HEALTH PHYSICS SOCIETY

64th Annual Meeting

Hilton Orlando • Orlando, Florida • 7-11 July 2019

FINAL PROGRAM

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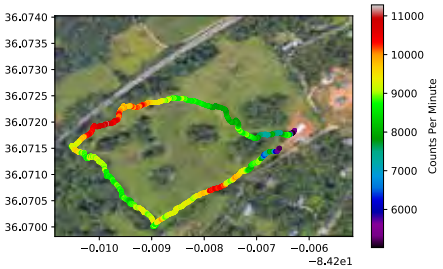

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SCHEDULE AT-A-GLANCE

All events at the Hilton Orlando unless otherwise noted.

Saturday, 6 July

All AAHP Courses take place at the Hilton Orlando

AAHP 1 Radiation Risk Assessment
08:00 – 17:00 Clear Lake

AAHP 2 2019 Radiological Operations Support Specialist (ROSS) Continuing Education Training
08:00 – 17:00 Conway Lake

AAHP 3 So You Want to Be a Medical Radiation Safety Officer?
08:00 – 17:00 Ruby Lake

Student Worker Orientation
17:45 – 18:45 Clear Lake

Sunday, 7 July

All PEP Courses take place at the Hilton Orlando

PEP 1-A thru 1-I
08:00 – 10:00

PEP 2-A thru 2-I
10:30 – 12:30

PEP 3-B thru 3-H
14:00 – 16:00

Quiz Bowl
16:00 – 17:00 Clear Lake

Speed Networking Event/Mentor Reception
17:00 – 18:00 Lake Highland A

Sunday PEP Locations

PEP A = Lake Concord
PEP B = Lake Hart
PEP C = Lake Down
PEP D = Lake George
PEP E = Lake Highland B
PEP F = Lake Monroe
PEP G = Lake Sheen A
PEP H = Lake Sheen B
PEP I = Lake Florence

KEY

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

Monday, 8 July

CEL-2 What Keeps Us from Being Effective Radiation Risk Communicators?
07:15 – 08:15 Orlando VI

MAM-A Plenary Session
08:30 – 12:30 Orange D-G

Exhibitor Sponsored Lunch
12:30 – 13:30 Orlando I-III

PEP Program 12:15 – 14:15

M-1 Orlando V
A Radiation Protection Program Logic Model: Inputs, Outcomes and Benchmarking Opportunities and Strategies for Keeping Your Radiation Safety Program on Course in a Sea of Constant Change

M-2 Orlando VI
CAP88-PC Version 4.1 Update

M-3 Orange A
Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers

M-4 Orange B
How to Choose the Correct Portable Radiation Detection Instrument for Your Needs

M-5 Orange C
Considerations for Implementation of NCRP 179, Guidance for Emergency Response Dosimetry

AAHP Exam
12:30 – 18:30 Lake Mizell

Poster Session
13:30 – 15:00 Orlando I-III

MPM-A Exhibitors of the HPS: A Special Discussion on Products and Services
15:00 – 17:45 Orlando IV

MPM-B Board of Director's Special Session: Changes in Director's Roles and HPS Strategic Plan
14:30 – 17:00 Orlando V

MPM-C Special Session: Government Relations
15:00 – 16:40 Orlando VI

MPM-D Special Session: Medical Health Physics
15:00 – 17:00 Orange A

MPM-E Special Session: AIRRS
14:30 – 17:00 Orange B

MPM-F Emergency Response Part 1
15:00 – 17:00 Orange C

Welcome Reception
17:00 – 18:30 Orlando 1-3

Tuesday, 9 July

CEL-3 Making Your Radiation Safety Message Stick! 35 Years of Powerful Quotes Collected on Sticky Notes
06:45 – 07:45 Orlando VI

CEL-4 History and Overview of the Formerly Utilized Sites Remedial Action Program
06:45 – 07:45 Orange B

CEL-5 Dosimetry Challenges of New Nuclear Medicine Theranostic Agents
06:45 – 07:45 Orlando IV

TAM-A AAHP Special Session: Risk Communication in the Context of Low Dose Health Effects
08:30 – 11:15 Orlando IV

TAM-B Medical Health Physics Part 1
08:00 – 11:30 Orlando V

TAM-C Internal Dosimetry
08:30 – 11:30 Orlando VI

TAM-D Special Session: Environmental / Radon Section
08:30 – 12:00 Orange A

TAM-E Special Session: Non-Ionizing Radiation (NIR) Section
08:20 – 11:50 Orange B

TAM-F Special Session: Translational Approaches to Improve Health Effects Knowledge in Support of Radiation Protection Guidance
08:30 – 12:00 Orange C

AAHP Awards Luncheon
12:00 – 14:00 Lake Mizell

Complimentary Lunch Orlando 1-3

PEP Program 12:15 – 14:15

T-1 Orlando VI
HEU to LEU Conversion and the Production of Mo-99 Without the Use of HEU

T-2 Orange B
Where Did This Come From? Lessons Learned from High-Routine Bioassay Investigations

T-3 Orlando IV
An Overview and the Lessons Learned from a Response to a Radiological Event Involving Potentially Significant Internal Radiation Doses from Americium-241

T-4 Lake Hart
Basic Physics for Radiation Detection

TPM-A AAHP Special Session: Risk Communication in the Context of Low Dose Health Effects
14:30 – 18:00 Orlando IV

TPM-B Medical Health Physics Part 2
14:30 – 17:00 Orlando V

TPM-C1 Risk Assessment
14:30 – 15:30 Orlando VI

TPM-C2 Radiobiology - Biological Response
16:00 – 17:15 Orlando VI

TPM-D Special Session - Rad NESAHAPS
14:30 – 17:15 Orange A

TPM-E Special Session: Non-Ionizing Radiation (NIR) Section
14:30 – 18:00 Orange B

TPM-F Academic Institutions
14:30 – 16:45 Orange C

AAHP Open Meeting
17:00 Orlando IV

CSU Reception for Alumni and Friends
17:00 – 19:00 Lake Mizell

Purdue Alumni Reception
18:00 – 19:00 Lake Monroe

SCHEDULE AT-A-GLANCE

All events at the Hilton Orlando unless otherwise noted.

Wednesday, 10 July

CEL-6 Science Is Not Enough
06:45 – 07:45 Orlando IV

CEL-7 How do we know they're good? Design and Administration of a Bioassay Oversight Program
06:45 – 07:45 Orlando VI

WAM-A Special Session: Chelation
08:10 – 12:00 Orlando IV

WAM-B Special Session: ICRP/IRPA - Tolerance and Reasonableness
08:10 – 12:30 Orlando V

WAM-C Special Session Homeland Security Part 1
08:30 – 11:45 Orlando VI

WAM-D Instrumentation
08:30 – 11:30 Orange A

WAM-E Special Session: Aerosols and Nanotechnology
08:15 – 12:00 Orange B

WAM-F Special Session: Military Health Physics
08:30 – 12:15 Orange C

PEP Program 12:15 – 14:15

W-1 Orlando IV
NDA Systems Used for the Qualification of TRU Waste to WIPP

W-2 Orlando VI
Fluoroscopic System Evaluation and Radiation Safety Consideration

W-3 Orange A
A Health Physics Perspective on Prevention Through Design - Modernization of a World-Class Radiation Physics Facility

W-4 Lake Hart
Radiation in Flight

W-5 Lake Down
Certification Options for Health Physicists

WPM-A Special Session: Social and Ethical Values in Radiation Protection
14:15 – 17:15 Orlando IV

WPM-B Special Session - International Collaboration Committee
14:15 – 17:10 Orlando V

WPM-C Emergency Response Part 2
14:30 – 16:00 Orlando VI

WPM-D External Dosimetry
14:30 – 16:30 Orange A

WPM-E1 Environmental Montioring
14:30 – 15:45 Orange B

WPM-E2 Air Montioring
16:15 – 17:15 Orange B

WPM-F Special Session: Military Health Physics
14:30 – 17:00 Orange C

HPS Business Meeting
17:30 – 18:30 Orlando IV

Thursday, 11 July

CEL-8 The Importance of the Measurand in Health Physicst
06:45 – 07:45 Orlando IV

CEL-9 Radiation Exposure to Terrestrial Organisms and Organisms in Space from Supernovae and Gamma Ray Burst?
06:45 – 07:45 Orlando V

HPS Awards Plenary
08:00 – 10:00 Orange D

THAM-A Accelerator Health Physics
10:00 – 12:00 Orlando IV

THAM-B Special Session Homeland Security Part 2
10:00 – 12:30 Orlando V

THAM-C Dose Reconstruction and Radiation Effects
10:00 – 12:00 Orlando VI

THAM-D Contemporary Health Physics Topics
10:00 – 11:30 Orange A

THPM-A IRPA Workshop on Public Understanding
14:00 – 16:00 Lake Hart

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.

Registration Hours

Registration at the Hilton Orlando, Orlando Foyer

Sunday	07:00 – 17:00
Monday	08:00 – 16:00
Tuesday	08:00 – 16:00
Wednesday	08:00 – 16:00
Thursday	09:00 – 11:00

Exhibit Hall Hours

Orlando I-III

Monday	12:00 – 19:00
Tuesday	09:30 – 17:00
Wednesday	09:30 – 12:00

BUSINESS MEETINGS

MONDAY

16:10 – 17:00 Orange B
AIRRS Business Meeting

16:30 – 17:00 Orange C
Instrumentation Business Meeting

16:30 – 17:00 Orange A
Medical Business Meeting

TUESDAY

11:05 – 12:00 Orange A
Environmental/Radon Business Meeting

12:30 – 14:15 Orange C
Power Reactor Business Meeting

17:00 – 18:00 Orlando IV
AAHP Business Meeting

17:00 – 18:00 Orlando B
NIR Business Meeting

WEDNESDAY

11:15 – 12:00 Orange B
Nanotechnology Business Meeting

11:45 – 12:15 Orange C
Military Business Meeting

17:30 – 18:30 Orlando IV
HPS Business Meeting

THURSDAY

11:30 – 12:00 Orlando IV
Accelerator Business Meeting

12:00 – 12:30 Orlando V
Homeland Security Business Meeting

12:15 – 13:15 Lake Down
Women and Minorities in RP Business Meeting

14:15 – 16:30 Lake Down
ICRP Business Meeting

64rd Annual Meeting

HEALTH PHYSICS SOCIETY

Hilton Orlando • Orlando, Florida • 7-11 July 2019

Registration Hours and Location

Hilton Orlando, Orlando Foyer

Sunday, 7 July
07:00 – 17:00

Monday, 8 July
08:00 – 16:00

Tuesday, 9 July
08:00 – 16:00

Wednesday, 10 July
08:00 – 16:00

Thursday, 11 July
09:00 – 11:00

Future Midyear Meetings

53rd Midyear Meeting
26-29 January 2020, Bethesda, MD

Future Annual Meeting

65th Annual Meeting
4-9 July 2020, National Harbor, MD

66th Annual Meeting
25-29 July 2021, Phoenix, AZ

67th Annual Meeting
16-21 July 2022, Spokane, WA

Look online for future meeting details
hps.org/meetings

Table of Contents

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Chris Shaw, ‘20
Charles Wilson, ‘19

HPS Awards Plenary Breakfast

Thursday, 11 July, 07:30 – 10:00
Hilton Orlando, Orange D

Join us Thursday, 11 July, for the HPS Awards Program. We look forward to seeing you by 08:00 for the presentation at the Hilton Orlando. There will be a buffet breakfast provided that begins at 07:30.

Sunday-Thursday

PEPs, CELs, Committee Meetings, Exhibits, and Sessions (all events) take place at the Hilton Orlando

Speaker Ready Room

Hilton Orlando
Ruby Lake

Sunday: 14:00 – 17:00
Monday-Wednesday: 07:30 – 17:00
Thursday: 07:30 – 12:30

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 Sandy Konerth, SKonerth@versantphysics.com for more information.

Student Events

Student Worker Orientation
Saturday, 17:45 – 18:45
Clear Lake, Hilton Orlando

Quiz Bowl
Sunday, 16:00 – 17:00
Clear Lake, Hilton Orlando

Speed Networking Event/ Mentor Reception
Sunday, 17:00 – 18:00
Lake Highland A, Hilton Orlando

Exhibitor Luncheons
Monday, 12:30
Tuesday, 12:00
Orlando I-III, Hilton Orlando

Welcome Reception
Monday, 17:00 – 18:60
Orlando I-III, Hilton Orlando

Plenary Awards Breakfast
Thursday, 07:00 – 10:00
Orange D, Hilton Orlando

Hilton Orlando
6001 Destination Parkway
Orlando, FL 32819
Direct Phone: 407-313-4300

IMPORTANT EVENTS

6th Annual 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, 7 July, 16:00 – 17:00, at the Hilton Orlando in Clear Lake.

Speed Networking Event/Mentor Reception

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 Sunday, 7 July, 17:00-18:00, at the Hilton Orlando in Lake Highland A.

Welcome Reception

The Welcome Reception this year will be held on Monday, 8 July from 17:00 – 18:30 in Orlando 1-3. Join fellow attendees for a time to socialize and renew old acquaintances. A cash bar will be available with appetizers.

Exhibits

Free Lunch! Free Lunch! – 12:30, Monday, 8 July and 12:00, Tuesday, 9 July. All registered attendees are invited to attend a complimentary lunch in Orlando I-III.

Breaks Monday Afternoon-Wednesday Morning – Featuring morning coffee and afternoon coffee. Be sure to stop by and visit with the exhibitors while enjoying your refreshments!

AAHP Part 2 Exam

Lake Mizell
Monday, 8 July, 12:30 – 18:30

Reception for Women and Minorities in RP

Hilton Orlando, Lake Monroe
Wednesday, 9 July, 13:15 – 14:15

Sessions and Course Locations

All sessions, courses, committee meetings, and events, Monday through Thursday, will take place at the Hilton Orlando.

AAHP Awards Luncheon

Hilton Orlando, Lake Mizell
Tuesday, 9 July • 12:00 – 14:00

HPS Awards Plenary

Join us Thursday, 11 July, for the Awards Program. We look forward to seeing you by 08:00 for the presentation at the Hilton Orlando. There will be a buffet breakfast provided that begins at 07:30. We look forward to seeing you there.

HPS Business Meeting

Hilton Orlando, Orlando IV
Wednesday, 10 July, 17:30 – 18:30

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 66 for course information.

Things to Remember!

All speakers are required to check in at the Speaker Ready Room (Ruby Lake) in the Hilton Orlando, at least one day prior to their assigned presentation.

Bionomics
Oak Ridge, TN

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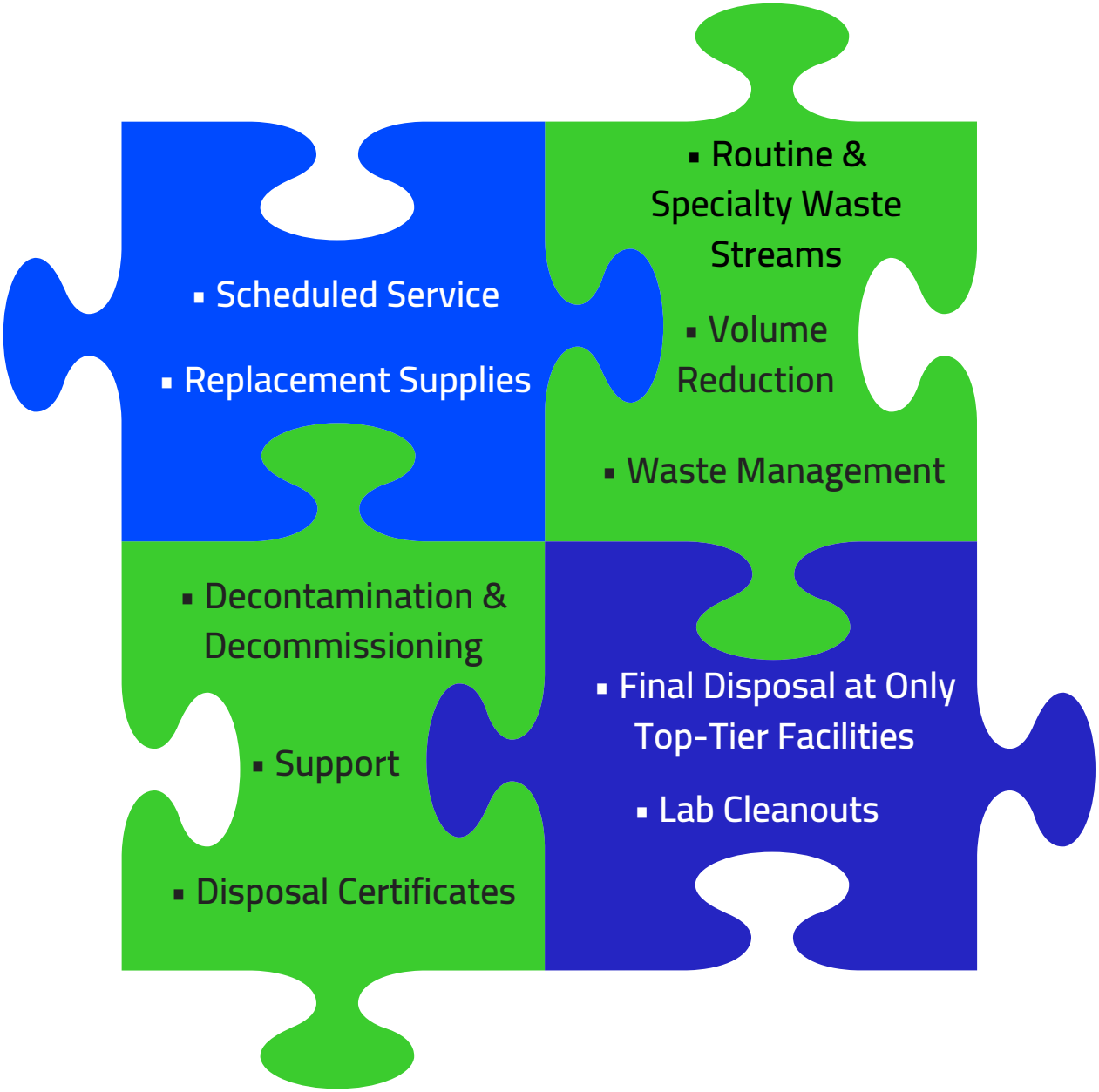

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HPS AWARDS PLENARY BREAKFAST

Thursday, 11 July • Hilton Orlando
07:30 – Breakfast Buffet
08:00 – 10:00 – Plenary Awards

Awards
Introduction by Nolan Hertel, President

Presented by Eric Abelquist, Chair, Awards Committee

Recognition of 50 Year Members

Recognition of Student Fellowship & Scholarship Recipients

Recognition of Student Travel Grant Recipients

Announcement of Health Physics-Related Awards

Working Group Chairs for Published HPS/ANSI Standards - Plaque Presentation

Fellow of the Health Physics Society Awards and Certificate Presentations

Distinguished Scientific Achievement Award

Elda E. Anderson Award

Adjournment

2019 50 Year Members

Lucas B. Beentjes
Robert M. Boyd
Benjamin F. Burton
Thomas B. Cochran
Leo S. Gomez
Ralph Grunewald
George D. Kerr
Peter S Littlefield
Patricia C. Vacca
Theodore Villafana
Walter F. Wegst
Leonard C. Wilson

Student Fellowships 2018-2019
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 Memorial Fellowship
Sara Abraham, University of Michigan

Health Physics Society Fellowships
Shraddha Rane, Purdue University
Eli Sanchez, Massachusetts Institute of Technology

Robert Gardner Memorial Fellowship
Kara Godsey, Clemson University

Robert S. Landauer, Sr., Memorial Fellowship
Lisa Manglass, Clemson University

Richard J. Burk, Jr., Fellowship
Ian McNab, Colorado State University

J. Newell Stannard Memorial Fellowship
Caleigh Samuels, Georgia Institute of Technology

Dade W. Moeller Scholarship Award Memorializing Kelly Austin
Brooke Stagich, Clemson University

Dade W. Moeller Memorial Scholarship Award
Brooke Stagich, Clemson University
Amber Harshman, Colorado State University

F. Ward Whicker Scholarship
Mara Watson, Clemson University

HPS AWARDS PLENARY BREAKFAST

Student Travel Grant Recipients
These grants enable health physics students to attend and participate in our annual meeting.
Additional support was received from the Medical Health Physics Section.

Tanner Ambrose, Bloomsburg University

Yosalyn Bolton, Alcorn State University

Emily Bragers, Purdue University

Roger Champion, University of Michigan

Emily Chou, Purdue University

Edgar Chung, University of Michigan

John Contreras, University of Texas Health Science Center

Madeline Cook, Idaho State University

Anthony Davila, Louisiana State University

Timothy Davis, University of Ontario Institute of Technology

Alexandra Detweiler, Illinois Institute of Technology

R Mark Dewald, University of Michigan

Daniel Dimarco, Louisiana State University

Naomi German, Purdue University

Lekhnath Ghimire, University of Ontario Institute of Technology

Trish Hander, Illinois Institute of Technology

Amna Hassan, University of Ontario Institute of Technology

Joshua Hayes, Colorado State University

Timothy Hooker, Purdue University

Ian Hoppie, Illinois Institute of Technology

Susan Jasim, University of Nevada, Las Vegas

Samantha Johnson, Illinois Institute of Technology

Jeremy King, Texas A&M University

Marta Kocemba, University of Ontario Institute of Technology

Candace Krout, Bloomsburg Univeristy

John Kuchta, University of Michigan

Pamela Bernadette Manglona, Idaho State University

Jonathan Miller, University of Michigan

Dawn Montgomery, Clemson University

Heidi Niskanen, Rensselaer Polytechnic Institute

Blessing Oladele, Federal University of Technology Akure, Nigeria

Lindsay Rand, Georgetown University

Cassandra Redmond, University of Massachusetts Lowell

Katrina Reti, Colorado State University

Timothy Rogers, UMass Lowell

Kate Saucke, UTHealth San Antonio

Samuel Schumacher, Illinois Institute of Technology

Brian J Shen, University of Michigan

Brianna Smiley, Duke University

Jack H Thiesen, University of Michigan

David Trimas, University of Michigan

Regina Tuey, University of Michigan

Jayendra Vattikonda, Alcorn State University

Jelena Vucicevic, University of Ontario Institute of Technology

Qian Wang, University of Massachusetts Lowell

HPS AWARDS PLENARY BREAKFAST

Related Awards

American Academy of Health Physics

2019 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.

2019 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.

Dennis Quinn

Accelerator Section Awards

H. Wade Patterson Memorial Award
Established in 2003, the H. Wade Patterson Memorial Award recognizes outstanding student presentations on accelerator health physics at the annual meeting. The winner receives a check and plaque.

Lutz Moritz Memorial Award
Established in 2009, the Lutz Moritz Memorial Award recognizes outstanding student presentations on accelerator health physics at the Annual Meeting. The winner receives a check and plaque.

Homeland Security Section Award

The Health Physics Society Homeland Security Section honors those who exemplfiy outstanding service and dedication to the HSS.

John J. Lanza

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.

Robert N. Cherry
Colonel, United States Army (retired)

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.

Robert W. Young
US Department of Defense (retired)

Young Military Health Physicist of the Year Award

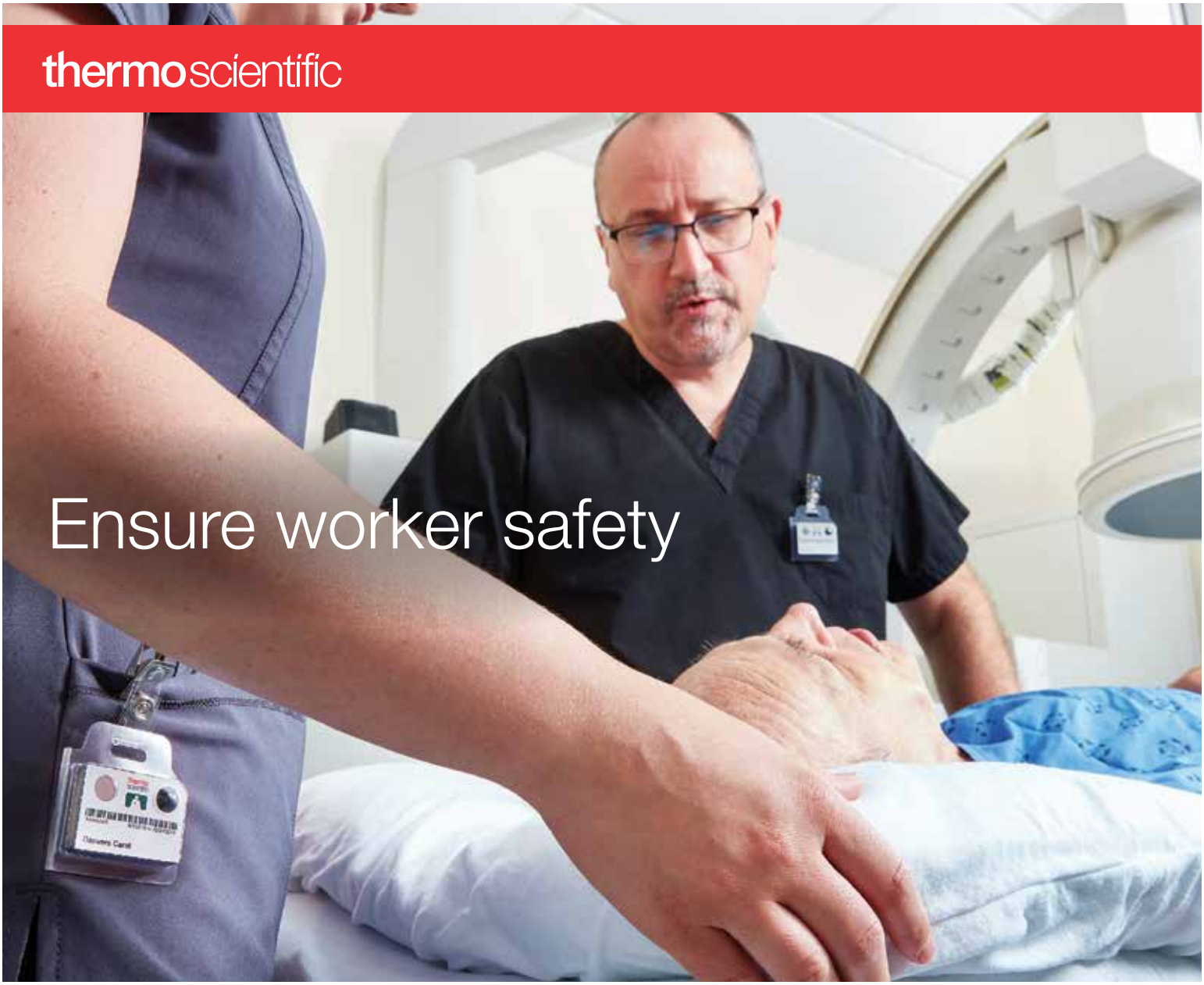
Established in 2014, the Young Military Health Physicist of the Year Award recognizes a young military health physicist for excellence in (1) research or development, (2) discovery or invention, (3) devotion to military health physics, and/or (4) significant contributions to the profession of military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

Major Matthew B. Stokley
Medical Service, U.S. Army

Non-Ionizing Radiation Section 2019 Service Award

Richard A. Tell

thermoscientific



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HPS AWARDS PLENARY BREAKFAST

Working Group Chairs for Published HPS/ANSI Standards

These HPS/ANSI standards have been published since July 2017. The Society has prepared plaques in recognition of this significant accomplishment by the respective working group chairs.

Charles Potter/N13.14-2018
Title: Bioassay Programs for Tritium

Eric Darois/N13.32-2018
Title: Performance Testing of Extremity Dosimeters

G. Spencer Mickum/N43.7-2018
Title: Safe Design and Use of Self-Contained, Dry Source Storage Irradiators (Category I)

Reaffirmed Standards for 2019

Steven Baker/N13.6-2010 (R2019)
Title: Practice for Occupational Radiation Exposure Records Systems

Gladys Klemic/N13.37-2014 (R2019)
Title: Environmental Dosimetry—Criteria for System Design and Implementation

Jeff Whicker and Mark Hoover/N13.56-2012 (R2019)
Title: Sampling and Monitoring Releases of Airborne Radioactivity in the Workplace

Dan Kassiday and Jack Glover/N43.17-2009 (R2018)
Title: Radiation Safety for Personnel Security Screening Systems Using X-Ray or Gamma Radiation

2019 Fellows

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

Paul K. Blake
J. Stewart Bland
Timothy A. DeVol
Scott Schwahn
James P. Tarzia
Elyse Thomas
Brant Ulsh

2019 Distinguished Scientific Achievement Award

This award is designed to acknowledge outstanding contributions to the science and technology of radiation safety. The recipient of the award is recognized for accomplishments of fundamental importance to the practice, acceptance, and advancement of the profession of health physics. It is awarded in memory of those scientists who contributed in an outstanding way to the development of scientific knowledge for the protection of man and his environment. (Prior to 1984 this was called the Distinguished Achievement Award.)

Richard E. Toohey
Award consists of a plaque and life membership in the Society

2019 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

Nicole Martinez
Award consists of a plaque and a $1,000 check

2019 Robley D. Evans Commemorative Metal

This award is given in memory and honor of Professor Evans in recognition of his outstanding and extraordinary dedication and contributions to radiation safety as physics educator, scientist, author and humanitarian for more than fifty years. A recipient of this award best demonstrates these exceptional qualities and accomplishments.

Richard Leggett
Award consists of a medal and life membership in the Society

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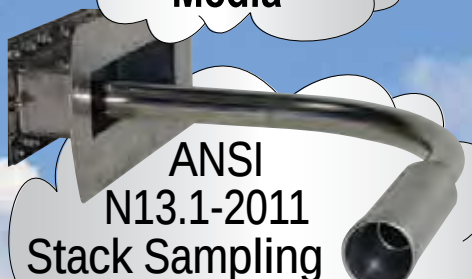

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64th Annual Meeting

HEALTH PHYSICS SOCIETY

Hilton Orlando • Orlando, Florida • 7-11 July 201918

Welcome

The Florida Chapter of the Health Physics Society welcomes you to Orlando, "the City Beautiful," for the 64th Annual Meeting of the HPS. Orlando is the Theme Capital of the World®! The meeting venue is located close to a number of features and events rated highly by tourists; Universal Orlando, Walt Disney World, SeaWorld, iDrive 360, and many more. Other area attractions include the incredible beaches of both the Gulf and Atlantic Coasts – each only an hour's drive. The Kennedy Space Flight Center is another great place to visit. Visit the link to VisitOrlando at visitorlando.com.

Local Arrangements Committee Room

Sand Lake, Hilton Orlando, Sunday-Thursday

PEP/CEL Ready Room

The PEP/CEL Ready Room will be combined with the Speaker Ready Room in Ruby Lake in the Hilton Orlando from Sunday-Thursday

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 (Ruby Lake) will be open Sunday from 14:00 – 17:00, Monday through Wednesday from 07:30 – 17:00, and Thursday 07:30 – 12:30. You must check in at the Speaker Ready Room (even if you have already submitted your presentation) no later than the following times:

Presentation Time	Check-In Deadline
Monday AM-PM	17:00 Sunday
Tuesday AM-PM	17:00 Monday
Wednesday AM-PM	17:00 Tuesday
Thursday AM	17:00 Wednesday

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 Exhibit Hall must be put up for display between 10:00 and 12:00 on Monday and removed on Wednesday by 11:00.

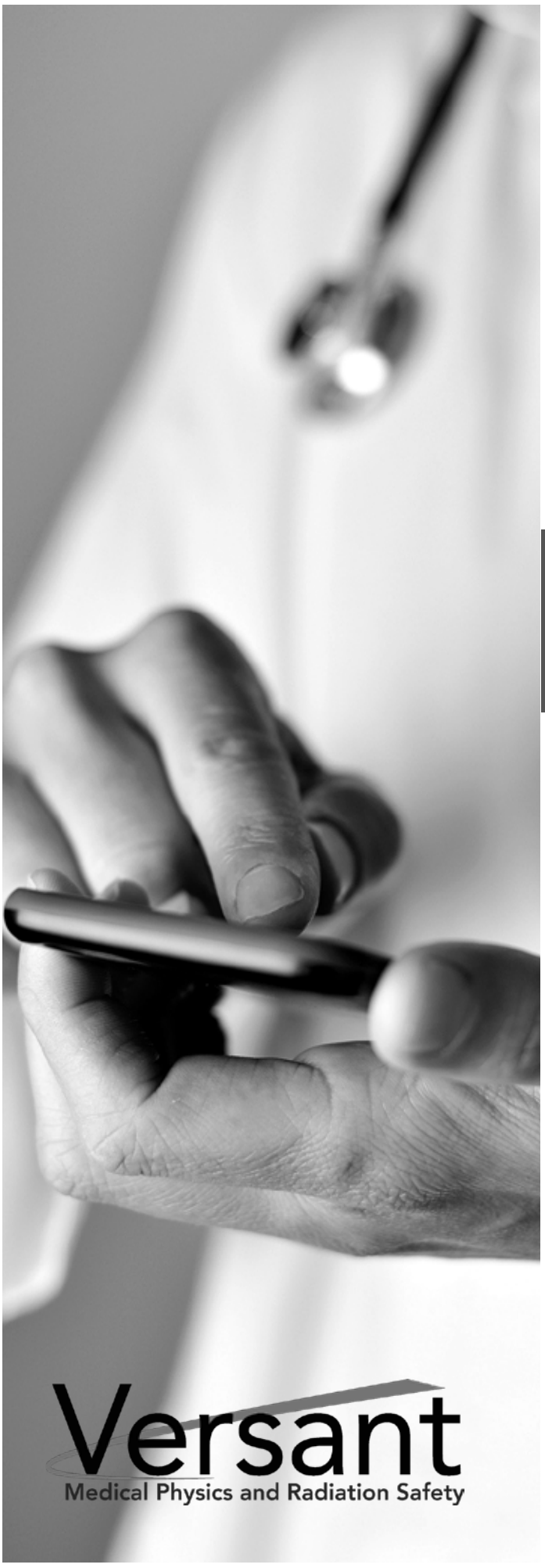
SAVE THE DATE

HPS 53rd Midyear Meeting

26-29 January 2020 • Bethesda, MD

HPS 65th Annual Meeting

4-9 July 2020 • National Harbor, MD



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COMPANION PROGRAM

Information for Registered Companions

Companion Registration cost is $110 and includes the Welcome Reception, Monday-Thursday breakfast buffet at the Hilton Orlando, and lunch and breaks in the Exhibition Hall. There will not be a separate Hospitality Room, however the Local Arrangements Committee staff in Lake Highland A will be happy to answer your questions or assist in finding the answer.

Monday, 8 July

Welcome Reception
17:00 – 18:30, Orlando 1-3, Hilton Orlando
Come see old friends and make new ones! Enjoy hors d'oeuvres with a cash bar, 17:00 – 18:30.

Monday, 8 July

Welcome to Orlando Companion Orientation
Orlando Representative – 09:00 - 10:00, Lake Highland A
The city orientation takes place Monday, 8 July from 09:00 to 10:00 in Lake Highland A. A representative from Orlando will be on hand to describe some of the many opportunities, provide maps, and answer questions.

Monday, 8 July - Thursday, 11 July

Companion Breakfast
06:30 - 10:30, Hilton Orlando, Bistro Restaurant

Companion Registration includes Monday – Thursday breakfast buffet at the Hilton Orlando, 06:30 to 10:30. A delicious buffet awaits you including made-to-order omelets, scrambled eggs, breakfast meats (sausage and bacon), French toast, pancakes, hot oatmeal, assorted pastries, fresh fruits, juice, coffee, and tea.

Registered companions are welcome to come to the lunch and breaks in the Exhibition Hall.

Thursday, 11 July

Awards Plenary
07:30 Breakfast, 08:00 – 10:00
Hilton Orlando, Orange D

Companion Registration includes Monday – Thursday breakfast buffet at the Hilton Orlando, 06:30 to 10:30. A delicious buffet awaits you including made-to-order omelets, scrambled eggs, breakfast meats (sausage and bacon), French toast, pancakes, hot oatmeal, assorted pastries, fresh fruits, juice, coffee, and tea.

Registered companions are welcome to come to the lunch and breaks in the Exhibition Hall.

Florida Department of Health
Bureau of Radiation Control

Mobile Emergency Radiological Laboratory

Emergency Response Equipment Showcase

The Florida Department of Health, Bureau of Radiation Control will be exhibiting radiological emergency response equipment and vehicles used during:

- nuclear power plant response;
- event security surveillance;
- radiological event response;
- radiological mapping;
- environmental sampling and
- radiological isotope identification

Demo Hours

Tuesday July 9, 2019

10:00 AM – 4:00 PM

Committee Meetings

Meetings take place at the Hilton Orlando

Saturday, 6 July 2019

Finance Commmittee Meeting
08:00 – 12:00 Turkey Lake

ABHP Board Meeting
08:00 – 16:00 Pocket Lake

NRRPT
08:30 – 16:30 Lake Lucerne

ABHP Part II Panel
08:00 – 17:00 Lake Virginia

Executive Committee Meeting
12:00 – 16:00 Turkey Lake

HP Journal Editorial Board
15:00 – 17:00 Lake Florence

Sunday, 7 July 2019

ABHP Part II Panel
08:00 – 17:00 Lake Virginia

NRRPT
08:30 – 16:30 Lake Lucerne

AAHP Executive Committee
08:30 – 17:00 Pocket Lake

HPS Board of Directors
08:30 – 17:00 Lake Nona A

IRPA Executive Council
09:00 – 17:00 Spring Lake

Quiz Bowl
16:00 – 17:00 Clear Lake

Accelerator Section Awards Meeting
16:30-18:30 Lake Hart

Student Mentor Speed Networking
17:00 – 18:00 Lake Highland A

Accelerator Section Board Meeting
17:30 – 18:30 Lake Lucerne

Monday, 8 July 2019

Elda Anderson Breakfast
06:45 – 08:00 Pocket Lake

ICC Welcome Breakfast for Int'l Attendees
07:00 - 08:00 Lake Highland A

NRRPT
08:30 – 16:30 Lake Lucerne

Student Support Committee
10:00 – 11:00 Clear Lake

Academic Education Committee
12:00 – 13:30 Spring Lake

Science & Public Issues Committee
12:00 – 15:00 Clear Lake

IRPA Board Meeting
13:00 – 18:00 Conway Lake

Web Ops
13:00 – 15:00 Lake Highland A

Chapter Council Meeting
13:30 – 14:30 Orlando IV

HPS Nominating Committee
13:30 – 15:00 Turkey Lake

NCRP PAC-2
13:30 – 15:00 Lake Down

Public Information Committee
13:00 – 15:00 Pocket Lake

Committee on Medical Health Physics Current Issues of the Medical HP Section
13:30 – 14:30 Lake George

ICRP Business Meeting
13:30 – 17:00 Lake Monroe

US TAG to ISO/TC85 and Subcommittees (NTAG)
14:00 – 17:00 Spring Lake

Section Council Meeting
14:30 – 15:30 Lake Concord

ANSI N13.8 Radiation Safety in Uranium Mining
15:00 – 16:30 Turkey Lake

Ask the Editor
15:00 – 17:00 Lake Highland A

Professional Development Committee
16:00 – 17:00 Pocket Lake

AAHP Nominating Committee
16:30 – 17:30 Turkey Lake

Medical Board Meeting
17:00 – 18:00 Clear Lake

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Committee Meetings

Meetings take place at the Hilton Orlando

Tuesday, 9 July 2019

N13.11
08:00 – 12:00 Pocket Lake

NRRPT
08:30 – 16:30 Lake Lucerne

ANSI N13.61
09:00 – 12:00 Clear Lake

International Collaboration Committee
12:00 – 14:00 Spring Lake

AEC hosts Program Directors Meeting
13:30 – 14:30 Lake Highland A

CSU Reception for Alumni and Friends
17:00 – 19:00 Lake Mizell

Purdue Alumni Reception
18:00 – 19:00 Lake Monroe

Wednesday, 10 July 2019

President Mtg with BOD Designates
10:00 – 17:00 Pocket Lake

Standards Committee
12:30 – 16:30 Lake Lucerne

Continuing Education Committee
13:00 – 15:30 Clear Lake

ANSI 13.64
14:00 – 17:00 Conway Lake

Government Relations Committee
15:30 – 16:30 Conway Lake

Thursday, 11 July 2019

ANSI N13 Revision
09:00 – 16:30 Lake George

IRPA Board Meeting
10:00 – 13:00 Lake Hart

HPS Executive/Finance Committee Meeting
10:15 – 11:30 Lake Lucerne

HPS Board of Directors Meeting
11:30 – 14:15 Lake Lucerne

Program Committee Meeting
12:30 – 14:00 Lake Concord

Reception for Women and Minorities in RP
13:15 – 14:15 Lake Monroe

Business Meetings

MONDAY

AIRRS Business Meeting
16:10 – 17:00 Orange B

Instrumentation Business Meeting
16:30 – 17:00 Orange C

Medical Business Meeting
16:30 – 17:00 Orange A

TUESDAY

Environmental/Radon Business Meeting
11:05 – 12:00 Orange A

Power Reactor Business Meeting
12:30 – 14:15 Orange C

AAHP Business Meeting
17:00 – 18:00 Orlando IV

NIR Business Meeting
17:00 – 18:00 Orange B

WEDNESDAY

Nanotechnology Business Meeting
11:15 – 12:00 Orange B

Military Business Meeting
11:45 – 12:15 Orange C

HPS Business Meeting
17:30 – 18:30 Orlando IV

THURSDAY

Accelerator Business Meeting
11:30 – 12:00 Orlando IV

Homeland Security Business Meeting
12:00 – 12:30 Orlando V

Women and Minorities in RP Business Meeting
12:15 – 13:15 Lake Down

ICRP Business Meeting
14:15 – 16:30 Lake Concord

Friday, 12 July 2019

ANSI N13 Revision
09:00 – 16:30 Lake George

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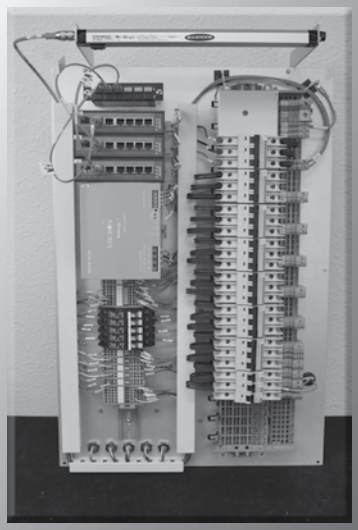

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Landauer Memorial Lectureship

The Landauer Memorial Lectureship was instituted in Chicago in 1971 under the auspices of Northwestern University in honor of Dr. Robert S. Landauer, a prominent radiological physicist and teacher for many years in the Chicago area. This award was funded initially by his students, friends, and family. In 1973, the Landauer Lectureship was established and sponsored by R.S. Landauer, Jr., and Company, now known as Landauer, Inc. The purpose is to honor prominent individuals who have made significant contributions to the field of radiation research and protection.

The recipient of the Landauer Lecture award will be joining a group of distinguished individuals who have been so honored in the past. A large plaque is displayed at the corporate headquarters of Landauer, Inc. commemorating all of the recipients of this award.

Dade W. Moeller Lectureship

"When you are near a fountain of knowledge, do everything possible to get thoroughly soaked."
– Dr. Dade W. Moeller

Since 2009, Dade Moeller & Associates, Inc. ("Dade Moeller") has bequeathed funds to the Health Physics Society to maintain the Dade Moeller Fund. The fund has been established to advance Dr. Moeller's deeply held belief that continued education, sharing of knowledge, exposure to new ideas, and strong professional relationships are integral to an individual's success in his or her career. The Fund sponsors the Dade Moeller Lectureship and Scholarship Awards. The Lectureship Award enables distinguished experts to share their knowledge with our membership at Society meetings.

Dr. Moeller (1927-2011) was very active in the Society, serving as New England Chapter president in 1966 and national President in 1971-1972. He served on and chaired many committees for the NRC, EPA, NCRP, ICRP, NAS, and AAEES. He was a consultant to the WHO for 15 years, and following 16 years on the NRC's congressionally appointed Advisory Committee on Reactor Safeguards, became in 1988 the founding chairman of the agency's Advisory Committee on Nuclear Waste, on which he served for five years.

Dr. Moeller is remembered for his practicality, humility, thoughtfulness, gentle nature, generosity, and humor. Despite his multitude of awards and accomplishments, including induction in the National Academy of Engineering, he remained genuinely humble, always able to explain complex technical issues with uncanny clarity and simplicity. He was a leader in every sense of the word, a skilled mentor to so many, and an inspiration to the thousands of students, employees, and colleagues who knew him. He was one of those rare giants in our profession with a work ethic and moral compass worthy for all of us to emulate.

G. William Morgan Lectureship

When G. William Morgan died in 1984, he bequeathed a substantial fund to the Health Physics Society. The will requires that the fund's interest be used to have internationally known experts present papers at the Society's meetings. Michael C. O'Riordan of the United Kingdom's National Radiation Protection Board was the first international expert to be supported by the Society through the Morgan Fund. O'Riordan's presentation "Radon in Albion" was part of the Indoor Radon Session at the 1989 Albuquerque meeting.

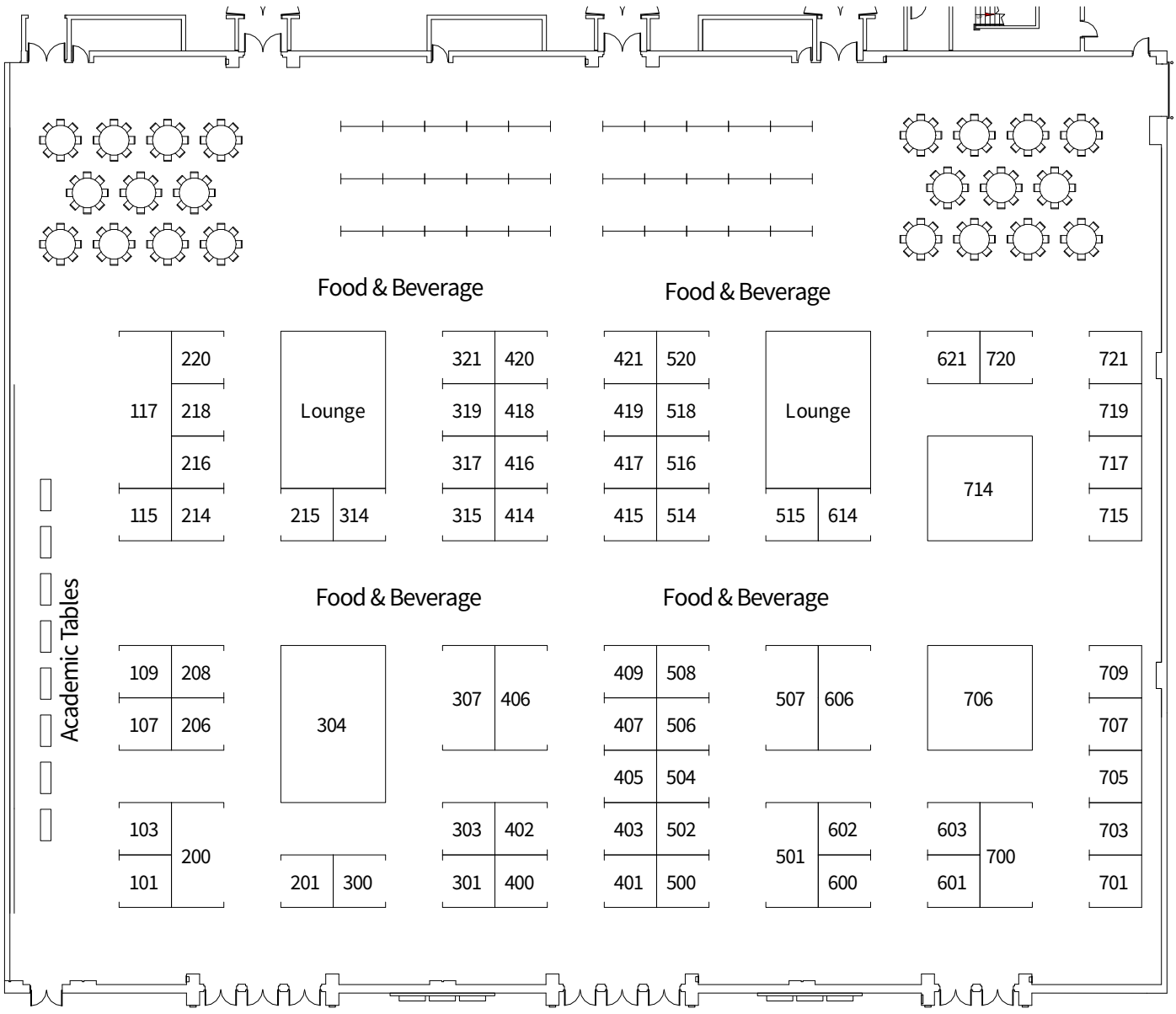
G. William Morgan was a charter member of the Society, and during the Society's early years a very active member. Bill began his health physics career at Oak Ridge National Laboratory as part of the Manhattan Project. He later joined the Atomic Energy Commission and was instrumental in the development of the initial regulations that became part of 10 CFR Part 20. He was a great champion of education and helped establish the AEC Health Physics Fellowship Program. Bill later became very successful in the real estate business, but always retained his interest in the health physics profession. The Society's Presidents Emeritus Committee has responsibility for the selection of the international experts who will be supported by the G. William Morgan Trust Fund.

2019 EXHIBIT HALL FLOOR PLAN

EXHIBIT HALL HOURS

Monday, 8 July	Tuesday, 9 July	Wednesday, 10 July
12:00 – 18:30	09:05 AM – 17:00	09:00 – 12:00

Orlando I-III



ENTRANCE

EXHIBITOR LISTING

Breaks

Tuesday AM – Wednesday AM

Featuring morning coffee and afternoon coffee. Be sure to stop by and visit with the exhibitors while enjoying your refreshments.

Lunches

Monday, 12:30 and Tuesday, 12:00

All registered attendees are invited to attend a complimentary lunch in Orlando I-III.

Note: the free lunches are not included in your registration fee, but are paid for by our sponsors & exhibitors.

Welcome Reception

Monday, 17:00 – 18:30

Join fellow attendees in the Orlando 1-3 for a time to socialize and renew old acquaintances.

2019 EXHIBITORS

2020 Annual Meeting National Harbor, MD — Booth: 705

www.hps.org/meetings

AAHP/ABHP — Booth: 719

www.hps1.org/aahp

Ameriphysics, LLC — Booth: 520

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Best Dosimetry Services — Booth: 317

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CAEN SyS is the new Systems & Spectroscopy Division of CAEN Spa. Such division relies upon an extremely strong foundational knowledge of nuclear measurement instrumentation in developing Radiation Measurements Systems and Spectroscopy Solutions. These systems and solutions are perfectly suited to operations involving Nuclear Fuel Facilities, Nuclear Power Plants, Measurements Laboratories, and Security Applications. CAEN SyS Systems & Spectroscopy division is built upon CAEN traditions of teamwork and partnership. Decades of collaboration and co-development with very large international research projects have maximized our capability to translate a customer's needs and expectations into cost-effective and reliable solutions.

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Centers for Disease Control and Prevention — Booth: 720

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Gamma Products, Inc. — Booth: 409

7730 West 114th Place
Palos Hills, IL 60465
708-974-4100
www.gammaproducts.com

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Spencers Wood
Reading, Berkshire RG7 1AW UK
44 (0)1189 888260
www.geminitechnologyltd.com

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281-578-7900
www.GlobalNucleonics.com

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H3D, Inc. — Booth: 506

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Ann Arbor, MI 48108
734-661-6416
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Health Physics Instruments — Booth: 201

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Health Physics Instruments manufactures and calibrates instruments and detectors that measure gamma, neutron, beta, and alpha radiation. The product line includes portable neutron survey meters, Geiger-counters, sophisticated fixed monitors, rem meters, dosimeters, multichannel analyzers and custom solutions. HPI has been serving the Health Physics community for over 40 years.

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HI-Q Environmental Products Company is an ISO 9001:2015 Certified designer/manufacturer that has been providing air sampling & monitoring equipment, systems and services to the nuclear and environmental monitoring industries since 1973. Our product catalog includes: Continuous duty high & low volume air samplers, radiation measurement instrumentation, radiation monitoring systems, air flow calibrators, radioiodine sampling cartridges, collection filter paper and both paper-only or combination style filter holders. Along with the ability to design complete, turn-key, stack and fume hood sampling system, HI-Q has the unique capability to test ducts and vent stacks as required by ANSI N13.1-1999/2011.

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HPS Journal/Newsletter Booth: 117

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813-626-6848
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410-465-5558
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804-402-2232
www.energy.gov/nnsa/office-radiological-security-ors

NRRPT — Booth: 707

PO Box 3084
Westerly, RI 02891
401-637-4811
www.nrrpt.org

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

NSSI — Booth: 501

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713-641-0391
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Nucleonix Systems founded in the year 1990 is a well-recognized and established company, engaged in design, development, manufacturing and supplying of nuclear radiation measuring & allied Instrumentation apart from offering CBRN solutions for Civilian and Military applications/platforms.

NUVIA Dynamics Inc. — Booth: 600

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509-946-0410
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Off-Site Source Recovery Program - Los Alamos National Lab TRIAD — Booth: 418

P.O. Box 1663, Mail Stop E539
Los Alamos, NM 87545
877-676-1749
osrp.lanl.gov

The Off-Site Source Recovery Program (OSRP) is a US Government activity that has a National Nuclear Security Administration (NNSA) sponsored mission to remove excess, unwanted, and abandoned radioactive sealed sources that pose a potential risk to national security, health, and safety. OSRP works with licensees from the private sector, DOE, DOD and other governmental agencies. This program can assist with sealed source identification, packaging, transportation, secure storage and disposition of sources in accordance with regulatory requirements.

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ORAU provides professional training in health physics, reconstructs radiation doses, conducts independent environmental assessments and verification, performs epidemiologic studies and exposure assessments, and manages health data for millions of active and former energy workers. A 501(c)(3) nonprofit corporation and federal contractor, ORAU manages ORISE for the Department of Energy.

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865-251-2078
www.perma-fix.com

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Stratham, NH 03885
603-778-2871
www.radsafety.com

RSCS offers expertise in all aspects of radiation safety and measurement applications. We specialize in operational and decommissioning services for nuclear, industrial, medical, and government radiological facilities. Our services include health physics consulting, technical staffing, training, instrumentation (sales, installation, calibration, and repair), emergency planning, and specialized radiological characterizations and measurements.

Radiation Solutions Inc — Booth: 421

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905 890 1111
www.radiationsolutions.com

Radiation Solutions Inc (RSI) is a manufacturer of low level radiation detection instruments. Specializing in large and small scale mobile systems for land vehicle, marine, airborne and stationary monitoring as well as handheld nuclide identification (RIID) units. Applications range from environmental, emergency response, security and geological mapping. The various systems offer Survey / Search , ID, Mapping and Directional capabilities. In addition, vehicle portal monitoring systems are also produced for homeland security, the scrap metal recycling industry and for solid waste transfer stations and trash sites.

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Ultra Electronics Energy — Booth: 403

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44 1202 850450
www.ultra-electronics.com

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csu-cvmbs.colostate.edu/academics/erhs/health-physics/Pages/default.aspx

Colorado State University offers both PhD and an ABET accredited MS program in in health physics, as well as concentrations in radioecology and radiochemistry. We have an established relationship with Fukushima University where many of our students perform their research. Most students are supported via grants from multiple agencies.

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Health Physics Graduate Program
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Durham, NC 27710
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School of Nuclear Science and Engineering
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www.ne.oregonstate.edu

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School of Health Science
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www.purdue.edu/hhs/hsci

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

Health Physics Program
1716 9th Ave S., SHPB 445
Birmingham, AL 35294
205-934-7637
www.uab.edu/shp/cds/health-physics

The University of Alabama at Birmingham (UAB) Master of Science in Health Physics (MSHP) program is the only Health Physics Program in the state of Alabama. For more information visit our website at: www.uab.edu/shp/cs/healthphysics

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University of Nevada, Las Vegas

Department of Health Physics and Diagnostic Sciences
4505 S. Maryland Parkway
Las Vegas, NV 89154
702-895-4320
www.unlv.edu/hpds

Students within the Department of Health Physics and Diagnostic Sciences may pursue certificate, minor, bachelor, and graduate degrees in the areas of health physics, nuclear medicine, comprehensive medical imaging, radiochemistry, and radiography. The mission of the health physics program is to provide a high-quality education experience for students in the fields of environmental health physics, medical physics, and radiation safety. The educational experience is accomplished through rigorous classroom instruction aided by computer and multimedia instruction, practical laboratory experiences, an introduction to the principles of research, and mentoring.

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Mentor Shadowing Program and Mentor Speed Networking

Introducing the Mentor Shadowing Program
(HPS Student Support Committee, HP-Connect)

The Mentor Shadowing Program is an offshoot of the HP-Connect Mentor program aimed at developing face-to-face interaction between Mentors and students/early career professionals at the annual HPS meetings. The goals of the Mentor Shadowing program are to facilitate meaningful and constructive discussion, to foster professional relationships between HPS members of various experience levels, and to increase society involvement of younger members by having the student/early career professional shadow a Mentor during the meeting (e.g., attending various social events, committee meetings, shared interest professional sessions/ presentations, etc.). A questionnaire will be sent to all persons expressing interest in the Mentor Shadowing program so that the HPS Student Support Committee can determine if there are sufficient numbers of potential Mentors and Shadows that have similar interests and goals for a successful trial program.

Additionally, communications between potential Mentors and Shadows may be established before the meeting if desired (but not required).

At the annual meeting, the program will kick-off with a combined Mentor Speed Networking/Meet & Greet event for interested parties so that mentors and students/early career professionals can discuss their interests, goals of the Mentor Shadowing program, and make plans for interactions through the remainder of the week. Other sponsored Mentor Shadowing events may be planned throughout the meeting; these will be available on the final meeting schedule and updated on the HPS Student Support Committee page as they are confirmed.

Mentor and Shadow Expectations

As a Mentor, you should be willing to have a "Shadow" for at least some time of the meeting. For example, you may invite your Shadow to a meal, social event, or exhibit hall lunch; have them go to committee meetings, PEPs, and/or a few presentations with you; introduce them to others who you think may be good professional connections for your Shadow(s). You do not have to have a Shadow for the entire time, the goal is just to establish lines of communication and make meaningful in-person connections that may continue outside of the meetings and/or at future meetings.

As a Shadow, you should be willing to shadow a Mentor for at least some portion of the meeting (see above). You may want to think about what type of questions you would like to ask a Mentor before the meeting and what you would like to get out of the relationship (e.g., academic advice, graduate school options, career options, knowledge on the mentors background/career path/goals, long lasting mentor relationship to continue outside of the meeting). Remember, it is okay if you just want or need some short term or one time advice, but it would be great if you make a real lasting connection too, even if just to recognize a friendly face at future meetings.

Mentor Speed Networking

The Student Support Committee will be hosting a Mentor Speed Networking event for students and early career professionals to connect with more experienced individuals within the Health Physics Society. 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. We hope to match students and early career professionals with a variety of potential mentors with similar disciplines. Each student and early career professional will be given time to chat with several possible mentors.

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Sunday Professional Enrichment Program (PEP)

All sessions take place in the Hilton Orlando

SUNDAY

08:00 – 10:00

PEP 1-A **Lake Concord**
DOE-STD-1153-2019 A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota
Katharine McLellan

PEP 1-B **Lake Hart**
Basic Training for the NRRPT Exam – Fundamentals
Tom Voss

PEP 1-C **Lake Down**
Fundamentals of Reproducible Research
Tom LaBone, Nancy Chalmers, Elizabeth Brackett

PEP 1-D **Lake George**
Quick and Dirty Radiological Dose Assessment Following a Rad/Nuke Emergency
Andy Karam

PEP 1-E **Lake Highland B**
Integration of Health Physics into Emergency Response
Stephen Sugarman

PEP 1-F **Lake Monroe**
Design of MARSSIM and MARSAME Surveys
David Stuenkel

PEP 1-G **Lake Sheen A**
Radiation Protection Consideration during Construction, Commissioning and Production of Mo-99 with a 40 kW 35 MeV Electron Linac
Pradyot Chowdhury

PEP 1-H **Lake Sheen B**
RDD Guidance
Brooke Buddemeier

PEP 1-I **Lake Florence**
The Fallacy of Safe-Siding Radiation Health Risk
Eric Daxon

10:30 – 12:30

PEP 2-A **Lake Concord**
RESRAD-BIOTA Code for the Evaluation of Radiological Doses to Flora and Fauna
Charley Yu, Sunita Kamboj, Jing-Jy Cheng, David LePoire

PEP 2-B **Lake Hart**
Basic Training for the NRRPT Eßxam – Practical Applications
Tom Voss

PEP 2-C **Lake Down**
Thorium Molten Salt Reactors (TMSR): Key Radiation Protection Challenges
Caspar Sun

PEP 2-D **Lake George**
Practical Computational Modeling for Health Physics (1) – Introduction to Monte Carlo Simulations
Shaheen DewjI

PEP 2-E **Lake Highland B**
Alpha Spectroscopy for the Health Physicist
Craig Maddigan

PEP 2-F **Lake Monroe**
Evaluation of MARSSIM and MARSAME Surveys
David Stuenkel

PEP 2-G **Lake Sheen A**
Dosimetry Methods for Second Cancer Risk Estimation Following Radiotherapy
Matthew Mille

PEP 2-H **Lake Sheen B**
Status of ANSI N42 RPI & HSI standards
Morgan Cox

PEP 2-I **Lake Florence**
Evolution of Occupational Radiological Protection
Dunstana Melo

14:00 – 16:00

PEP 3-B **Lake Hart**
Basic Training for the NRRPT Exam – Review of the Applicable CFRs
Tom Voss

PEP 3-C **Lake Down**
What Neurosciences Can Tell Us about Radiation Safety Decisions
Ray Johnson

PEP 3-D **Lake George**
Practical Computational Modeling for Health Physics (2) - Intermediate Monte Carlo Modeling with Anthropomorphic Phantoms
Autumn Kalinowski, Shaheen Dewji

PEP 3-E **Lake Highland B**
Gamma Spectroscopy for the Health Physicist
Craig Maddigan

PEP 3-F **Lake Monroe**
Technical Basis and Operational Experience for Clearance of Personal Property From SLAC Accelerator Facilities
James Liu, Ryan Ford, Jim Allan, Sayed Rokni

PEP 3-G **Lake Sheen A**
Federal Radiological Response Teams
Ken Groves

PEP 3-H **Lake Sheen B**
Neutrons: Discovery, Detection, Applications and Health Physics
Jeff Chapman

Final Scientific Program

Presenter's name is asterisked (*) if other than first author. All sessions take place in the Hilton Orlando.
This meeting has applied to CAMPEP for approval of 25 MPCEC hours..

MONDAY

07:15 – 08:15

CEL-2 **Orlando VI**
What Keeps Us from Being Effective Radiation Risk Communicators?
Ray Johnson

08:30 – 12:30 Orange D-G

MAM-A
Chairs: Nolan Hertel, Hannah Graham

08:30
Introduction
Hertel N
HPS President

08:40 **MAM-A.1**
Health Physicists and Their Impact on the Past, Present, and Future of America's Nuclear Security Enterprise
Gordon-Hagerty L
NNSA

09:10 **MAM-A.2**
The Linac Coherent Light Source Facilities: LCLS, LCLS-II and Beyond (G William Morgan Lecturer)
Galayda JN
SLAC National Accelerator Laboratory

09:40 **MAM-A.3**
General Introduction and the Latest Research Progress of China Institute for Radiation Protection
Liu L
CIRP

10:10 **Orlando I-III**
BREAK

10:40 **MAM-A.4**
Radiation Therapy Related Late Effects
Howell R
The University of Texas at MD Anderson Cancer Center

11:10 **MAM-A.5**
Comparison of Findings in Studies of Radiation and Cancer Risk in the Atomic Bomb Survivors Russian Populations Exposed as a Result of the Operation of the Mayak Plutonium Production Association (G William Morgan Lecturer)
Preston DL
Hirosoft International

11:40 **MAM-A.6**
Connecting Radiation Health Science to Protection of People
Niwa O
Radiation Effects Research Foundation

12:10 **MAM-A.7**
Panel Discussion

12:15 – 14:15

PEP M-1 **Orlando V**
A Radiation Protection Program Logic Model: Inputs, Outcomes and Benchmarking Opportunities and Strategies for Keeping Your Radiation Safety Program on Course in a Sea of Constant Change
Janet Gutierrez, Robert Emery

PEP M-2 **Orlando VI**
CAP88-PC Version 4.1 Update
Brian Littleton, Ray Wood

PEP M-3 **Orange A**
Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers
Michael Stabin

PEP M-4 **Orange B**
How to Choose the Correct Portable Radiation Detection Instrument for Your Needs
Judson Kenoyer

PEP M-5 **Orange C**
Considerations for Implementation of NCRP 179, Guidance for Emergency Response Dosimetry
Adela Salame-Alfie, Jeff Chapman

13:30 – 15:00 **Orlando I-III**

P: Poster Session

Radio-biology - Biological Response

P.1 Building a Statistical Index on Nuclear Security Culture Awareness at a University
Robinson MP, German NJ, Harris JT*
Purdue University

Risk Assessment

P.2 The Pseudo Pelger-Huet Cell, a Fast and Cheap Potential Biomarker for Radiation Dose: An Overview
Reti KE, Johnson TE, Hayes JM
Colorado State University

External Dosimetry

P.3 Research of Indications of Albedo Individual Neutron Dosimeters in the Fields of Mixed Gamma-Neutron Radiation of Various Origin
Gantsovskiy PP, Tsovyanov AG, Shinkarev SM
State Research Center - Burnasyan Federal Medical Biophysical Center of Federal Medical Biological Agency

P.4 Evaluation of Individual Extremity Dose Using 3D Scanner and Monte Carlo Simulation
Kim HS, Kim Y, Ha WH, Park S
Korea Institute of Radiological and Medical Sciences

P.5 Practical Lessons for Transitioning to a New Dosimetry System
Baca MA
Mirion - DSD

P.6 Establishment of Database for Retrospective Dose Estimation in Industrial Radiography Accidents
Kim Y, Kim HS, Ha WH, Jang S
Korea Institute of Radiological and Medical Sciences

P.7 Characterization of an Automated, All-Purpose Thermoluminescent Dosimeter Reader with Removable Planchets
Thiesen JH, Kuchta JR, Pombier KD, Chung LK, Golduber RM, Noey JD, Kearfott KJ*
University of Michigan

P.8 Preliminary Demonstration of a Method for Temporal Dosimetry using Passive, Integrating LiF:Mg,Ti Thermoluminescent Dosimeters
Thiesen JH, Kearfott KJ
University of Michigan

P.9 The Circle Experiment: Consistency of Radiation Dose Delivery for a Dosimeter Calibration Facility
Golduber RM, Kuchta JR, Champion RJ, Kearfott KJ*
University of Michigan

P.10 General Purpose Software for Thermoluminescent Dosimeter Glow Curve Analysis
Hepker JM, Thiesen JH, Kuchta JR, Kearfott KJ*
University of Michigan

P.11 A Comparison of Age-dependent Organ Depth Distributions: Stylized Versus Voxel Phantom Series
Griffin K, Dewji SA, Cuthbert T, Lee C*
National Cancer Institute - National Institutes of Health, Texas A&M University

P.12 Computation of Spontaneous Fission External Dose Coefficients due to Contaminated Environmental Media
*Kistle H, Dewji SA**
Texas A&M University

P.13 Comparison of Organ and Effective Neutron Dose Coefficients for Reference Phantoms in Articulated and Upright Postures in Cranial and Caudal Irradiation Geometries
Bales K, Perry A, Dewji SA*
University of Texas Health Science Center at San Antonio, Texas A&M University

Instrumentation

P.14 Monte Carlo Simulations to Predict the Energy Discrimination Capability of a Novel Beta Particle Detector
King JW, Marianno CM
Texas A&M University

P.15 Performance of Soviet Geiger-Muller Tubes with a Computerized Do-It-Yourself Detector
Dewald RM, Shen BJ, Tuey RA, Miller JM, Chung LK, Noey JD, Kearfott KJ*
University of Michigan

P.16 University of Michigan's Computerized Do-It-Yourself Geiger-Müller Radiation Detector: Preparation for Outreach Programs
Tuey RA, McClain RM, Miller JM, Chung LK, Li M, Shen BJ, Dewald RM, Wisusik FF, Noey JD, Kearfott KJ*
University of Michigan

P.17 Use of an Imaging Spectrometer for Characterization of a Cesium Facility
Champion RJ, Golduber RM, Chung LK, Kearfott KJ
University of Michigan

P.18 Dose Calibrator Activity Measurement of Actinium-225 for targeted alpha therapy
Kim JG, Lee TW, Song KH, Yoo WJ, Kim BS
Korea Institute of Radiological and Medical Sciences, Korea Association for Radiation Application

P.19 World List of Early Nuclear Reactors, Africa and Asia. A Philatelic Look at Health Physics History.
Johnston TP
NIST

P.20 World List of Early Nuclear Reactors, Europe. A Philatelic Look at Health Physics History.
Johnston TP
NIST

P.21 World List of Early Nuclear Reactors, the Americas and Antarctica. A Philatelic Look at Health Physics History.
Johnston TP
NIST

P.22 Development of an Optical Sensor to Measure Opacity Changes in Polyvinyl Toluene Scintillators
Ordonez EA, Marianno CM, King JW, Suh R
Texas A&M University

Academic Institutions

P.23 Revision of an Undergraduate Health Physics Program for a New Generation
Fulmer PC, Jokisch DW
Francis Marion University

Emergency Response

P.24 Southern Urals Regional Emergency Medical-dosimetry Center. The Experience
Marov VA
Southern Urals Biophysics Institute of the FMBA of Russia

P.24.5 A Novel Approach to Tomographic Imaging for Internalized Dose Estimation for At-Risk Members of the Public
O'Connell C, Foreman C, D'Souza B, Caldwell N, Cuthbert T, Dewji SA
Texas A&M University

Air & Environmental Monitoring

P.25 The Use of Administrative Monetary Penalties in Nuclear Safety
Vucicevic J, Waller E
University of Ontario Institute of Technology

P.26 Status of Zooplankton Communities of Radioactively Contaminated Reservoirs of "MAYAK" Production Association
Aldibekova AY, Styazhkina EV, Osipov DI
URCRM, Russia

P.27 Natural Radioactivity Measurement And Dose Assessment Of Excavated Soils and Well Waters Of Southwestern Nigeria
Oladele BB, Dike CG
Federal University of Technology Akure, Nigeria

P.28 Modeling of Radiocesium Urban Washoff and Fate in Wastewater Treatment Plant
Ng GM, Higley KA
Oregon State University

P.29 Development and Comparison of Plant-Specific Dosimetric Phantoms
Montgomery DA, Martinez NE
Clemson University

P.30 Investigation of Variations in Gamma Rays Detected by the EPA Air Monitoring Systems Located in Pennsylvania
Fallahian N, Zhang D, Ambrose TA, Simpson DR*
Bloomsburg University

P.31 Low Dose Retrospective Dosimetry on Shelled Aquatic Species
Hassan A, Waller EJ
University of Ontario Institute of Technology

P.32 Investigation of the Bioavailability of Radiocesium in the Fukushima Exclusion Zone using a Sequential Extraction Technique
McNabb IM, Sudowe R
Colorado State University

P.33 Uncertainty of the Results of the Radon Control in Housings. The Problem of Assessment of the Radon Concentration and Modern Control Principles
Tsapalov AA, Kiselev SM, Marennyy AM, Kovler KL, Kuvshinnikov SI, Kiselev SI*
Institute of Mineralogy, Geochemistry and Crystal Chemistry of Rare Elements, SRC Burnasyan Federal Medical Biophysical Center of the FMBA of Russia, Federal State Unitary Enterprise Research and Technical Center of Radiation-Chemical Safety and Hygiene of the FMBA of Russia, National Building Research Institute, Israel Institute of Technology, Federal Service for Surveillance on Consumer Rights Protection and Human Well-Being, Moscow, Russia

P.34 Radon Kinetics in a Natural Indoor Radon Chamber
Mata LA, Ye Y, Chung LK, Carmona MA, Maurer TE, Shubayr NA, Zhou Q, Kearfott KJ*
University of Michigan, University of South China, Jazan University

P.35 Evolution of the University of Michigan's Radiation Weather Station System for Research and Public Outreach
*Maurer TE, Chung LK, White WJ, Kearfott KJ**
University of Michigan

P.36 Development of Korea's Radiation Safety Information System : Identifying Challenges and Developing Functions
Kim MK, Kim JY, Yang JS, Lee JH, Lee KH, Lee BH
Korea Institution of Nuclear Safety

P.37 Numerical Simulation of Radon Concentration Distribution in a Discovered Radon Chamber with and without Fans
Ye Y, Mata LA, Zhou Q, Huang J, Chung LK, Morishita Y, Carmona MA, Liu W, Kearfott KJ*
University of Michigan, University of South China, Japan Atomic Energy Agency

P.38 Numerical Simulation of Radon Migration and Exhalation Rules of Loose Porous Emanation Media during Measuring of the Radon Exhalation Rate
Ye Y, Mata LA, Zhou Q, Chen G, Su H, Chung LK, Morishita Y, Carmona MA, Kearfott KJ*
University of Michigan, University of South China, Japan Atomic Energy Agency

P.39 Study of the Reliability of Soil ^{222}Rn and ^{220}Rn Concentrations Measured with In-Situ Diffusion Chamber Methods
Ye Y, Chung LK, Zhou Q, Kearfott KJ*
University of Michigan, University of South China

P.40 Evaluation of Radiological Health Hazard Parameters of Selected Fertilizers- A Statistical Approach
Clark P, Wilson L, Brandon J, Billa J, Adzanu S, Adjaye J, Ankrah M
Alcorn State University, University of Kentucky

P.41 Assessment of Isotopic Transfer Factors in Sweet Potatoes
Vattikonda J, Akuana B, Amankwah M, Bolton Y, Billa J, Adzanu S, Adjaye J, Ankrah M
Alcorn State University

P.42 Assessment of Radionuclide Contents in Soil Samples in the Vicinity of a Coal Fired-power Plant in Mississippi
Gella U, Beitollahi M, Billa J, Adzanu S, Adjaye J, Ankrah M
Alcorn State University, University of Utah, University of Kentucky

P.43 Pitchblende. A Philatelic Look at Health Physics History.
Johnston TP
NIST

P.44 Evaluation of Radioactivity Levels in Soilless Growth Media Collected From Agricultural Research Site in Tallahassee, Florida.
Osei GK, Ngatia LW, Abazinge MD, Bolques A, Billa JK, Jagoe C
Florida A&M University, Alcorn State University

Department of Energy Facilities

P.45 Investigation of the Creation and Spread of Contamination During Rapid Oxidation of Depleted Uranium Pressed Powder Pellets.
Hollaway DA, Beck RL
Idaho National Lab

Dose Reconstruction

P.46 Dosimetric Models of Hematopoietic Sites of Skeleton for Male and Female
Parshkova DA, Shishkina EA, Tolstykh EI, Sharagin PA, Degteva MO, Smith MA
Chelyabinsk State University, URCRM, PNNL

Internal Dosimetry

P.47 Applying of ICP-MS for Individual Dosimetric Control of Plutonium Intake
*Ephimov AV, Batalov VR**
Southern Urals Biophysics Institute, Southern Urals Biophysics Institute, Russia

P.48 Assessment of Counting Efficiency Depending on the Physical Characteristics of Subject for Whole Body Counting Measurement by Monte Carlo Simulation
Park MS, Ha WH, Park SH, Jin YW
Korea Institute of Radiological and Medical Sciences

P.49 Faster, Sharper, and Open: A New Pipeline for Biota Phantoms
Neville D, Higley KA
Oregon State University

Radiation Effects

P.50 Association of Single Nucleotide Polymorphisms of Apoptosis and Cell Cycle Control Genes with the Risk of Malignant Neoplasm Development in Chronically Exposed Persons
Blinova EA, Ianishevskaia MA, Akleyev AV*
Ural Scientific and Practical Center of Radiation Medicine, Chelyabinsk

P.51 Mayak Worker Families and Offspring Database – Source for Studies of Hereditary Effects of Ionizing Radiation
*Azizova TV, Zhuntova GV, Grigoryeva ES, Denisova AA**
Southern Urals Biophysics Institute

P.52 Analysis of Interrelation Between Lifetime Shortening and Plutonium-239 in Atomic Workers
Legkikh IV
Southern Urals Biophysics Institute

P.53 The Study of the Telomere Length in Chronically Exposed People
Krivoshchapova YA
Urals Research Center for Radiation Medicine, Chelyabinsk

P.54 Characterization Of MCP-124 and MCP-150 Metal Alloys for Beam Collimation and Radiation Shielding purposes.
*Stinson K, Maqbool M**
University of Alabama at Birmingham

P.55 Estimation of Exposure Dose by Naturally Occurring Radionuclides in Food consumed in Korea
Kim JY, Kim MK
Korea Insttute of Nuclear Safety

P.56 Measurement of Absorbed Dose and Radiation Quality for Low Energy Beta Particle Emitters in Micrometric Sites Using a Wall-less TEPC
Boyd CO, Waker AJ
University of Ontario Institute of Technology

Medical Health Physics

P.58 Reducing Variability of Radiation Dose in Computed Tomography: The New Frontier in Patient Safety
Lockerby S, Lee RK, Sun JY, Soltycki E, Matalon T
Einstein Healthcare Network

P.59 State of Radiation Protection Practice by Radiologic Technologists at Saudi Pediatric Hospitals
Gary MS
Alfaisal University

P.60 Evaluating Dosimetric Changes Caused by Positional Errors of the SAVI Applicator Used for Breast Cancer Treatment
*Jammali A, Maqbool M**
Ball State University, University of Alabama at Birmingham

P.61 Four-Dimensional Digital Tomosynthesis Based On Visual Respiratory Guidance
*Kim DS, Suh TS**
The Catholic University of Korea

P.62 Validation of Isodose Curves for the Airo Mobile CT
Smiley BR, Kurgatt S, Yoshizumi T
Duke University

P.63 Estimation of Patient Release Exposure Rates for Pediatric Patients Receiving I-131 Therapy
Aziz L, Dewji SA
Texas A&M University

Ethics and Radiation Protection

P.64 Proposal of Technology Trees for insuring the Qualities of Radiation Safety Program in Korea
Kim BH, Hwang WT, Lee JI, Kim KM, Kim CH, Kim KP, Lee HS, Kwon JW, Kim SY, Kim JI
KAERI, KIRAMS, Han Yang University, PAL, RadCore, KHNP RHI

Military Health Physics

P.65 Space Applications with Radiation Sources and Detectors, Part 1. A Philatelic Look at Health Physics History
Johnston TP
NIST

P.66 Space Applications with Radiation Sources and Detectors, Part 2. A Philatelic Look at Health Physics History
Johnston TP
NIST

P.67 Ships and Submarines. A Philatelic Look at Health Physics History
Johnston TP
NIST

Works-in-Progress

P.68 Dual PSA Discriminators to Categorize Marginal Events for Optimal Alpha Beta Separation and Improved Quality Metric
Belobradydich M, Harazin R, Sim J, Troyer R, Ward B
PerkinElmer, Inc.

P.69 Low Dose Radiation Induces Radioprotective Melanocyte Umbrella and a Latent Hormetic Effect in Danio Rerio
Gee SC
Reed College

P.70 Aqueous Uranium Uptake Using Dextran-graft Polyacrylamide and Kaolinite Clay
Cabrera TA, Bliznyuk VN, Kutsevol NV, DeVol TA
Clemson University, Kiev Shevchenko University

P.71 Moving Towards Risk Informing Emergency Preparedness around Commercial Nuclear Power Plants
Milligan PA
US NRC

15:00 – 17:45 Orlando IV

MPM-A
Exhibitors of the HPS: A Special Discussion on Products and Services

Chairs: Dustin Miller, Jim Menge

15:00 **MPM-A.1**
Continuous and Unattended Spectroscopic Operation and Analysis with the Mirion Data Analyst
Zickefoose J, Bronson F, Huckins B, Anderson T, Laskos S, Sullivan D
Mirion Technologies (Canberra) Inc

15:15 **MPM-A.2**
RadSolver - Sensitive Affordable Gamma Imager
Khodyuk I, Fiala J, Motakef S
CapeSym, Inc.

15:30 **MPM-A.3**
The Use of Smart Scintillation Detectors in Installed and Portable Health Physics Instruments
Asamoto BS, Kocvara S
HI-Q Enironmental Products Company, Inc.

15:45 **MPM-A.4**
Radioactive Standards for Instrument Calibration
Beinlich UF
Eckert & Ziegler Isotope Products

16:00 **MPM-A.5**
Hidex Scintillation and Gamma Counters
Boodhun AS
LabLogic Systems Inc

16:15 **MPM-A.6**
3D Gamma Source Mapping and Intervention Analysis
Hilsabeck JR
Transco Products, Inc.

16:30 **MPM-A.7**
Unmanned Aerial Vehicle Deployed Radiation Measurement System
Kaletsch K
Environmental Instruments Canada Inc.

16:45 **MPM-A.8**
RN SUITE: a Synthetic Radiological Training Environment
Winso JH, Rolando JB
Spectral Labs

17:00 **MPM-A.9**
Odyssey: A Web-Based Modern Management System for Radiation Safety Programs
Ramsay BM, Ramsay IA, Roller DA
Versant Medical Physics

17:15 **MPM-A.10**
Fuji Electric Innovation in Radiation Detection
Menge JP
SME Associates

17:30 **MPM-A.11**
Chase Environmental Group - Decommissioning & Brokerage Services
Miller DG
Chase Environmental Group, Inc.

14:30 – 17:00 Orlando V

MPM-B
Board of Director's Special Session: Changes in Director's Roles and HPS Strategic Plan

Chair: Tara Medich

14:30 **MPM-B.1**
Summary of and Rationale for Governance Changes
Abelquist EW
ORAU

14:45 **MPM-B.2**
Role of Director in Revised HPS Governance Mode
Lewandowski M
3M Corporate

15:00 **MPM-B.3**
History of HPS Strategic Planning: Dodd, Simpkins, Lanza
Simpkins AA
NV5

15:15 **MPM-B.4**
A Strategic Board: Implementation of HPS Strategic Planning 2016 to Today
Lewandowski M
3M

15:45 **MPM-B.5**
HPS 2017 Goal Priority A1, Leverage Annual Meeting Resources to Engage Members - Presentations
Mahathy JM
ORAU

16:00 **MPM-B.6**
HPS 2017 Goal Priority A1, Leverage Annual Meeting Resources to Engage Members – PDS and PEP Talks
Morgan III TL, Mahathy JM
HPS, ORAU

16:15 **MPM-B.7**
HPS 2017 Goal Priority A1, Leverage Annual Meeting Resources to Engage Members – Affiliate Interactions
Perle SC, Mahathy JM
HPS, ORAU

16:30 **MPM-B.8**
Leading to the Future: Opportunities for Early Career Members
Caffrey EA
Risk Assessment Corporation

16:45 **MPM-B.9**
Panel Discussion: Director Experiences with Governance Change and Strategic Planning
Braun JS, Berry K, Mahathy JM, Whicker JJ*
Mayo Clinic, Fox Chase Cancer Center, ORAU, LANL

15:00 – 17:00 Orlando VI

MPM-C
Special Session: Government Relations
Chair: Craig Little

15:00 **MPM-C.1**
The HPS Government Relations Program: Our Members Voice in Washington
Little CA
HPS

15:20 **MPM-C.2**
Health Physics Society Government Relations Committee
Ring JP, Elder D, Hiatt JW, Anderson K
Beth Israel Deaconess Medical Center, University of Colorado Hospital, Nuclear Energy Institute, Barnes-Jewish Hospital

15:40 **MPM-C.3**
NRC/HPS: A Relationship that Informs Radiation Protection
Flannery CM
US NRC

16:00 **MPM-C.4**
Interactions Between EPA and HPS Strengthen Both Organizations
Wieder JS, Boyd MA, Veal LA
U.S. EPA

16:20 **MPM-C.5**
HPS Interaction with Congress
Connolly DA
The Connolly Group

16:40 **MPM-C.6**
Recent National Academies' Activities on Radiation Health Effects
Kosti O
National Academies of Sciences, Engineering, and Medicine

15:00 – 17:00 Orange A

MPM-D
Special Session: Medical Health Physics
Chair: Brian Lemieux

15:00 **MPM-D.1**
Medical Radiation Exposure of Patients in the United States
Bushberg J, Held K, Mettler F, Mahesh M, Miller D, Bhargavan Chatfield M, Frush D, Guebert G, Milano M, Chambers C
NCRP, University of New Mexico, Johns Hopkins University School of Medicine, US Food and Drug Administration, American Collage of Radiology, Stanford Children's Hospital, University of Rochester, Penn State University College of Medicine

15:30 **MPM-D.2**
Past, Present and Future of Patient Radiation Dose Management Efforts - Has Progress Been Made?
Martel CB
Philips Healthcare

16:00 **MPM-D.3**
International Atomic Energy Agency's (IAEA) Efforts to Improve Radiation Protection and Patient Safety
Gilley D
IAEA

16:15 **MPM-D.4**
Discussion
Lemieux B
UK HealthCare

16:30
Medical Section Business Meeting

14:30 – 17:00 Orange B

MPM-E
Special Session: AIRRS
Chair: Catherine Ribaudo

14:30 **MPM-E.1**
Leaking Ni-63 Source from Ionscan Chemical Agent Detectors
Ribaudo CA
National Institutes of Health

14:50 **MPM-E.2**
Hidex Triple Label Quench Curve - Part II
Ball KF
National Institutes of Health

15:10 **MPM-E.3**
Transition from Beckman Coulter and Perkin Elmer to the Hidex Counting Equipment
Ball KB
National Institutes of Health

15:30 **MPM-E.4**
Haute Compliance: A Radiation Safety Management System in Use
Sturchio GM
Mayo Clinic College of Medicine

15:50 **MPM-E.5**
Decommissioning Lessons Learned for Academic and Research Reactor Institutions
Miller DG
Chase Environmental Group, Inc.

16:10
AIRRS Business Meeting

15:00 – 17:00 Orange C

MPM-F
Emergency Response Part 1
Chairs: Patricia Milligan, Craig Marianno

15:00 **MPM-F.1**
The Radiological Operations Support Specialist at Cobalt Magnet 19
Irwin WE
Vermont Department of Health

15:15 **MPM-F.2**
Managing First Responder Dose in Severe Reactor Accidents: The Role for Wearable Selective Shielding
Jaczko G
Senior Nuclear Advisor StemRad, former US NRC Chair

15:30 **MPM-F.3**
Risk Informing Emergency Preparedness for Small Modular Reactors and other New Technologies
Milligan PA
US NRC

15:45 **MPM-F.4**
Orphan Source Search and Secure Program: Issues, Achievements, Sustainability
Kahn RA, McRee B, Rolando J, Taplin T
Argonne National Laboratory, Pacific Northwest National Laboratory, Spectral Labs Incorporated, DOE/National Nuclear Security Administration

16:00 **MPM-F.5**
Passive Neutron Activation Detectors
Exline PR, Hertel NE
Georgia Institute of Technology, US Army

16:15 **MPM-F.6**
Validation of a Dose Assessment Tool to be Used in Loose Contamination Exercises
Chen ML, Cochran LD, Cook KM, Marianno CM
Texas A&M University

16:30
Instrumentation Business Meeting

06:45 – 07:45

CEL-3 **Orlando VI**
Making Your Radiation Safety Message Stick! 35 Years of Powerful Quotes Collected on Sticky Notes
Janet Gutierrez, Robert Emery

CEL-4 **Orange B**
History and Overview of the Formerly Utilized Sites Remedial Action Program
John Hackett

CEL-5 **Orlando IV**
Dosimetry Challenges of New Nuclear Medicine Theranostic Agents
Michael Stabin

08:30 – 11:15 Orlando IV

TAM-A
AAHP Special Session: Risk Communication in the Context of Low Dose Health Effects
Chairs: Kathy Pryor, Armin Ansari

08:30
Introduction

08:45 **TAM-A.1**
The Use and Misuse of Effective Dose
Cool DA
ICRP

09:15 **TAM-A.2**
Science Is Not Enough
Daxon EG
SINE

09:45 **TAM-A.3**
Say What? Patient-Centered Communication on Benefits and Risks
Dauer LT
Memorial Sloan Kettering Cancer Center

10:15 **Orlando I-III**
BREAK

10:45 **TAM-A.4**
Risk Communication in Emergency Response and Recovery
Wieder JS
U.S Environmental Protection Agency

08:00 – 11:30 Orlando V

TAM-B
Medical Health Physics Part 1
Chairs: John Hackett, Joseph Ring

08:00 **TAM-B.1**
Testing the IAEA TRS483 Code of Practice for Small Fields Dosimetrynat King Faisal Specialist Hospital and Research Centre
Arib M, Nobah A, Alkafi A, Alzorkani F, Shehadeh M, Mwedu U, Alnajjar W, Moftah B, Mayhoub F, Noor O
King Faisal Specialist Hospital and Research Centre

08:15 **TAM-B.2**
Development of Novel Nano-Fiber Optic Detector Technology for Real-time Detection of Beta Energy in a Pure Beta Emitter (P-32)
Smiley BR, Petry NA, Gunasingha R, Therien M, Yoshizumi T
Duke University

08:30 **TAM-B.3**
Dosimetry In Pulsed Radiation Fields – Features And Measurement Data Of An Innovative Active Alarming Personal Dosimeter
Iwatschenko-Borho MA, Trost N
Thermo Fisher Scientific Messtechnik GmbH

08:45 **TAM-B.4**
Dose Analysis & Comparison For Landauer Personnel Dosimetry & Philips Dose-Wise Dose Management System
*Pringle D, Yates S, Johnson L**
University of Alabama at Birmingham

09:00 **TAM-B.5**
Selective-reconstruction Methods and A Microscopic-system Design for Spectral Computed Tomography
Wang Q
University of Massachusetts Lowell

09:15 **TAM-B.6**
Dosimetric Characterization of a High Efficiency Gaseous Neutron Dosemeter Consisting of 95 Multi-elements
Kim JY
McMaster University

09:30 **Orlando I-III**
BREAK

10:00 **TAM-B.7**
A New Era of Medical Radiation Shielding: Environmentally Friendly Lead-Free Alternate for the Attenuation of X- and Gamma Rays
*Fenelon PJ, Liverett MD, Konerth SE**
Artemis Shielding LLC, Versant Medical Physics and Radiation Safety

10:15 **TAM-B.8**
The Radiation Safety Officer as an Advocate for Patient Safety
Morgan TL
Versant Medical Physics

10:30 **TAM-B.9**
Simplifying the Identification and Management of Radiation Protective Apparel
Ring JP, Jozokos J, Mungia J, Bohn J
Beth Israel Deaconess Medical Center, Tego, Inc

10:45 **TAM-B.11**
131I-Iomab-B Blood Sample Handling and Occupational Radiation Extremity Exposures
Safavi F, Fisher DR, Konerth S, Liang Q, Reddy V, Berger MS*
Actinium Pharmaceuticals, Inc., Versant Medical Physics and Radiation Safety

11:00 **TAM-B.12**
Evaluating Feline Release Criteria Following Iodine-131 Treatment For Hyperthyroidism
Davila AD, Fletcher JF, Matthews KM, Wang WW
Louisiana State University, Louisiana State University School of Veterinary Medicine, Louisiana State University

11:15 **TAM-B.14**
Health Physics Analysis of Cs-131 Mesh Implants for Colorectal Cancer
Chang LA, Patel P, Alvarez H, Quan EM
Houston Methodist Hospital

08:30 – 11:30 Orlando VI

TAM-C
Internal Dosimetry
Chairs: John Klumpp, Dan Strom

08:30 **TAM-C.1**
Radon Recommendations: NCRP vs. ICRP
Harley NH
NYU School of Medicine

08:45 **TAM-C.2**
Cylindrical Representations of Recycling Biokinetic Models
Strom DJ, Dumit S, Avtandilashvili M, McComish SL, Tabatadze G, Tolmachev SY
Washington State University, Los Alamos National Laboratory

09:00 **TAM-C.3**
Macrodistribution of Plutonium among Dosimetric Compartments of the Human Respiratory Tract
Avtandilashvili M, Tolmachev SY
USTUR, Washington State University

09:15 **TAM-C.4**
Biokinetics of Pu-238 Oxides: Inferences from Bioassay Data
Poudel D, Bertelli L, Klumpp JA, Dumit S, Waters TL
Radiation Protection Division, LANL

09:30 **Orlando I-III**
BREAK

10:00 **TAM-C.5**
Investigation of a Plutonium 238 Skin Puncture Event
Costigan SA
Los Alamos National Laboratory

10:15 **TAM-C.6**
Application of the Los Alamos Screening Wound Counter to a 238Pu Contaminated Wound
Gadd MS
LANL

10:30 **TAM-C.7**
Case Study of a Wound Contaminated With 238Pu
Klumpp JA, Bertelli L, Poudel D
Los Alamos National Laboratory

10:45 **TAM-C.8**
Historical Plutonium Contaminated Wound: Progression of the Calculated Dose During and After Chelation Treatment
Dumit S, Miller G, Bertelli L, Klumpp JA, Poudel D, Waters T
Los Alamos National Laboratory

11:00 **TAM-C.9**
Mitigating the Psychological Harm from Actinide Intakes
Klumpp JA, Bertelli L, Hoffman J, Poudel D, Waters T
Los Alamos National Laboratory

11:15 **TAM-C.10**
A Review of Computational Dosimetry for Intakes of Strontium-90
Jokisch DW
Francis Marion University, Oak Ridge National Laboratory

08:30 – 12:00 Orange A

TAM-D
Special Session: Environmental / Radon Section

Chairs: James Reese, Phil Egidi

08:30 **TAM-D.1**
Measurements of Alpha and Beta Radiation from Uncontaminated Surfaces of Common Building Materials
Bullock CA, Whicker JJ, Chastenet MJ, Mcnaughton M
Los Alamos National Laboratory

08:55 **TAM-D.2**
Statistical Analysis for Indistinguishable from Background Unrestricted Release of Property Using Visual Basic
Chastenet M, Bullock C, Whicker JJ
Los Alamos National Lab

09:20 **Orlando I-III**
BREAK

09:50 **TAM-D.3**
Long-Term Assessment of Critical Radionuclides and Associated Environmental Media at the Savannah River Site
Jannik GT, Paller MH, Baker RA, Eddy TP
Savannah River National Laboratory, Savannah River Nuclear Solutions

10:15 **TAM-D.4**
Uptake of Radionuclides by Plants from Soils at Uranium Mine Impacted Sites
Hargraves JT, Higley KA
Oregon State University

10:40 **TAM-D.5**
International Radiation Protection and Waste Management Guidance for NORM/TENORM Sites
Egidi P
US EPA

11:05
Environmental/Radon Section Business Meeting

08:20 – 11:50 Orange B

TAM-E
Special Session: Non-Ionizing Radiation (NIR) Section

Chairs: Jerrold Bushberg, Fred McWilliams

08:20
Introduction

08:30 **TAM-E.1**
Overview of Safety Standards For Non-ionizing Electromagnetic Fields (0-300 GHz)
Chou CK
IEEE ICES TC95

09:10 **TAM-E.2**
Transient Thermal Responses of Tissue to Millimeter-wave Pulses
Foster KR, Ziskin MC, Balzano Q
University of Pennsylvania, Temple University Medical School, University of Maryland

09:40 **TAM-E.3**
Assessing RF Exposure by Analysis: Estimating RF Fields through Calculation
Tell RA
Richard Tell Associates, Inc.

10:20 **Orlando I-III**
BREAK

10:50 **TAM-E.4**
RF Field Measurements: Overview of Instruments and Techniques
Haes DL
Consultant

11:20 **TAM-E.5**
RF Safety Programs: The What, Why, When and Where
*Tell RA, Haes DL**
Richard Tell Associates

08:30 – 12:00 Orange C

TAM-F
Special Session: Translational Approaches to Improve Health Effects Knowledge in Support of Radiation Protection Guidance

Chairs: Isaf Al-Nabulsi, Daniela Stricklin

08:30 **TAM-F.1**
The Framework for an Adverse Outcome Pathway for Radiation Carcinogenesis
Stricklin DL
DOE

09:00 **TAM-F.2**
Review of Modern Molecular and Cellular Low Dose Radiation Literature Reveals Need for Paradigm Shifts in Radiation Biology
Tharmalingam S, Sreetharan S, Brooks AL, Boreham DR
Northern Ontario School of Medicine, McMaster University, Washington State University

09:30 **TAM-F.3**
Exploring the Adverse Outcome Pathway Framework in Radiation Risk Assessment: A Case Example of Radon-Induced Lung Carcinogenesis
Chauhan V
Health Canada

10:00 **TAM-F.4**
Radiation Effects on Neurogenesis: A Mechanistic Modeling Approach
Cacao E, Cucinotta FA
University of Nevada Las Vegas

10:30 **Orlando I-III**
BREAK

11:00 **TAM-F.5**
Integrating Molecular Biology and Radioepidemiology for Biologically-Based Risk Estimation with Mechanistic Models of Carcinogenesis
Kaiser JC
Helmholtz Zentrum Muenchen

11:30
Panel Discussion

12:15 – 14:15

PEP T-1 **Orlando VI**
HEU to LEU Conversion and the Production of Mo-99 Without the Use of HEU
Lynne Fairobent, Jeff Chapman

PEP T-2 **Orange B**
Where Did This Come From? Lessons Learned from High-Routine Bioassay Investigations
Brett Rosenberg

PEP T-3 **Orlando IV**
An Overview and the Lessons Learned from a Response to a Radiological Event Involving Potentially Significant Internal Radiation Doses from Americium-241
Manuel Mejias, Steven Dewey

PEP T-4 **Lake Hart**
Basic Physics for Radiation Detection
Doug Van Cleef

14:30 – 18:00 Orlando IV

TPM-A
AAHP Special Session: Risk Communication in the Context of Low Dose Health Effects

Chairs: Kathy Pryor, Armin Ansari

14:30 **TPM-A.1**
Risk Communications in the Context of Low Dose Health Effects: Communicating in the Courtroom
Frazier JR
Consultant

15:00 **TPM-A.2**
Importance of Audience Research in Communicating Radiological Health Information
Ansari A
Centers for Disease Control and Prevention

15:20
Question & Answer Session

16:00 **Orlando I-III**
BREAK

17:00
AAHP Business Meeting

14:30 – 17:00 Orlando V

TPM-B
Medical Health Physics Part 2
Chairs: Thomas Morgan, Muhammad Maqbool

14:30 **TPM-B.1**
The Development, Validation, And Application Of A Monte Carlo-based CBCT Model To Investigate Patient Size Impact On Organ Dose
Niskanen HK, Caracappa PF, Xu XG
Rensselaer Polytechnic Institute, Columbia University

14:45 **TPM-B.2**
Occupational Radiation Exposures to Clinical Staff Working With I-131-Iomab-B
Safavi F, Konerth S, Fisher DR, Liang Q, Reddy V, Berger MS
Actinium Pharmaceuticals, Inc., Versant Medical Physics and Radiation Safety

15:00 **TPM-B.3**
The Adventures of a Health Physicist in Nuclear Medicine as a Patient
Schultz DB
United States Military Academy

15:15 **TPM-B.4**
Estimation of External Dose Rates to Hotel Workers from I-131 Patients
Foreman C, Dewji SA
Texas A&M University

15:30 **Orlando I-III**
BREAK

16:00 **TPM-B.5**
Radioactive Decedants - What are the Risks?
Miller MA, Sturchio GM
Cleveland Clinic, Mayo Clinic

16:15 **TPM-B.6**
Functions of the Nuclear Regulatory Commission Advisory Committee on the Medical Uses of Isotopes - Part I
Sheetz MA, Holiday S
University of Pittsburgh, US Nuclear Regulatory Commission

16:30 **TPM-B.7**
Functions of the Nuclear Regulatory Commission Advisory Committee on the Medical Uses of Isotopes - Part II
Holiday S, Sheetz MA
US Nuclear Regulatory Commission, University of Pittsburgh

16:45 **TPM-B.8**
Assessment of Reference Dose Associated with Computed Tomography Examination
Allehyani SH
Medical Physics Division

14:30 – 15:30 Orlando VI

TPM-C1
Risk Assessment
Chair: Wayne Gaul

14:30 **TPM-C1.1**
A Methodology for Investigating the Impact of Biological Countermeasures on the Risk of Exposure Induced Death
Werneth CM, Slaba TC, Blattnig SR, Huff JL, Norman RB
NASA, Wyle Laboratories, Inc.

14:45 **TPM-C1.2**
US EPA Superfund Model for Assessing Radon and Thoron Intrusion
Walker SA
US Environmental Protection Agency

15:00 **TPM-C1.3**
US EPA Superfund Assessing Risks and Doses of Homegrown Food at Contaminated Sites
Walker SA
US Environmental Protection Agency

15:15 **TPM-C1.4**
Minimum Provable Risk Considering the Variation in Background Risk
Sasaki M, Ogino H, Hattori T
Central Research Institute of Electric Power Industry

16:00 – 17:15 Orlando VI

TPM-C2
Radiobiology - Biological Response
Chairs: Ronald Goans, Lisa Manglass

16:00 **TPM-C2.1**
The Neutrophil-Lymphocyte Ratio as a Triage Tool – The REAC/TS Accident Registry Experience
Goans RE
MJW Corporation

16:15 **TPM-C2.2**
Uptake of 239Pu in Common Environmental Bacteria Evaluated for Transcriptional Changes as a Result of Low-Dose Radiological Exposures
Manglass LM, Wintenberg M, Blenner M, Martinez N
Clemson University

16:30 **TPM-C2.3**
The Pseudo Pelger-Huet Anomaly as a Potential Biodosimeter for Chronic Low Dose Radiation Exposures of Japanese Wild Boar
Hayes JM, Iddins C, Thomas TE, Goans R
Colorado State University, Oak Ridge Associated Universities

16:45 **TPM-C2.4**
Detection of Early Radiation Damage to the Eye-Lens of Rainbow Trout
Kocemba M, Waker AJ
University of Ontario Institute of Technology

17:00 **TPM-C2.5**
Comparative Analysis of The Effect of Low Doses of Radiation on Human Mesenchymal Stem Cells.
Usupzhanova DY, Astrelina TA, Nikitina VA, Suchkova YB, Kobzeva IV, Brunchukov VA, Brumberg VA, Nugis VY, Osipov AN, Samoylov AS
State Research Center - Burnasyan Federal Medical Biophysical Center FMBA of Russia

14:30 – 17:15 Orange A

TPM-D
Special Session - Rad NESAHAPS
Chairs: Matthew Barnett, Dave Fuehne

14:30 **TPM-D.1**
U.S. Environmental Protection Agency Update on the Radionuclide NESHAPs
Walsh JP
U.S. EPA

14:45 **TPM-D.2**
U.S. Environmental Protection Agency Update on Compliance Codes
Littleton BK, Wood R, Stuenkel D
U.S. EPA, Trinity Engineering Associates

15:00 **TPM-D.3**
Resuspension and Redistribution of Plutonium and Americium in the WIPP Environment
Ward AL, Thakur P
US Department of Energy, Carlsbad Environmental Monitoring and Research Center

15:15 **Orlando I-III**
BREAK

15:45 **TPM-D.4**
On Sampling The Background Indoor Particulate Resuspension Factor
Marshall SA, Medich DC, Potter C
Worcester Polytechnic Institute, Sandia National Laboratories

16:00 **TPM-D.5**
DOE Subpart H Report
Snyder SF, Favret D
Pacific Northwest National Laboratory, Department of Energy

16:15
Rad NESHAPS Roundtable Q&A

14:30 – 18:00 Orange B

TPM-E
Special Session: Non-Ionizing Radiation (NIR) Section

Chairs: Jerrold Bushberg, Fred McWilliams

14:30 **TPM-E.1**
Communicating the Science and Risk of Emerging Technologies in a Sea of Intuitive Toxicology and Cognitive Bias
Bushberg JT
NCRP

15:15 **TPM-E.2**
NIR Distinguished Service Award

15:25
Panel Discussion

16:05 **TPM-E.3**
Commercial Wireless Towers on Campus
Jo MC, Woolf SA
University of Nevada, Reno

17:00
NIR Business Meeting

14:30 – 16:45 Orange C

TPM-F
Academic Institutions

Chairs: Subashri Kurgatt, Philip Fulmer

14:30 **TPM-F.1**
Managing Safe Use of Lasers at a Academic and Medical Institution
Kurgatt S, Reiman R, Tsorxe I
Duke University Health Systems

14:45 **TPM-F.2**
Response to a Spill Involving Lutetium-177 in a Radiation Use Facility
Robinson J, Hamideh AM, Wang WH
Louisiana State University

15:00 **TPM-F.3**
A Mixed Methods Approach for Improving the Radiation Safety Climate at Princeton University
Root CM, DeVol T, Sinclair R, Martinez N
Princeton University, Clemson University

15:15 **TPM-F.4**
Doing More with Less: Increasing Health Physics Capabilities in a Resource-Limited Environment
Nagata JS
U.S. Environmental Protection Agency

15:30 **Orlando I-III**
BREAK

16:00 **TPM-F.5**
Radiation Safety Challenges Using High Activity Radioactive Sources In An Open Configuration On A Military Base
Grimm SL
Georgia Institute of Technology

16:15 **TPM-F.6**
Guide to an Effective Database Transfer
Kennedy MJ
University of Pittsburgh

16:30 **TPM-F.7**
Use of the UMass Lowell Research Reactor for the Production of Stable and Radioactive Gold Nanoparticles
Alshahrani AM, Abdulrhman M, Tries MA, Konomi KK

06:45 – 07:45

CEL-6 **Orlando IV**
Science Is Not Enough
Eric Daxon

CEL-7 **Orlando VI**
How do we know they're good? Design and Administration of a Bioassay Oversight Program
Brett Rosenberg

08:10 – 12:00 Orlando IV

WAM-A
Special Session: Chelation
Chairs: Luiz Bertelli, Raymond Guilmette

08:10
Introduction and Announcements

08:15 **WAM-A.1**
Dosimetry of a Wound Contaminated with 238Pu During and After Medical Intervention
Klumpp JA, Bertelli L, Poudel D, Dumit S
Los Alamos National Laboratory

08:45 **WAM-A.2**
Early Wound Assessment: The Derived Reference Level (DRL)
Sugarman SL
Summit Exercises and Training

09:15 **WAM-A.3**
Chelation Therapy at the Savannah River Site 1986-2006: A Personal Recollection
LaBone TL
MJW Companies

09:45 **WAM-A.4**
Health Physics and Medical Management of a Pu-238 Contaminated Wound
Findley WM
MJW Corporation, formerly Savannah River Site

10:15 **Orlando I-III**
BREAK

10:45 **WAM-A.5**
Chelation Modeling: the use of ad hoc models and approaches to overcome a dose assessment challenge
Dumit S, Bertelli L, Klumpp JA, Poudel D, Waters T
Los Alamos National Laboratory

11:00 **WAM-A.6**
Efficacy of DTPA Chelation of Actinides – The REAC/TS Experience
Toohey RE, Goans RE, Davis J, Iddins CJ
M. Chew Associates, MJW Corporation, ORAU-REAC/TS

11:15 **WAM-A.7**
DTPA efficacy after wound contamination with Am: comparison of various administration protocols
Van der Meeren A, Lamart S, Griffiths NM
CEA

11:30 **WAM-A.8**
New decorporation strategies for reducing risk from intakes of lanthanides and actinides
Abergel RJ, Rees JA, An DD
University of California Berkeley, Lawrence Berkeley National Laboratory

11:45 **WAM-A.9**
Recent Research On Improved Chelating Agents For Decorporation Radionuclides
Guilmette RA
Ray Guilmette & Associates

08:10 – 12:30 Orlando V

WAM-B
Special Session: ICRP/IRPA - Tolerance and Reasonableness
Chairs: Theirry Schneider, Nichole Martinez

08:10
Introduction

08:15 **WAM-B.1**
About the tolerability of radiological risk
Lochard J
Nagasaki University

08:45 **WAM-B.2**
Where do we go from here on the quest for reasonableness?
Cool DA
ICRP

09:15 **WAM-B.3**
IRPA/SFRP workshops on the practical implementation of the ALARA principle
Lecomte JF, Schneider T, Schieber C, Jean-François S, Billarand Y
Institut de Radioprotection et de Sûreté Nucléaire (IRSN), Centre d'Etude pour l'Evaluation de la Protection dans le Domaine Nucléaire (CEPN), Canadian Radiation Protection Association (CRPA)

09:45 **WAM-B.4**
Practicality, Common Sense and Value for Society
Coates R
International Radiation Protection Association

10:15 **Orlando I-III**
BREAK

10:45 **WAM-B.5**
Thoughts on Tolerability/Reasonableness from NCRP
Held KD
NCRP

11:15 **WAM-B.6**
A Dilettante Looks at ICRP Publication 138
Hertel N
Georgia Tech

11:45 **WAM-B.7**
What is Reasonable Radiation Protection for Non-Human Biota?
Martinez NE, Van Bladel L
Clemson University, Federal Agency for Nuclear Control

12:05
Open Discussion

12:15
Panel Discussion

08:30 – 11:45 Orlando VI

WAM-C
Special Session Homeland Security Part 1
Chairs: Brooke Buddemeier, Shraddha Rane

08:30
Introduction

08:45 **WAM-C.1**
FEMA CBRN RadResponder Network; Transforming Radiological Emergency Response
Leek A, Semancik J, Buddemeier BR, Palmer B, Powers M
Iowa Department of Public Health, Connecticut Department of Energy and Environmental Protection, Lawrence Livermore National Laboratory, Chainbridge Technologies

09:00 **WAM-C.2**
Update on the Removal of Risk from Dirty Bomb
Kamen J, Hsu W
Mount Sinai Hospital

09:15 **WAM-C.3**
Threat and Hazard Identification and Risk Assessment/ Stakeholder Preparedness Review (THIRA/SPR) for Technical Audiences
Howe MF, Hollingsworth H, Yoo B
FEMA/DHS

09:30 **WAM-C.4**
Benchmarking Utility for Performance Evaluations of Radionuclide Identification Algorithms
Morton AJ, Hecht AA, Monterial M, Nelson KE, Labov SE
University of New Mexico, Lawrence Livermore National Laboratory

09:45 **WAM-C.5**
The ROSS Position Task Book, FEMA 509 Typing and OneResponder
Irwin WE
Vermont Department of Health

10:00 **Orlando I-III**
BREAK

10:30 **WAM-C.6**
Can the Roadmap for ROSS Ready Use a Higher Education Expressway?
Higley KA
Oregon State University

10:45 **WAM-C.7**
Emerging Radiation Detection Calibration Requirements in Homeland Security Applications
Chapman JA
ORNL

11:00 **WAM-C.8**
Routine Alarm Performance Testing And Quantitative Multi Energy Calibration Of A Spectroscopic Radiation Pager Using Test Adapters Containing Less Than 10 nCi Of Natural Radioactivity
Iwatschenko-Borho MA
Thermo Fisher Scientific Messtechnik GmbH

11:15 **WAM-C.9**
Testing of Transuranic Activity Estimation in the iSolo® Radon Rejection Algorithm
Cope SJ, Hayes RB
North Carolina State University

11:30 **WAM-C.10**
Nuclear and Radiological Emergency Preparedness and Natural Disasters
Waller EJ, Lafortune JF
UOIT, ISR

08:30 – 11:30 Orange A

WAM-D
Instrumentation
Chairs: Frazier Bronson, Tom Voss

08:30 **WAM-D.2**
Radio Frequency Immunity Testing of Two Ion Chamber Instruments
Collins SL
Ludlum Measurements, Inc.

08:45 **WAM-D.3**
SrI2 Scintillator: Low Energy Performance and Applications
Bronson FL
Mirion Technologies - Canberra

09:00 **WAM-D.4**
Challenges In Monitoring For Transuranics
Voss JT
Voss Associates

09:15 **WAM-D.5**
Real-time Dosimetry of I-131 Using Nano fiber-Optic Detection Technology
Raudabaugh JM, Smiley BR, Petry NA, Therien M, Gunasingha R, Yoshizumi T
Duke University, Duke University

09:30 **Orlando I-III**
BREAK

10:00 **WAM-D.6**
Countering Detector Sensitivity Changes when Calibrating Neutron Survey Instruments and Reference Fields
Piper RK
Pacific Northwest National Laboratory

10:15 **WAM-D.7**
Understanding the Radiation Soaking Effect in Neutron Survey Meters
Mozhayev AV, Piper RK
Pacific Northwest National Laboratory

10:30 **WAM-D.8**
Development of a Silicon-Plastic Scintillator Coincidence Beta-ray Spectrometer
Omar-Nazir L, Byun SH
McMaster University

10:45 **WAM-D.9**
Adding the Ability to Quantify Activity to a Radionuclide Identification Device
Sullivan DF, Persson H, Phillips K, Spruytte J, Oginni B
Mirion Technologies

11:00 **WAM-D.10**
Introducing the R Programming Package, "Radsafer"
Hogue MG
SRNS

11:15 **WAM-D.11**
Novel, Low-Cost, Light-Weight, High Efficiency (H* Capable) Neutron Detection-Dosimetry
Taleyarkhan RP, Archambault B, Sansone A, Grimes T, Hagen A
Purdue University, Pacific Northwest National Laboratory

08:15 – 12:00 Orange B

WAM-E
Special Session: Aerosols and Nanotechnology
Chairs: Jeff Whicker, Mark Hoover

08:15 **WAM-E.1**
Aerosol Science Advances and Challenges in Radiation Protection: Thirty Years of Experience and Insights from the Air Monitoring Users Group
Hoover MD, Whicker JJ, Hayes RB, Maiello ML, Jenkins P, Cox M
Mark D Hoover LLC, Los Alamos National Laboratory, North Carolina State University, New York City Department of Health, Bowser-Morner, Inc.

09:15 **WAM-E.2**
Nanotechnology and Radiation Protection: HPS Nanotechnology Committee Activities and Opportunities
Hoover MD, Marceau-Day L, Cash LJ, Davis J, Hay T, Holiday S, Whicker JJ
Mark D Hoover LLC, LSU Scientist Emerita, Los Alamos National Laboratory, Oak Ridge Associated Universities, Washington State Department of Health, Nuclear Regulatory Commission

09:45 **Orlando I-III**
BREAK

10:15 **WAM-E.3**
Measuring Air Sampler Filter Material For Pressure Drop, Aerosol Collection Efficiency, Alpha Spectrum Resolution And Radon Progeny Collection LAUR-19-21686
Moore ME, Tao Y, McLean TD, Voss JT, Stephens JA, Simpson CT
Los Alamos National Laboratory, Pacific Northwest National Laboratory

10:35 **WAM-E.4**
Health Physics Society rules governing formation of a proposed new Aerosols/Emerging Technologies Section
Whicker JJ, Hoover MD
Los Alamos National Laboratory, Mark Hoover LLC

10:55
Vision for the Aerosols/Emerging Technologies Section Panel Discussion

11:15
Nanotechnology Business Meeting

08:30 – 12:15 Orange C

WAM-F
Special Session: Military Health Physics
Chair: Col. John Cuellar

08:30 **WAM-F.1**
The History of Department of Defense's Nuclear Test Personnel Review
Blake PK
DTRA

08:45 **WAM-F.2**
Modernizing the Nuclear Test Personnel Review Database and Work Flow Elements
Alleman LA
DoD

09:15 **WAM-F.3**
Neutron Spectra and Energy Deposition in a Computational Phantom
Prins RD
Applied Research Associates, Inc.

09:45 **Orlando I-III**
BREAK

10:15 **WAM-F.4**
Applying the ALARA Principles to Maneuvering in a Fallout Environment
Dant JT
Applied Research Associates, Inc.

10:45 **WAM-F.5**
Mainland Japan Ship and Shore Medical Clinic Radiation Health Program Standardization
Caudill JS, Sowers DA
NAVHOSP YOKO, NAVSEA DET RASO

11:15 **WAM-F.6**
Developing a Unified Radon Policy for the US Air Force
Hale AC, Rademacher SE
United States Air Force

11:45
Military Business Meeting

12:15 – 14:15

PEP W-1 **Orlando IV**
NDA Systems Used for the Qualification of TRU Waste to WIPP
Jeff Chapman

PEP W-2 **Orlando VI**
Fluoroscopic System Evaluation and Radiation Safety Considerations
Cari Borrás

PEP W-3 **Orange A**
A Health Physics Perspective on Prevention Through Design - Modernization of a World-Class Radiation Physics Facility
Manuel Mejias

PEP W-4 **Lake Hart**
Radiation in Flight
Joseph Shonka

PEP W-5 **Lake Down**
Certification Options for Health Physicists
Steven King, Andy Miller

14:15 – 17:15 Orlando IV

WPM-A
Special Session: Social and Ethical Values in Radiation Protection
Chairs: Nichole Martinez, Kendall Berry

14:15
Introduction

14:20 **WPM-A.1**
Applying the Cultural Tool-Kit Perspective to Foster Inclusive Interactions
Koontz AJ
University of Central Florida

15:00 **WPM-A.2**
Accommodating Personnel with Disabilities – What does Accessibility Really Mean?
Manglass LM
Clemson University

15:15 **WPM-A.3**
The Mentor–Apprentice Relationship: A Closer Look of Intergenerational Interactions in the Workplace
Trimas DJ, Martinez NE
University of Michigan, Clemson University

15:30 **WPM-A.4**
The Hidden Keys to a Successful Radiation Protection Culture
Lee MB
Los Alamos National Laboratory

15:45 **Ballroom Foyer**
BREAK

16:00 **WPM-A.5**
Fostering Empathy Through Shared Experiences
Berry KE, Root CM
Fox Chase Cancer Center, Princeton University

16:15 **WPM-A.6**
Alignment of the Definition of Health Physics and Job Description of a Health Physicist: Resetting the Mortar in the Foundation to Evolve a Stronger Organization.
Sowers DA
NAVSEA DET RASO

16:30 **WPM-A.7**
The HPS Student Support Committee: Current Initiatives
Montgomery DA, Condon CA, Poudel D, Kuchta J
Clemson University, Oregon State University, Los Alamos National Laboratory, University of Michigan

16:45 **WPM-A.8**
Getting Involved in the Health Physics Society – Straightforward and Rewarding
Simpkins AA
NV5/Dade Moeller

17:00 **WPM-A.9**
The NCRP: Why You Need to Know About This Organization?
Lanza JJ
Florida Department of Health

14:15 – 17:10 Orlando V

WPM-B
Special Session - International Collaboration Committee
Chairs: Alexander Brandl, Nichole Martinez

14:15 **WPM-B.1**
ICRP's Role in Engaging with the Public
Clement CH
International Commission on Radiological Protection

14:40 **WPM-B.2**
Current issues and thoughts for RP professionals regarding Public Understanding on radiation and risk
Yoshida HI
International Radiation Protection Association

15:05 **WPM-B.3**
Risk Communication and Public Understanding About Radiation: Some Lessons from Nuclear Accidents
Lochard JA, Takamura NO
Nagasaki University

15:30 **WPM-B.4**
Connecting Science and Life with Trust
Ando R
Ethos in Fukushima

15:45 **Ballroom Foyer**
BREAK

16:15 **WPM-B.5**
Moving from Lecturing on Data to Communicating Content
Brandl AL, Tschurlovits MA
Colorado State University, Vienna University of Technology

16:30 **WPM-B.6**
By Any Other Name: Is "Risk Communication" What We Mean?
Martinez NE
Clemson University

16:45 **WPM-B.7**
The Role of the International Atomic Energy Agency in Communication of Radiation Safety Principles in Other than Emergency Situations
Dojcanova L, Pinak M
International Atomic Energy Agency

14:30 – 16:00 Orlando VI

WPM-C
Emergency Response Part 2
Chairs: Patricia Milligan, Craig Marianno

14:30 **WPM-C.1**
A Simulation Tool for Optimizing Community Reception Center Operations
Finklea LF
Centers for Disease Control and Prevention

14:45 **WPM-C.2**
Efficient Contamination Screening at Community Reception Centers in Response to a Radiological Dispersal Event
Goldhagen P, Klemic G, Link S, Chen A, Schopfer C, Schumock G, Schaefer L, Schlueck R, Rice T
DHS National Urban Security Technology Laboratory, Fire Department of the City of New York

15:00 **WPM-C.3**
Cesium Irradiators - Replacement and Removal: Lessons Learned
Rasmituth J
Emory University

15:15 **WPM-C.4**
Radiological Dispersal Device Simulations Help Responders Save Lives
*Chen RW, Buddemeier BR**
Lawrence Livermore National Laboratory

15:30 **WPM-C.5**
Assessing RadTriage Colorimetric Dosimeter Response to Low-Dose Gamma-Ray Exposure
Rand LE
Georgetown University

14:30 – 16:30 Orange A

WPM-D
External Dosimetry
Chair: Chris Passmore

14:30 **WPM-D.1**
Comparison of Extremity Dose for Nuclear Medicine Workers using Finger Stall and TLD Ring Dosimeters
Passmore CN, Kirr M
Landauer

14:45 **WPM-D.2**
Comparison of Lens of the Eye Doses Determined Using Collar and Eye Dosimeters
Kirr M, Passmore C
Landauer

15:00 **WPM-D.3**
Improving Reproducibility in TLD Dosimetry Systems
Ramlo MJ
Thermo Fisher Scientific

15:15 **Ballroom Foyer**
BREAK

15:45 **WPM-D.4**
An Introduction to Federal Guidance Report No. 15
*Boyd MA, Nagata J**
U.S. EPA

16:00 **WPM-D.5**
Regional Intercomparison on Hp(10) Measurements Using Tld And Osl
Arib M, Noor O, Moftah B, Algain i, Mayhoub F, Alhumaidan H, Alkudaibi M, Alshora S, Aledan N
King Faisal Specialist Hospital and Research Centre

16:15 **WPM-D.6**
Dose Rate Simulations of Uranium Ore Samples in the Grand Canyon Museum Collection
Samuels CE, Inman JW, Hertel NE
Georgia Institute of Technology

14:30 – 15:45 Orange B

WPM-E1
Environmental Montioring
Chairs: Tim Jannik, Paul Charp

14:30 **WPM-E1.1**
The Creation of a Moose Voxel Model: Part I - Segmentation
Graham HR, Waller EJ
University of Ontario Institute of Technology

14:45 **WPM-E1.2**
The radiation dose response of Zebra Mussels (Dreissena polymorpha) from the Great Lakes
Tzivaki M, Waller EJ
University of Ontario Institute of Technology

15:00 **WPM-E1.3**
Environmental Thermoluminescent Dosimetry Program of Nevada National Security Site
Liu NA, Warren W, Xianan R

15:15 **WPM-E1.4**
Effective Environmental Half Life of 134Cs and 137Cs in Fukushima Prefecture When Compared to Theoretical Decay Models
Hayes JM, Johnson TE, Anderson D, Nanba K
Colorado State University, Fukushima University

15:30 **WPM-E1.5**
Public Health Evaluation of Radiologic Contamination in St. Louis – Coldwater Creek
*Dyken JJ, Evans E, Trubiano A, Charp PA**
ATSDR, CDC

16:15 – 17:15 Orange B

WPM-E2
Air Montioring
Chairs: Matthew Barnett, Dave Fuehne

16:15 **WPM-E2.1**
Visualization Of Radioiodine Distribution In Silver Zeolite Cartridges With Gamma-Ray Imaging
DiMarco DJ, Matthews KL, Wang WH
Louisiana State University

16:30 **WPM-E2.2**
Operational Health Physics Challenges: From Discovery to Recovery of a Leaking Transuranic Glovebox at Idaho National Laboratory's Materials and Fuels Complex
Case RL, Konzen K, Brower CS, Hyde TA, Johnston JD, Lopez JJ, Morgan CD, Nelson PL, Schrader BJ
Idaho National Laboratory

16:45 **WPM-E2.3**
Military and American National Standards Institute Testing of a Tritium In Air Monitor
Ramey AJ
Ludlum Measurements Inc.

17:00 **WPM-E2.4**
Investigation of the Airborne Release Fraction During Rapid Oxidation of Depleted Uranium Metal
Bragg PB
Idaho National Laboratory

14:30-17:00 Orange C

WPM-F
Special Session: Military Health Physics
Chairs: Col. John Cuellar

HPS Awards Plenary Breakfast

08:00 – 10:00, Orange D

Join us for the Awards Program at the Hilton Orlando. There will be a buffet breakfast provided that begins at 07:30. We look forward to seeing you by 08:00 for the presentation.

06:45 – 07:45

CEL-8 **Orlando IV**
The Importance of the Measurand in Health Physics
Daniel Strom

CEL-9 **Orlando V**
Radiation Exposure to Terrestrial Organisms and Organisms in Space from Supernovae and Gamma Ray Burst?
P. Andrew Karam

10:00 – 12:00 Orlando IV

THAM-A
Accelerator Health Physics

Chairs: Stefania Trovati, Marcia Maria Campos Torres

10:00 **THAM-A.1**
Radiation Safety Systems for the LCLS-II Project at SLAC: Use of Beam Loss Monitors to Supplement Shielding
Rokni SH
SLAC National Accelerator Laboratory

10:15 **THAM-A.2**
Review of RAM Experiments a Graded Approach on Radiological Controls
Torres MC
SLAC

10:30 **THAM-A.3**
Radiation Shielding Design of a Cryo-Module Test Facility
Trovati S, Leitner MS, Ge L
SLAC

10:45 **THAM-A.4**
Developing Compact Deuterium-Deuterium (DD) Generator Based In Vivo Neutron Activation Analysis (IVNAA) as a New Method for Measuring Sodium (Na) in Bone and Soft Tissue
Coyne MC, Lobene AJ, Weaver CM, Nie LH
Purdue University

11:00 **THAM-A.5**
Characterization of Measured Activity and Collection Efficiency of Tritium Smears
Stavola AJ, Hartberger AM
Thomas Jefferson National Accelerator Facility

11:15 **THAM-A.6**
Implementation of ALARA Practices for Accelerator Maintenance Work in High Radiation Areas
Overbay LA, Duran MA
Los Alamos National Laboratory

11:30
Accelerator Business Meeting

10:00 – 12:30 Orlando V

THAM-B
Special Session Homeland Security Part 2

Chairs: Brooke Buddemeier, Shraddha Rane

10:00 **THAM-B.1**
RadResponder Network - A Quick Walkthrough With The Newest Updates
*Chen G, Palmer B**
EPA, Chainbridge Tech, Inc

10:15 **THAM-B.2**
Myths about Protective Action Guides (PAGs)
Decair S, Ralston L, Nagata J, Wieder JS, Matakas L, Buddemeier BR*
U.S. Environmental Protection Agency, Lawrence Livermore National Laboratory

10:30 **THAM-B.3**
Risk Based Decision-Making During a Radiation Incident
Leek AE
Iowa Department of Public Health

10:45 **THAM-B.4**
A Communication Tool for Use in Nuclear/Radiological Emergencies – Development and Testing
Ansari A, Salame-Alfie A
Centers for Disease Control and Prevention

11:00 **THAM-B.5**
Implementation Guidance for Emergency Response Dosimetry
Salame-Alfie A, Musolino SV
Centers for Disease Control and Prevention, Brookhaven National Laboratory

11:15 **THAM-B.6**
The Use of PET/CT to Evaluate Internal and External Contamination on a Canine Exposed to a Contaminated Environment
Marianno CM, Cook KM
Texas A&M University

11:30 **THAM-B.7**
Streamlining Public Health Planning for Radiation Emergencies: A Tool to Transform Point of Dispensing Plans into Community Reception Center Plans
Finklea LR, Cathcart L, Flanagan E
Centers for Disease Control and Prevention

11:45
Closing Remarks
HP Access to New Preparedness Tools and Guidance

12:00
Homeland Security Business Meeting

10:00 – 12:00 Orlando VI

THAM-C
Dose Reconstruction and Radiation Effects
Chairs: Wesley Bolch, Joseph Shonka

10:00 **THAM-C.1**
The First Dirty Bomb, Trinity
Shonka JJ
SRA

10:15 **THAM-C.2**
Dosimetric Impact of a New Computational Voxel Phantom Series for the Japanese Atomic Bomb Survivors: Children and Adults
Griffin K, Paulbeck C, Bolch WE, Cullings H, Egbert S, Funamoto S, Sato T, Endo A, Hertel N, Lee C*
National Cancer Institute, University of Florida, Radiation Effects Research Foundation, Japan Atomic Energy Agency, Georgia Institute of Technology

10:30 **THAM-C.3**
Dosimetric Impact of a New Computational Voxel Phantom Series for the Japanese Atomic Bomb Survivors: Pregnant Females
Paulbeck CJ, Griffin K, Choonsik L, Cullings H, Egbert S, Funamoto S, Sato T, Endo A, Hertel N, Bolch W
UF, NCI, RERF, JAEA, Georgia Tech

10:45 **THAM-C.4**
Uncertainty of Dose Factors for Bone Marrow Dosimetry of Bone-seeking Sr-90 and Sr-89
Shishkina E, Volchkova A, Sharagin P, Smith M, Degteva M, Napier B
Urals Research Center for Radiation Medicine, URCRM, Pacific Northwest National Laboratory

11:00 **THAM-C.5**
Estimation of Lifetime Doses to the Public Living Close to NPPs Using Electron Paramagnetic Resonance (EPR) Measurements on Extracted Tooth Enamel
Ghimire L, Waller E
University of Ontario Institute of Technology

11:15 **THAM-C.6**
Health Effects from Exposure to Thorium
Keith LS, Ingerman L, Wohlers DW, Brooks MD, Charp PA
ATSDR, SRC

11:30 **THAM-C.7**
Limitations of Cause of Death Data Among Autopsied Population in the United States Transuranium and Uranium Registries
McComish SL, Zhou J, Martinez FT, Tolmachev SY
Washington State University, U.S. Department of Energy

11:45 **THAM-C.8**
Case Studies in Brain Dosimetry for Internally Deposited Radionuclides
Tolmachev SY, Leggett RW, Avtandilashvili M, Boice, Jr JD
US Transuranium and Uranium Registries, Washington State University, Oak Ridge National Laboratory, National Council on Radiation Protection and Measurements

10:00 – 11:30 Orange A

THAM-D
Contemporary Health Physics Topics
Chairs: Jeffrey Lively, Wayne Gaul

10:00 **THAM-D.1**
A Conceptual Approach to the Remediation of Wide-Area Radioactive Contamination
Chen SY
Illinois Inst. of Technology

10:15 **THAM-D.2**
Scanning Spectroscopy v. Randomized Discrete Soil Samples – A Case Study In Surface Soil Characterization Data Quality
Lively JW, Posner RG, Jones AR
Wood E&IS

10:30 **THAM-D.3**
Lessons Learned from the Development of a Web-Based System for Managing Gamma Scan Data
Witmer M, Brown M, Mason T, Hackett J
Jacobs

10:45 **THAM-D.4**
IPCM12 Radon Enhancements
Lamb SD
Thermo Fisher Scientific

11:15 **THAM-D.6**
Discussions on Radiation Protection Design under Accident Condition of China PWR
Wang XX, You W, Mi AJ, Mao YW
China Nuclear Power Engineering Co. Ltd

14:00 – 16:00 Lake Hart

THPM-A
IRPA Workshop on Public Understanding
Chair: Roger Coates

IRPA is preparing a guidance document to assist our members, both radiation protection societies and individual professionals, to become more comfortable. confident and better equipped in the science and art of communicating with the public on radiation and risk. The objective of the workshop is to review the latest draft of the guidance document and to seek suggestions for improvement. Attendance at the workshop is by invitation, but any interested person should request an invitation by emailing coates@irpa.net

AAHP COURSES

Hilton Orlando • 6 July 2019

08:00 – 17:00 **AAHP 1**

Radiation Risk Assessment

Stuart Walker, Fred Dolislager

Location: Clear Lake

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.

08:00 – 17:00 **AAHP 2**

2019 Radiological Operations Support Specialist (ROSS) Continuing Education Training

Brooke Buddemeier, Bill Irwin, Angela Leek, Matt McKinley, Jeff Semancik

Location: Conway Lake

This 8-hour Radiological Operations Support Specialist (ROSS) continuing education training is designed to provide new guidance and experiential learning opportunities on targeted topics and tools. It is designed to provide beneficial updates and continuing education for health physicists who have attended a previous ROSS training course, including FEMA MGT 455 Radiological Operations Support Specialist. It will also benefit health physicists and radiation protection personnel with interests in becoming a ROSS and anyone engaged in or interested in radiological and nuclear emergency preparedness.

Targeted topics include:

- Updates on ROSS National Qualification System typing, the ROSS position task book and OneResponder for qualifying ROSS;
- A review of ROSS experiences in exercises around the nation;
- Demonstration of emergency responder training videos depicting the ten tactics of the Department of Homeland Security (DHS) National Urban Security and Technology Laboratory (NUSTL) Radiological Dispersal Device (RDD) Response Guidance which can be used in training by ROSS;
- Ten-point monitoring, RDD and shape file overlays for situational awareness in RadResponder;
- Experiential learning using the ROSS Toolkit on RadResponder to generate briefing products for perimeters & zones, worker safety, shelter & evacuation, population monitoring and recovery;
- Introduction to the ROSS Emergency Operations Center Job Aid.

A word about the ROSS Toolkit: It is a web-based collection of national and international guidance organized for quick reference by a ROSS or other radiation professional to quickly guide recommendations or decisions for radiation control perimeters, radiation dose decision points, personnel contamination screening levels, shelter and evacuation guidance, as well as provides fact sheets and other resources for nuclear power plant, RDD and nuclear detonation emergencies. Instructors will demonstrate how to access the ROSS Toolkit through RadResponder and review the structure of the various guidance topics within the Toolkit. Students will be provided an assignment requiring review of guidance in the Toolkit, and they will present a briefing on their recommendations based on the Toolkit guidance.

08:00 – 17:00 **AAHP 3**

So You Want to Be a Medical Radiation Safety Officer?

Jeffrey Brunette, Sandy Konerth, Christopher Martel

Location: Ruby Lake

The use of radiation sources in health care is constantly changing with new and exciting radiopharmaceuticals and radiation-producing machines. It is a constant challenge for the radiation safety staff to stay ahead of the curve and provide value-added guidance to practitioners prior to acquisition of the new technology. This course will outline the fundamental differences between medical and nonmedical licensees for those new to medical health physics. However, the primary focus of the course will be examining the radiation safety and regulatory hurdles involved in the different modalities, for example:

- Diagnostic Imaging – PET/MR; $^{68}Ge/^{68}Ga$ Generators; new PET radiopharmaceuticals.
- Radiation Therapy – new infusion therapies and patient-release considerations.
- Fluoroscopy Guided Interventions – staff and patient radiation dose minimization.
- Emerging Technologies – ^{90}Y microspheres; ^{125}I seed localization.
- Regulatory Landscape – changes to federal rules and the progression through agreement state adoption; and state x-ray rules and Joint Commission recommendations.

Another aspect of a large medical program that will be examined is radiation safety involvement in human use research protocol review. This includes process steps and informed consent form reviews—with examples. Whenever radioactive materials are administered to a patient or research participant, there is an opportunity for something to go wrong, so no discussion of a medical radiation safety officer's role would be complete without a discussion of the medical-event regulations and reporting requirements.

This course will give an overview of medical health physics to health physicists not in health care, while providing an opportunity for medical health physicists to share experiences and gain insights into a variety of elements within a broad-scope medical licensee program.

PROFESSIONAL ENRICHMENT PROGRAM (PEP)

Sunday, 7 July through Wednesday, 10 July • Hilton Orlando

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, 7 July, a series of 27 courses will be offered between 08:00 – 16:00.

In addition to the above-mentioned sessions for Sunday, 15 PEP lectures are scheduled on Monday-Wednesday, 12:15 – 14:15. Registration for each two-hour course is $99 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.

Please Note!!

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.

Sunday 08:00 – 10:00

PEP 1-A DOE-STD-1153-2019 A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota

Katharine McLellan

Lake Concord

DOE-STD-1153-2019, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota* was published earlier this year at DOE and is on the DOE Technical Standards Website. The revised standard has been reduced to one volume and updated to add new radionuclides, updated parameters, and enhanced methods, models, guidance and case studies to support DOE's characterization of radiation doses to aquatic and terrestrial biota within a graded approach that meet the requirements set forth in DOE O 458.1, Radiation Protection of the Public and the Environment. This PEP will focus on the changes made to the standard for use in DOE's continued mission for protection of the public and the environment. This lecture will be followed by a PEP on RESRAD BIOTA, a computer code developed to assist users implementing DOE's graded approach methodology in this standard.

PEP 1-B Basic Training for the NRRPT Exam – Fundamentals

Tom Voss

Lake Hart

This class presents the fundamentals of radiation – Sources of Radiation, Biological Effects, Mathematics, Chemistry, Physics, and Units and Terminology. The techniques and requirements of emergency preparedness, prescribed dosimetry, and contamination control are explored. Radiation interactions, radiation effects, radiation shielding, and radiation measurement techniques are described. The derivation and history of units are discussed. The relationships between various units are explored. Calculations of units and conversion of units are stated. Basic radiation rules and laws are interpreted. The primary reference materials are taken from Glenn Knoll "Radiation Detection and Measurement", James Turner "Atoms, Radiation, and Radiation Protection", and the wide experience of the instructor. The instructor began his career in radiation in 1967, working at a commercial nuclear power plant (then under AEC rules). The instructor's experience covers working with the AEC, NRC, DOE, US Military, Research, and the commercial world. He participates in the reviews and development of US and International standards for radiation instruments and measurements.

PEP 1-C Fundamentals of Reproducible Research

Tom LaBone, Nancy Chalmers, Elizabeth Brackett

Lake Down

Here we will define *research* to be the process where we:

- Ask a question.
- Acquire data that we hope is capable of answering the question.
- Analyze the data.
- Draw conclusions from the analysis that are generally applicable to similar situations and data not yet observed.

Research can be high-stakes, a clinical trial for a new cancer treatment for example. Or, it can be fairly mundane, like trying to decide if your GM counter is operating properly. The gold standard for demonstrating that the conclusions you reached at the end of your research are valid is *replication.*

Research is replicated when another person independently acquires another dataset, reanalyzes it, and arrives at more or less the same conclusions. Replication is not always feasible because it can be expensive, time consuming, unethical, or impossible. A lesser standard is *reproduction*.

Research is reproduced when another person can recreate all the numbers and graphs in your report given your data, code, and associated documentation. There is a bit of a crisis in modern research because an uncomfortable amount of published research can't be replicated or reproduced. Failure to replicate someone's work is called science. Failure to reproduce someone's work is actually more troubling because at first glance one might think this should be easy to do. But, at a personal level, who has not experienced the situation where a plot in a report can't be reproduced by the author (much less someone else) at a later date? One can't help but to be suspicious of any research that can't be reproduced.

The idea of *reproducible* research centers around configuring the workflow in your research so as to make it possible for someone else to readily reproduce all the numerical results and graphs in your report, starting with the original data and and documentation on how you manipulated this data.

Today we are going to discuss details of reproducible research, including

- asking a good question,
- acquiring adequate data,
- cleaning data,
- using appropriate analytical methods, and
- reaching conclusions that are based on the data and analysis.

To a large extent the software tools you use for these activities has a huge impact on the effort involved with creating reproducible research and hence on the chances of your work being

reproducible. The ubiquitous Microsoft Word/Excel applications do not easily lend themselves to the production of reproducible research, but there are other software packages that do. We will review some freely available applications like the statistical programming language *R*, the word-processing/typesetting software *Lyx*, and version control software Git that make this task easier. The goal of this software review is not necessarily to convert you to using these tools, but to illustrate what you should be trying to do with Microsoft Word/Excel if you use them to do your research.

PEP 1-D Quick and Dirty Radiological Dose Assessment Following a Rad/Nuke Emergency

Andy Karam

Lake George

I recently published a paper in HPJ describing a methodology that will make it possible for lightly-trained personnel (e.g. my father) to quickly establish whether or not a person requires the administration of decorporation agents, should be sent home, or requires more study. This PEP would describe the development of this methodology, how it is intended to be used in an actual emergency (at a Community Reception Center, for example), and will include a few examples showing how it would work in real life. There might even be some class participation at a mock dose assessment desk.

PEP 1-E Integration of Health Physics into Emergency Response

Stephen Sugarman

Lake Highland B

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. Various techniques can be employed to help gather the necessary information needed. There are many groups of responders that need to be considered such as law enforcement, EMS, fire, and healthcare providers. Most, if not all, of these groups have relatively little understanding of the realistic hazards associated with radiation. 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, law enforcement officers routinely incorporate stand-off distances when approaching a suspect or other dangerous situation. Firefighters are familiar with the use of protective clothing and respiratory protection. EMS and healthcare providers routinely incorporate contamination control practices – universal precautions and proper patient handling techniques – into their everyday jobs. 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. Support duties can also include assessment of dose responders or patients and assistance with communication issues affecting incident response, medical care, or with external entities such as regulators and the media. As time goes on and more information, such as bioassay or biological dosimetry data, plume data, and other additional data is received the health physicist will be called upon to interpret that data and communicate its meaning to the decision-makers and otherwise advise incident command. It is, therefore, 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.

PEP 1-F Design of MARSSIM and MARSAME Surveys

David Stuenkel

Lake Monroe

The Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) provides guidance on how to demonstrate that a site complies with applicable radiation dose- or risk-based release criteria. In a similar way, the Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME) manual, a supplement to MARSSIM, provides guidance on how determine proper disposition of materials and equipment. While both MARSSIM and MARSAME and provide comprehensive guidance, the focus of both is on the design and evaluation of final surveys, known as final status surveys in MARSSIM and disposition surveys in MARSAME. This presentation will discuss the design of final status surveys and disposition surveys. For MARSSIM surveys, this will include determination of the number of sample or measurement locations required, the calculation of minimum detectable concentrations during scanning, adjustment to the number of sample or measurement locations required, and the selection of sample or measurement locations. For MARSAME surveys, this will include the calculation of minimum quantifiable concentrations and the development of an operational decision rule. Illustrative examples will be used to demonstrate these concepts.

PEP 1-G Radiation Protection Consideration during Construction, Commissioning and Production of Mo-99 with a 40 kW 35 MeV Electron Linac

Pradyot Chowdhury

Lake Sheen A

Our experience during construction, commissioning and production of ^{99}Mo with a high power linac (40 kW, 35 MeV Electrons) will be shared. The electrons bombarded on a heavy metal converter generate Bremsstrahlung photons that undergo photonuclear reaction ^{100}Mo(ɣ,n)^{99}Mo with a Mo Target placed in the forward direction. Gamma spectroscopy detected 46Sc as an activated product from Ti. Converters and targets are water cooled, and the radiation protection due to Bremsstrahlung and neutrons are achieved using iron, lead, polyethylene, concrete and earth as shielding materials. Monte Carlo simulations are performed with FLUKA to generate the dose profiles for the electron, gamma and neutron.

We have explored the possibility of using a high power linac (40 kW and 35 MeV Electrons) to produce medical isotopes such as ^{99}Mo, as a cost-effective alternative method. The electrons bombarded on a Tantalum heavy metal converter generates Bremsstrahlung photons that undergo photonuclear reaction ^{100}Mo(ɣ,n)^{99}Mo with an enriched Mo target placed in the forward direction. The high intensity Bremsstrahlung and neutrons generated require significant shielding. The dose rate calculated for Bremsstrahlung from a thick Tantalum converter in the forward direction is 4×10^5 Sv/h at one meter, and in the perpendicular direction 2×10^3 Sv/h at one meter. By assuming that the 35 MeV, 40 kW electron beam is stopped entirely on a thick target, the neutron yield would be about 5×10^{13} n/s. To keep the dose rate in the public occupied areas ALARA, the number of tenth value layer of shielding required in the perpendicular direction are 8.3 for Bremsstrahlung and 6 for the neutrons, respectively. The shielding is achieved by using the following materials: Iron, Lead, Polyethylene, Concrete and Earth.

The cooling water at the converter and target as well as the room air will be activated, and may produce ozone and hydrogen. The expected radioactive gases produced in air are ^{15}O, ^{13}N, and ^{41}Ar, and in water are ^{15}O, ^{11}C, ^{7}Be, and ^{3}H (tritium). Adequate precautions are taken to mitigate these hazards. The tritium generated in the cooling water for the converter and target after 58.5 kW-hour of Linac operation was found to be only 2.5 Bq/L. Similarly, there was no Be-7 in the converter and target cooling water, nor any ozone production in the room air could be observed during the early phase of commissioning. However, we have experienced an elevated level of radiation from the converter and target holder's material - titanium that has undergone nuclear reaction ^{48}Ti(ɣ, pn)^{46}Sc generating Sc-46, which emits two cascading gamma photons ~1 MeV detected by gamma spectroscopy, with a longer half-life of 83.8 days. The Ti was replaced by Zr and Cu at the converter and target holders, respectively. Monte Carlo simulations were performed with FLUKA to calculate the dose at the converter, target, beam dump and shielding structures, as well as independent dose profiles for the electron, gamma and neutron.

We have commissioned and produced Medical Isotope with a linac (40 kW and 35 MeV Electrons) where the electrons bombarded on a heavy metal converter generating Bremsstrahlung photons that undergo ^{100}Mo(ɣ,n)^{99}Mo photonuclear reaction. Issues of providing adequate radiation shielding and containment of the hazards due to activated products will be presented. Monte Carlo simulations were performed with FLUKA to generate the dose profiles of electron, gamma and neutron.

PEP 1-H RDD Guidance

Brooke Buddemeier

Lake Sheen B

Great strides have been made in the past few years to improve our response preparedness capabilities, including the release of updated guidance on response to RDDs, animations that visualize the RDD Response tactics, H&S Officer guidance for responder support to nuclear detonations, an NCRP report on responder dosimetry, a new PAG Manual, FEMA's RadResponder platform for collecting, sharing, and using radiological data, the development of a FEMA Radiological Operations Support Specialist (ROSS) position (including new tools, Job Aids, and training to support the ROSS), operational support tools early phase hazard area assessments, and lots of great new communication tools to help inform the public, responders, and decision makers on the best way to reduce the consequences of radiological and nuclear incidents.

This session will review all of these new tools and capabilities, and how health physicists can access them to support radiological and nuclear response training and preparedness efforts.

PEP 1-I The Fallacy of Safe-Siding Radiation Health Risk

Eric Daxon

Spring Lake

Health physicists live in two worlds – the regulatory world and the health risk world. At the beginning of our profession in the 1950's, these worlds were appropriately merged in that the known health risks of radiation were used to develop a radiation safety system commensurate with that health risk belief. At this point in time, dire genetic effects were thought to be the primary health risk from radiation exposure. This led to a

fear-based ethos that permeated the profession, the regulatory system and was subsequently communicated to the public at large. The discovery of the multiple DNA repair mechanisms and the wealth of subsequent data showed these initial health risk estimates to be inaccurate. The health risk aspects of health physics evolved accordingly but the regulatory and emergency response worlds did not. The continuance of the initial regulatory framework has fostered the continuance of this fear-based ethos in the profession and in the public at large. The intent of this paper is to outline the evolution of these two systems, to provide recommendations for bringing congruence and to outline the major roadblocks to the needed changes. Specific objectives include: · Identify the origins of the culture of safe-siding risks. · Describe the impacts of safe-siding radiation health risk assessments/dose assessments on individuals and populations. · Present methodologies that can provide bests estimates of total health risk and communicate those risks.

Sunday 10:30 – 12:30

PEP 2-A RESRAD-BIOTA Code for the Evaluation of Radiological Doses to Flora and Fauna

Charley Yu, Sunita Kamboj, Jing-Jy Cheng, David LePoire

Lake Concord

RESRAD-BIOTA is part of the RESRAD Family of Codes developed by Argonne National Laboratory. It is designed for demonstrating compliance with the dose rate criteria set in Department of Energy (DOE) Order 458.1 and implements the graded approach methodology described in DOE Standard DOE-STD-1153-2019. The development of RESRAD-BIOTA was sponsored by DOE, with support from US Nuclear Regulatory Commission and the US Environmental Protection Agency. The RESRAD-BIOTA code provides a complete spectrum of biota dose evaluation capabilities, ranging from generic screening to comprehensive receptor-specific dose estimation. The implementation of the DOE graded approach methodology in the RESRAD-BIOTA code will be demonstrated with examples. The advanced analysis capabilities in RESRAD-BIOTA code, including geometry-based dose coefficients, organism wizard, food chain model, and sensitivity and probabilistic analysis, etc., will be discussed.

PEP 2-B Basic Training for the NRRPT Exam – Practical Applications

Tom Voss

Lake Hart

IThis class presents the practical applications of the use of radiation detection instruments and radiation protection. ALARA techniques will be discussed in depth. The primary reference materials are taken from Dan Gollnick “Basic Radiation Protection Technology” and Glenn Knoll “Radiation Detection and Measurement”. Radiation instrumentation calibration techniques will be presented. Radiation survey techniques will be explored. The types of radiation detectors and the capabilities and limitations are described. Ion chamber, gas filled detectors, gas flow detectors, scintillators, dual scintillators, sandwich detectors, proportional, and other detectors are explored. The six region curve for gas filled detectors is explored in depth. The connection between radiation instrument calibration and radiation instrument usage will be discussed. The limitations and interferences for various detector types will be explored in detail. Remember; almost every type of radiation detector responds to almost every type of radiation!

PEP 2-C Thorium Molten Salt Reactors (TMSR): Key Radiation Protection Challenges

Casper Sun

Lake Down

Join this lecture for an overview of thorium molten salt reactors (TMSR) and their radiation safety requirements. In recent years, the potential of TMSR has captivated the attention of our nuclear energy industry. Key benefits include fuel flexibility—the ability to burn spent fuels, thorium, and unwanted plutonium—as well as reduced risk, both during normal reactor operations and in case of emergency. As Richard Martine noted in MIT Technology Review (2016), *“cheaper and cleaner nuclear plants could finally become a reality…the technology was invented more than 50 years ago”.*

Overall, TMSR is a very promising option for nuclear energy, but there’s work to be done. We’ll review the top radiation protection considerations around TMSR today, including neutron radiation protection, fuel loading management and chemical separation, and controlling neutron flux in the core. Lastly, you’ll get a quick look at things to come: robotic radiation workers operating advanced nuclear reactors.

PEP 2-D Practical Computational Modeling for Health Physics (1) – Introduction to Monte Carlo Simulations

Shaheen Dewji

Lake George

Radiation transport codes are used in a breadth of application scopes in health physics, including estimating doses due to radiation exposures, characterizing radiation fields from sources, and conducting shielding calculations. In this introductory course, we will review the fundamentals of radiation interactions with matter and construct simple problems defining simulation geometries, materials, sources, and tallies. The objectives of this course are to: (1) provide participants with a background in Monte Carlo radiation transport code development; (2) provide a fundamental understanding of radiation interactions with matter; (3) help participants create and visualize a basic input file for Monte Carlo simulation; and (4) conduct and analyze the simulation data to interpret meaningful results.

Participants are responsible for obtaining their own license for MCNP® from RSICC at rsicc.ornl.gov. Participants are strongly encouraged to bring their own computers to the course with MCNP® installed.

PEP 2-E Alpha Spectroscopy for the Health Physicist

Craig Maddigan

Lake Highland B

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-F Evaluation of MARSSIM and MARSAME Surveys

David Stuenkel

Lake Monroe

The Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) provides guidance on how to demonstrate that a site complies with applicable radiation dose- or risk-based release criteria. In a similar way, the Multi-Agency Radiation Survey and Assessment of Materials and Equipment (MARSAME) manual, a supplement to MARSSIM, provides guidance on how determine proper disposition of materials and equipment. While both MARSSIM and MARSAME and provide comprehensive guidance, the focus of both is on the design and evaluation of final surveys, known as final status surveys in MARSSIM and disposition surveys in MARSAME. This presentation will discuss the evaluation of these surveys. For final status surveys in MARSSIM, this will include preliminary data review, performance of statistical tests and performance of the elevated measurement comparison. For disposition surveys in MARSAME, this will include preliminary data review, evaluation of the measurement uncertainty, and comparison to an upper confidence limit. Illustrative examples will be used to demonstrate these concepts.

PEP 2-G Dosimetry Methods for Second Cancer Risk Estimation Following Radiotherapy

Matthew Mille

Lake Sheen A

Advanced imaging methods combined with modern linear accelerator technologies have made it possible to deliver radiation precisely to the targeted tissue. Nonetheless, even the most careful treatment planning still results in unavoidable dose to nearby normal tissues. The impact of this unintended dose on patient long-term health is of increasing concern as survival rates improve. Radiotherapy is known to be an important contributor to second primary cancers and cardiovascular disease which may occur many years after treatment. Furthermore, the efficacy of emerging treatments such as proton and heavy ion therapies have yet to be evaluated through long-term epidemiological follow-up. Improved knowledge on the relationship between organ dose and late health effects is critical for the optimization of treatments and the development of preventative measures for mitigating toxicity, thereby improving quality of life of future survivors. Consequently, the Radiation Epidemiology Branch (REB) of the National Cancer Institute, Division of Cancer Epidemiology and Genetics has initiated or is participating in a number of epidemiologic studies of radiotherapy patients. Radiation exposure assessment is a critical component of these efforts but poses significant challenge in the context of epidemiological studies which typically involve a large number of patients who were treated many years in the past, for whom anatomical images may be inaccessible, and for whom only limited radiotherapy plan information may be known. To overcome these issues the REB is developing a novel radiotherapy dosimetry system entitled NCIRT which combines computational phantoms, accelerated Monte Carlo simulation, and the NIH High-Performance Computing cluster to provide organ dose estimates. This talk will describe the multi-institutional effort to develop, validate, and ultimately apply the NCIRT method to branch and extramural epidemiologic studies or clinical trials.

PEP 2-H Status of ANSI N42 RPI & HSI standards

Morgan Cox

Lake Sheen B

This summary covers the current status of American National Standards Institute (ANSI) N42 standards for health physics instrumentation in two sections:

This section includes the discussion of some seventeen ANSI N42 standards for Radiation Protection Instrumentation (RPI) in effect, being revised or being combined, including those for performance & testing requirements for portable radiation detectors, in ANSI N42.17A for normal environmental conditions and in ANSI N42.17C for extreme environmental conditions, being combined; and now published ANSI N42.323A/B, for calibration of portable instruments over the entire range of concern, i.e., in the normal range and for near background measurements; performance criteria for alarming personnel monitors in ANSI N42.20; replaced airborne radioactivity monitors in ANSI N42.30 for tritium, ANSI N42.17B for workplace airborne monitoring, ANSI N42.18 for airborne effluent on-site monitoring, and ANSI N323C for test and calibration of airborne radioactive monitoring; instrument communication protocols in ANSI N42.36; in-plant plutonium monitoring in ANSI N317 is being revised; reactor emergency monitoring in ANSI N320 is being revised; quartz and carbon fiber personnel dosimeters in ANSI N322; installed radiation detectors in ANSI N323D needs to be updated and revised; ANSI N42.26 for personnel warning devices; radon progeny monitoring in ANSI N42.50 in development; and radon gas monitoring published in ANSI N42.51 by ARRP.

The newly published ANSI N42.54 standard combines the salient materials for airborne radioactivity monitoring from ANSI N42.17B, ANSI N42.18 (airborne only), ANSI 323C and ANSI N42.30, with the comprehensive title of "Instrumentation and systems for monitoring airborne radioactivity".

This section includes the discussion of twenty ANSI N42 standards recently developed, being developed, or being revised and updated for Homeland Security.

Instrumentation (HSI), including those for performance criteria for personal radiation detectors in ANSI N42.32 that has been revised; portable radiation detectors in ANSI N42.33 in revision; portable detection and identification of radionuclides in ANSI N42.34; all types of portal radiation monitors in ANSI N42.35; for training requirements for homeland security personnel in ANSI N42.37 revised and published in 2017; spectroscopy-based portal monitors in ANSI N42.38 in revision; performance criteria for neutron detectors in ANSI N42.39, needing attention; neutron detectors for detection of contraband in ANSI N42.40, not addressed; active interrogation systems in ANSI N42.41; data formatting in ANSI N42.42, revised and updated; mobile portal monitors in ANSI N42.43; checkpoint calibration of image-screening systems in ANSI N42.44; criteria for evaluating x-ray computer tomography security screening in ANSI N42.45; performance of imaging x-ray and gamma ray systems for cargo and vehicles in ANSI N42.46; measuring the imaging performance of x-ray and gamma ray systems for security screening of humans in ANSI N42.47; spectroscopic personal detectors in ANSI N42.48; personal emergency radiation detectors (PERDs) in ANSI N42.49A for alarming radiation detectors and in ANSI N42.49B for non-alarming radiation detectors; backpack-based radiation detection systems used for Homeland Security in ANSI N42.53; portable contamination detectors for emergency response in ANSI N42.58 needing some attention; and ANSI N42.60 training for radiological/nuclear initial detection response, being developed.

PEP 2-I Evolution of Occupational Radiological Protection

Dunstana Melo

Spring Lake

Occupational radiation exposure occurs in the workplace due to exposure to sealed radiation sources (generally known external exposure) and/or exposure to unsealed radiation sources (generally known as internal exposure), that involves incorporation of radionuclides by inhalation, ingestion or skin absorption. The International Commission on Radiological Protection (ICRP) provides an appropriate standard of protection for man without unduly limiting the beneficial practices giving rise to radiation exposure. The aim of the radiological protection is to prevent detrimental deterministic effects and to limit the probability of stochastic effects to levels deemed to be acceptable.

The first radiological protection recommendations were published in 1958: ICRP Publication 1, which was based on the concept of critical organs, the tissues and organs of concern were gonads, red bone marrow and lens of the eyes. In 1977, the ICRP Publication 26 replaced the previous 1958 recommendations with important updates. In this new Publication, ICRP recommends a system of dose limitations. Based on this new system, these recommendations were completely revised and again issued in 1991 as Publication 60, the dose limits were reviewed based on findings of epidemiological studies, radiation quantities were updated, and physiologically based biokinetic models were adopted as well. Most recently, the ICRP recommendations were again updated and published in 2007, with further guidance and clarifications in ICRP Publication 103.

The objective of this course is to educate and inform health physicist and students about the latest concepts of radiological protection and the favourable changes and improvements over the 60 years. We will discuss the evolution of dosimetry methodologies, dose limits, occupational monitoring programs as well as a comparison the doses calculated using the different ICRP recommendations.

Sunday 14:00 – 16:00

PEP 3-B Basic Training for the NRRPT Exam – Review of the Applicable CFRs

Tom Voss

Lake Hart

This class presents the interpretation of the CFRs applicable to radiation protection. The class concentration is on 10CFR19, 10CFR20, 10CFR30, 10CFR34, 10CFR35, 10CFR835, 29CFR1910, 49CFR100-199, and Regulations and Guides. The CFRs are the federal laws that govern our work with radiation. An in-depth knowledge and understanding of those CFRs is vital to the radiation professional. Reguides, Nuregs, Info Notices, and additional sources of guidance are explored. The history of guides and regulations is explained. The effect that US and International Standards and radiological organizations have on the CFRs is examined. The instructor began his career in radiation instrumentation in 1967, working at a commercial nuclear power plant (then under AEC rules). His experience covers working with the AEC, NRC, DOE, US Military, Research, and the commercial world. Part three of three.

PEP 3-C What Neurosciences Can Tell us About Radiation Safety Decisions

Ray Johnson

Lake Down

The past 15 years have seen tremendous growth in in the fields of neuroscience and neurobiology that have resulted in many new insights on how our minds acquire information, how we process that information, and how we make decisions. Interpersonal neurobiology shows how the structure and function of the mind and brain are shaped by experiences, especially those involving emotional factors. Perhaps there is no greater emotional factor in our lives than the motivation for survival. We are also social creatures with brains and minds that are part of larger organisms called families, communities, and cultures. There is not only safety in numbers but we share the fundamental human experience of inhabiting an incomprehensible and often frightening universe. Given our dependence on groups for our very survival, we have evolved elaborate neural networks for interacting with others. The fundamental behavioral tendency of all organisms is to approach what is life sustaining and avoid that which is dangerous. The success of rapid and accurate approach/avoidance decisions determines whether we live long enough to reproduce or not. During stressful situations, such as deciding on the risks of radiation, much of the brain's functioning is based upon primitive fight-or-flight mechanisms as opposed to conscious and compassionate decision making. Although we are born with certain survival instincts, for example, infants are automatically startled by loud noises, other survival instincts are acquired from modeling of our parents. If a parent is fearful of spiders, the child may also be fearful. If parents are fearful of radiation, the children may inherit those fears. As these children become adults they may respond with aversion to radiation automatically without knowing why. The big question today is whether those automatic responses can be changed by our interventions? While the simple answer to this question is YES, there are many factors that go into decisions for radiation safety, only part of which are the ingrained biases from our early lives. During our lifetimes, our subconscious minds continuously store knowledge, impressions, and feelings as we assess the outer world for signs of danger. Because we cannot experience radiation by any of our five senses we have to rely on what the community tells us. The media has done a good job of creating a general mindset against radiation by the frequent use of the words "Deadly Radiation." For many people those words are sufficient for decisions to avoid radiation exposure at all costs. Since radiation fears are largely automatic, it may not be helpful to tell people, "You do not have to be afraid." While these words are intended to be helpful and allay fears they may be heard by a frightened person as if we are telling them, "Your feelings are wrong and it's not OK to be fearful of radiation." Anxiety is contagious and it activates fear and alarm circuitry through the amygdala that spreads throughout our body. Conscious processing may become inhibited by the amygdala, making us have a difficult time being rational, logical, and in control of our emotions when making decisions for radiation safety.

PEP 3-D Practical Computational Modeling for Health Physics (2) - Intermediate Monte Carlo Modeling with Anthropomorphic Phantoms

Autumn Kalinowski, Shaheen Dewji

Lake George

Computational phantoms can be employed to estimate or reconstruct organ and effective doses due to external and internal radiation exposures. In this course, we will build upon principles for those familiar with MCNP basics and apply computational modeling skills for internal and external

radiation sources in reference male and female adult phantoms. Demonstrations of computing organ doses and effective doses will be conducted.

The objectives of this course are to: (1) review the history and capabilities of computational phantoms; (2) explore using the reference adult computational phantoms in dose estimation; (3) conduct rudimentary real-life problems and applications; and (4) provide in-person resources and support to navigate specific user needs. Participants should obtain a copy of the PIMAL (Phantom with Moving Arms and Legs) from the U. S. Nuclear Regulatory Commission Radiation Protection Computer Code Analysis and Maintenance Program website (www.usnrc-ramp.com). Participants are responsible for obtaining their own license for MCNP® from RSICC at rsicc.ornl.gov. Participants are strongly encouraged to bring their own computers to the course with MCNP® and PIMAL installed.

PEP 3-E Gamma Spectroscopy for the Health Physicist

Craig Maddigan

Lake Highland B

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-F Technical Basis and Operational Experience for Clearance of Personal Property From SLAC Accelerator Facilities

James Liu, Ryan Ford, Jim Allan, Sayed Rokni

Lake Monroe

At high energy particle accelerators, induced radioactivity in accelerator components or materials can occur as a direct or indirect consequence to exposure to the particle beam and/or the secondary radiation particles due to beam losses. Management of the potentially activated materials is an important part of the radiation protection program. This presentation addresses the release of the materials from radiological control (i.e., clearance of personal property) in accelerator facilities to meet the DOE Order 458.1 requirements. SLAC, a high-energy electron accelerator facility, has successfully release metals for recycle in the past few years. The SLAC material clearance program with its technical bases are consistent with the DOE Technical Standard DOE-STD-6004-2016 on "Clearance and Release of Personal Property from Accelerator Facilities".

The technical bases that support the clearance of metals (e.g., aluminum, iron, steel, copper, and lead) associated operational experience at SLAC will be presented. The emphasis of the technical basis is placed on the volumetric radioactivity aspects, instead of surface contamination, due to potential activation at high-energy accelerator facilities and the more challenging measurement methods for volumetric radioactivity. The technical basis includes process knowledge (e.g., characteristics of induced radioactivity, proxy radionuclides versus the hard-to-measure radionuclides, and surface maximum activity), measurement protocols (including quantification of detection capability), and a release criterion based on that the release measurements are indistinguishable from background (IFB).

SLAC has developed and implemented a material management and release program for the material clearance and metal recycling. The program includes the establishment of radiation detection instrumentation and measurement methods to meet the ANSI N13.12 screening level requirements for clearance of accelerator materials. These instruments include portable instruments with sufficient detection capability for survey on material surfaces, field gamma spectrometer for confirmatory measurements, and a portal gate monitor. The discussion will also include best practices for instrument set-up, field measurements, documentation and record management, and communication with stakeholders. A summary of recycling progress, as well as lessons learned and mitigation of safety hazards, at SLAC will be provided.

PEP 3-G Federal Radiological Response Teams

Ken Groves

Lake Sheen A

This Presentation will offer a review of both Federal and State (Federally-Funded) Radiological/Nuclear Emergency Response Teams/Assets. It should be noted that FIRST AND FOREMOST—ALL EMERGENCIES ARE LOCAL (AND AT BEST REGIONAL). The response times for both Federal and State resources are not fixed; so it is imperative that local jurisdictions have planned for the first 24+ hours without outside support. It is critical that "regional" plans be in place, documented, trained and exercised if your response is to be effective! Integration of the Federal and State assets will be important in achieving a successful response during the early and intermediate phases of the radiological/nuclear emergency.

PEP 3-H Neutrons: Discovery, Detection, Applications and Health Physics

Jeff Chapman

Lake Sheen B

This session will present the interesting and somewhat contradictory circumstances that lead to the discovery of the neutron, in 1932, by James Chadwick. With its discovery, the physics community--- primarily lead by Fermi---studied the experimental behavior of neutron capture, and ultimately fission, induced by thermal neutron capture. Later, the determination of neutron multiplicity was sought, and with almost complete surprise the average number of neutrons per fission was measured at greater than 2, sufficient to sustain a neutron chain reactor. Applications of the neutron will be discussed, as well as some of the more interesting health physics issues that arise in the detection and interpretation of dose resulting from neutron exposure.

Monday 12:15 – 14:15

PEP M-1 A Radiation Protection Program Logic Model: Inputs, Outcomes and Benchmarking Opportunities and Strategies for Keeping Your Radiation Safety Program on Course in a Sea of Constant Change

Janet Gutierrez, Robert Emery

Orlando V

Part A. Successful radiation protection programs function largely in the realm of prevention, thus making it difficult to explain to upper management and others the amount of resources needed to "make nothing happen". One possible solution to this conundrum resides in the filed of public health where logic models are often used to assess program "inputs" and program "outcomes". This session will examine radiation protection programs from the perspective of a public health logic model and serve as the basis for a discussion about what sorts of valid benchmarking might be able to be accomplished within the radiation safety profession.

Part.B.The University of Texas School of Public Health recently conducted a straw poll of approximately fifty very experienced health & safety professionals and the results were astonishing: 80% had reported to the person they current report to for a period of less than 5 years, and 25% for a period of less than 1 year! These striking results underscore the old adage that "change is constant". But adapting to change is not something that is traditionally addressed in academic health & safety programs. Interestingly, although change is indeed constant, the underlying data that drives radiation safety programs doesn't change. What does change is the framing of the delivery of this important information to ensure continued program support. This presentation will discuss the dilemma of constant change and provide some tips on the personal management of change and will present options to consider for communicating essential information to the ever-changing environment.

PEP M-2 CAP88-PC Version 4.1 Update

Brian Littleton, Ray Wood

Orlando VI

The EPA is preparing a new release of the CAP88-PC model, version 4.1. This new release updates the existing version 4.1 with new data and includes some small modifications to the user environment. This course will help users of the CAP88-PC model to understand the changes in the new version relative to previous versions, describe the bases for the model, and instruct users on proper use of the model for regulatory compliance. The course will include descriptive presentations about the model along with demonstrations on using CAP88-PC version 4.1 for specific types of scenarios. Additional information on future update paths and regulatory approaches will also be presented.

PEP M-3 Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers

Michael Stabin

Orange A

Internal dose calculations for nuclear medicine applications or for protection of radiation workers are based on the same fundamental concepts and units. The various systems developed to provide a basis for the needed calculations (e.g. ICRP 30/60/103, MIRD, RADAR) use equations that appear to be different, but are in fact identical when carefully studied. The RADAR method harmonized the defining equations and units employed to provide quantitative analysis for these two general problem areas. This program will show, from a theoretical standpoint, how all of these systems are identical in concept, and will then show, using practical examples, how each is applied to solve different problems. For nuclear medicine, an overview will be given of the current state of the art and promise for future improvements to provide more patient specificity in calculations and better ability to predict biological effects from calculated doses. For occupational applications of internal dosimetry, an overview will be given of currently applicable models and methods for bioassay analysis and dose assessment, showing several practical examples.

PEP M-4 How to Choose the Correct Portable Radiation Detection Instrument for Your Needs

Judson Kenoyer

Orange B

Over the past 5 years, the presenter has had many, many discussions with radiation-protection peers and students of Radiation Safety Officer classes with regard to the factors that go into the decision on how to choose the correct portable radiation detection instruments for specific needs. Most of those needs fall into two categories – exposure rate measurements or contamination (activity) measurements. During this PEP session, we will discuss basic principles of radiation detection (mainly for gas ionization and scintillation detectors), several different types of instruments (ion chambers, gas proportional counters, GM, NaI, plastic scintillators), and factors that can affect instrument readings (temperature, ambient pressure, humidity, type of window and thickness, background, radiation absorption, calibration conditions, energy dependence, geometry, and speed of movement). By comparing the specific needs to be met, the characteristics of the radiation being measured (or what is known or unknown about the radiation field) and the features of different portable radiation detection instruments, one can follow a fairly straightforward path to determine the types of instruments that can meet your needs and also establish a prioritization of choices within the types of instruments that will give you the best results for your situation.

PEP M-5 Considerations for Implementation of NCRP 179, Guidance for Emergency Response Dosimetry

Adela Salame-Alfie, Jeff Chapman

Orange C

National Council on Radiation Protection and Measurements (NCRP) Report No. 179, Guidance for Emergency Response Dosimetry, complements three previous NCRP publications that provide advice on planning responses to radiological or nuclear terrorism incidents." In an effort to implement the guidance from NCRP 179, an inter-agency steering committee, between FEMA, NNSA, EPA, OSHA, HHS has been established to guide the decision-making process in how dosimetry for first responders to a radiological or nuclear incident is managed, when in fact the responders are absent external dosimetry. This PEP/CEL course will review the key issues to be addressed, and proposed methodologies for assigning and controlling dose to first responders who are not necessarily trained in radiation protection and who are not assigned external dosimetry.

With minimal dosimetry resources, how do responders make decisions to control the total dose and associated risk? • How are doses assigned to responders when not every responder is issued a dosimeter before exposure occurs? • What is the regulatory framework for responders who are not trained as radiation workers?

Tuesday 12:15 – 14:15

PEP T-1 HEU to LEU Conversion and the Production of Mo-99 Without the Use of HEU

Lynne Fairobent , Jeff Chapman

Orlando VI

The National Academy of Sciences issued its first report on conversion of research reactor fuel and targets from HEU to LEU in 2009, as a result of a mandate for the National Research Council study from Section 630 of the Energy Policy Act of 2005 (Public Law 109-58). Section 630 directed the Secretary of Energy to enter into an arrangement with the National Academy of Sciences for a study on the elimination of highly enriched uranium (HEU) from reactor fuel, reactor targets, and medical isotope production facilities. At that time Lynne was working for ACR and Jeff was working this very conversion problem at the SAFARI-1 reactor in South Africa. Since that time, which really started in as early as 2006, the Department of Energy has made considerable progress in assisting with the conversion of several reactors around the world, and began an effort to produce Mo-99 domestically. This PEP session will provide the historical framework as well as problems and issues encountered along the way, in producing this vital medical isotope, which accounts for more than 40,000 medical procedures a day in the United States.

PEP T-2 Where Did This Come From? Lessons Learned from High-Routine Bioassay Investigations

Brett Rosenberg

Orange B

This PEP class provides actual case studies of high routine bioassay measurements addressing the investigation process, resolution, and lessons learned from each. The considerations made during these investigations could be of benefit to other sites that run internal dosimetry programs. High routine bioassay results can come from several sources, including false positive results, laboratory errors, interference from non-occupational sources, and previous occupational intakes, as well as new intakes. It is incumbent upon the site performing a high bioassay result investigation to thoroughly address all possibilities before classifying a high routine as a new intake. The presenter has encountered all of the foregoing issues in the

course of investigating high routine bioassay measurements at the US Department of Energy Hanford Site. The important lessons learned include, 1) have good measurement verification protocols, 2) confirm intakes by more than one bioassay measurement, 3) conduct interviews with workers concerning their specific circumstances and recollections, 4) have good retrievable site records for work history reviews, 5) exercise good professional judgment in putting the pieces together to form a conclusion, and 6) clearly communicate the conclusions to the worker, the employer, and the regulatory agency.

PEP T-3 An Overview and the Lessons Learned from a Response to a Radiological Event Involving Potentially Significant Internal Radiation Doses from Americium-241

Manuel Mejias, Steven Dewey

Orlando IV

As a Radiation Safety Officer (RSO) or health physicist, there are numerous technical, regulatory, and political challenges involved in managing a NRC reportable event that involves internal contamination potentially exceeding occupational dose limits. The health physics personnel involved with the response and incident investigation will have to address bioassays, radiological surveys, remediation activities, reports to the NRC, advising senior management, handling of public affairs inquiries, and many other activities. This program will discuss the events from the initial discovery of the contamination to the closure of an NRC reactionary inspection. The discussion will include valuable lessons learned concerning the adequacy of hazards assessment for radioactive materials not in use, the proper use and selection of detection equipment, the collection and interpretation of bioassay data, communicating with medical staff, laboratory decontamination, incident reporting and investigation, interactions with NRC personnel and senior leadership, communicating with potentially exposed personnel and preventive measures implemented to prevent recurrence of the event.

PEP T-4 Basic Physics for Radiation Detection

Doug Van Cleef

Lake Hart

This course presents an overview of the basic physics of radiation detection, from the generation of radiation in the decay process to the interaction with detector materials. We will include discussions on the effects of distance, shielding, sample materials, and detector materials and will include ample time for Q&A to allow attendees to address specific applications. Upon completion of this course, students will have a solid working foundation for understanding the basic physics of radiation emission and detection.

Who should attend: Experienced technologists who need a review of basic radiation physics, or new technologists seeking a brief and practical introduction to the physics principles involved in radiation detection.

Wednesday 12:15 – 14:15

PEP W-1 NDA Systems Used for the Qualification of TRU Waste to WIPP

Jeff Chapman

Orlando IV

NDA Systems used for the qualification of TRU waste to WIPP Jeff Chapman, Oak Ridge National Laboratory This session will present an overview of NonDestructive Assay (NDA) systems currently deployed across the U.S. for the measurement of transuranic waste. Additionally, and where applicable, measurement devices used in the "IAEA community" for the conduct of Material Control and Accountancy will be discussed. Methodology, Instrumentation, and application limitations will be discussed.

PEP W-2 Fluoroscopic System Evaluation and Radiation Safety Considerations

Cari Borrás

Orlando VI

Fluoroscopic studies, especially interventional ones, may result in high radiation doses to the patient and to the staff. Radiation protection can be achieved by proper equipment design, availability and selection of imaging protocols specific to the imaging task and the patient body habitus, and optimized operational procedures. While FDA standards address only the manufacturer's equipment design, some State Radiation Control Regulations and accreditation programs such as those of The Joint Commission (TJC) and the American College of Radiology (ACR), have emphasized the need to manage the radiation risks involved.

This radiation safety course will focus on the state of the art fluoro systems used in diagnostic and interventional procedures, primarily angiography units. Equipment evaluation checks and criteria will be taken from the 2016 "ACR–AAPM Technical Standard for diagnostic medical physics performance monitoring of fluoroscopic equipment". This document lists the tests to be performed during acceptance testing, for the annual evaluation (required by many State Regulations), and to set up and implement a quality control program. The methodologies involved in the assessment of image quality and radiation dose will be described, highlighting the differences between analog and digital components such as image intensifiers vs flat panel detectors. Dosimetry parameters will be defined, and instrumentation and techniques involved in their measurement will be reviewed. Typical diagnostic reference levels for adults and children will be presented. Examples of staff and patient exposures for selected interventional procedures will be shown. Emphasis will be placed on the estimation of organ doses. DICOM standards such as the Radiation Dose Structured Report (RDSR) and Patient-RSDR will be introduced. Compliance with Federal Regulations and recent TJC fluoroscopy standards, including training requirements, will be discussed. The latter may be challenging in scope, since fluoroscopy is not only performed in radiology departments, but also in cardiology, neurology, surgery, urology, orthopedics, obstetrics and gynecology, gastroenterology, physiatry and pain management clinics, where the physicians performing the procedures may not have received any formal training in radiation protection.

PEP W-3 A Health Physics Perspective on Prevention Through Design - Modernization of a World-Class Radiation Physics Facility

Manuel Mejias

Orange A

This course offers a review of the health physics considerations in the design of new facilities which include radioactive material laboratories, industrial/research x-ray devices, and health physics support areas. The course will include a discussion of hazards elimination and/or mitigation during the design phase of a new facility and the renovation of an existing facility. Topics will include shielding design, travel paths between laboratories, personnel contamination check points, and liquid and gaseous effluent monitoring design. Lessons learned from the Modernization of the Radiation Physics building at NIST will be discussed.

PEP W-4 Radiation in Flight

Joseph Shonka

Lake Hart

In 2012, measurements of an extreme solar flare that missed earth by 7 days, along with analysis that showed such an event had a 12% probability of occurrence per decade led the US and UK science and technology advisors to recommend a course of action should such an event occur. Unlike the US, carriers in the EU and UK are regulated, and the doses that would have been received exceeded allowable limits. There are no radiation dose limits for US aircrew and passengers. This CEL will summarize the conclusions of those meetings and address both routine and extreme events from radiation that occur in flight. The CEL will also address methods that are being considered to control that radiation routinely and during space weather events. Recent efforts by the ISO to develop standards for measurement of radiation in flight will also be summarized.

PEP W-5 Certification Options for Health Physicists

Steven King, Andy Miller

Lake Down

There are several certifications that health physicists can earn that would benefit them in their practice. This talk explores the various certifications and gives the HP the online locations and allows exploration and finding relevance for your situation.

We will explore the CHP, NRRPT, MRSO (Magnetic Resonance Safety Officer), CMLSO, ABMP, and ABSNM certifications and educational as well as pertinent experience requirements. Each organization has examinations and fees involved in becoming certified as well as maintenance of certification expectations after you are certified.

We will follow up the talk with a question and answer period.

CONTINUING EDUCATION LECTURES (CELs)

Monday, 8 July through Thursday, 11 July

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CEL5-34159	CEL9-65485

Monday

CEL-2 **07:15 – 08:15**

What Keeps Us from Being Effective Radiation Risk Communicators?

Ray Johnson

Orlando VI

The simple answer to the title question is that we are creatures of habit. As we evolve from infancy and acquire skills such as how to eat, how to put on our clothes, and how to walk, such skills become automatic habits controlled by our subconscious minds and we no longer think about how we learned those skills. How could we function today if all of these natural habits had to be rethought or relearned every day? Actually most of lives are governed by automatic habits that we no longer think about. As infants we begin to develop ways of communicating that most easily meet our needs for survival. As adults, after decades of experience building our communication habits, we do not think about the process of communication any longer. Most of the time our automatic communication processes allow us to interact with others as successful and responsible adults. However, from time to time, we may find that our normal communications style is no longer effective. For example, are we typically well prepared to deal with difficult people that are emotional, fearful, angry, upset, antagonistic, or distrustful? In these situations we may find that our normal communication approaches do not work. While psychologists and neuroscientists know many strategies for dealing with difficult people, for any of us to use those strategies means that we have to change our communication habits. Now here is the challenge. How hard is it to change any habit? Have any of you had success trying to lose weight? How are you doing with your New Year's resolutions this year? To communicate in more effective ways we must do more than simply learn about new communication strategies. To become proficient with these strategies we will have to practice, practice, and practice. This means making a decision to spend the time and energy for practicing new skills. This may not be easy in our typically busy lives where we already feel over committed. For best results we will not only need significant practice, but also frequent coaching or supervision to help us keep on tract. Feedback from ongoing supervision can help us refine our new communication skills. Ideally we will have the opportunity to meet weekly or biweekly with others to share our ongoing practice who will provide positive feedback and encouragement.

Tuesday

CEL-3 **06:45 – 07:45**

Making Your Radiation Safety Message Stick! 35 Years of Powerful Quotes Collected on Sticky Notes

Mark Hoover

Orlando VI

Successful radiation safety programs function largely in the realm of prevention, so on a good day "nothing happens". But the value of "making nothing happen" can be a very difficult message to convey, and this often becomes an impediment to our ability to collectively articulate our story and needs to key program stakeholders. After 35 years of practice we have learned that the right quote, when used at the right time, can be a very strategic way of achieving desired decision making. These quotes, captured on hundreds of disorganized sticky notes, have adorned our office bulletin board for almost four decades, and while drawn from many safety specialties, they seem to have an uncanny universal appeal and thus have been compiled into a "top ten" list that will be shared for discussion during this presentation.

CEL-4 **06:45 – 07:45**

History and Overview of the Formerly Utilized Sites Remedial Action Program

John Hackett

Orange B

The Formerly Utilized Sites Remedial Action Program (FUSRAP) has a 45-year history of identifying and cleaning up legacy sites from the nation's initial atomic weapons development during the Manhattan Project and early days of the Atomic Energy Commission. This lecture presents an overview of the work performed by the Manhattan Engineer District as well as the history of FUSRAP from its initial execution by the Department of Energy (DOE), through the transition of FUSRAP execution from DOE to the U.S. Army Corps of Engineers (USACE) following congressional mandate in the late 1990s, to the present-day roles and responsibilities of both agencies in the program. A discussion of the FUSRAP site life cycle and the eligibility process for new sites is also provided. Case studies of several sites (both completed and active) are presented to highlight specific technical and regulatory issues common to FUSRAP sites.

CEL-5 **06:45 – 07:45**

Dosimetry Challenges of New Nuclear Medicine Theranostic Agents

Michael Stabin

Orlando IV

The term theranostics is defined as the integration of a diagnostic test with a specific therapeutic intervention. The diagnostic test should identify patients who will likely respond to a particular therapy, fail to respond to a given drug or eventually exhibit adverse events. The therapeutic application seeks to treat a specific disease. This session will describe the criteria for selecting good theranostic radiopharmaceuticals, and provide an overview of several useful theranostic agents in use, or under consideration for use, in nuclear medicine therapy, with a focus on the radiation dosimetry aspects.

Wednesday

CEL-6 **06:45 – 07:45**

Science Is Not Enough

Eric Daxon

Orlando IV

This is not a science presentation. It is a presentation about how science does and how it should interface with politics, the population at large and decision-makers. The genesis of this talk was a question from a four-star general in 1984, "Is it safe?" General Lawson was referring to depleted uranium (DU). I was an Army captain at the time and a newly-minted health physicist. My answer started with, "Sir, there is always a risk of cancer…" That was about as far as I got. At this point, General Lawson made it clear that my answer was "unsatisfactory." He asked the question again, "Is it safe?" My second response was more succinct, "Yes sir." That incident started my quest to find a way to communicate radiation risk in a manner understandable to decision-makers and non-health physicists. Up until the late 1990's, my answer was the same as everyone else's answer – leaders and the public needed more training. While working to develop an Army-wide DU training program, I decided to look at the problem from a different perspective. I assumed that the issue was not with the public but with we health physicists and the process of scientific investigation. This talk was first given to the annual meeting of the American Association of Aerosol Research in October 2001. My work with Gulf War veterans and my experiences both before and after this first talk reinforce the veracity of the concepts presented and the solutions proposed. As mentioned earlier, this is not just a science presentation. It is a presentation that addresses the interactions of science/scientists with the non-science world from a unique, holistic vantage point. Specific objectives:

- Describe the "language" barriers generated by our scientific methodology.
- Demonstrate the ability to translate the language of science into the language of politics and the language of the general population.
- Identify how our current scientific methodology can cause harm.
- Identify the steps you can take to mitigate the harm and the personal toll of taking science into the political sphere.

CEL-7 **06:45 – 07:45**

How do we know they're good? Design and Administration of a Bioassay Oversight Program

Brett Rosenberg

Orlando VI

Missing an occupational exposure can have dire consequences. It is the bioassay program's responsibility to ensure quality in its measurements, both direct (in vivo) and indirect (in vitro), regardless of whether the measurements are performed in-house or through an offsite vendor. This presentation addresses how the DOELAP-accredited Hanford Internal Dosimetry Program oversees its direct and indirect bioassay programs. We will discuss some practices that have bolstered the program, allowing it to catch shortfalls that would have resulted in false positives and missed detections. Lessons learned include 1) the consequences of using synthetic versus real excreta samples, 2) the value of blind and double-blind quality control samples, and 3) the statistical power of recounts.

Thursday

CEL-8 **06:45 – 07:45**

The Importance of the Measurand in Health Physics

Daniel Strom

Orlando IV

When making a measurement for radiation protection or regulatory compliance, what is "the quantity intended to be measured?" That phrase is the definition of *"measurand"* that appears in the latest version of the International Vocabulary of Metrology (the VIM). For example, one may conduct a counting experiment to determine the amount of activity in a sample or the amount of activity in a lake. These two different measurands come with differing assumptions, although they may be based on the same measurement result. Another example is the distinction between the result of a measurement in counts per second and the measurand in becquerels (or cpm versus dpm). Alas, most US writing, such as ANSI standards, regulations, MARLAP, and MARSSIM, ignores the concept of the measurand, making it very difficult to convey concepts such as minimum detectable amount, a terribly misleading name for the smallest usually detectable measurand (SUDM). The concept of measurand gives clearer meaning to the notions of population parameter (a measurand) and sample parameter (one or more measurement results or inferences based on those results). When the concepts of variability, uncertainty, bias, error and blunder are combined with models used to make inferences about measurands, or probabilistic statements about measurands using Bayes's theorem, the distinction between measurement results and measurands is key. While the measurand has sometimes been called the "true value," those words are not adequate in understanding metrology. All health physicists need to be able to state what the measurand is for every measurement result they make or use.

CEL-9 **06:45 – 07:45**

Radiation Exposure to Terrestrial Organisms and Organisms in Space from Supernovae and Gamma Ray Burst?

P. Andrew Karam

Orlando V

There is a great deal of speculation about the possible impact that nearby supernovae and gamma ray bursts might have on life on Earth; at least one credible assertion has been made that a nearby supernova or gamma ray burst might have triggered a mass extinction over 400 million years ago. At the same time, supernovae have gone off so close to Earth that debris has been found in deep-sea sediments – and so recently that it includes live radioactivity in the form of Fe-60 and Pu-244. In this CEL we will discuss the forms of radiation emitted by supernovae and gamma ray bursts and how close one might have to be to cause harm. For good measure, we'll also talk about how events such as these might affect organisms traveling through space, the subject of a great deal of speculation under the topic of "panspermia."

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LOBBY LEVEL

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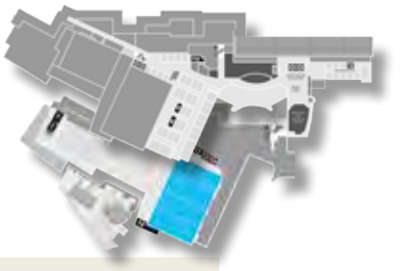
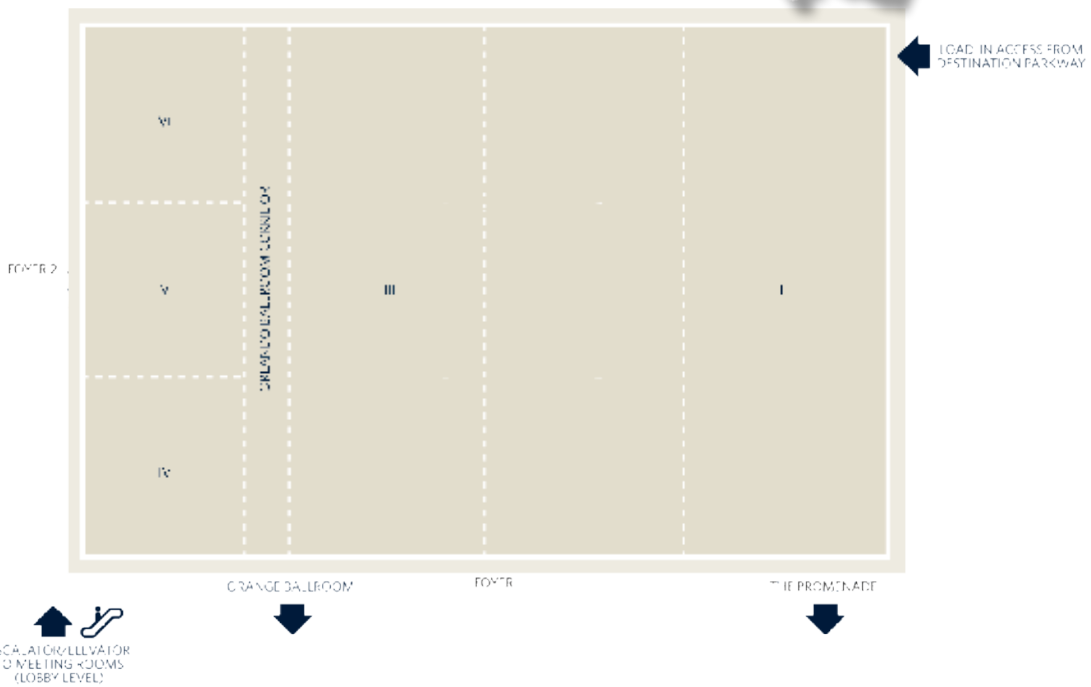
LOWER LEVEL
ORLANDO BALLROOM





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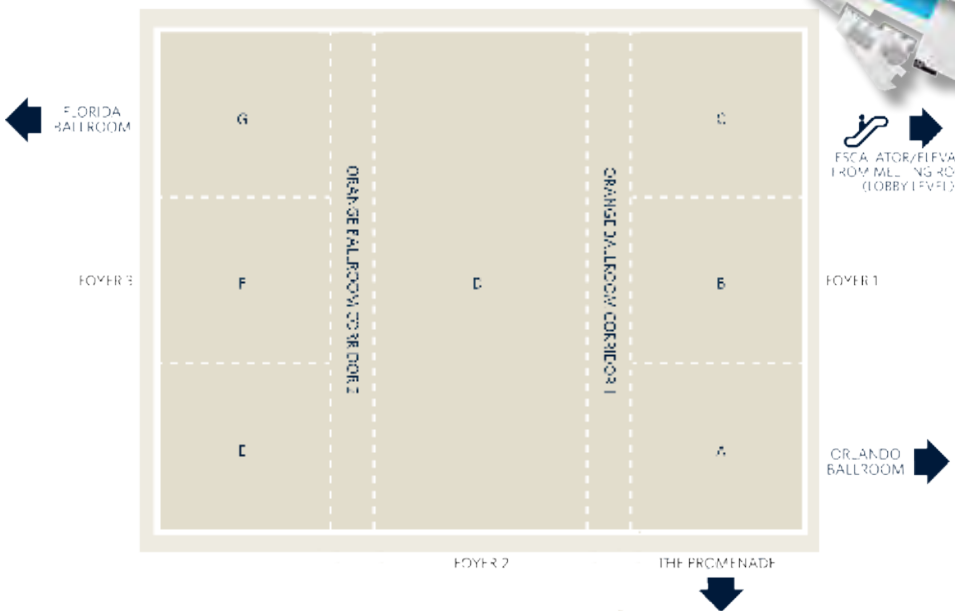

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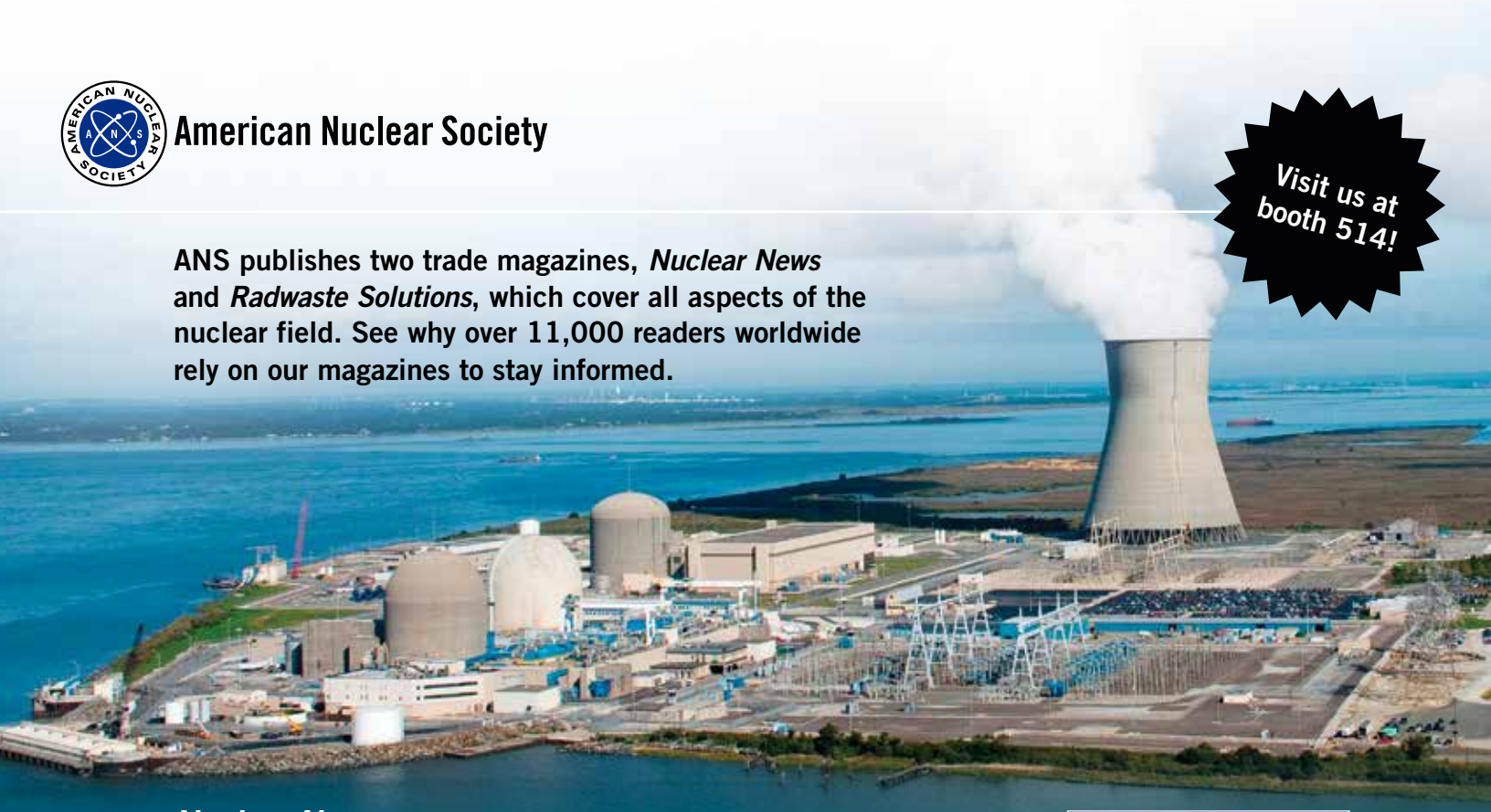

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