM
Prince George's A&B Exhibit Hall

Welcome Reception
Monday, 5:30 PM – 7:00 PM
Prince George's A&B Exhibit Hall

Challenging Health Physics Questions (CHPQ)
Monday, Tuesday, and Wednesday
7:00 AM – 8:00 AM
Azalea 3

Student Lounge
Monday, Tuesday, and Wednesday
6:00 PM – 10:00 PM
Azalea 3

HPS Awards Lunch
Wednesday, 26 July, 12:00 PM – 2:30 PM
Woodrow Wilson A

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HPS AWARDS LUNCHEON

Wednesday, 26 July • Gaylord National Resort, Woodrom Wilson A
12:00 PM – 2:30 PM • Awards Luncheon

Awards
Introduction by John Cardarelli II, President
Presented by Eric Goldin, Awards Committee Chair

Recognition of 50 Year Members

Recognition of Student Fellowship & Scholarship Recipients

Recognition of Student Travel Grant Recipients

Announcement of Health Physics-Related Awards

Fellow of the Health Physics Society Awards and Certificate Presentations

Geoffrey G. Eichholz Outstanding Science Teacher Award

Founders Award

Elda E. Anderson Award

Adjournment

2023 HPS 50 Year Members

J. Stewart Bland
Arthur Desrosiers
Clayton French
Winborn Gregory
Bruce A. Horn
Eileen Hotte
Judson Kenoyer
Craig A. Little
Larry W Luckett
Jay A. MacLellan
Robert L. Metzger
David W. Miller
Nicholas Panzarino
Sander C. Perle
Lawrence N. Rothenberg
Alan Schoenfeld
Joseph J. Shonka
Gian-Maria Sordi
Michael E. Wangler

Affiliate Member
ORTEC

Student Fellowships
We appreciate the sponsors and recognize the merits of the students in the following fellowships that provide important financial support to students in our health physics teaching programs:

Burton J Moyer Fellowship
Bryanna Wattier, Clemson University

Health Physics Society Fellowships
Anilu Diaz, Francis Marion University
Heechan Lee, Georgia Institute of Technology

Robert Gardner Memorial Fellowship
Ignacio Bartol, Georgia Institute of Technology

Robert S. Landauer, Sr., Memorial Fellowship
Dmitri Margot, Georgia Institute of Technology

Richard J. Burk, Jr., Fellowship
Annelise Gonzales, Clemson University

J. Newell Stannard Memorial Fellowship
Emmanuel Mate-Kole, Georgia Institute of Technology

Dade W. Moeller Scholarship
Suman Shrestha, University of Texas MD Anderson Cancer Center

Dade W. Moeller Scholarship Memorializing Kelly Austin
Anna Manfredo, Illinois Institute of Technology

F. Ward Whicker Scholarship
Jonathan Whipple, Oregon University

HPS AWARDS LUNCHEON

Student Travel Grant Recipients

These grants enable health physics students to attend and participate in our annual meeting.
Additional support was received from the Sections: Medical Health Physics, AIRRS, and Decommissioning.

Sherry Adadi
Georgia Institute of Technology

Johnson Aina
Idaho State University

Andrea Alipio
University of Santo Tomas

Samuel Arnold (AIRRS)
University of Alabama at Birmingham

Eric Ofosu Asare
University of Ghana-School of Nuclear and Allied Sciences

Melissa Bailey
Oregon State University

Alex Baty (Decommissioning)
University of Alabama at Birmingam

Ridhita Binte Borhan (Decommissioning)
University of Massachusetts Lowell

Chandler Burgos (AIRRS)
Purdue University

Christine Dulohan
University of Santo Tomas Graduate School

Mohammad Omar Faruque Fahim
University of Michigan - Ann Arbor

Jacob Farkas (Decommissioning)
Purdue University

David Gonzalez
Georgia Institute of Technology

Thomas Grier
Purdue University

Philip Gyan
KEPCO International Nuclear Graduate School

Christina Hewett
Illinois Institute of Technology

Chukwuka James
Alcorn State University

Elif Kara
Ludwig-Maximilians-Universität München

Maruf Hassan Khan (Decommissioning)
Purdue University, West Lafayette

Joeun Lee
Purdue University

William Lynn (Decommissioning)
University of Alabama at Birmingham

Arielle Miller (Medical Health Physics)
university of alabama birmingham

Martin Murungi
The University of Alabama at Birmingham

Stephen Reed
University of Alabama at Birmingham

Andrew Rosenstrom
Georgia Institute of Technology

Ricky Sahagun
Purdue University

Abdullahi Shittu
King Abdulaziz University

Lancer Smith (Medical Health Physics)
University of Alabama at Birmingham

Sarah Sublett
Colorado State University

Theodore Thomas
Purdue University

Yi Wei
Georgia Institute of Technology

Paige Witter
Colorado State University

HPS AWARDS LUNCHEON

Related Awards

American Academy of Health Physics

William A. McAdams Outstanding Service Award
Presented annually to individuals who have made long-term and significant contributions to the certification process and have elevated professionalism in health physics.

Cindy Flannery

Joyce P. Davis Memorial Award
Presented in recognition of exemplary service as a role model in upholding the ethical and professional standards of the Academy.

Jay Tarzia

Nancy K. Johnson National Service Award
Presented to individuals who have provided exceptional service to the Academy during the immediate Past President's term of office.

Andy Miller

Bill Fitzgerald Award
This award may be made annually by the ABHP to honor an Active or Emeritus Certified Health Physicist who has provided exceptional service to the ABHP during the immediate previous Chair's term of office.

Bill Fitzgerald

AAHP Distinguished Membership 2023
The Distinguished Member Award is given as a recognition of outstanding contributions to the AAHP/ABHP and the health physics profession for a period of at least 20 years while maintaining the integrity and ethical standards of our profession as a certified health physicist.

Dr. Kenneth Skrable
Dr. George Chabot
Kathryn Pryor
Professor Kim Kearfott
Frazier Bronson
Dr. Paul Ziemer
Ruth McBurney
Dr. Richard Toohey
Dr. Ken Kase
Kent Lambert

Academic, Industrial, and Research Radiation Safety (AIRRS) Section Award

Academic, Industrial, and Research Radiation Safety Section Award
This travel grant is to provide funding assistance for Health Physics Professionals to attend the annual HPS meeting.

Awardees: Daniel Jim Strom,Ashley Lauren Nieves

AIRRS Section Travel Grant
This grant is to supplement the HPS travel grant for students whose area of concentration is in operational health physics in university, research or industry.

Awardees: Chandler Burgos, Samuel Arnold

Homeland Security Section Award

The Health Physics Society Homeland Security and Emergency Response Section Distinguished Service Award honors those who exemplify outstanding service and dedication to Homeland Security and Emergency Response.

Jacob Kamen, Ph.D., DABHP, CMLSO

Military Health Physics Section Awards

John C. Taschner Leadership Award
Established in 2014 the John C. Taschner Leadership Award recognizes a uniformed officer or senior enlisted person who has distinguished himself or herself in service to our country over a long career as a uniformed military health physicist and is presented at the annual meeting.The winner receives a plaque.

Jeffrey S. Caudill

Superior Civilian Service Award
Established in 2014, the Superior Civilian Service Award recognizes a person who has distinguished himself or herself in service to our Country over a long career as a civilian military health physicist and is presented at the Annual Meeting. The winner receives a plaque.

Julie A. Clements

HPS AWARDS LUNCHEON

Young Military Health Physicist of the Year Award
Established in 2014, the Young Military Health Physicist of the Year Award recognizes a young military health physicist for excellence in (1) research or development, (2) discovery or invention, (3) devotion to military health physics, and/or (4) significant contributions to the profession of military health physics and is presented at the annual meeting. The winner receives a plaque and a one-year membership in the Health Physics Society.

Aure J. Stewart

Women in Radiation Protection Section Awards

Inclusivity Award
The Health Physics Society Women in Radiation Protection Section honors those who, in the past year, have made significant efforts in widening participation and promoting inclusion within health physics and related disciplines. Such efforts include improving the experience, involvement, and/or development of under-represented persons, and fostering attitudes, relationships, or environments that are welcoming and accessible to all.

Dr. Lisa Manglass

Published HPS/ANSI Standards

ANSI/HPS N13.11 – *2022 Personnel Dosimetry Performance–Criteria for Testing*

ANSI/HPS N13.25 – *2022 Internal Dosimetry Programs for Plutonium Exposure–Basic Requirements*

ANSI/HPS N13.35 – *2022 Specifications for the Bottle Manikin–Absorption Phantom*

Fellows

To honor senior members of the Society who have made significant administrative, educational, or scientific contributions to the profession of health physics.

2023 Fellows

Richard R. Brey
John Cardarelli, II
Kathleen Dinnel-Jones
Robert J. Emery
Robert Hayes
Allen Mabry
Elaine T. Marshall
Thomas Morgan, III
James R. Sherrard
James M. Shuler
Jama VanHorne-Sealy

Geoffrey G. Eichholz Outstanding Science Teacher Award

To honor teachers who have made significant contributions to educating students in topics related to the field of radiation safety.

Ann Marie Dubick
Award consists of an Associate Membership.

Founders Award

This award recognizes exceptional service to the Health Physics Society or the health physics profession.

David Connolly
Award consists of a plaque and life membership in the Society

Elda E. Anderson Award

This award is presented to a young member of the Health Physics Society to recognize excellence in:

1. Research or development
2. Discovery or invention
3. Devotion to health physics, and
4. Significant contributions to the profession of health physics

Deepesh Poudel
Award consists of a certificate and a $1,000 check

2023 EXHIBIT HALL FLOOR PLAN

Prince George's A&B Exhibit Hall

View the latest floorplan and company profiles on your phone or tablet.
Scan the QR Code or visit **hps2023.expofp.com**.

Exhibit Hall Hours

Monday, July 24
11:30 AM – 7:00 PM

Tuesday, July 25
9:30 AM – 5:00 PM

Wednesday, July 26
9:30 AM – 12:00 PM

Breaks
Monday AM – Wednesday AM
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Tuesday, sponsored by Ludlum Measurements Inc.
Featuring morning and afternoon coffee.
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Lunches
Monday and Tuesday, 11:30 AM
All registered attendees are invited to attend a complimentary lunch in Prince George's A&B Exhibit Hall.

Welcome Reception
Monday, 5:30 PM – 7:00 PM
Join fellow attendees in the Prince George's A&B Exhibit Hall for a time to socialize and renew old acquaintances.

2023 HPS EXHIBITORS

AAHP (The American Academy of Health Physics) — Booth: 213

191 Clarksville Road
Princeton Junction, NJ 08550
888-282-3446
www.aahp-abhp.org

The AAHP advances the profession of Health Physics and encourages the highest standards of ethics and integrity in its members. The AAHP offers membership to all individuals who have been certified by the American Board of Health Physics (ABHP), known as Certified Health Physicists (CHPs).

Advetage Solutions — Booth: 202

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Health Physics Society Publications — Booth: 610

hps.org

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NRRPT — Booth: 507

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www.nrrpt.org

Objective of the Registry: To encourage and promote the education and training of Radiation Protection Technologists and, by doing so, promote the science of Health Physics.

NSSI — Booth: 311

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865-603-5640
www.phdsco.com

PHDS Co. manufactures high-purity germanium (HPGe) gamma-ray spectrometers. All PHDS Co. HPGe detectors are portable, battery powered, turnkey systems suitable for use in the laboratory, reactor, security site or the field. The Fulcrum and GeGI gamma-ray Imaging spectrometers provide quantitative spectroscopy in real-time addressing the most challenging nuclear materials situations.

Polimaster Inc — Booth: 205

44873 Falcon Place, Suite 128
Sterling, VA 20166
703-525-5075
www.polimaster.us

Polimaster Inc. delivers the solutions for radiation control since 2004. Everyday our instruments help thousands of professionals all over the world to solve various tasks of radiation control – detection, localization, monitorization and, radionuclide identification. Our product line includes: Electronic Personal Dosimeters, Personal Radiation Detectors, Radiation Portal Monitors, Radionuclide Identifiers, Radiometers, Spectroscopic Personal Radiation Detectors etc.

Rad Source Technologies, Inc. Booth: 402

4907 Golden Parkway, Suite 400
Buford, GA 30518
470-758-7834
www.radsource.com

Rad Source's Quastar X-ray is FDA approved to prevent the growth of dangerous microbes in food, ensures the safety of consumers and employees of growing facilities by completely eliminating the presence of harmful chemicals. The flower friendly process ensures that the product retains its terpenes, potency, moisture, and visual quality.

The RS 420 Series conforms to all federal guidelines within Schedule II, Part XV of the Canadian C.R.C., c. 1370 Radiation Emitting Devices ACT.

Radiation Detection Company, Inc Booth: 108

3527 Snead Drive
Georgetown, TX 78626
512-831-7000
www.radetco.com

Radiation Detection Company offers NVLAP accredited dosimetry solutions with world-class service levels to the medical, dental, energy, and veterinary fields with over 70 years of industry experience. RDC's top-rated white glove experience combined with its extensive network of partner relationships provide businesses an affordable, reliable, and easy-to-use compliance solution.

Radiation Safety & Control Services Booth: 400

93 Ledge Road
Seabrook, New Hampshire 03874
800-525-8339
www.radsafety.com

Established in 1989, RSCS, Inc. is a small business that offers expertise in all aspects of radiation safety and measurement applications. Our company specializes in operational and decommissioning services for nuclear power plants as well as for industrial, medical, and government radiological facilities. Our core services include health physics consulting, technical staffing, training, instrumentation (including sales, installation, calibration, and repair), emergency planning, and specialized radiological characterizations and measurements.

Radium Incorporated Booth: 509

Silver Sponsor

463 Dinwiddle Ave
Waynesboro, VA 22980
540-942-5734
radiuminc.com

Radium has developed a next generation of gamma radiation shielding technology. Our patented (#10262763) ClearView Radiation Shielding liquid solution is developed to be a light-weight, non-hazardous alternative to the industry's existing heavy and toxic lead shielding. Our shields are being used by hospitals in nuclear medicine departments, theranostics such as Lu-177 and I-131 therapies, nuclear medicine along with DOE labs, radwaste sites, etc.

Revvity Booth: 506

940 Winter Street
Waltham, MA 02451
800-762-4000
www.revvity.com

Revvity provides health science solutions, technologies, expertise and services that deliver complete workflows from discovery to development and diagnosis to cure.

S.E. International, Inc Booth: 508

PO BOX 39, 436 Farm Road
Summertown, TN 38483
931-964-3561
www.seintl.com

Manufacturer of the Radiation Alert® product line, offering affordable handheld ionizing radiation detection instruments including Geiger counters, dosimeters, multi-channel analyzers, Area Monitors, for surface and air contamination. Proven reliable in Emergency Response, environmental, industrial, laboratory, research, Health physics, and educational fields. We provide excellence in instrumentation, reliability and customer service.

Spectral Labs Incorporated Booth: 605

Silver Sponsor

15920 Bernardo Center Drive
San Diego, CA 92127
858-207-3727
spectrallabs.com

The Spectral Labs mission is to leverage our broad technical skill set and the product development passion of our Employee Owners to innovate practical, high-quality solutions developed through keen focus on customer requirements. Our experience lies in product development and manufacturing of instrumentation and software for military and first responders.

Spectrum Techniques, LLC — Booth: 500

106 Union Valley Road
Oakridge, TN 37830
865-482-9937
www.spectrumtechniques.com

Spectrum Techniques is your primary source for exempt quantity radionuclides, radiation detection and measurements instrumentation. Applications include teaching in nuclear medicine, health physics, chemistry, biology and nuclear engineering. See our web site at Spectrumtechniques.com for MCAs, nuclear counters and ratemeters. Source types include disk, rod, laminated and needle sources.

Teletrix — Booth: 101

2000 Golden Mile Highway, Suite C
Pittsburgh, PA 15239
412-798-3636
teletrix.com

Teletrix makes simulation solutions to support radiation training with a no-exposure, high realism approach. Our products allow for hands on training that is instructor and student friendly with an impactful experience for all involved.

Transco Products Inc. — Booth: 301

Silver Sponsor

1215 East 12th St
Streator, IL 61364
815-672-2197
www.transcoproducts.com

Transco Products Inc. has unsurpassed experience in supporting the power and process industries. Transco materials and systems are in service at every operating nuclear power station in the United States. Worldwide, Transco insulation systems are in use at over 200 nuclear power plants in 15 countries.

U.S. Nuclear Regulatory Commission (NRC) — Booth: 513

OCHCO, MS: TWFN 2A 77
Washington, DC 20555-0001
301-415-7000
www.nrc.gov

The mission of the U.S. Nuclear Regulatory Commission is to license and regulate the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment.

Ultra Energy — Booth: 407

Silver Sponsor

707 Jeffrey Way
Round Rock, TX 78665-2408
512-434-2800
www.ultra.energy

Radiation monitoring systems for effluent (air or liquid), stack sampling, stack flow monitoring, air monitoring, area monitoring, process monitoring compliance monitoring, SIL-rated interlock systems, SCADA systems, bespoke systems, neutron flux detectors for in-core measurements, safety systems, aging and obsolescence.

2023 UNIVERSITY TABLES

Colorado State University

CSU/ERHS 1618 Campus Delivery
Fort Collins, CO 80523
970-491-0563

vetmedbiosci.colostate.edu/degree-programs/graduate/ms-radiological-health/health-physics/

Colorado State University offers an MS in health physics (ABET accredited), with concentrations in radioecology and radiochemistry, as well as a PhD program. CSU has established relationships with Fukushima, Los Alamos National Laboratory, Idaho National Laboratory and others as key partners in the education of students.

Idaho State University Health Physics

921 S. 8th Ave Stop 8060
Pocatello, Idaho 83209-8060
208-282-2902
isu.edu/hp

Idaho State University's Health Physics program offers associate to doctoral degrees with distance learning options for working professionals looking to advance their careers. For more info, visit isu.edu/hp or contact Richard Brey at breyrich@isu.edu.

Oregon State University, School of Nuclear Science and Engineering

151 Batcheller Hall
Corvallis, OR 97331
541-737-2343
ne.oregonstate.edu

Founded in 1959, OSU School of Nuclear Science and Engineering boasts a global influence and are one of the top programs in the United States. We are known for our progressive research, large-scale test facilities, and industry and governmental partnerships. With students from around the globe; world-class faculty hailing from China, Iran, Poland, Slovakia, and the United States; and more than 1,300 alumni living and working in the United States and abroad, we are driving the future of nuclear science through engineering and health physics.

Purdue University School of Health Sciences

550 Stadium Mall Drive
West Lafayette, IN 47907
765-494-2974
hhs.purdue.edu/graduate-programs/health-physics-radiation-protection-graduate-program/

Purdue University's School of Health Sciences is committed to creating, disseminating, preserving and applying knowledge in the areas of Radiological, Occupational and Environmental Health Science through leading-edge scholarly research, teaching and engagement. The School offers a long-standing and nationally recognized educational program in Radiological Health Science (Health Physics).

University of Alabama at Birmingham

1716 9th Ave S
Birmingham, AL 35233
541-250-1975
www.uab.edu/shp/cds/health-physics

The UAB MS in Health Physics program strives to provide a quality educational experience that prepares students to be skilled professionals who will equitably serve in a diverse workforce, who will contribute to the profession throughout their careers, and who will uphold the highest standards of ethics and integrity both personally and professionally.

Professional Enrichment Program (PEP)

All sessions take place in the Gaylord National Resort and Conference Center

SUNDAY

8:00 AM – 10:00 AM

PEP 1-A **Annapolis 1**
Radiation Safety's Translation of Worker Well-being Principles into Practice:Positioning for the New Work Environment
Emery RJ, Gutierrez JM
UTHSCH UTSPH

PEP 1-B **Annapolis 2**
Retrospective dosimetry in nuclear forensics and nonproliferation
Hayes RB
NC State

PEP 1-C **Annapolis 3**
Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 1: Nuclear Power Plant Emergencies
Irwin WI, Leek AE, Renno WJ, Palmer BW, Alston CL, Callan M
Vermont Department of Health, SummitET, Radiation Emergency Services, Chainbridge Technologies

PEP 1-D **Annapolis 4**
Radiation Safety Risk Mitigation in Y-90 Microsphere Administrations
Gibbons WR, Dillingham KL
Moffitt Cancer Center, The University of Chicago

PEP 1-E **Woodrow Wilson B**
PiMAL
Rose CT
Renaissance Code Development

10:30 AM – 12:30 PM

PEP 2-A **Annapolis 1**
Alpha Spectroscopy for the Health Physicist
Maddigan C
ORTEC

PEP 2-B **Annapolis 2**
Revisiting and Redefining TENORM for the 21st Century
Egidi PV
U.S. EPA

PEP 2-C **Annapolis 3**
Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 2: Radiological Dispersal Device (RDD)
Irwin WE, Leek AE, Renno WJ, Palmer BW, Alston CL, Callan M
Vermont Department of Health, SummitET, Radiation Emergency Services, Chainbridge Technologies

PEP 2-D **Annapolis 4**
Laser Safety for The Health Physicist
Gibbons WR, Dillingham KL
Moffitt Cancer Center, The University of Chicago

PEP 2-E **Woodrow Wilson B**
Utility of Modeling in Operation Health Physics
Kelley SW
NorthStar Medical Radioisotopes

1:00 PM – 3:00 PM

PEP 3-A **Annapolis 1**
Gamma Spectroscopy for the Health Physicist
Maddigan C
ORTEC

PEP 3-B **Annapolis 2**
Important Radiation Biology Concepts for Radiation Protection
Held KD
NCRP

PEP 3-C **Annapolis 3**
Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 3: A Nuclear Detonation
Irwin WE, Leek AE, Renno WJ, Palmer BW, Alston CL, Callan M
Vermont Department of Health, SummitET, Radiation Emergency Services, Chainbridge Technologies

SUNDAY

PEP 3-D **Annapolis 4**
Medical Lasers – Types, Uses and Safety
Elder DH
UCHealth

PEP 3-E **Woodrow Wilson B**
Cognitive Dissonance; Heuristics & Logical Fallacies in Risk Perception: Why it's so natural for so many to believe so much that is so wrong.
Bushberg JT
NCRP

3:30 PM – 5:30 PM

PEP 4-A **Annapolis 1**
Emergency Response and Information Communication – What Can a Health Physicist Provide?
Sugarman SL
SummitET (Summit Exercises and Training)

PEP 4-B **Annapolis 2**
On Uncertainty in Surface Activity Concentration Measurements
Stuenkel DO
U.S. Environmental Protection Agency

PEP 4-C **Annapolis 3**
Federal Radiological Response Teams
Groves KL
Retired Navy

PEP 4-D **Annapolis 4**
Characteristic Limits in Bioassay
LaBone TR, Chalmers NM
MJW Corp

PEP 4-E **Woodrow Wilson B**
Medical Health Physics Update
Charlton MA, Charlon Michael
UT Health San Antonio

Continuing Education Lectures (CEL)

All sessions take place in the Gaylord National Resort and Conference Center

MONDAY

6:45 AM – 7:45 AM

CEL 1 **Woodrow Wilson B**
Case Studies in "Radiation Deception": Practical Strategies for Avoiding Fraud Based on Lessons Learned
Emery RJ, Howell D
UTHSC Houston, Atrium Health Wake Forest Baptisit
Mount Sinai

CEL-2 **Woodrow Wilson C**
The Art of Presenting
Snay SP
UMass Lowell

CEL-3 **Woodrow Wilson D**
A Hospital Radiological Incident Response Plan
Elder DH
UCHealth

CEL-4 **Baltimore 1-2**
Decommissioning a Wet Storage Panoramic Irradiator
Lewandowski MA
3M

Preliminary Scientific Program

Presenter's name is asterisked (*) if other than first author.
All sessions take place in the Gaylord National Resort and Conference Center.

This meeting has applied to CAMPEP for approval of 25 MPCEC hours..

MONDAY

8:00 AM – 9:30 AM

Welcome and Plenary Session
Woodrow Wilson A

8:00 am
Doctrinal Ethics in Research Practice: Professional Probity and Public Good
Giordano J, PhD
Departments of Neurology and Biochemistry, Chief of the Neuroethics Studies Program

9:45 AM – 11:30 AM

MAM-A
Accelerator Health Physics
Chairs: Robert May,Adam Stavola
Woodrow Wilson A

9:45 am **MAM-A.1**
Enhanced radiation attenuation and shielding ability of materials by changing their crystal structure and electron density
Maqbool M, Wright B
The University of Alabama at Birmingham

10:00 am **MAM-A.2**
Analysis of Misalignment Fault Conditions for the Accelerator Test Facility Plasma Shutter
Rosenstrom A, Dewji S, Rokni S, Santana M, Liu J, Palmer M
Georgia Institute of Technology, SLAC National Accelerator Laboratory, Brookhaven National Laboratory

10:15 am **MAM-A.3**
Comparison of Analyzed Soil Activation Results to FLUKA Analysis Model
Papas CC, Schake M
Jlab

10:30 am **MAM-A.4**
Medical Radioisotope Production Using Novel Electron Accelerators
Kelley SW
Northstar Medical Radioisotopes

10:45 am **MAM-A.5**
Activity simulation study in the soil surrounding the Hall-B dump at Jefferson Lab
Zana L
Jefferson Lab

11:00 am **MAM-A.6**
Studies of Residual Doses for the MEC-U Laser Facility
Connolly P, Bauer J, Liu J, Rosenstrom A, Rokni S, Dewji S
Georgia Institute of Technology, SLAC National Accelerator Laboratory

11:15 am **MAM-A.7**
Radiation Safety Lessons Learned from Re-installation of a Clinical Linear Accelerator
Boateng F, Shupe J, Mejias M, Bateman F, Pidida L
NIST

10:00 AM – 11:15 AM

MAM-B
Regulations/Licensing
Chair: Alan Fellman
Woodrow Wilson B

10:00 am **MAM-B.1**
Program Overview And Explanation Of Policies For The Turn-In Of Defense-Owned Radioactive Items Found In The Public Domain
Turner CE
Department of Defense

10:15 am **MAM-B.2**
Design Basis Accident Dose Criteria History and Perspectives
Parillo JG
U.S. Nuclear Regulatory Commission

10:30 am **MAM-B.3**
TENORM Regulation in the United States of America post-West Virginia v. EPA
Lynn WS, Caffrey EA, Wilson CA
University of Alabama at Birmingham

10:45 am **MAM-B.4**
Policy Surveillance Methods as Applied to TENORM Regulation in the Gulf States
Lynn WS, Caffrey EA, Wilson CA
University of Alabama at Birmingham

11:00 am **MAM-B.5**
The Impact of LNT on Litigation
Fellman AL
NV5 Dade Moeller

10:00 AM – 12:00 PM

MAM-C
Non-Ionizing Radiation (NIR)
Chairs: Ken Barat, David Sliney
Woodrow Wilson C

10:00 am **MAM-C.1**
Bringing technology to Laser Safety
Barat KL
Laser Safety Solutions

10:15 am **MAM-C.2**
DoD Electromagnetic Radiation Safety Incidents
Erwin WE, Miaullis AM, Kelley EK
Defense Center for Public Health - Dayton, United States School of Aerospace Medicine

10:30 am **MAM-C.3**
Unintended Consequences of Laser Safety
Lewandowski MA
3M

10:45 am **MAM-C.4**
Studies of UV-C Effects Upon the Human Cornea
Sliney DH

11:00am
Non-Ionizing Radiation Business Meeting

9:30 AM – 12:10 PM

MAM-D
Special Session: Homeland Security Part 1
Chairs: William Irwin, Jeff Chapman
Woodrow Wilson D

9:30 am **MAM-D.1**
An analysis of the GSR Part 7 EPR Requirements against the real-world experience of the response to the terrorist attacks on September 11 2001
Bergman L, Waller E
Health Canada, Ontario Tech University

9:50 am **MAM-D.2**
The Radiological Operations Support Specialist as a Profession
Irwin WE
Vermont Department of Health

10:10 am **MAM-D.3**
NCRP Statement No. 14 – Instrument Response Verification and Calibration for Use In Radiation Emergencies (2022)
Irwin WE, Buddemeier BR, Klemic GA, Pibida LS, Chapman JA, Salame-Alfie A
Vermont Department of Health, Lawrence Livermore National Laboratory, US Department of Homeland Security, National Institute of Standards and Technology, US Department of Energy, Centers for Disease Control and Prevention

10:30 am **BREAK**

10:50 am **MAM-D.5**
Exacting the Science of Emergency Preparedness
Smith TR
U.S. Nuclear Regulatory Commission

11:10 am **MAM-D.6**
New Airborne Radio-Iodine InSitu Spectroscopic Analysis Methods for Routine and Emergency Applications
Bronson FL
Mirion Technologies - Canberra

11:30 am **MAM-D.7**
Lung counting efficiency and chest-wall thickness correction for in-vivo assay triage of inhaled radionuclides
Wei V, Dewji S
Georgia Institute of Technology

11:50 am **MAM-D.8**
DOE Consequence Management Vision
Hunt BD
Sandia National Labs

10:00 AM – 12:00 PM

MAM-E
So You're Thinking of Retirement?
Chair: Jess Joyce
Baltimore 1-2

10:00 am **MAM-E.1**
Transitioning HPS Full Membership to Emeritus Status
*Chu BP, Cochran LD**
MSKCC, Sandia

10:15 am **MAM-E.2**
So You're Thinking of Retirement? Options for the Later Career Health Physicist
Allard DJ
ACC

10:30 am **MAM-E.3**
So You're Thinking of Retirement? Options for the Later Career Health Physicist
Sheetz MA
Retired

10:45 am **MAM-E.4**
How to take the next step - retirement - personal perspectives
Scroggs DM
Retired

11:00 am **MAM-E.5**
So, You're Thinking of Retirement? Options for the Later Career Health Physicist
Vetter RJ
Mayo Clinic

11:15 am **MAM-E.6**
Retirement?: A Non-retired Person's POV
Little CA
Two Lines, Inc.

11:30 am **MAM-E.7**
Panel Discussion

10:00 AM – 11:45 AM

MAM-F
Radon in the Oil and Gas Industry Part 1
Chair: Phil Egidi
Baltimore 3

10:00 am **MAM-F.1**
Special Session on Radon in Oil and Gas operations
Okyar HB, Rood AS, Allard DJ, McArthur A, Koutrakis P, Longxian L
IAEA, KSpar, SE Compact, Consultant, Harvard

10:05 am **MAM-F.2**
Assessing Exposures and Health Effects of Particle Radioactivity: An Emerging Research Field
Koutrakis P
Harvard T.H. Chan School of Public Health

11:05 am **MAM-F.3**
Unconventional Oil and Gas Development and Ambient Particle Radioactivity
Li L, Blomberg AJ, Coull BA, Spengler JD, Schwartz JD, Koutrakis P
Harvard University

11:25 am **MAM-F.4**
Impact of Radon Exposures on Non-Cancer Outcomes and Future Perspectives
Zilli Vieira CL, Koutrakis P

12:15 PM – 2:15 PM

PEP M-1 **Baltimore 1-2**
Dose Estimates to Workers From Y-90 Excluding Fluoroscopy During Microspheres Treatments
Miller A
Cleveland Clinic

PEP M-2 **Woodrow Wilson B**
An Introduction to Nuclear Security for the Health Physicist
Harris JT
Purdue University

PEP M-3 **Woodrow Wilson C**
Electromagnetic Energy Field Surveys for Comparison with Implanted Medical Device Manufacturers' Maximum Allowable Field Strengths
Haes DL
Consultant

PEP M-4 **Woodrow Wilson D**
Design and Optimization of Ambient Air Monitoring Networks using Atmospheric Dispersion Modeling and Frequency of Detection Methods
Rood AS
K-Spar Inc

PEP M-5 **Baltimore 3**
Quantitative Environmental Risk Analysis for Human Health
Fjeld RA, DeVol TA, Martinez NE*
Clemson University

2:30 PM – 6:00 PM

MPM-A
Early-Career Professional Special Session
Chairs: Chu Wang, Candace Krout
Woodrow Wilson A

2:30 pm **MPM-A.1**
Think Again! The Health Physicist Must Live a Life of Curiosity and Continuous Learning
Sowers DA
Defense Threat Reduction Agency

2:50 pm **MPM-A.2**
Career Management Insights from a Recently Retired Federal Health Physicist
Boyd MA
U.S. EPA (retired)

3:10 pm **MPM-A.3**
Who Knows What Stuff is Out There? – Lessons in an Early Career in Environmental Health Physics
Joyce JM
H3 Environmental

3:30 pm **BREAK**

4:00 pm **MPM-A.5**
Utilizing Resources and Optimizing Oppurtunities
Krout CL

4:20 pm **MPM-A.6**
Volunteering for the Health Physics Society as an Introvert: How I Give Back and What I Get
Poudel D
LANL

4:40 pm **MPM-A.7**
Finding Mentorship through HPS
Joyce J, Serencstis B, Montgomery D, Wilson C, Halloran A, Emery R, King S, Vanhorne-Sealy J
HPS Mentorship Committee

5:00 pm **MPM-A.8**
Panel Discussion

5:20 pm **MPM-A.9**
Early Career Business Meeting

2:30 PM – 5:00 PM

MPM-B
Special Session: The Rhisotope Project - Using radioisotopes to combat illicit wildlife trafficking
Chair: Thomas Johnson
Woodrow Wilson B

2:30 pm **MPM-B.1**
The Rhisotope Project: Justification of planned doses to black (Diceros bicornis) and white rhinoceros (Ceratotherium simum
Larkin JF
University of Witwatersrand

3:00 pm **MPM-B.2**
Using 13C and 15N To Track Potential Movement of Material In White Rhinoceros Horn (Ceratotherium Simum)
Larkin JF
University of Witwatersrand

3:20 pm **MPM-B.3**
Preliminary Study of Doses to Rhinoceros Basal Cells from a Radioactive Source to Deter Poaching
Hillis JA, Marianno CM, Ford J
Texas A&M University

3:40 pm **BREAK**

4:00 pm **MPM-B.5**
Finding suitable isotopes for labelling Rhinoceros horn
Kros CG, Kotze D, van Rooyen J, Buffler A, Faanhof A
South African Nuclear Energy Corporation SOC, North-West University, University of Cape Town

4:20 pm **MPM-B.6**
Detection of Smuggled Rhinoceros Horns
Johnson TE, DeVincenzo E, Bell J
Colorado State University

4:40 pm **MPM-B.7**
The Rhisotope Project: Where to after rhinos? How else might the techniques being developed by the project be applied?
Larkin JF
University of Witwatersrand

2:30 PM – 5:00 PM

MPM-C
Government Relations in the Health Physics Society
Chair: Craig Little

Woodrow Wilson C

2:30 pm **MPM-C.1**
The HPS Government Relations Program: The Society's Voice on Regulatory Affairs and Legislation
Little CA
HPS

2:50 pm **MPM-C.2**
HPS Government Relations Committee
Ring J
HPS Gov Relations Committee

3:10 pm **MPM-C.3**
Legislative Program of HPS
Connolly David
HPS

3:30 pm **BREAK**

4:00 pm **MPM-C.5**
Health Physics Pathways at the U.S. Nuclear Regulatory Commission
Clark TV
U.S. Nuclear Regulatory Commission

4:20 pm **MPM-C.6**
GAO Covert Testing of NRC Materials Licensing
Bawden A, Woodward N, Barron J
GAO

4:40 pm **MPM-C.7**
Radioactive Source Security and Accountability
Williams K, Giantelli A
U.S. Nuclear Regulatory Commission

2:30 PM – 6:00 PM

MPM-D
Special Session: Homeland Security Part 2
Chairs: William Irwin, Jeff Chapman

Woodrow Wilson D

2:30 pm **MPM-D.1**
Radiological Communications Considerations
Sugarman SL, Hardin H, Basnight M
SummitET (Summit Exercises and Training)

2:50 pm **MPM-D.2**
Why Emergency Biodosimetry Shouldn't Tell Us Dose
Adams GG
Gryphon Scientific

3:10 pm **MPM-D.3**
NCRP Statement 15- Respiratory Protection Recommendations for Workers and Volunteers Responding to a Nuclear Incident Outside the Affected Area
Salame-Alfie A, Ansari AA
NCRP

3:30 pm **BREAK**

3:50 pm **MPM-D.5**
RadResponder Network – A Quick Walkthrough With The Newest Updates
Chen G
U.S. EPA

4:10 pm **MPM-D.6**
Minor Actinide and Lanthanide Chromatographic Separations Using Synergistic Extractions
Boey AP, Bertelsen ER
University of Massachusetts, Lowell/Air Force Institute of Technology, University of Massachusetts, Lowell

4:30 pm **MPM-D.7**
Health Physics Aspects of the 2022 Planning Guidance for Response to a Nuclear Detonation
Buddemeier BR, Dillon MB
Lawrence Livermore National Laboratory

5:00 pm **MPM-D.8**
Homeland Security and Emergency Response Section Business Meeting

2:30 PM – 5:00 PM

MPM-E
Special Topics in Health Physics
Chair: Daniel Strom
Baltimore 1-2

2:30 pm **MPM-E.1**
Spectroscopic Particulate, Iodine, and Noble Gas Monitor with Continuous Unattended Operation and Analysis
Zickefoose JK, Bronson F, Dang E, Huckins B
Mirion Technologies (Canberra) Inc

2:45 pm **MPM-E.2**
Aerospray: What Covid-19 Research Teaches HPs about Managing Intakes
Strom DJ
Washington State University

3:00 pm **MPM-E.3**
Review of Efforts in the Validation of the TRDS for the Location of Metlino
Hiller M, Woda C, Napier B
CheMin GmbH, bfs, PNNL

3:15 pm **MPM-E.6**
Dose and Risk Assessment for Faculty and Students Studying in a CS-137 Contaminated Building.
Chao TC, Tien NC, Yeh TK, Lin CY
Chang Gung University, National Tsing HuaUniversity, Chang Gung Memorial Hospital

3:30 pm **MPM-E.7**
ISOE ALARA Global Program Accomplishments & Future HP Studies
Miller D
North American Technical Center

3:45 pm **MPM-E.8**
Identification of novel biomarkers of radiation exposure using four different species
Sproull M, Nishita D, Chang P, Moroni M, Citrin D, Shankavaram U, Camphausen K
NIH/NCI/ROB, SRI, AFRRI

4:00 pm **MPM-E.9**
Retrospective Evaluation of Cytogenetic Effects Induced by Internal Radioiodine Exposure: A 27-Year Follow-Up Study
*Livingston GK, Ryan TL, Escalona MB, Balajee AS**
REACTS CBL, ORISE

4:15 pm **MPM-E.10**
Time Dependence of the Neutrophil-Lymphocyte Ratio in the 1958 Y-12 Criticality Accident
Goans RE
MJW Corporation and REAC/TS

4:30 pm **MPM-E.11**
Long-term response of leukocyte counts in Rhesus Macaques with whole body irradiation
Chino Y, Olson JD, Cline JM, Johnson TE
Colorado State University, Wake Forest School of Medicine

4:45 pm **MPM-E.12**
Radiation Protection Careers Initiative
Lee MB, Billa J, Bonds M, Adzanu S
Los Alamos National Laboratory, Alcorn State University, Universal Training and Testing Academy of America

2:30 PM – 5:00 PM

MPM-F
Radon in the Oil and Gas Industry Part 2
Chair: Phil Egidi
Baltimore 3

2:30 pm **MPM-F.1**
The Impact of Radon-222 and Its Progeny in Natural Gas and Natural Gas Liquids
Lemons WH
Consultant

3:00 pm **MPM-F.2**
Factors Influencing Spatial Variability in Background Radon Concentrations in Ambient Air
Rood AS, Whicker R
ERG Group

3:30 pm **MPM-F.3**
Revision of SR-34 (safety report on oil and gas industry)
Okyar HB
International Atomic Energy Agency

4:00 pm **MPM-F.4**
NORM, TENORM and Radon in Pennsylvania, and Impact from O&G Industry Activities
Allard DJ
Appalachian Waste Compact

4:30 pm **MPM-F.5**
Radon Section Business Meeting

5:30 PM – 7:00 PM

P

Poster Session

Prince George's A&B Exhibit Hall

(Posters will be displayed Monday 10:00 AM – Wednesday 10:00 AM)

P.1
High radiation exposure works in Korean nuclear power plants
Kong TY, Kim SJ, Son JH, Song CJ
Chosun University

P.2
Radiation Safety Training in Switzerland - an Overview
Keller MF
Paul Scherrer Institut

P.3
Occupational ionizing radiation exposure monitoring in several medical departments
Alomairy NA
Diagnostic Radiography Technology Department, Faculty of Applied Medical Sciences, Jazan University, Jazan 45142, Saudi Arabia

P.4
Development of radiological triage criteria for internal contamination applied in radiological disaster
Kim KH, Yoo JR
Korea Institute of Radiological & Medical Sciences

P.5
Worker Exposure Scenarios during Incident-Free Overland Transportation of Radioactive Wastes
Kwak MW, Kim HJ, Oh GE, Kim KP
Kyung Hee University

P.6
Development of Radiation Source Activity Prediction Algorithm for Worker Dose Assessment in Nuclear Power Plants
Kim MS, Na HJ, Kim JY, Lee HW, Kim KP
Kyung Hee University

P.7
Analysis of Airborne Particulate Property Based on Industrial Field Information of the Refractory Industry
Lee SY, Na HJ, Jeon SH, Kwon J, Kim KP
Kyung Hee University, Korea Institute of Nuclear Safety

P.8
Development of method for assessing dose to the public applicable to long-term measures in radiation emergency response
Lee BM, Yoo JR
Korea Institute of Radiological and Medical Sciences, Seoul

P.9
Estimation of Dietary Intake of Strontium-90 in Japan after the Fukushima Daiichi Nuclear Power Plant Accident
Nabeshi H, Hachisuka A, Matsuda R, Teshima R, Akiyama H, Tsutsumi T
National Institute of Health Sciences

P.10
20 Years of Online Education in Master of Radiation Health Physics at Oregon State University
Ranjbar L
Oregon State University

P.11
Simulation of ISO standard X-ray radiation field (N-120) using Monte-Carlo code
Lee MY
Korea Institute of Nuclear Safety

P.13
NRC Research to Inform Protective Action Strategies
Smith TR
U.S. Nuclear Regulatory Commission

P.12
NRC Research to Inform Protective Action Strategies
Smith TR
U.S. Nuclear Regulatory Commission

P.14
Putting Our Vision into Focus: NRC Collaboration to Enhance Emergency Preparedness
Smith TR
U.S. Nuclear Regulatory Commission

P.15
A Day in the Life of a HOO
Crouch HT, Smith TR
U.S. Nuclear Regulatory Commission

P.16
NRC Rulemaking on Emergency Preparedness
Fisher RD, Smith TR
U.S. Nuclear Regulatory Commission

P.17
Internal Dosimetry of Cu-64 in a Computational Tumor-Bearing Mouse Model
Witter PK, Brandl A, Bell JJ
Colorado State University

P.18
Radioactivity in Selected Fertilizers and their Radiological Health Implications
Billa B, Beitollahi M, Nettles C, Adzanu S, Adjaye J
Mississippi School for Mathematics and Sciences, University of Utah, Alcorn State University

P.19
Radioactivity Studies on Local Catfish
Dominic D, Beitollahi M, Billa J, Adzanu S, Adjaye J
Alcorn State University, University of Utah

P.20
Toxicological Considerations of Tungsten and Depleted Uranium Exposure using Biokinetic Models
Keifer L, Mate-Kole EM, Sundberg D, Dewji SA
Georgia Institute of Technology

P.22
Lens Dose Reduction in Image-Guided Radiation Therapy Using Cone Beam Computed Tomography
Taniguchi T, Adachi K, Nakaya S, Asahi R, Matsuo M
Asahi University Hospital, Gifu University

P.23
Test and comparison of two extremity dosimetry systems based on BeO and Al2O3
Chen LY, Hsu FY
Mirion Technologies, National Tsing Hua University

P.24
A Novel Calibration Phantom Used with a Basic Portable GM Detector to Monitor for Internal Radiation Exposure
Datz H, Aviv O, Spitz H
Soreq Nuclear Research Center, Israel.University of Cincinnati, Cincinnati, Ohio., Soreq Nuclear Research Center, Israel., University of Cincinnati, Cincinnati, Ohio.

P.25
Occupational Dose Reductions During FDG Administrations at Memorial Sloan Kettering Cancer Center
Bierman DA, Williamson M, Miodownik D, Quinn B, Schöder H, Davie S
Memorial Sloan Kettering Cancer Center

P.26
Shielding Study of a Miniature Klystron Emitting 60 keV Electrons
Adadi S, Frosio T, Santana M, Shirley B, Weatherford BR, Dewji SA
Georgia Institute of Technology, Stanford Linear Accelerator Laboratory, U.S. Department of Energy

P.27
Simulation study on radioactive contamination mapping for emergency responder safety
Lee J, Kim
Korea Institute of Nuclear Safety

6:45 AM – 7:45 AM

CEL-5 **Woodrow Wilson B**
Biodosimetry: What It Is, Why We Need It
Sproull M
NIH/NCI/ROB

CEL-6 **Woodrow Wilson C**
Bootcamp for Medical Broadscope RSO
Leuenberger RD
CHP, CSP, RSO

CEL-7 **Woodrow Wilson D**
Airborne Plutonium and Airborne VirusesHave Enormously DifferentSources, Properties, Behaviors, and Protective Actions
Strom DJ
Washington State University

CEL-8 **Baltimore 3**
An Overview of Cybersecurity Threats and Related Risk Assessment Methods in the Nuclear Sector
Ranjbar L
Oregon State University

8:15 AM – 12:00 PM

TAM-A
Medical Health Physics 1
Chairs: Thomas Morgan,Andy Miller
Woodrow Wilson A

8:15 am **TAM-A.2**
ALARA Planning in Medical Health Physics for Patient Safety
Morgan TL
Versant Medical Physics

8:30 am **TAM-A.3**
DHA Unusual Occurrences – The Intersection Between Clinical and Operational Radiation Safety
Dufford CA
Defense Health Agency

8:45 am **TAM-A.4**
Quantitative Analysis of the Impact of Automatically Generated Normal Tissue Contours on Knowledge-Based Planning Model Quality
Arnold SC, Harms JM, Cardenas CE, Caffrey EA, Wilson CA
UAB Health Physics, UAB Rad Oncology

9:00 am **TAM-A.5**
Density Override
Reed SL, Blue KM, Alexandrian A, Caffrey E, Wilson C
University of Alabama at Birmingham

9:15 am **TAM-A.6**
Radiotherapy Dose Calculation Algorithm Sensitivity to High Density Artifacts
Blue KM, Reed SL, Alexandrian A, Caffrey E, Wilson C
University of Alabama at Birmingham

9:30 am **BREAK**

10:00 am **TAM-A.8**
Establishing a Safe And Effective Radioligand Therapy Program for the Treatment of PSMA-Positive Prostate Metastases With Lutetium-177 (Pluvicto)
Anderko CM, Howard DM, Berg JA, Wan S, Free AM, DiNome JW, Gingold EL, MacCallum ML
West Physics and Thomas Jefferson University Hospital, Thomas Jefferson University Hospital

10:15 am **TAM-A.9**
Sharing Lessons from Lutetium-177 Therapies at a Cancer Clinic
Chang LA, Taylor MA, Fan J, Gregg D, Patel N, Alcock MS, Hinchcliffe B, Patel P, Kim D, Eblan MJ
Inova Health Systems, Yale-New Haven Hospital, Houston Methodist Hospital

10:30 am **TAM-A.10**
Managing Radiation Safety Issues with 177Lu Theranostic Agents
Ring JP, Parker AJ, Stenstrom C, Barletta G, Griffin S, Whitmarsh S, Jozokos J
Beth Israel Deaconess Medical Center

10:45 am **TAM-A.11**
Growing Need for a Standardized Response to Radiopharmaceutical Extravasations
Drelich MR
University of Alabama at Birmingham

11:00 am **TAM-A.12**
Physician Privileging for Medical Laser Use
Elder DH
UCHealth

11:15 am **TAM-A.13**
Dose Estimates to Workers From Y-90 Excluding Fluoroscopy During Microspheres Treatments
Miller A, Banks R, Rayadurgam S, Rowland P
Cleveland Clinic

11:30 am **TAM-A.14**
Effect of Tube Housing Leakage from X-ray Imaging System Tube Housing on Patient Dose
Steege PC, Gainor JP, Wilson RF
University of Wisconsin - Madison, Egg Medical, University of Minnesota - Twin Cities

11:45 am **TAM-A.15**
Dosimetry for a new in vivo X-ray Fluorescence Measurement System
Burgos CJ, Grier TR, Khan M, Weisskopf MG, Taylor KM, Specht AJ Purdue University, Harvard T.H. Chan School of Public Health, United States Army Research Institute of Environmental Medicine*

8:00 AM – 12:00 PM

TAM-B
Special Session: Rad NESHAP
Chairs: Matthew Barnett, Christine Lobos
Woodrow Wilson B

8:00 am **TAM-B.1**
U.S. Environmental Protection Agency Update on the Radionuclide NESHAPs
Walsh JP, Rustick JH
U.S. EPA

8:30 am **TAM-B.2**
DOE Subpart H Report
Lobos CM, Snyder SF
DOE-HQ, EHSS-22, PNNL- Richland, WA

9:00 am **TAM-B.3**
ANSI N13.1 Criteria Explained
Blunt BC
Blunt Consulting LLC

9:30 am **BREAK**

10:00 am **TAM-B.5**
De Minimis Criteria Value for Compliance with 40 CFR 61 Subpart H Diffuse Source Requirements
Cummings JA
Lawrence Berkeley National Lab

10:30 am **TAM-B.6**
U.S. Environmental Protection Agency Update on Compliance Codes
Littleton B, Stuenkel D
EPA

11:00 am **TAM-B.7**
Methods for Dose Tracking from Project Emissions for 40CFR61, Subpart H Compliance
Harshman AM, McCarter WL
Oak Ridge National Lab

11:30 am **TAM-B.8**
Roundtable

8:00 AM – 12:00 PM

TAM-C
Special Session: Decommissioning
Chair: Ken Gavlik
Woodrow Wilson C

8:00 am **TAM-C.1**
Cyclotron Decommissioning
Hansen TW
Southeast Compact Commission

8:30 am **TAM-C.2**
Wasteland to Wonderland: Remediation Of A New Jersey Brownfield Site
Power JT
New Jersey Department of Environmental Protection

8:55 am **TAM-C.3**
Waste Characterization by the Department of Energy at the Energy Technology Engineering Center
Rutherford PD
Phil Rutherford Consulting

9:25 am **BREAK**

10:00 am **TAM-C.5**
State of California Licensee Decommissioning Why It Pays To Plan Ahead
Gavlik KE
NAC Philotechnics

10:30 am **TAM-C.6**
Important Practical Considerations for Final Status Survey Planning with Proposed Revisions to MARSSIM
Hansen TW
Southeast Compact Commission

11:00 am **TAM-C.7**
Panel Discussion

8:00 AM – 8:30 AM

TAM-D.1
Waste Management
Chair: Mike Stewart
Woodrow Wilson D

8:00 am **TAM-D.1.1**
DOE Radiation Protection of the Public and the Environment: Recent Guidance Documents
Stewart HM
Department of Energy

8:15 am **TAM-D.1.2**
Exploring Radiation Effects on Extraction Chromatographic Materials
Borhan RB, Bertelsen ER
University of Massachusetts Lowell, Massachusetts

9:30 AM – 11:45 AM

TAM-D.2
External Dosimetry
Chair: Rusi Teleyark
Woodrow Wilson D

9:30 am **TAM-D.2.1**
Renewable, Low-Cost PLA Bio-Polymer Based Solid-State Gamma-Neutron-Alpha Radiation Sensor For Medical, Health Physics & Nuclear Industry Applications
Jiang W, Boyle N, Barlow T, Ota Y, DiPrete D, Taleyarkhan RP*
Purdue University, Oak Ridge Institute of Science and Education, Savannah River National Laboratory

9:45 am **TAM-D.2.2**
A one-year-old anthropomorphic phantom organ dose assessment using BeO optically stimulated luminescence dosimeters in computed tomography.
Kara E, Woda C
Helmholtz Zentrum München, Neuherberg, Germany

10:00 am **TAM-D.2.3**
Investigation of the radiographic imaging volume and occupational dose of radiologic technologists before and during the COVID-19 pandemic
Shubayr NA
Department of Diagnostic Radiography Technology, Collage of Applied Medical Sciences, Jazan University

10:15 am **TAM-D.2.4**
Development of an Energy-Dependent Neutron Shielding Model for VARSKIN+
Tucker ZG
Renaissance Code Development, LLC

10:30 am **TAM-D.2.5**
Validation of VARSKIN+ Neutron Model Using MCNP
Rose CT, Tucker ZG
Renaissance Code Development

10:45 am **TAM-D.2.6**
Monte Carlo Estimates of Secondary Photon Contribution to Effective Dose from External Exposure to Beta-Emitting Radionuclides Concentrated in Environmental Soil
Asano EA, Eckerman KF, Dewji SA
Georgia Institute of Technology, Oak Ridge National Laboratory

11:00 am **TAM-D.2.7**
Practical Importance of Dose Accuracy in Criticality Accident Emergency Response
Veinot KG, McMahon KJ, Detweiler AE, Hayes JM*
Y-12 National Security Complex, Oak Ridge Associated Universities (ORAU)

11:15 am **TAM-D.2.9**
Significant Reduction in X-ray Dose with a Simple Tube Housing Shield
Steege PC, Gainor JP, Wilson RF
University of Wisconsin - Madison, Egg Medical, University of Minnesota - Twin Cities

11:30 am **TAM-D.2.10**
Debunking Myths and Urban Legends in Ionizing Radiation Dosimetry
Passmore CN
Radiation Detection Company

8:00 AM – 12:00 PM

TAM-E
AAHP Special Session Part 1
Chairs: Charles Potter, Heather Pennington
Baltimore 1-2

8:00 am **TAM-E.1**
Introduction to Radiation Dispersal and Consequences
Potter CA
Sandia National Laboratories

8:45 am **TAM-E.2**
RDD risk – A holistic model for radiological facilities
Rane S, Harris J, Potter C
Sandia National Laboratories, Purdue University

9:30 am **BREAK**

9:45 am **TAM-E.4**
Radiological Dispersal Parameters
Pennington HM
Sandia National Laboratories

10:30 am **TAM-E.5**
Chemical Analysis of Cesium Chloride Sealed Sources
Abrecht D, Fuhr A, Weber C
Oak Ridge National Laboratory

11:15 am **TAM-E.6**
Evaluation of the Radioactive Material Release in the Harborview Research and Training Building and Implications for Emergency Response
Musolino SV, Harper FT, Schwantes J, Buck EC, Carney KP, Chichester DL, Murray DJ
Brookhaven National Laboratory, Neo Prime Risk Management Solution, LLC, Pacific Northwest National Laboratory, Idaho National Laboratory

8:20 AM – 11:30 AM

TAM-F
HPS Standards Organization Part 1
Chair: Antonio Triventi
Baltimore 3

8:20 am **TAM-F.1**
The Health Physics Society Standards Committee (HPSSC)
Triventi A
Health Physics Society Standards Committee (HPSSC)

8:30 am **TAM-F.2**
ANSI/HPS N13 Radiation Protection Standards
Barnett JM, Potter CA
PNNL, Sandia National Laboratories

8:50 am **TAM-F.3**
Overview of Accredited Standards Committee N43
Jones CR
Accredited Standards Committee N43

9:10 am **TAM-F.4**
Participation In International Radiation Protection Standardization
Herrold JF
University of Wyoming

9:30 am **BREAK**

10:00 am **TAM-F.6**
N13 Standard on Incineration of Low-Level Radioactive Waste
Reed RP
Consultant

10:15 am **TAM-F.7**
Radiation Safety Standards for Security Inspection of Humans (ANSI/HPS N43.17)
Glover JL
NIST

10:30 am **TAM-F.8**
Overview of ANSI/HPS N43.16
Jones CR
Accredited Standards Committee N43

10:45 am **TAM-F.9**
ANSI/HPS N43.7, 2018 Edition, 2018 - Safe Design and Use of Self-Contained, Dry Source Storage Irradiators (Category I)
Vanderpool CD, Mickum GS
Hopewell Designs, Inc., Steris

11:00 am **TAM-F.10**
ANSI/HPS N43.10, 2019 Edition, 2019 - Safe Design and Use of Panoramic, Dry Source Storage (Category II), Self-Contained, Wet Source Storage (Category III), and Panoramic, Wet Source Storage (Category IV) Gamma Irradiators
Vanderpool CD
Hopewell Designs, Inc.

11:15 am **TAM-F.11**
Harmonization of dosimetry standards (ISO/TC 85/SC 2/WG 19)
Perle SC
Retired Mirion Technologies, Inc., Consultant

12:15 PM – 2:15 PM

PEP T-1 **Woodrow Wilson A**
Nuts and Bolts of Lutetium 177 (Lu-177) Therapies
Berry KE
Fox Chase Cancer Center

PEP T-2 **Woodrow Wilson B**
"Boot Camp" for Radiation Safety ProfessionalsFocusing on the Basics of Security, Biological and Chemical Safety
Gutierrez JM, Emery RJ
UTHealth Houston

PEP T-3 **Woodrow Wilson C**
The Case Against The LNT
Fellman AL
NV5 Dade Moeller

PEP T-4 **Woodrow Wilson D**
Introductory R programming with the 'radsafer' package
Hogue MG
SRNS

PEP T-5 **Baltimore 3**
Pixelated, 3D CZT Detection Systems New Developments for Nuclear Power Plants, IAEA Safeguard Inspectors & Medical Imaging
Miller DW
NPRE Un of Illinois

2:30 PM – 4:45 PM

TPM-A
Medical Health Physics 2
Chairs: Thomas Morgan,Andy Miller
Woodrow Wilson A

2:30 pm **TPM-A.1**
Radiation Safety Perspectives from the Oversight of an Ambulance-Based Computed Tomography Unit and a Van Equipped with Dental X-ray Units
Gutierrez JM
UTHealth Houston

2:45 pm **TPM-A.2**
The Effects of Mobile Radiation Shielding on Scatter Radiation in the Cardiac Catheterization Laboratory
Smith DL, Caffrey E, Wilson C
UAB

3:00 pm **TPM-A.3**
To inventory or not to inventory – protective apron integrity assessment process and documentation
Sturchio GM, Coder JL
Mayo Clinic

3:15 pm **TPM-A.4**
Bulk vs. Unit-Dose Packaging of [F-18]FDG: Impact on Occupational Radiation Dose for Production and Imaging Personnel
Moerlein SM, Lake J, Amurao M, Nickels ML
Washington University in St. Louis

3:30 pm **BREAK**

4:00 pm **TPM-A.6**
Radiation Protection Considerations for Cancer Patients with End-stage Renal Disease Receiving I-131 Treatment
Louis M, Mate-Kole EM, Aziz L, Dewji SA
Georgia Institute of Technology

4:15 pm **TPM-A.7**
The Effects of the 2009 Molybdenum-99/ Technetium-99m shortage: Is it Time to Move On?
Miller AD, Caffrey E, Wilson C
University Alabama Birmingham

4:30 pm **TPM-A.8**
Participating In The Cesium Irradiator Replacement Project In A Post Pandemic World
King SH
Penn State Hershey Medical Center

2:30 PM – 5:15 PM

TPM-B
Risk Assessment
Chair: Armin Ansari
Woodrow Wilson B

2:30 pm **TPM-B.1**
Optimized Novel Shielding for Van Allen Belt Radiation
McDonell S, Hanson S, Pudelko R, Hayes RB
North Carolina State University

2:45 pm **TPM-B.2**
Estimation of the Disability-adjusted Life Years attributed by the Occupational Risk in Japan
Kimura T, Sasaki M
Central Research Institute of Electric Power Industry

3:00 pm **TPM-B.3**
RADIOLOGICAL ASSESSMENT OF QUANTUM SCIENCE PENDENT - A CASE STUDY
Alsomali OM
Saudi Aramco

3:15 pm **TPM-B.4**
Analyzing Culture and Training and Education as Points of Synergy in the Integration of Nuclear Safety and Security in Research Reactors
Thomas TA, Harris JT
Purdue University

3:30 pm **BREAK**

4:00 pm **TPM-B.6**
Development of a Risk Assessment Method for Integrating Nuclear Safety and Security Using Terrorism Scenarios with the PUR-1 Research Reactor
Lee J, Harris JT
Purdue University

4:15 pm **TPM-B.7**
Clarifying Some More Misconceptions about EPA's Superfund Approach
Walker SA
US Environmental Protection Agency

4:30 pm **TPM-B.8**
Superfund Update: New and Revised Risk and Dose Assessment Models
Walker SA
US Environmental Protection Agency

4:45 pm **TPM-B.9**
Geographical Data and Methods for estimating Indoor Residential Radon Exposure
Lee H, Agasthya GA, Hanson HA, Maguire DD, Logan JS, Kapadia AJ, Dewji SA
Georgia Institute of Technology, Oak Ridge National Laboratory

5:00 pm **TPM-B.10**
Roles and Responsibilities of the U.S. EPA in Radiological Protection
Ansari A, DeCair S, Nagata J, Borrego D
U.S. Environmental Protection Agency

2:30 PM – 6:00 PM

TPM-C
Decontamination and Decommissioning
Chairs: Tom Hansen, Nasser Rashidifard
Woodrow Wilson C

2:30 pm **TPM-C.1**
Decommissioning Planning for Building 58 at University of Nevada, Reno
Hansen TW, Jo MC
Southeast Compact Commission, University of Nevada, Reno

2:45 pm **TPM-C.2**
Improved Clearance Verification by Use of the Sum of Fractions
Adams SR, Jiselmark J, Meck RA
Tetra Tech EC, Inc., Green Field Strategies AB, Sweden, Science and Technology Systems, LLC

3:00 pm **TPM-C.3**
Hard to Detect Radionuclides – A Decontamination & Decommissioning Contractor's Perspective
Long MP, Adams W
UCOR

3:15 pm **TPM-C.4**
Efficacy Of Various Products For The Decontamination Of Actinides In An Ex Vivo Model Of Healthy Or Wounded Skin
Van der Meeren A, Devilliers K, Bohand S, Caire-Maurisier F, Pasteur M, Griffiths NM
The French Alternative Energies and Atomic Energy Commission, Orano, Central Pharmacy of french Army

3:30 pm **BREAK**

4:00 pm **TPM-C.7**
Lessons Learned In Health Physics Oversight and Radiological Protection during Tritium Systems Demolition and Disposal (TSDD) at the Princeton Plasma Physics Laboratory (PPPL)
Malo JL
Princeton University

4:15 pm **TPM-C.8**
Gamma Spectroscopy on a Large Scale: Quantification of Uranium in CaF2 Pond Sludge in Super Sacks
Meyer KE, Bronson FL
Mirion Technologies - Canberra

4:30 pm **TPM-C.9**
Moonage MARSSIM (a shout out to Ziggy stardust)
Rashidifard N
Mirion

5:00 pm
Decommissioning Section Business Meeting

2:30 PM – 5:45 PM

TPM-D
Internal Dosimetry
Chair: John Klumpp
Woodrow Wilson D

2:30 pm **TPM-D.1**
Side Effects and Complications Associated with Treating Plutonium Intakes
Klumpp JA, Glover LM, Bertelli L, Dumit S, Poudel D, Smith LM, Waters T
Los Alamos National Laboratory, Texas Tech University Medical School

2:45 pm **TPM-D.2**
Chelation Modeling of a Plutonium-238 Inhalation Incident Treated with Delayed DTPA
Dumit S, Miller G, Grémy O, Poudel D, Bertelli L, Klumpp JA
Los Alamos National Laboratory (LANL), Retired, Commissariat à l'énergie atomique et aux énergies alternatives (CEA)

3:00 pm **TPM-D.3**
Discussion on internal dose intercomparison exercise design and results in a CANDU reactor environment
Hunton DL
Canadian Nuclear Laboratories

3:15 pm **TPM-D.4**
Improving our Communication Skills as Occupational Internal Dosimetrists
Dumit S, Matta T, Poudel D, Klumpp JA
Los Alamos National Laboratory, Oak Ridge National Laboratory

3:30 pm **TPM-D.5**
Long-term retention of plutonium in the respiratory tract compartments: chemical binding, scar-tissue retention, or systemic uptake?
Poudel D, Klumpp JA, Avtandilashvili M, Tolmachev SY
Los Alamos National Laboratory, Washington State University

3:45 pm **TPM-D.6**
Relevance and Uncertainties of Internal Dosimetry When Studying the Effects of Ionising Radiation Exposure in Offspring and Next Generations
Degenhardt Ä, Dumit S, Giussani A
German Federal Office for Radiation Protection (BfS), Los Alamos National Laboratory (LANL)

4:00 pm **TPM-D.7**
Improving Uncertainty Estimates of Plutonium Activity Concentration in Human Skeleton from Individual Bone Sample Analyses
Zhou JY, Avtandilashvili M, Sefl M, Tabatadze G, Tolmachev SY
U.S. Department of Energy, U.S. Transuranium and Uranium Registries, Washington State University

4:15 pm **TPM-D.8**
Plutonium in Rocky Flats Workers: Using Post-mortem Tissue Analyses to Evaluate Organ Content and Dose Estimates Based on Monitoring Data
Sefl M, Avtandilashvili M, Zhou JY, Tolmachev SY
U.S. Transuranium and Uranium Registries, Washington State University, U.S. Department of Energy

4:30 pm **TPM-D.9**
Improving deposition fraction factors in realistic human respiratory tract geometries using nuclear security source inhalation aerosols
Bartol IR, Tano Retamales ME, Dewji SA
Georgia Institute of Technology, Idaho National Laboratory

4:45 pm **TPM-D.10**
Uncertain Components of the Human Respiratory Tract for Stochastic Biokinetic Modeling
Margot D, Mate-Kole EM, Kalinowski AE, Cochran LD, Jelsema C, Dewji SA
Nuclear and Radiological Engineering and Medical Physics Programs, Georgia Institute of Technology, Sandia National Laboratories

5:00 pm **TPM-D.11**
Python-Based Solutions of Biokinetic Models of the Human Respiratory Tract System: A Technique for an Augmented Uncertainty Propagation
Mate-Kole EM, Margot D, Dewji SA
Georgia Institute of Technology

5:15 pm **TPM-D.13**
Mapping ^{226}Ra Micro-Distribution in Radium Dial Painter Skeleton
Tabatadze G, Tolmachev SY
U.S. Transuranium and Uranium Registries, Washington State University

5:45 pm **TPM-D.14**
Predict the bioavailability of actinides following incidental contamination to improve the handling of the contaminated victim
Van der Meeren A, Moureau A, Defrance M, Huet F, Griffiths NM
The French Alternative Energies and Atomic Energy Commission

2:00 PM – 6:00 PM

TPM-E
AAHP Special Session Part 2
Chairs: Charles Potter, Heather Pennington

Baltimore 1-2

2:00 pm **TPM-E.1**
A Study of Suspension and Resuspension of Americium Surrogate Aerosol
Glen A, Pennington H
Sandia National Laboratories

2:45 pm **TPM-E.2**
Evaluation of Neutron Production from Dispersed AmBe Source Materials
Snow M, Cooper J
Idaho National Laboratory

3:30 pm **BREAK**

4:00 pm **TPM-E.4**
The Economic Impact of Radiological Dispersal Device Events
Trost LC, Vargas VN
Sandia National Laboratories

5:00 pm **TPM-E.5**
AAHP Business Meeting

2:30 PM – 4:30 PM

TPM-F
HPS Standards Organization Part 2
Chair: Antonio Triventi

Baltimore 3

2:30 pm **TPM-F.1**
Radiological Monitoring of Emergency Workers and Populations Following Nuclear/Radiological Incidents: Developing an International Standard for Effective Emergency Response
Dewji SA, Herrold J
Georgia Institute of Technology, University of Wyoming; US NTAG Chair ISO TC 85

2:45 pm **TPM-F.2**
Revised International Standardization For The Detection Of Inadvertent Movement And Illicit Trafficking In Radioactive Materials
*LaFontaine MW, Herrold JF**
Physics Solutions, US ANSI Expert Delegate, ISO TC 85/SC 2, University of Wyoming, US TAG Chair, ISO TC 85/SC 2

3:00 pm **TPM-F.3**
What's New In International Nuclear and Radiation Protection Standards?
Herrold JF
University of Wyoming, US TAG Chair, ISO TC 85/SC 2

3:15 pm **TPM-F.4**
Pending Revision of ANSI N13.8-1973 Radiation Protection in Uranium Mines
Hoover MD, Egidi P, Jenkins PH, Johnson JA*
Mark D Hoover LLC, US EPA, Bowser-Morner, Sopris Environmental

3:30 pm **TPM-F.6**
Panel Discussion

8:00 AM – 9:30 AM

Plenary Session

Woodrow Wilson A

8:00 am
Biological Responses to Low Dose Radiation:
An Evolutionarily Conserved Adaptive Mechanism
Boreham D
Northern Ontario School of Medicine University

6:45 AM – 7:45 AM

CEL-9 **Woodrow Wilson B**
Geiger-Mueller Counters 101
Allard DJ
ACC

CEL-10 **Woodrow Wilson C**
What it's like to be a Health Physics Professor
Harris JT
Purdue University

CEL-11 **Woodrow Wilson D**
Is Far-Ultraviolet UV-C Safe For Human Exposure – But How Do We Measure It!?
Sliney DH, Welch DJ
Consulting Medical Physicist, Fallston, MD, Columbia University Medical Center, New York

CEL-12 **Baltimore 1-2**
How Health Physicist Could Help Researchers in Biomedical Institutions to Migrate From Gamma Irradiator to X-ray Irradiators
Kamen J

10:00 AM – 12:00 PM

WAM-A
Million Person Study Dosimetry
Chairs: Isaf Al-Nabulsi, David Bierman
Baltimore 3

10:00 am **WAM-A.1**
Comprehensive Dosimetry for the Million Person Study Epidemiology
Dauer LT, Leggett R, Samuels C, Bellamy M, Mumma M, Boice Jr JD
Memorial Sloan Kettering Cancer Center, Oak Ridge National Laboratory CRPK, Vanderbilt/IEI, NCRP

10:20 am **WAM-A.2**
MPS Hanford Cohort Dosimetry: Internal Dose Reconstruction Approaches
Samuels CE, Leggett RW, Tolmachev SY
Oak Ridge Center for Radiation Protection Knowledge (CRPK), U.S. Transuranium and Uranium Registries (USTUR)

10:40 am **WAM-A.3**
External radiation doses to the brain in the Hanford worker cohort
Bellamy MB
MSKCC

11:20 am **WAM-A.4**
Radium Dial Painter Dosimetry: Person-Centered Innovations
Martinez NE, Jokisch DW, Samuels C, Leggett RW, Tolmachev S, Avtandilashvili M, Tabatadze G, Goans R, Dauer L, Boice Jr JD
Clemson University, Oak Ridge National Lab, Francis Marion University, Oak Ridge National Laboratory, US Transuranium and Uranium Registries, MJW Corporation, Memorial Sloan Kettering Cancer Center, Vanderbilt-Ingram Cancer Center, National Council on Radiation Protection and Measurements

11:40 am **WAM-A.5**
NCRP SC 1-28, Recommendations on Statistical Approaches to Account for Dose Uncertainties in Radiation Epidemiologic Risk Models
Cullings HM
RERF

10:00 AM – 11:15 AM

WAM-B
Environmental Monitoring
Chair: TBD
Woodrow Wilson B

10:00 am **WAM-B.1**
Radioecology under Arid Conditions
*Semioshkina N, Voigt G, Fiedler I, Hiller M**
r.e.m. GbR, CheMin GmbH

10:15 am **WAM-B.2**
Large Scale Characterization of Naturally Occurring Radioactive Materials in Oil & Gas Industry
Asuni GA, Cowie MI
Saudi Aramco

10:30 am **WAM-B.3**
Fukushima and Chernobyl: similarities and differences of radiocesium behavior in the soil-water environment
Konoplev AV
Fukushima University

10:45 am **WAM-B.4**
Potential Risk from Consumption of Savannah River Site Creek-Mouth Fish
Stagich BH
Savannah River National Laboratory

8:00 AM – 11:20 AM

WAM-C
Military Health Physics Part 1
Chairs: Jama VanHorne-Sealy,Dan Sowers
Woodrow Wilson C

8:00 am **WAM-C.1**
Creating a Transportable/Mobile Nuclear Reactor Regulatory Program
VanHorne-Sealy J
US Army

8:20 am **WAM-C.2**
Modeling Radiation Exposure on Flight Missions to Analyze Aircrew Risk
Quintero Hilsaca CV, McClory JW, Dailey WT, Manfredi JJ, Erwin WJ
Air Force Institute of Technology, U.S. Air Force School of Aerospace Medicine

8:40 am **WAM-C.3**
The United States Navy and Employees with Cancer: The Time for Change is Now
Sowers DA
US Navy, Retired

9:00 am **WAM-C.4**
MTF Laser Safety: An Overview
Caudill JC
U.S. Navy (NUMI)

9:20 am **WAM-C.5**
Update on the U.S. Army Radiation Safety Program
Mikulski HT
U.S. Army

9:40 am **BREAK**

10:00 am **WAM-C.7**
Health Effects from Nuclear and Radiological Environments (HENRE) Capabilities and Ongoing Development
Dant JT
Applied Research Associates

10:20 am **WAM-C.9**
Removal of the Last Cs-137 Blood Irradiator in the Military Health System
Allen JL, Reyes RA, Smith DA, Wagner RN, Van Way RL
Defense Health Agency, Nuclear Regulatory Commission, Naval Medical Center Portsmouth

10:40 am **WAM-C.10**
"Establishing Metrics for Monitoring Defense Health Agency Military Treatment Facility Radiation Safety Programs"
Keeney GN, Reyes RA, Shivji S, Smith DA, Lazarenochavez BK, Allen JL, Dufford CA, Hammersborg KH, Bosley WS
DOD Defense Health Agency, DOD DHA

11:00 am **WAM-C.11**
Health physics support to a military unit with a unique mission that includes addressing radiological/nuclear engagements- capability development - capacity challenges
Bosley WS, Reyes RA, Smith DA, Allen JL, Keeney GN, Shivji S
Defense Health Agency

9:40 AM – 12:10 PM

WAM-D
Special Session: Women in Radiation Protection
Chair: Rachel Nichols
Woodrow Wilson D

9:40 am **WAM-D.1**
Hard Vs. Soft Skill Professional Development in a Health Physics Career
Nichols RP
University of Missouri

9:50 am **WAM-D.3**
Managing Remotely
Leeks A
Summit Training and Exercise

10:00 am **WAM-D.4**
Managing Personnel Post Pandemic
Higley K
School of Nuclear Science and Engineering, Center for Quantitative Life Sciences, Oregon State University

10:10 am **WAM-D.5**
Pregnancy Consultations for Radiation Workers
Williams-Lee K
National Institutes of Health

10:20 am **WAM-D.6**
Panel

11:00 am **WAM-D.7**
Why You Should Consider Becoming a CHP
MacKenzie C
AAHP

11:10 am **WAM-D.8**
Experiences and Challenges in Military Health Physics
VanHorne-Sealy J
US Army

11:20 am **WAM-D.9**
Adjusting to a Changing Health Physics Work Environment,Hiring Practices, and Specialties
McBurney RE
CRCPD

11:30 am **WAM-D.10**
Parallels Between Being a REAC/TS Health Physicist and a New Mother
Dieffenthaller M
REAC/TS

11:40 am **WAM-D.11**
Panel

10:00 AM – 12:00 PM

WAM-E
Instrumentation 1
Chair: Aaron Specht
Baltimore 1-2

10:00 am **WAM-E.1**
Experimental design and testing of a portable x-ray tube based KXRF system to measure lead in bone
*Khan M, Burgos CJ, Grier TR, Weisskopf MG, Taylor KM, Specht AJ**
Purdue University, Harvard T.H. Chan School of Public Health, United States Army Institute of Environmental Medicine

10:15 am **WAM-E.2**
Improvements in Energy-Dependent Exposure Calculations using 3-D Pixelated CdZnTe
Goodman DI
H3D, Inc.

10:30 am **WAM-E.3**
Neutron Detection Sensitivity and H*10 Dosimetry - Tensioned Metastable Fluid Detectorsvs He-3 (Ludlum 42-49B) and ROSPEC
Ozerov S, Boyle N, Harabagiu C, DiPrete D, Whiteside T, Boone A, Hadlock D, Noll W, Roberts D, Taleyarkhan RP
Purdue University, Oak Ridge Institute of Science and Education, Savannah River National Laboratory, Savannah River Nuclear Solutions

10:45 am **WAM-E.4**
3D Dose-Rate Mapping of Commercial Nuclear Power Plant Radiological Area Surveys using Spatially 3D CdZnTe Imaging Spectrometers
Goodman DI, Nestle D, Sobota R, Kitchen B*
H3D, Inc.

11:00 am **WAM-E.5**
Converting Plutonium Canister Survey Data to Dose Rates
Hogue MG, Ratliff MD
SRNS, Mirion

11:15 am **WAM-E.6**
Radiation Hardness Assurance Testing of Raspberry Pi Boards in the PULSTAR Research Reactor
Hanson SC, McDonell SM, Charrette RJ, Hayes RB
North Carolina State University

11:30 am **WAM-E.7**
Design and fabrication of human tissue substitutes suitable for a continuous low photon energy spectrum between 10 and 120 keV
Spitz H, Stringer J, Howell E
University of Cincinnati

11:45 am **WAM-E.8**
Characterization of the Spectroscopic Mobile Unshielded Radiation Field (SMURF) Detector
Hurtado JM, Zhang ZX, Stuenkel DO
U.S. Environmental Protection Agency

2:30 PM – 5:00 PM

WPM-A
Million Person Study and Agency Perspectives on Importance of Occupational Epidemiology

Chairs: Isaf Al-Nabulsi, David Bierman

Baltimore 3

2:30 pm **WPM-A.1**
The Million Person Study of Low-Level and Low-Dose-Rate Health Effects: Importance, Information and Innovation
Dauer LT, Bierman D, Boice Jr JD
Memorial Sloan Kettering Cancer Center, NCRP

2:45 pm **WPM-A.2**
Million Person Study (MPS) Rocky Flats: Epidemiologic Analyses and Comparison to Other Department of Energy Cohorts
Golden AP, Howard SC, Samuels CE, Leggett RL, Eckerman KF, Mumma MT, Dauer LT, Boice JD
ORAU, ORNL, Easterly Scientific, International Epidemiology Institute, Vanderbilt Medical Center, Memorial Sloan Kettering Cancer Center, NCRP, Vanderbilt University

3:00 pm **WPM-A.3**
NASA Perspectives on Importance of Occupational Epidemiology Data
Blattnig SR
NASA

3:15 pm **WPM-A.4**
DOE Perspectives on Importance of Occupational Epidemiology
Al-Nabulsi I
DOE

3:30 pm **BREAK**

4:00 pm **WPM-A.6**
The Department of Defense Perspective On The Importance Of Radiation Epidemiology
Blake PK
DoD-Retired

4:15 pm **WPM-A.7**
Perspectives of the U.S. Nuclear Regulatory Commission
Holahan EV
US NRC

4:30 pm **WPM-A.8**
The EPA Perspectives on Importance of Radiation Epidemiology
Ansari A
U.S. Environmental Protection Agency

4:45 pm **WPM-A.9**
Perspectives on the Importance of Radiation Epidemiology in Radiological Emergency Preparedness
Salame-Alfie A, Chang A
Centers for Disease Control and Prevention

2:15 PM – 5:15 PM

WPM-B
Academic Health Physics

Chair: Subashri Kurgatt

Woodrow Wilson B

2:15 pm **WPM-B.1**
Making the Switch: Transitioning from Cs-137 to X-ray Irradiators Results in Increased Use
Fennesy DR, Gutierrez JM
UTHealth Houston

2:30 pm **WPM-B.2**
Experience of Replacing a Cesium Irradiator in the midst of a Pandemic
Kurgatt S
Virginia Commonwealth University

2:45 pm **WPM-B.3**
Improvements of Radiation Safety Training in a Post Covid Environment
Cotton C, Wilson C, Caffrey E, Heath R
University of Alabama at Birmingham

3:00 pm **WPM-B.4**
Development of the Research Facilities for a Next Generation University Research Reactor
Hugger NA
Worcester Polytechnic Institute

3:15 pm **BREAK**

3:30 pm **WPM-B.6**
Evaluation of Particle Movement in Laboratory Fume Hoods
Altamimi S, Davis JE, Heilbronn LH
University of Tennessee - Knoxville, Oak Ridge National Laboratory, University of Tennessee - Knoxvile

3:45 pm **WPM-B.7**
What every health physicist should know about ChatGPT
Rashidifard N, Wilson CA, Caffrey EA, ChatGPT Mirion, University of Alabama at Birmingham

4:00 pm **WPM-B.8**
A Regulatory Perspective on Communicating Radiation Protection in the Modern World
Gyan PK
Nuclear Regulatory Authority

4:15 pm **WPM-B.9**
Employing the Three Principles for Radiation Safety in 1980s Radio-Chemistry
Haes DL
Consultant

4:30 pm **WPM-B.10**
Integrating Augumented Reality with Hardware Simulators to Visualize Exposures In Radiation Protection Training
*Podobnik M, O'Connell J**
Teletrix

4:45 pm **WPM-B.11**
Radiation in Pop Culture
Murungi MM, Caffrey EA, Wilson CA
University of Alabama at Birmingham

5:00 pm **WPM-B.12**
Continuing Education in HPS: The Future is Now!
Mahathy JM
ORAU

2:40 PM – 5:00 PM

WPM-C
Military Health Physics Part 2
Chairs: Jama VanHorne-Sealy,Dan Sowers
Baltimore 3

2:40 pm **WPM-C.1**
The establishment of a radiation safety program for the U.S. Military Healthcare System
Reyes RA, Smith DA, Shivji S, Bosley WS, Allen JL, Dufford CA, Keeney GN, Hammersborg KH
Defense Health Agency

3:00 pm **WPM-C.2**
Lost and Not Found - A review of Lost Brachytherapy Sources and Corrective Actions Implemented
Smith DA, Reyes RA, Shivji S, Bosley WS, Allen JL, Dufford CA, Hammersborg KH, Keeney GN
Defense Health Agency

3:20 pm **WPM-C.3**
Most common findings while performing DHA Radiation Safety Site Assistance Visits at Military Treatment Facilities
Hammersborg KH, Reyes RA, Shivji S, Smith DA, Bosley WS, Allen JL, Dufford C, Keeney GN
DHA

3:40 pm **BREAK**

4:00 pm **WPM-C.5**
Characteristics of Gamma Radiation Fields in Subterranean Structures for Radiation Protection and Decision Making
Sublett SM, Parker AR, Brandl AW
US Army, Colorado State University

4:20 pm **WPM-C.6**
NRC Preceptorship Experience and Lessons Learned
Witt JC
US Army, Defense Health Agency

4:40 pm **WPM-C.7**
The role of an Army Nuclear Medical Science Officer in supporting the Defense Threat Reduction Agency mission
*Lawindy DL, Bosley WB**
U.S. Army

2:30 PM – 5:00 PM

WPM-D
Emergency Response and Homeland Security
Chairs: Edward Waller, Andrea DiCarlo
Woodrow Wilson D

2:30 pm **WPM-D.1**
Optimization of Radiation Protection in Emergency Planning: What does this actually mean?
Waller EJ
Ontario Tech University

2:45 pm **WPM-D.2**
Modelling the need for protective actions around Canadian nuclear generating stations
Bergman L, Waller E, Buchanan K, Al Nasser A, Chakir M
Health Canada, Ontario Tech U

3:00 pm **WPM-D.3**
Radiation and Nuclear Countermeasures Program Efforts to Ensure Robust and Reproducible Dosimetry Throughout the Funded Portfolio and Beyond
DiCarlo AL, DeWerd LA, Kunugi K, Satyamitra MM, Rios CI, Cassatt DR, Molinar-Inglis O, Taliaferro LP, Winters TA
NIAID, NIH, University of Wisconsin-Madison

3:15 pm **WPM-D.4**
Secondary Effects of Water Contamination on Communities and Industry
Adams GG, Becker EM
Gryphon Scientific, PNNL

3:30 pm **BREAK**

4:00 pm **WPM-D.6**
Source Term Verification for Radiological Accident Analysis for The 1L Target Facility at the Los Alamos Neutron Science Center (LANSCE)
Gerard JL
Los Alamos National Laboratory

4:15 pm **WPM-D.7**
DoD Detaille Opportunities to support the DHS Countering Weapons of Mass Destruction Office
Costeira T
Army, Department of Homeland Security

4:30 pm **WPM-D.8**
Evaluating the Radiological Dose from a Portable Neutron Material Assay System
Rahon JM
Massachusetts Institute of Technology

4:45 pm **WPM-D.9**
Advanced Tools to Utilize in Large-Scale Radiological Contamination for Public Health and Safety
Mukhopadhyay S, Guss P, Maurer R

2:30 PM – 4:45 PM

WPM-E
Instrumentation 2
Chair: Zaijing Sun
Baltimore 1-2

2:30 pm **WPM-E.1**
Developing a Remote Gamma Spectra Collection System for Nuclear Sciences
Sun ZJ, Nangeelil KD, Searcy H, Turner M
University of Nevada Las Vegas

2:45 pm **WPM-E.2**
Dosimetry in Pulsed Radiation Fields
Collatz R, Greim R
Berthold Technologies GmbH & Co. KG

3:00 pm **WPM-E.3**
Using Monte Carlo Calculation Modeling to Predict Minimal Detectable Activity for Large Article/Waste Contamination Monitors
Palatine RL, Manessi G
RT Technologies Inc, Else Nuclear

3:15 pm **WPM-E.4**
Comparison of GEANT 4 simulation and experimental measurements of CosmicGuard background reduction system
Nangeelil KD, Pak S, Sun ZJ, , ,
University of Nevada Las Vega

3:30 pm **BREAK**

4:00 pm **WPM-E.6**
DIY Neutron Spectrometer
Rashidifard N
Mirion

4:15 pm **WPM-E.7**
Analysis of the Neutron Radiographic Image Quality and Beam Intensity Produced by a Compact Multi-channel Collimator
Snyder HL, Jolicour BW, Hugger N, Medich DC
Worcester Polytechnic Institute

4:30 pm **WPM-E.8**
A Novel Integrated Continuous Quality Control Method for Gamma Spectroscopy Systems
Bronson FL
Mirion Technologies - Canberra

PROFESSIONAL ENRICHMENT PROGRAM (PEP)

Sunday, 23 July through Tuesday, 25 July • Gaylord National Resort and Conference Center

ONCE AGAIN

The Professional Enrichment Program (PEP) handouts for the Annual Meeting will not be available in hard copy. For those who preregister, 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.

Please note, not all instructors provide downloadable information.

The Professional Enrichment Program (PEP) provides a continuing education opportunity for those attending the Health Physics Society Annual Meeting. The two hours allotted each course ensure that the subjects can be discussed in greater depth than is possible in the shorter programs offered elsewhere in the meeting.

On Sunday, 23 July, a series of 20 courses will be offered between 8:00 AM – 5:30 PM.

In addition to the above-mentioned sessions for Sunday, 10 PEP lectures are scheduled on Monday-Tuesday, 12:15 PM – 2:15 PM. Registration for each two-hour course is $105 and is limited to 60 attendees on a first-come, first-served basis. Those whose registrations are received before the preregistration deadline will be sent confirmation of their PEP course registration.

Students with a current ID card will be admitted free of charge to any sessions which still have space available after the waiting list has been admitted. Student admission will be on a first-come, first-served basis and will only begin 15 minutes after the start of the session to allow for completion of ticket processing.

AAHP is evaluating the number of Continuing Education Credits awarded for each of the PEP (and CEL) courses based on technical content. Course instructors will be able to provide this information at the time of the presentation. This information will also be made available on the AAHP recertification site after data entry is completed.

Please Note!!

In-Person PEPs will be taught in National Harbor, MD. All times shown below are Eastern Standard Time (EST). Virtual attendees must adjust for their local time. All PEPs will be viewable by either type of paid PEP attendee.

If a PEP is given virtually you will be sent a link to watch the PEP virtually from home or your hotel room. There will NOT be a room on-site at the convention center to watch the PEP.

If a PEP is given in person, you can participate in the course in person or virtually. If you are attending virtually, you will be sent a link to watch it LIVE. If you are attending in person, the course will take place at the Gaylord National Resort and Conference Center.

Please be on time for your sessions. The lecturer will begin promptly at the scheduled time. Please allow time for check-in. The HPS reserves the right to schedule a substitute speaker or cancel a session in case the scheduled speaker is unavailable.

Attendees not present at the starting time of the session cannot be guaranteed a space, as empty spaces will be filled from the wait list at that time. Spaces left after the wait list has been admitted may be filled with students. If your duties at the meeting cause you to be late for your lecture (e.g., chairing a session), contact the PEP registration desk so that your name can be placed on the waiver list and your space held.

Refund Policy

Requests for PEP refunds will be honored if received in writing by 15 June. All refunds will be issued AFTER the meeting. Exceptions will be handled on a case-by-case basis.

Sunday, 8:00am – 10:00am

PEP 1-A Radiation Safety's Translation of Worker Well-being Principles into Practice: Positioning for the New Work Environment

RJ Emery, JM Gutierrez

Annapolis 1

Organizations are learning that efforts to protect the health and safety of their workers from risks both at work and away from work yields great dividends in the form of increased productivity, morale, and reduced health care costs. This realization has given rise to a variety of worker well-being and wellness initiatives that span far beyond the typical boundaries of traditional workplace health and safety programs. Examples include providing information and services on diet, exercise, personal habits, and mental health issues. Interestingly, the radiation safety profession has been historically involved with a series of progressive worker well-being practices that perhaps have not been fully appreciated by the well-being community. These include the tracking of occupational doses, training regarding doses arising from outside the workplace (such as medical procedures and radon exposures), and fetal protection policies, to name a few. This course will describe the shift in perspective from health and safety merely for the workplace to a more holistic approach. This information will be followed by a discussion about various well-being initiatives and how current radiation safety practices can be folded into these larger efforts. The discussion will describe likely points of engagement with well-being programs and necessary guardrails. Participants are asked to come prepared to describe any well-being activities that may be underway within their organizations and any role that radiation safety may currently be playing in these efforts.

PEP 1-B Retrospective dosimetry in nuclear forensics and nonproliferation

RB Hayes

Annapolis 2

The use of thermoluminescence, optically stimulated luminescence and electron paramagnetic resonance will all be introduced and reviewed. Their applications in epidemiology, radiation safety and geological dating will then be reviewed. The session will end by reviewing how this research has developed capabilities for nuclear forensics in reconstructing the historical presence and type of radioactive materials for nuclear nonproliferation applications. Basically determining where and what type of sources were present or absent from any given location and distribution in history.

PEP 1-C Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 1: Nuclear Power Plant Emergencies

WE Irwin, AE Leek, WJ Renno, BW Palmer, CL Alston, M Callan

Annapolis 3

The United States likely possesses the greatest capabilities for responding to and recovering from a radiological or nuclear incident. Much of this is built on the eight-year cycle of exercises for U.S. nuclear power plants (NPPs). Unfortunately, there are numerous opportunities to become complacent or formulaic in the Radiological Emergency Preparedness Program. Thankfully, the National Council for Radiation Protection & Measurements, federal agencies and national laboratories are developing new tools and guidance that allows us to better succeed should there be a major release from an NPP or other nuclear reactor. This first of a three-part series of Professional Enrichment Program sessions considers how the U.S. has traditionally exercised its plans and procedures for nuclear reactor releases and how much more is needed to be genuinely prepared. Because it is so rarely practiced and because it is going to be the most resource-intensive, there will be significant discussion about recovery needs following a major release at a nuclear power plant. In addition to offering recommendations to improve our profession's support of response and recovery following an NPP release, we will share new tools, techniques and guidance. One of the greatest concerns is the potential loss of funding and declining support for offsite response organizations. Losing this capability may worsen our national preparedness capacity as well as that at the state and local level. We also will describe how recruiting new and retired HPs for nuclear emergency response and recovery should bolster the HP profession overall. One of the resources developed recently is the Radiological Operations Support Specialist (ROSS). This FEMA Typed position can help serve local jurisdictions with volunteer HPs trained to develop and implement radiological and nuclear emergency plans, training, and exercises. For example, ROSS volunteers may help with unfunded planning, training and exercise needs. Similarly, the now super-charged CBRNResponder can be used freely by state and local HPs to ensure high resolution situational awareness, effective verification of collected data and clear visualization of the initially modeled and then subsequently measured radiological impacts all to make decision making most effective. For example, CBRNResponder cannot only assign responders to teams and geolocate fixed survey and sampling sites for EOC staff and responders alike to see, but can provide simulated radiation levels based on the plume models so responders see radiation levels change as they traverse to emergency planning zones. A very new tool, RadTeamSim.Route is a game-based platform using GPS and radiological data to immerse the user as a field team member traversing a simulated scene where responder doses accumulate while accomplishing missions. All three parts in the series are taught by responder scientists who have helped develop and test the aforementioned tools, techniques and

guidance: Christine Alston and Brendan Palmer of Chainbridge Technologies, Bill Irwin, ScD, CHP of Vermont, Angela Leek, CHP of Iowa and Wendy Renno, PhD of Radiation Emergency Services.

PEP 1-D Radiation Safety Risk Mitigation in Y-90 Microsphere Administrations

WR Gibbons, KL Dillingham

Annapolis 4

Selective Internal Radiation Therapy (SIRT) using Yttrium-90 (Y-90) microspheres is widely performed for radioembolization of primary or metastatic tumors within the liver. Intravascular administration of glass or resin microspheres containing radioactive isotopes is performed in interventional radiology and typically involves a multidisciplinary team composed of authorized users, medical physicists, and nuclear medicine technologists. As the number of Y-90 microsphere administrations increases, so too are the number of reported medical events. The December 2022 final report of the Nuclear Regulatory Commission Advisory Committee on the Medical Uses of Isotopes Y-90 Microsphere Medical Events Subcommittee reported 93 total medical events over 4 years from Y-90 microsphere administrations, more than double the number of events of the next highest source of medical events. This discussion will engage the audience and introduce key topics to those newly tasked with or interested in developing Y-90 microsphere programs while offering those more experienced an opportunity to review the fundamentals of such procedures and share personal insights related to the safe and effective use of Y-90 for radioembolization. This presentation will review reported types of medical events and explore various practices that can be implemented to improve a multidisciplinary Y-90 microsphere program and mitigate associated safety risks.

PEP 1-E PiMAL

CT Rose

Woodrow Wilson B

PiMAL (Phantom wIth Moving Arms and Legs) is a collection of computational human phantoms useable with MCNP® for the assessment of radiation dose to various organs in standard and nonstandard positions through the user inputted articulation of arms and legs. A phantom model, included in the GUI, enables visualization of the arms and legs as they are positioned using slider bars. An MCNP® input file is then generated and the radiation transport simulations using MCNP® are performed through the GUI. Once simulation is complete, the computed organ dose values are extracted from the MCNP® output file, displayed, and exported as an ASCII file. Training objectives This training will guide the student through the use of PiMAL from installation to simulation with emphasis on use cases, methods, materials, sources, and tallies. A detailed tutorial on a simple modeling technique will conclude the training session.

Sunday, 10:30am – 12:30pm

PEP 2-A Alpha Spectroscopy for the Health Physicist

C Maddigan

Annapolis 1

This course offers a fast-paced review of the basic principles of alpha spectroscopic analysis for the health physicist. 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.

PEP 2-B Revisiting and Redefining TENORM for the 21st Century

PV Egidi

Annapolis 2

This PEP will cover the evolution of the definitions and regulation of naturally occurring radiation and radioactivity. The various definitions of NORM (naturally occurring radioactive material) and TENORM (technologically enhanced NORM) have not evolved with current polices and science. A revised and expanded definition of TENORM is presented with suggested justification for going forward with the changes. The legal framework for controlling radioactivity based on the Atomic Energy Act (AEA) is a Cold War relic; it is suggested that it should be revisited, since the AEA only addresses the nuclear fuel cycle. Publications and policies recommended by ICRP and NCRP over the recent past have added NORM/TENORM to the scope of radiation protection. ICRP recommends NORM should be regulated using a graded approach. Current IAEA recommendations call for member states to identify industries impacted by NORM, and conduct inventories of volumes and concentrations generated, along with exposure data for workers, none of which are federally required at this time; unlike radioactivity and radiation regulated under the Atomic Energy Act. The IAEA looks through the lens of the United Nations Sustainable Development Goals with respect to reuse and remining of tailings, which can have a radiological component. The U.S. is also revisiting it's policies with respect to critical minerals. States have the major responsibility to protect public health but are not funded enough and do not have the bandwidth to take on legal challenges from multiple industries; therefore, the aspirational suggestion here is that EPA take the lead and federally regulate the management (including reuse) and disposal of TENORM, perhaps in the solid waste regulations. Those programs can then be delegated to the states along with appropriations to stand up the programs.

PEP 2-C Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 2: Radiological Dispersal Device (RDD)

WE Irwin, AE Leek, WJ Renno, BW Palmer, CL Allston, M Callan

Annapolis 3

See PEP 1-C description.

PEP 2-D Laser Safety for The Health Physicist

WR Gibbons, KL Dillingham

Annapolis 4

State and federal agencies comprehensively regulate ionizing radiation through licensing, policies, and consensus standards, and licensees are frequently visited by inspectors from regulatory agencies. Non-ionizing radiation requirements, on the other end of the spectrum, may be as simple as registering devices with state agencies. As time progresses, lasers are becoming more powerful and with that the associated hazards continue to increase. In many academic and research institutions, the responsibility for laser safety may be placed on existing health physics staff who may not be comfortable carrying out the duties of laser safety officers. Awareness of the hazards associated with lasers and more intimate knowledge of the subject will provide a stronger foundation on which to build a laser safety program. This discussion will engage the audience and introduce key topics to those newly tasked with or interested in laser safety duties while offering those more experienced an opportunity to review the fundamentals and share personal insights. Topics covered will include a brief review of laser safety terminology, aspects of successful laser safety programs, an overview of the Z136 laser safety standards, example laser safety calculations, and discussions on lessons learned.

PEP 2-E Utility of Modeling in Operation Health Physics

SW Kelley

Woodrow Wilson B

Health Physicists are required to make extensive use of models in their work to predict and/or estimate doses from many possible sources. Some of the parameters that require modeling include nuclide production rates, dose rates, shielding, internal doses and effluent effects. There are numerous models and software implementations of these models in use. While all of these models can be very useful, they all also have their limitations. These limitations can include incomplete or inaccurate input data, model simplifications, differences between model and real world and over conservative assumptions. This lecture will focus on the experience with models used at a high power electron accelerator nuclear medicine manufacturing facility from design phase to operation. Models to be discussed will include MCNP, RayXpert, MicroShield and others used to model nuclide production rates, accelerator vault shielding, hot cell shielding, effluent estimates and more. Model results will be compared to actual measured values, highlighting significant differences. Recommendations regarding the appropriate uses and cautions to be used when evaluating model results will be discussed.

Sunday, 1:00pm – 3:00pm

PEP 3-A Gamma Spectroscopy for the Health Physicist

C Maddigan

Annapolis 1

This course offers a fast-paced review of the basic principles of gamma spectroscopic analysis for the health physicist. 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.

PEP 3-B Important Radiation Biology Concepts for Radiation Protection

KD Held

Annapolis 2

A good understanding of basic radiation biology concepts and new information and research approaches is critical for understanding and applying radiation protection practices. In recent years there has been a plethora of new thoughts and data derived using state-of-the-art molecular biology techniques that impact the application of radiation biology knowledge to many aspects of radiation protection, particularly in the low dose and low dose rate arena. In addition to knowing "classic" concepts such as acute and delayed effects on irradiated normal tissues, sparing by low dose rates, and mechanisms of radiation carcinogenesis, a health physics practitioner should now be familiar with concepts such as bystander effects, genomic instability, DNA damage repair fundamentals, and genomics and proteomics. This lecture will provide an overview of important radiation biology fundamentals relevant to protecting workers, the public and medical patients exposed to radiation, as well as an introduction to newer findings that could impact future approaches to protection.

PEP 3-C Critical Improvements for Health Physicists in Radiological and Nuclear Emergencies Part 3: A Nuclear Detonation

WE Irwin, AE Leek, WJ Renno, BW Palmer, CL Allston, M Callan

Annapolis 3

See PEP 1-C description.

PEP 3-D Medical Lasers – Types, Uses and Safety

DH Elder

Annapolis 4

Healthcare facilities may have a variety of lasers, including excimer lasers with ultraviolet wavelengths, diode lasers with different visible wavelengths and carbon dioxide lasers that emit in the infrared. They are used in many clinical settings, including ophthalmology and dermatology clinics, interventional radiology and cardiology, and the operating room. This course will introduce the most common medical laser systems, describe the treatments performed with each and provide the framework for a medical laser safety program that complies with the current the American National Standard for Safe Use of Lasers in Health Care (ANSI Z136.3) and the Recommended Practices for Laser Safety in Perioperative Practice Settings developed by the Association of Perioperative Registered Nurses. Whether you need to develop a laser safety program for your institution, step into an existing program or are just curious about how lasers are used in medicine, this course has something for you.

PEP 3-E Cognitive Dissonance; Heuristics & Logical Fallacies in Risk Perception: Why it's so natural for so many to believe so much that is so wrong

JT Bushberg

Woodrow Wilson B

Public resistance and fear of radiation is not a new phenomenon. Research on affective influences on public opinion suggests cognitive influences compete with various emotional variables in their influences on public perceptions of risk from technology employing ionizing and non-ionizing radiation. Specifically, people are often influenced by more affective aspects, such as concerns or fears, which are more a function of the potential severe outcomes or of the vividness of potential risks rather than of objectively quantifiable probabilities or expectations. Even though cognitions, such as levels of scientific knowledge and education, are related to public support for radiation-related technology, they alone cannot fully explain the variations of public opinion on these issues. There is a significant body of literature that has empirically examined the influences of cognitive dissonance, heuristics, and logical fallacies in greater detail. This line of research has shown that (1) affective processes often precede cognitive evaluations and (2) people's judgments about science and technology are sometimes based not on analytical judgment but on a general feeling about science and technology. The seminal research of Paul Slovic, Daniel Kahneman and Amos Tversky, and others on intuitive toxicology can be used as a starting point. An overview of these topics will be presented along with specific recommendations aimed at increasing the effectiveness of communicating the risks of radiation exposure in a public forum.

Sunday, 3:30pm – 5:30pm

PEP 4-A Emergency Response and Information Communication – What Can a Health Physicist Provide?

SL Sugarman

Annapolis 1

It is essential that health physicists are able to seamlessly integrate themselves into the response environment and effectively communicate their findings to a wide variety of people that may include on-scene command staff, involved victims, medical care providers, public information officers, decision makers, and others. Response and communication go hand-in-hand. In the event of a radiation incident, it is essential that the radiological situation is properly, yet rapidly, assessed so that a proper response can be planned. It is not always necessary to incorporate wholesale changes to the way things may usually be done in the absence of radioactive materials. For instance, stand-off distances, universal precautions, and response PPE that are normally used can also serve to protect personnel when responding to a radiological event. Coupled with a good event history and other data, health physicists can help to develop a strategy for safely and effectively responding to a radiological event. HP support duties can also include assessment of dose to patients/victims. In addition to performing the "normal" health physics duties, assisting with messaging and communication should be looked at as an area where health physicists can be of help. As time goes on and more information – such as specific source term and chemical/physical form of the involved material, bioassay data, plume data, and other additional data – is received, the health physicist will be called upon to interpret that data and communicate the technical information in an understandable manner to people who need it.

PEP 4-B On Uncertainty in Surface Activity Concentration Measurements

DO Stuenkel

Annapolis 2

Many environmental measurements involve the measurement of surface activity concentrations. These include walls, floors, or ceilings in buildings, or the top layer of soil outdoors. For measurements

of surfaces in buildings, ISO 7503-1:2016, "Measurement of radioactivity — Measurement and evaluation of surface contamination — Part 1: General principles" provides guidance for measurements of surface activity concentrations of radionuclides that emit alpha, beta, and/or photon radiation. In addition to estimating the surface activity concentration, it is also important to estimate the uncertainty in the measurement. Guidance for determining the uncertainty for any measurement is provided by "Joint Committee for Guides in Metrology, Evaluation of measurement data – Guide to the expression of uncertainty in measurement" (JCGM 100:2008). This PEP presents the eight-step method outlined in the "Guide to the expression of uncertainty in measurement", along with the use of different probability distributions, such the uniform, triangular, normal, and Poisson to represent various input quantities. Applications of the GUM method to surface activity concentration measurements, including stationary (i.e., static) measurements, averages of multiple static measurements, and quantitative scanning surveys are developed and presented. Finally, this PEP provides a brief overview of Monte Carlo methods for estimating quantities their uncertainties, along with a demonstration of software tools, such as the NIST Uncertainty Machine and Keith McCroan's GumCalc. Participants are encouraged but not required to bring a laptop or tablet.

PEP 4-C Federal Radiological Response Teams

KL Groves

Annapolis 3

This presentation reviews Federally-funded radiological response teams. These include state teams, National Guard WMD Civil Support Teams (in every U.S. state and territory), and Teams from the Federal agencies: DoD, DOE, EPA, CDC and VA. While all emergencies are local; a number of state and Federal agencies are available to help with radiological/nuclear incidents in a timely manner. Except in major incidents, the responding agencies report to and work for the local Incident Commander.

PEP 4-D Characteristic Limits in Bioassay

TR LaBone, NM Chalmers

Annapolis 4

Characteristic limits are the general term for what we in health physics refer to as the detection level (DL), minimum detectable amount (MDA), and minimum quantifiable value (MQV). The DL and MDA are concerned with our ability to detect an analyte in a sample, whereas the MQV is concerned with our ability to quantify an analyte rather than just detect it. In the first part of this lecture we will discuss how to calculate the a priori DL, MDA, and MQV for an analytical process. This discussion is somewhat atypical because it is presented in terms of the reported result (e.g., mBq/L) rather than the signal (e.g., number of counts in the sample and background) and the use of replicate measurements is covered. In the second part of the lecture, the a posteriori DL, which is used to make decisions about detection for a particular analysis, will be derived using the combined standard uncertainty (csu) for the analysis that is reported by the analytical laboratory and coverage intervals constructed from this csu. As we shall see, this approach offers many benefits.

PEP 4-E Medical Health Physics Update

MA Charlton

Woodrow Wilson B

This PEP session will focus on institutional experience on the following topics of interest: dental PSP quality assurance, dose to interventional radiologists performing CT-guided procedures, GammaTile implant procedures, and safety considerations during Lu-177 PSMA and Y-90 Zevalin therapies.

Monday, 12:15pm – 2:15pm

PEP M-1 Dose Estimates to Workers From Y-90 Excluding Fluoroscopy During Microspheres Treatments

A Miller

Baltimore 1-2

During Y-90 microsphere treatments, workers receive occupational dose from fluoroscopy use and from the Y-90 microspheres. The dosimeters in use by the workers integrates the doses received from both sources during the wear period. The occupational dose received from the fluoroscopy use on each patient is highly variable and dominates the occupational exposure for the physician. The occupational dose received from the Y-90 sources is estimated by dose rate measurements and time/motion studies to provide a tool to provide customizable dose estimates for each user based on their tasks. This information can be used to better educate staff members in the interventional radiology suite who work with these patients. This will be a more detailed version of the methods and equipment used to develop a paper submitted for presentation at the meeting.

PEP M-2 An Introduction to Nuclear Security for the Health Physicist

JT Harris

Woodrow Wilson B

Health physics is an essential function in most facilities that use radioactive materials or radiation generating devices and the primary responsibility is a safety function. Over the last several years, nuclear security has become increasingly important, and the health physicist may become tasked with understanding or even

implementing security measures. Still, the role of the health physicist in nuclear security matters is not clearly defined even though a fundamental understanding of radiological hazards is required for understanding the total risk to the facility and/or material. Health physicists are multi-capable scientists, engineers and systems integrators that can contribute greatly at multiple levels for effective and efficient nuclear security. The purpose of this course is to introduce the basic elements of nuclear security, with specific emphasis on prevention, detection, delay, and response. The course will also cover two key components necessary for health physics integration with security: culture and insider threat mitigation. The course format will include lecturing, case-study analysis with discussion, and a small simulation. At the end of this course the participant should have a high-level overview of nuclear security and be able to formulate ways health physics can be integrated more effectively with security.

PEP M-3 Electromagnetic Energy Field Surveys for Comparison with Implanted Medical Device Manufacturers' Maximum Allowable Field Strengths

DL Haes

Woodrow Wilson C

There are many sources of electromagnetic energy (EME) which are used in industry and research. Their typical use results in both intentional and unintentional sources of various EME electric and magnetic fields. While regulatory Maximum Permissible Exposure (MPE) values have been published for workers and members of the general public, they are often above the field values that could cause Electromagnetic Interference (EMI) with certain Implanted Medical Devices (IMD). Workplace EME electric and magnetic fields can be evaluated using commercially available instrumentation and compared to IMD manufacturers published maximum allowable field strengths. In this PEP the attendee will learn the about the IMD manufacturers published maximum allowable field strengths, and how they compare to worker and public exposure limits. Some commercially available instrumentation will be introduced with actual survey results compared to sample IMD limits. In addition, we will cover how the EME survey fulfils the requirements of the latest revision to IEEE Std C95.7(TM)-2023 Standard for Electromagnetic Energy Safety Programs, 0 Hz to 300 GHz.

PEP M-4 Design and Optimization of Ambient Air Monitoring Networks using Atmospheric Dispersion Modeling and Frequency of Detection Methods

AS Rood

Woodrow Wilson D

Ambient air monitoring networks are a critical part of environmental monitoring programs at nuclear power plants, nuclear processing facilities, and U.S Department of Energy sites. Often times annual wind roses or dispersion patterns from an atmospheric transport model are used to establish air monitoring locations. While these methods provide a good first cut at favorable monitoring locations, they do not provide a quantitative measure of either a sampler or network performance in terms of meeting the performance objectives of the network. Frequency of detection analysis provides a rigorous structure to analyze quantitatively the performance of an air monitoring network. The analysis first defines of the performance objective of the network followed by a quantitative evaluation of the network that establishes its acceptability in terms of meeting the performance objective. Frequency of detection methods can be applied to design of a new network or evaluation of an existing networks. The analysis can determine optimal sampler placement and operating parameters and identify redundant samplers. This course will provide an overview of frequency of detection methods including defining performance objectives, developing input, interpreting results, and developing network optimization. The method requires an atmospheric transport model capable of calculating hourly time-integrated concentrations. Basic principles of atmospheric transport modeling important for frequency of detection analysis will be reviewed and discussed including industry standard codes. Application of the method will be illustrated using three case studies at the Idaho National Laboratory, Hanford Reservation, and a former uranium mine. Frequency of detection methods will be demonstrated using software available to the attendant. Site environmental monitoring program technical and managerial staff and regulators should find this course useful.

PEP M-5 Quantitative Environmental Risk Analysis for Human Health

RA Fjeld, TA DeVol, NE Martinez

Baltimore 3

Environmental risk analysis is complex and interdisciplinary. While risk analysis involves equal contribution of risk communication, risk management and risk assessment, this lecture will focus on the latter. Risk assessments are conducted to quantify the likelihood of human health effects from an actual or potential release of a contaminant and are often conducted to meet a regulatory requirement. Quantitative risk assessment can be broken down into four steps: release assessment, transport assessment, exposure assessment, and consequence assessment. The objective of the release assessment is to identify the contaminants released and quantify the release rate. The objective of the transport assessment is to quantify the contaminant concentration in air, groundwater, surface water and food stuffs following movement of the contaminant in the environment from the release to the human receptor. The objective of the exposure assessment is to quantify the effective dose (Sv) or effective dose rate (Sv/hr) from a radiological contaminant, or the dose (mg of contaminant per kg of body mass) or average daily dose (mg of contaminant per kg of body mass per day) for a chemical contaminant. The

exposure assessment will depend on the route of exposure: inhalation, ingestion, skin absorption/penetration as well as possibly external exposure from a radiological contaminant. The objective of the consequence assessment is to quantify the deterministic effects and/or the probability of stochastics effects in a human that may result from the exposure. In this lecture we will explore the fundamental concepts and analytical methods to quantify risk of radiological and chemical contaminants released into the environment on human health.

Tuesday, 12:15pm – 2:15pm

PEP T-1 Nuts and Bolts of Lutetium 177 (Lu-177) Therapies

KE Berry

Woodrow Wilson A

Commercially available in the US today are Lutathera for neuroendocrine tumors and Pluvicto for prostate cancer. Worldwide there are 98 clinical trials recruiting patients as of February 20, 2023, 35 of which are open in the US. There are studies of new Lu-177 drugs to treat small cell lung cancer, midgut carcinoid tumors, prostate cancer, neuroendocrine tumors that are labeled as "completed" in clinicaltrials.gov. We can clearly anticipate that there are more Lutetium 177 commercial offerings in the pipeline. So where so you start? Start with this PEP course. This course will cover everything from the basics of what is Lutetium 177, the basic theory of Lu-177 as a cancer agent, licensing considerations, staffing requirements, differences between commercially available therapies, administration options, extravasations, contamination prevention, discharge instructions, how to handle the death of a patient, and lots of lessons learned along the way. The goal of this course is to prepare you to confidently speak with your team when one of your physicians says "I want to use Lutathera" or "I want to use Pluvicto on my patient."

PEP T-2 Boot Camp for Radiation Safety Professionals Focusing on the Basics of Security, Biological and Chemical Safety

JM Gutierrez, RJ Emery

Woodrow Wilson B

It is currently quite rare for organizations to maintain stand-alone radiation safety programs. Resource constraints and workplace complexities have served as a catalyst for the creation of comprehensive environmental health & safety (EH&S) or risk management (RM) programs, which include, among other health and safety aspects, radiation safety programs. But many of these consolidations were not inclusive of staff training to instill an understanding of the areas now aligned with the radiation safety function. This situation is unfortunate because when armed with a basic understanding of the other safety programs, the radiation safety staff can provide improved customer service and address many simple issues before they become major problems. This unique Professional Enrichment Program (PEP) is designed to address this shortcoming by providing an overview of a number of key aspects of EH&S programs from the perspective of practicing radiation safety professionals who now are involved in a broader set of health and safety issues. This PEP will examine "Security 101 for Radiation Safety Professionals" and "The Basics of Biological & Chemical Safety". The first part of this session will focus on security as it is applied in the institutional settings. Various strategies employed to improve security controls will be presented. The second part of the session will address the classification of infectious agents and the various assigned biosafety levels. Aspects of chemical exposures, exposure limits, monitoring and control strategies will also be discussed. The particular topics included in the PEP, along with several other presentations have been consistently identified as extraordinarily useful to participants in the highly successful week-long "University of Texas EH&S Academy". Ample time will be allotted for questions answers and discussion, and each segment will be supplemented with key reference information.

PEP T-3 The Case Against The LNT

AL Fellman

Woodrow Wilson C

Radiation safety programs must establish compliance with radiation regulations which continue to be based on the linear no-threshold (LNT) hypothesis and the ALARA principle, despite overwhelming sound, peer-reviewed science that demonstrates the existence of a carcinogenic threshold and/or hormesis at low doses. LNT and ALARA insist that when we make changes that lower worker dose by as little as one µSv, we are making the workplace safer. Public health authorities and many radiation safety professionals have convinced most members of the public that when we evacuate 150,000 persons following Fukushima to keep them from receiving tens of mSv, we are improving public health despite the fact that this decision has resulted in more than 2,000 fatalities among evacuees. Yet despite compelling evidence revealing LNT to be fraudulent, the consistent response taken by regulatory agencies and scientific bodies whose recommendations are cited as the basis of regulatory actions is to deflect or rationalize away the science at best or simply pretend it doesn't exist at worst so as to maintain allegiance to a worldview of radiation safety built on ALARA and LNT. A sample of relevant findings supporting this allegation will be presented.

PEP T-4 Introductory R programming with the 'radsafer' package

MG Hogue

Woodrow Wilson D

Health physicists routinely perform computations, but many of us lack tools that help keep these computations accurate and transparent. Some even resort to – gasp – spreadsheets. In this PEP session, you learn how to quickly get started with R programming, using the radsafer package. The radsafer package provides easy-to-use functions in the following categories: radiation measurements, decay corrections, accessing radionuclide data, and tools for MCNP. (The MCNP tools will be reserved to the end of the class since they are of interest only to MCNP analysts.) R can be challenging to learn if starting from scratch. But starting with a package -- a documented set of shared code and data designed for your work -- makes the transition easier. All software in this course is free and open-source. The class will start with a brief overview of R and Rstudio. Attendees will perform simple computations in the Rstudio console, then run the same computations from the Rstudio source panel. This will transition to writing and saving work as scripts. A brief look at function writing will provide the user insight into the best way to use the functions provided in radsafer. Next, we will explore the radsafer package and try out functions on realistic examples. Many radsafer functions access the RadData package. RadData contains the International Commission on Radiological Protection (ICRP) Publication 107, Nuclear Decay Data for Dosimetric Calculations – one of the data sets used by ORNL's Radiological Toolbox. More details on the packages are provided at github.com/markhogue/radsafer and https://github.com/markhogue/RadData. Attendees are encouraged to bring laptops, with any common operating system, loaded with the latest versions of R and Rstudio. Installing radsafer (through the Package menu in Rstudio) automatically installs all needed packages such as RadData. Loading R and RStudio is very straight-forward. If desired, a set of instructions to load the programs is located at: www.sthda.com/english/wiki/installing-r-and-rstudio-easy-r-programming.

PEP T-5 Pixelated, 3D CZT Detection Systems New Developments for Nuclear Power Plants, IAEA Safeguard Inspectors & Medical Imaging

DW Miller

Baltimore 3

The health physics presentation discusses the latest applications of pixelated, 3D CZT new technology at nuclear plants mapping, medical 3D imaging, homeland security surveillance, and decommissioning site isotopic characterization. The CZT detection system provides GPS location and digital camera color-coding of individual isotopic identification. The CZT system was developed by the University of Michigan over 22 years of extensive research. Seventy CZT monitors have been employed at nuclear plants globally. The North American Technical Center's ALARA network program has provided information on new applications and lessons learned with the new technology. The CZT system has been successfully used to verify the adequacy of temporary shielding installed for refueling outages, contamination control, PWR CRUD burst isotopic mapping, and radwaste shipment surveys. The system allows room-temperature applications for process lines to accurately measure isotopic characterization without the delay of sample line collection and chemistry laboratory analysis. The use of the new spectra CZT system at Palisades is discussed including the new discovery of significant Ag-110m coolant line contamination. The IAEA has selected the pixelated, 3D CZT system for the IAEA safeguard inspectors based on comparisons of available similar isotopic characterization instrumentation. Position-sensitive, 3-dimensional CZT semiconductor gamma-ray spectrometers and imagers have been designed and are now in medical research laboratories for applications for PET and radionuclide patient isotopic imaging including 100 CZT detectors.

CONTINUING EDUCATION LECTURES (CELs)

Sunday, 23 July through Tuesday, 25 July • Gaylord National Resort and Conference Center

CELs will be taught in National Harbor, MD. All times shown below are Eastern Standard Time (EST). Virtual attendees must adjust for their local time. All CELs will be viewable by either type of paid CEL attendee.

You can participate in the course in person or virtually. If you are attending virtually, you will be sent a link to watch it LIVE. If you are attending in person, the course will take place at the Gaylord National Resort and Conference Center.

AAHP is evaluating the number of Continuing Education Credits awarded for each of the PEP (and CEL) courses based on technical content. Course instructors will be able to provide this information at the time of the presentation. This information will also be made available on the AAHP recertification site after data entry is completed.

Monday, 6:45am – 7:45am

CEL-1 Case Studies in Radiation Deception: Practical Strategies for Avoiding Fraud Based on Lessons Learned

RJ Emery, D Howell

Woodrow Wilson B

The radiation protection profession has periodically experienced instances of purposeful deception practices that remained undetected for some period of time. Upon discovery these cases of fraud revealed gaps in confirmation and validation practices that all members of the radiation protection community should note. In this Continuing Education Lecture (CEL) summaries of actual "radiation deception" cases will be summarized and the process vulnerabilities they exploited described. Recommended process improvements that the entire radiation safety community can consider will be presented and discussed. Ample time will be provided for discussion with the overall intent of improving the collective fidelity of radiation protection processes.

CEL-2 The Art of Presenting

SP Snay

Woodrow Wilson C

Successful presentations are based on one's ability to deliver the focused content in a clear manner on a platform that is in tune with that mission. PowerPoint can be a useful tool or your worst enemy when presenting, I plan to deliver the basic strengths and weakness of presenting and pointers on delivering content successfully through any medium. Whether at a podium or through a computer screen, with PowerPoint or memorized flash cards, how we reach an audience is directly dependent on that audience and how we communicate our topic to them. This talk will describe the key attributes of achieving success while presenting as well as countless failures including but not limited to content, colors, sizing, motion, overly active animations, laser pointing, etc. We will dive into the presenter, the presentation, the content and how to deliver in an online space while protecting your Intellectual property and achieving your goal.

CEL-3 A Hospital Radiological Incident Response Plan

DH Elder

Woodrow Wilson D

For more than 2 years, hospital emergency response was focused on Covid-19. Only recently have we seen drills and exercises resume. Due to the Russian invasion of Ukraine and the political situation in other parts of the world, there is more interest in preparing for a radiological incident. UCHealth hospitals have been updating our Radiological Incident Response Plans, providing training to Emergency Department Staff, and planning for drills or exercises with a radiological component. We have also been working with our regional partners on Radiological Surge Annexes to their Emergency Response Plans. The elements of our program will be shared to help other facilities prepare for a radiological incident.

CEL-4 Decommissioning a Wet Storage Panoramic Irradiator

MA Lewandowski

Baltimore 1-2

After nearly 40 years of use, a Category IV wet storage panoramic irradiator regulated by the US Nuclear Regulatory Commission was removed from service and decommissioned. This continuing education lecture will briefly describe the irradiator facility, its use, and the process used for removing it from service and rendering the facility safe. Pertinent decommissioning requirements established under US Nuclear Regulatory Commission rules such as Title 10 Code of Federal Regulations, Part 30, and guidance, including NUREG 1757, Consolidated Decommissioning Guidance, will be highlighted. The process used by the licensee to demonstrate compliance with the agency expectations and the

final decommissioning inspection by the US Nuclear Regulatory Commission will be described. Specific challenges faced by the licensee, such as a global pandemic, resource constraints, and change in business practices, and the methods used to address those challenges will be discussed.

Tuesday, 6:45am – 7:45am

CEL-5 Biodosimetry: What It Is, Why We Need It

M Sproull

Woodrow Wilson B

This session will provide an introduction to biodosimetry, a brief history of its utility in accidents, and provide a framework for the necessity of its use in mass casualty medical management of future radiological or nuclear events. With the threat of future event scenarios involving radiation exposure, there is a need to model and develop new medical countermeasures for medical management of large scale population exposures to radiation. The field of radiation biodosimetry has advanced far beyond its original objectives to identify new methodologies to quantitate unknown levels of radiation exposure applicable to a mass screening setting. New research in the areas of genomics, proteomics, metabolomics, transcriptomics and electron paramagnetic resonance (EPR) applications have identified novel biological indicators of radiation injury from a diverse array of biological sample materials and studies continue to develop more advanced models of radiation exposure and injury. This talk will cover the principle history of biodosimetry from its origins with cytogenetic methodologies, its current evolution across a wide array of "omics" technologies, and the most recent advancements in the field. How biodosimetry diagnostics work in the context of a broad range of radiation exposure types and scenarios and the current state of its integration within the national radiological emergency response framework will also be highlighted.

CEL-6 Bootcamp for Medical Broadscope RSO

RD Leuenberger

Woodrow Wilson C

RSO is the person within an organization responsible for the safe use of radiation and radioactive materials as well as regulatory compliance. RSO duties originate form radioactive materials and are specified within Nuclear Regulatory Commission training requirements (10CFR35.50) and delegation of authority as required under the authority (NUREG 1556, Vol 9, Appendix I). This bootcamp will focus on regulations and compliance unique to an academic medical center. The objective is to provide fundamentals and medical health physics tools for an RSO to manage worker and patient radiation risk and protection. The lecture will provide pragmatic compliance strategies for: 1) Occupational Safety & Health Association (29CFR1910) radiation risk for eye protection, 2) Health & Human Services (45CFR46); radiation risk assessment for Institutional Review Board (IRB), 3) The Joint Commission (PI.03.01.01); radiation risk for patient skin protection.Medical health physics fundamentals and tools within this lecture includes: 1) guidance & regulations for occupational eye protection (i.e., cataracts), 2) risk assessment for IRB (i.e., medical procedure radiation dose calculator & Health Physics Society fact sheet), 3) patient skin protection using big data registry [i.e., Radiation Exposure Monitoring (REM) Registry].

CEL-7 Airborne Plutonium and Airborne Viruses Have Enormously Different Sources, Properties, Behaviors, and Protective Actions

DJ Strom

Woodrow Wilson D

People don't emit plutonium, but they do emit SARS-CoV-2 virions if infected, and people are both the source and the receptor of the airborne virus. Pu aerosols tend to be tiny, with AMADs of 1 to 5 ?m, while droplets of these sizes will usually contain zero virions. Observed virus titers from 102 to 1012 virions mL-1 are linked to probability of a droplet containing a particle. Virion-containing droplets > 20 ?m can be transported by spraying, squirting, or projecting, being sprayed into faces and breathing zones of other people by breathing, talking, singing, coughing, sneezing. Smaller droplets ? 50 ?m (aerosols) can be carried by convection of air for limited distances depending on AMAD. Droplets may evaporate, but evaporation beyond 95% of water may inactivate virions. Particles with AMAD > 20 ?m that are considered "non respirable" in still air can be sprayed or squirted over distances on the order of a meter or more. Health effects of low doses of Pu are stochastic, while an individual either does or does not have the Covid-19 disease, with a 50%ile infectious dose of 1,440 virions for the original variant. ALARA means that any reduction in the number of virions inhaled reduces risk of clinical Covid-19 unless an individual has inhaled several times the infectious dose. Clearly, later variants have lower infectious dose because 'increased ability to evade the immune system.' Surgical masks were not originally designed to be PPE, but rather emission controls to protect patients from biologicals exhaled by surgical staff, and are effective emission controls or effluent filters for "big stuff" that people exhale. As emission controls, "The most important mask is the one on the other guy." That's why everyone wears a mask in a healthcare facility. Masks almost completely eliminate the projectile movement of droplets when breathing, speaking, singing, coughing, or sneezing. Traditional negative-pressure respirators that are effective for Pu aerosols do not filter exhaust, so they are a "Protect-My-Health-and-Forget-about-Your-Health" measure for the wearer.

CEL-8 An Overview of Cybersecurity Threats and Related Risk Assessment Methods in the Nuclear Sector

L Ranjbar

Baltimore 3

Nuclear power plants produce about 10% and 20% of the world's and the US's electricity, respectively. The global nuclear energy demand is growing through the initiatives to expand clean energy resources, and therefore the threats of cyber attacks are increasing. Cyber threats to critical nuclear infrastructure, especially nuclear power plants, are real and constantly evolving. These threats impact critical global infrastructure, placing the nations' economy, security, public safety, and health at risk. In addition, over the years, Supervisory Control and Data Acquisition (SCADA) systems in nuclear power plants have matured from analog to digital systems. These Digital systems also actively evolve as technology advances, bringing new risks and vulnerabilities. Therefore, attackers try penetrating nuclear power plants and aligning their attack scenarios through such cyber systems. Nuclear Power Plants are protected from cyberattacks using a defense-in-depth concept in which security controls are layered throughout the network. Understanding various risk assessment methods for cybersecurity in nuclear facilities is crucial to prevent such attacks. This CEL reviews the history of nuclear infrastructures' cyber security, the cyber vulnerability of nuclear power plants, the defense-in-dept concept, the cyber security risk assessment methods for nuclear security, and some essential frameworks for designing and implementing cyber security plans for nuclear power plants.

Wednesday, 6:45am – 7:45am

CEL-9 Geiger-Mueller Counters 101

DJ Allard

Woodrow Wilson B

This lecture will provide an overview the most versatile and widely used radiation detection device in history – the geiger-mueller (G-M) counter. The talk will begin with a brief review of the history of the invention and early applications in nuclear science. A G-M counter is basically an electrical device consisting of an envelope with anode and cathode, containing a sealed or sometimes flow through noble gas, applied high voltage, with a trace amount of halogen or organic gas and [perhaps] high value external resistor to quench spurious pulses after the primary is generated. That pulse is created by an avalanche of electrons from an initiating radiation interacting within the gas or wall of the counter. These G-M tubes are used in many alpha, beta, and gamma radiation countering instruments used in medical, academic, industrial and health physics applications. Included will be a discussion of manufacturing methods, construction materials, impact on detecting certain radiations, and constraints resulting from the reactivity of modern halogen gas quench agents. Also presented will be the photon energy and dose rate response characteristics of various common G-M tubes.

CEL-10 What it's like to be a Health Physics Professor

JT Harris

Woodrow Wilson C

The Princeton Review provides a nice definition of what a college professor is. "College professors organize and conduct the functions of higher education. They engage in a variety of activities, from running laboratory experiments and supervising graduate student research to conducting large undergraduate lectures and writing textbooks. With the exception of scheduled classes-which can consume as few as three hours a week in graduate universities or up to twelve to sixteen hours per week for undergraduates-a professor's time is largely spent on research, preparing class material, meeting with students, or however else they choose." While this is a nice explanation, is it all really true, is this all there is? Does this apply to health physics professors as well? Have you ever wondered what it would be like to be a professor in health physics? This lecture will provide an overview of what it is really like to be a professor and how to succeed if you want to become one. Common myths of professorial life will be debunked, lessons learned will be given, and words of wisdom will be shared.

CEL-11 Is Far-Ultraviolet UV-C Safe For Human Exposure – But How Do We Measure It!?

DH Sliney, DJ Welch

Woodrow Wilson D

Most health physicists may be familiar with potentially hazardous germicidal ultraviolet lamps - the low-pressure mercury vapor lamps, which emit primarily at 254-nm. These are no longer widely used for infection control outside of some hospitals facilities and biological laboratories. Their use experienced a limited revival during the COVID-19 pandemic. Over exposure can result in painful eye irritations (photokeratitis) and related safety concerns. In the past decade a new, far-UV-C source emitting at 222 nm - the KrCl excimer lamp - has appeared on the scene with claims that it is inherently safe even for direct human exposure, giving wide interest to install these in workplaces, public facilities and healthcare installations. This CEL series lecture will examine the scientific evidence for its impressive safety based upon basic biophysical principles, animal and human studies. Various methods for measuring exposure to far-UVC sources are available. Calibrated film dosimeters have been developed and characterized. In addition survey meters are available that are calibrated at the 222-nm wavelength to determine daily exposure doses for comparing with UV recommended exposure limits. Attendees will learn the answers to: Is it really safe?, What is the importance of spectrally filtered KrCl lamps, and how to properly measure these new lamp installations.

CEL-12 How Health Physicist Could Help Researchers in Biomedical Institutions to Migrate From Gamma Irradiator to X-ray Irradiators

J Kamen

Baltimore 1-2

Some biological researchers using irradiators have had concerns about transitioning away from gamma irradiators to alternative technologies. The Office of Radiological Security has been successful in its effort to reduce and replace the number of self-shielded gamma irradiators through CIRP program by almost 50% since 2015. As Health Physicists, we can help facilitate these efforts by assisting researchers to migrate to x-ray irradiators. In this presentation, we will review how to start the discussion with researchers and get them involved. Health Physicists could help the researchers with comparison studies by identifying an appropriate X-ray irradiator, depth-dose measurement, and the possible sources of errors in measurements. The Health Physicist could assist with modifying the radiation beam hardness (or softness) until they achieve equivalent biological effects to gamma irradiators. We will review some of the previous successful comparison studies done at Mount Sinai.

PROFESSIONAL DEVELOPMENT SCHOOL (PDS)

Wednesday, 26 July through Friday, 28 July • Gaylord National Resort and Conference Center

Occupational Internal Dosimetry

Thomas LaBone (MJW Companies) and Dr. Charles "Gus" Potter (Sandia National Laboratories)

Baltimore 4-5

This is a 3-day course that gives an detailed introduction to occupational internal dosimetry. In the first day we will focus on ICRP 30, 68, and 130 biokinetics models and dosimetry schema as they relate to deriving secondary occupational dose limits (for example, ALIs and DACs). In the second day we will discuss the design and implementation of occupational internal dose monitoring programs in USNRC and USDOE regulated facilities. In the third day we will cover the heart of occupational internal dosimetry: the methods and philosophy of evaluating occupational intakes of radioactive materials. We will primarily use spreadsheets (e.g., Excel, LibreOffice) to work example intake evaluations and occasionally use R (a freely available language for statistical computing) to tackle more challenging problems. The course concludes with a workshop session where the class will have the opportunity to work example problems. No previous experience is required and only freely available software will be used.

*HPS meeting presentations for Wednesday, July 26 will be recorded and available to watch on demand.

AAHP CONTINUING EDUCATION COURSES

National Harbor, MD • 22 July 2023

8:00 AM – 5:00 PM **AAHP 1**

Radiation Risk Assessment

Stuart Walker, Fred Dolislager

Annapolis 1

Radiation Risk Assessment is a full-day advanced course that focuses on specific technical and regulatory issues that Remedial Project Managers (RPMs) and On-Scene Coordinators (OSCs) address when managing Superfund sites that have a risk assessment conducted for radioactive contaminants.

By taking the course, participants achieve the following objectives:

- Learn a step-by-step approach to the Superfund remedial program's risk assessment process for radioactive contamination.
- Explore methods for conducting site-specific risk assessments.
- Discover practical recommendations for improving the radiation risk assessments conducted at your site.
- Master information about radiation risk assessment process.

The instructional methodology for this course includes lectures and demonstrations of using EPA's risk and dose assessment calculators developed by the Superfund remedial program. The target audience for this course is RPMs, OSCs, risk assessors and others that want to obtain a working knowledge on conducting Superfund radiation risk assessments.

1:00 PM – 5:00 PM *(In-person or Virtual)* **AAHP 2**

Y-90 Boot Camp

Andy Miller, CHP

Annapolis 2

More and more cases of Y-90 therapy for liver tumors are being performed each year in the US.These treatments involve a series of activities to select the proper dose for the treatment, receive the doses, assay them, deliver them correctly and handle waste issues. This course will take students through a team-based process involving interventional radiology, nuclear medicine, nursing, and radiation safety to give an example of a highly reliable operation that is currently in use at a busy academic medical center.We will use actual de-identified case data, data from packages and doses, forms and procedures to show how the process works and some of the issues that arise with discussions for solutions.Both resin and glass Y-90 microspheres will be discussed.

11:00 AM – 3:00 PM *(In-person or Virtual)* **AAHP 3**

Advances in *Over* and *Under* Land Surveys in Support of MARSSIM-based Characterizations and Final Status Surveys

Alex Lopez, CHP

Annapolis 3

3:30 PM – 5:30 PM **AAHP 4**

A Review of the CHP exam Part 2 Useful Formula Sheet

Dr. Thomas Johnson, CHP

Annapolis 3

The Part 2 Useful Formula sheet contains multiple equations and constants, but no explanation as to their use.Each constant and equation will be reviewed, including example usage and thoughts on how questions could be constructed to utilize each of the equations and constants on the exam. Additionally, multiple nuclides are listed for the part 1 exam that will also be reviewed. Strategies for study and where to obtain more information on the Useful Equations will be provided. The presentation does not constitute an endorsement or recommendation from the ABHP/AAHP and all contents of the presentation are the opinion of the author.

AAHP and ABHP Awards Luncheon

Tuesday, 25 July

12:00 PM – 2:00 PM, Annapolis 1-2

Join us for the Awards Program at the Gaylord National Resort & Convention Center to re-connect with colleagues and friends, while also getting an opportunity to meet new CHPs in the industry. AAHP and ABHP awards and recognition will be presented during the event.

Registration fees include the cost of a served lunch. Guest registrations are available. New CHPs who earned their certification in 2022 are invited to attend at no cost.

We hope to see you there!

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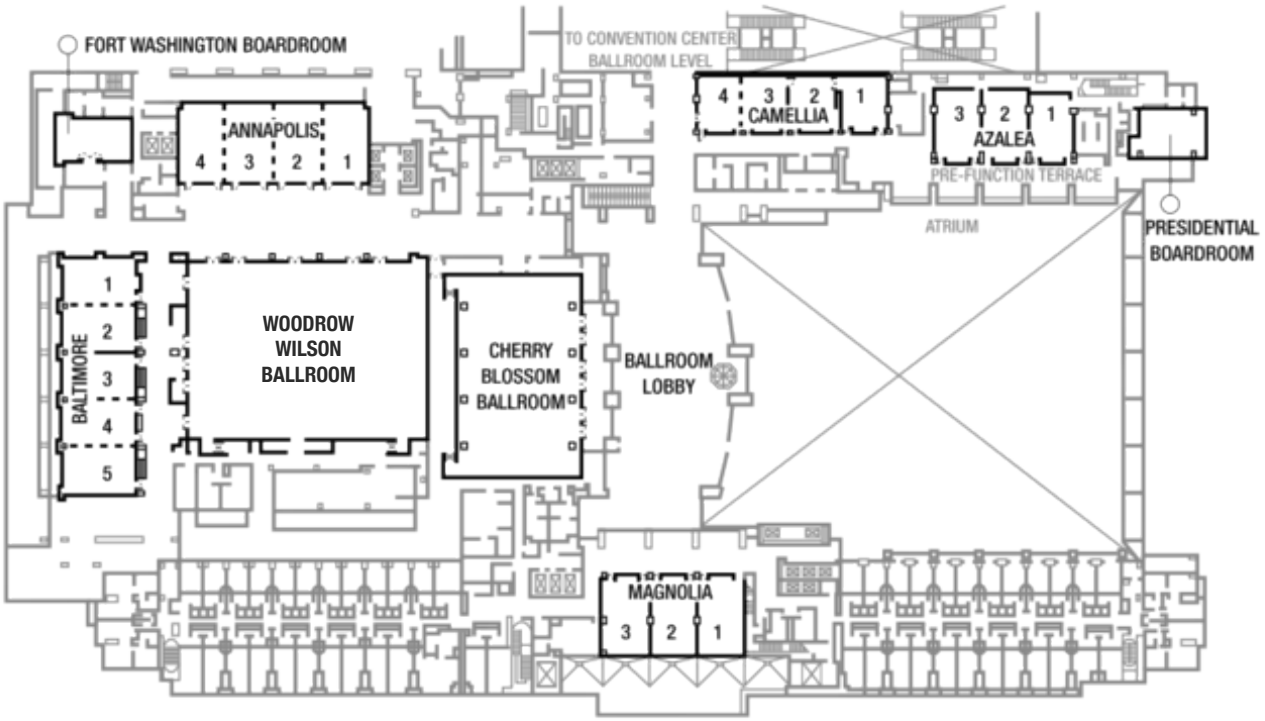

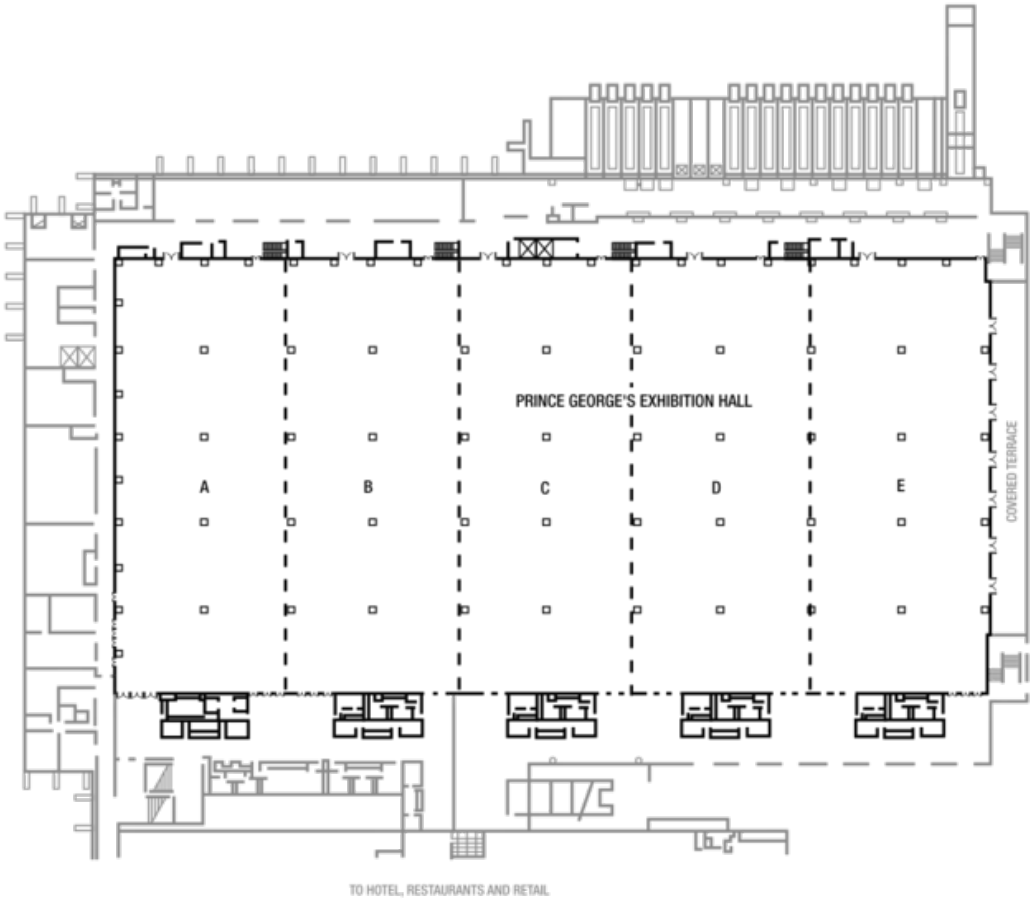

Notes

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IRPA 2024

SAVE THE DATE

International Radiation Protection Association

July 7-12, 2024 • Orlando, Florida • Rosen Shingle Creek

16th International Congress
"Harmonization of Radiation Protection Principals"

SAVE THE DATE

Health Physics Society

Annual Meeting & Exhibition

5–9 July 2026 • National Harbor, MD

Join us at the Gaylord National Harbor Resort and Convention Center for five days of education, networking, and professional development.

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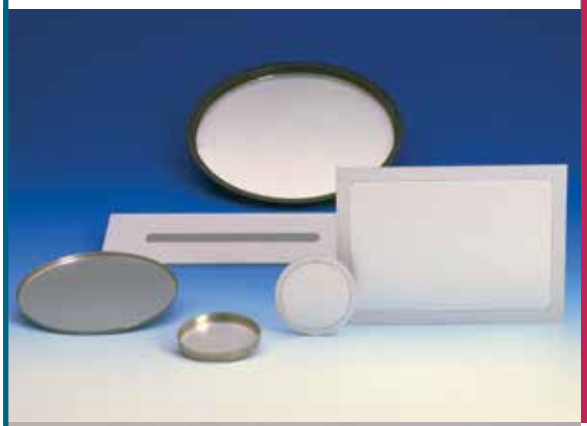

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