# HEALTH PHYSICS SOCIETY

## 66th Annual Meeting

Phoenix, Arizona • 25-29 July 2021

# CONFERENCE PROGRAM

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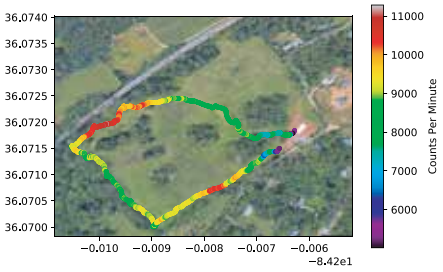


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66th Annual Meeting

# HEALTH PHYSICS SOCIETY

Phoenix, Arizona • 25-29 July 2021

## Registration Hours and Location

Exhibit Hall Foyer, Phoenix Convention Center

**Sunday, 25 July**
1:00 PM – 4:00 PM

**Monday, 26 July**
7:30 AM – 4:00 PM

**Tuesday, 27 July**
8:00 AM – 4:00 PM

**Wednesday, 28 July**
8:00 AM – 4:00 PM

**Thursday, 29 July**
8:00 AM – 11:00 AM

## Exhibit Hours and Location

Exhibit Hall B-C, Phoenix Convention Center

**Monday, 26 July**
12:00 PM – 7:00 PM

**Tuesday, 27 July**
9:30 AM – 5:00 PM

**Wednesday, 28 July**
9:30 AM – 12:00 PM

All events take place at the Phoenix Convention Center.

## Table of Contents

# SCHEDULE AT-A-GLANCE

All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## TUESDAY, JULY 20

**VTU-A** Special Session: Pandemic Experiences Part 1
10:10 AM – 2:10 PM

**VTU-C** Special Session: Homeland Security and Emergency Response
10:10 AM – 2:10 PM

**VTU-D** Special Session: Nonionizing Radiation
10:10 AM – 12:40 PM

## THURSDAY, JULY 22

**VTH-A** Special Session: Rad Air NESHAP
10:00 AM – 1:10 PM

**VTH-B** Special Session: AIRRS
10:00 AM – 2:00 PM

**VTH-C** Special Session: Medical Health Physics
10:00 AM – 2:30 PM

**VTH-D** Special Session: Veterinary MedicineHealth Physics
10:00 AM – 12:00 PM

**Virtual Speed Networking**
4:00 PM – 5:30 PM

## SATURDAY, JULY 24

**In-Person AAHP Courses will take place at the Phoenix Convention Center**

**AAHP 1** Radiation Risk Assessment *(16 CECs)*
8:00 AM – 5:00 PM North 221ABC

**AAHP 2** Y-90 Boot Camp *(8 CECs)*
8:00 AM – 12:00 PM North 224AB

**AAHP 3** Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers *(16 CECs)*
8:00 AM – 5:00 PM Virtual

## SUNDAY, JULY 25

**In-Person PEPs will be taught in at the Phoenix Convention Center**

**PEP Program** 8:00 AM – 10:00 AM
**1-A** North 224AB
Palomares Dose Reconstruction

**1-B** Virtual
Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers

**1-C** North 222ABC
Nonionizing Radiation: An Overview of Biological Effects and Exposure Limits

**1-D** Virtual
Contemporary Topics Affecting Radiation Safety Program Operations: Session 1

**1-E** Virtual
The Ins and Outs of Wound Counting

**Student Orientation**
9:00 AM – 10:00 AM North 221ABC

**PEP Program** 10:30 AM – 12:30 PM
**2-A** North 224AB
Integration of Health Physics into Emergency Response

**2-B** North 221ABC
Federal Radiological Response Teams

**2-C** North 222ABC
Laser Safety for Health Physicists

**2-D** Virtual
Contemporary Topics Affecting Radiation Safety Program Operations: Session 2

**2-E** North 226AB
Gamma Spectroscopy for the Health Physicist

**PEP Program** 2:30 PM – 4:30 PM
**3-A** North 224AB
Alpha Spectroscopy for the Health Physicist

**3-C** North 222ABC
Performing ANSI Z136-Based Laser Hazard Calculations

**3-D** Virtual
Getting started in consulting: Some practical things about consulting in private practice

**In-Person Speed Networking and Mentor Reception**
5:15 PM – 6:45 PM North 232A

## MONDAY, JULY 26

**CEL-M1** The 1976 Hanford Americium Accident: Then and Now
6:45 AM – 7:45 AM North 221 ABC

**CEL-M2** Working with emergency responders
6:45 AM – 7:45 AM Virtual

**Opening Plenary Session**
8:00 AM – 10:40 AM North 120D

**MAM-A** Special Session: Pandemic Experiences Part 2
11:00 AM – 12:00 PM North 221ABC

**MAM-B** Decommissioning and Decontamination
11:00 AM – 11:45 AM North 222ABC

**MAM-C** Novel Ideas in Health Physics 1
11:00 AM – 12:00 PM North 224AB

**MAM-D** Novel Ideas in Health Physics 2
11:00 AM – 12:00 PM North 226AB

**Complimentary Exhibitor Lunch**
12:00 PM – 1:30 PM Exhibit Hall B-C

**PEP Program** 12:15 PM – 2:15 PM
**M-1** Virtual
Nuclear Space Launch Policy and Planning

**M-2** North 224AB
RDD Primer

**M-3** Virtual
Understanding Alpha Radiation Therapy: From Pre-clinical Considerations to Clinical Outcomes

**ABHP Part II Exam**
12:30 PM – 6:30 PM North 129A

**Poster Session**
1:00 PM – 3:00 PM Exhibit Hall B-C

**MPM-A** Special Session: Conservatism Approach in Radiation Safety
2:30 PM – 4:30 PM North 120D

**Welcome Reception**
5:00 PM – 7:00 PM Exhibit Hall B-C

# SCHEDULE AT-A-GLANCE

All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## TUESDAY, JULY 27

**CEL-T** Therapeutic Uses Nuclear Medicine Pharmaceuticals
6:45 AM – 7:45 AM — North 221 ABC

**TAM-A** AAHP Special Session - Nuclear Site Decommissioning
8:00 AM – 12:00 PM — North 221ABC

**TAM-B** Special Session: The HPS Government Relations Program
8:00 AM – 10:50 AM — North 222ABC

**TAM-C** Special Session: Women in Radiation Protection
8:00 AM – 12:00 PM — North 224AB

**TAM-D** Special Session: Be A Part of the Future
9:00 AM – 11:45 AM — North 226AB

**Complimentary Exhibitor Lunch**
12:00 PM – 1:30 PM — Exhibit Hall B-C

**AAHP and ABHP Awards Luncheon**
12:00 PM – 2:00 PM — North 228AB

**PEP Program** 12:15 PM – 2:15 PM

**T-1** Virtual
Understanding and Using the CAP88-PC Compliance Code

**T-2** North 221ABC
Where Did This Come From? Lessons Learned from High-Routine Bioassay Investigations

**T-3** Virtual
Technical Basis and Operational Experience for Clearance of Personal Property From SLAC Accelerator Facilities

**TPM-A** AAHP Special Session - Nuclear Site Decommissioning
2:30 PM – 4:30 PM — North 221ABC

**TPM-B** Environmental Monitoring
2:30 PM – 6:00 PM — North 222ABC

**TPM-C** Vendor Special Session
2:30 PM – 3:30 PM — North 224AB

**TPM-C2** Instrumentation
3:45 PM – 6:00 PM — North 224AB

**TPM-D** External Dosimetry
2:30 PM – 5:45 PM — North 226AB

**AAHP Business Meeting**
5:00 PM – 6:00 PM — North 221 ABC

## WEDNESDAY, JULY 28

**CEL-W** NRRPT: Advantages to Membership
6:45 AM – 7:45 AM — North 222ABC

**WAM-A** Special Session: Pandemic Experiences Part 3
7:30 AM – 12:00 PM — North 221ABC

**WAM-B** Special Session: The Contamination of the Harborview Research and Training Building, Seattle, Washington
8:00 AM – 11:50 AM — North 222ABC

**WAM-C** Internal Dosimetry
8:00 AM – 12:00 PM — North 224AB

**WAM-D** Special Session: Military Health Physics
8:00 AM – 11:55 AM — North 226AB

**HPS Awards Luncheon**
12:15 PM – 2:00 PM — North 120CD

**WPM-A** Special Session: 10 Reasons you can thrive in HP, #7 will shock you
2:30 PM – 5:25 PM — North 221ABC

**WPM-B** Special Session: The Contamination of the Harborview Research and Training Building, Seattle, Washington Part 2
2:30 PM – 4:55 PM — North 222ABC

**WPM-C** Academic Institutions
2:30 PM – 5:15 PM — North 224AB

**WPM-D** Special Session: Environmental Justice
2:30 PM – 5:15 PM — North 226AB

**Student Support Committee Meeting**
3:00 PM – 4:00 PM — North 229B

## THURSDAY, JULY 29

**CEL-TH** Chemical Interactions and How They Can Complicate Decontamination
6:45 AM – 7:45 AM — North 221ABC

**THAM-A** Power Reactor Health Physics
8:00 AM – 9:45 AM — North 221ABC

**THAM-A2** Radiation Effects
10:15 AM – 11:15 AM — North 221ABC

**THAM-B** Medical
8:00 AM – 10:15 AM — North 222ABC

**THAM-C** Homeland Security and Emergency Response
7:45 AM – 12:00 PM — North 224AB

**THAM-D** Risk Assessment
8:00 AM – 11:15 AM — North 226AB

## Registration Hours

**Exhibit Hall Foyer**

| | |
|---|---|
| Sunday | 1:00 PM – 4:00 PM |
| Monday | 7:30 AM – 4:00 PM |
| Tuesday | 8:00 AM – 4:00 PM |
| Wednesday | 8:00 AM – 4:00 PM |
| Thursday | 8:00 AM – 11:00 AM |

## Exhibit Hall Hours

**Exhibit Hall B-C**

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

**Raymond H. Johnson, Jr. Coffee Breaks**

MONDAY PM – WEDNESDAY PM
EXHIBIT HALL

**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

**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 for 1 CEC per contact hour, excluding meals and business meetings.
- AAHP 8-hour courses are granted 16 CECs each.
- AAHP 4-hour courses are granted 8 CECs each.
- HPS 2-hour technical PEPs will be granted 4 CECs each.
- HPS 1-hour technical CELs will be granted 2 CECs each.

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# What's New For




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## Welcome

The Phoenix Chapter of the Health Physics Society welcomes you to Phoenix, Arizona, for the 66th Annual Meeting of the HPS. The meeting venue is located close to a number of features and events highly rated by tourists; from weekend ideas, to museums, things to do in the desert, kids activities and everything in between, you will find lots of fun things to make your trip memorable. Go to VisitPhoenix.com for a look at many of the activities you can explore while visiting Phoenix.

## PEP/CEL Ready Room

The PEP/CEL Ready Room will be combined with the Speaker Ready Room in North 223 in the Phoenix Convention Center 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 (North 223) will be open Sunday from 2:00 PM – 5:00 PM, Monday through Wednesday from 7:30 AM – 5:00 PM, and Thursday 7:30 AM – 10:00 AM. 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 | 5:00 PM Sunday |
| Tuesday AM-PM | 5:00 PM Monday |
| Wednesday AM-PM | 5:00 PM Tuesday |
| Thursday AM | 5:00 PM 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 B-C must be put up for display between 10:00 AM and 12:00 PM on Monday and removed on Wednesday by 11:00 AM.**

SAVE THE DATE

**2022 IRPA North American Regional Congress**
20-24 February 2022 • St. Louis, MO

**HPS 67th Annual Meeting**
16–21 July 2022 • Spokane, WA

## HPS Awards Luncheon

**Wednesday, 28 July • 12:15 PM – 2:00 PM**
**Phoenix Convention Center, North 120CD**

Join us Wednesday, 28 July, for the HPS Awards Program. We look forward to seeing you by 12:15 pm for the presentation at the Phoenix Convention Center. There will be a luncheon provided that begins at 12:15 pm.

## Sunday-Thursday

PEPs, CELs, Committee Meetings, Exhibits, and Sessions (all events) take place at the Phoenix Convention Center.

## Speaker Ready Room

**Phoenix Convention Center • North 223**

Sunday: 2:00 PM – 5:00 PM
Monday-Wednesday: 7:30 AM – 5:00 PM
Thursday: 7:30 AM – 10:00 AM

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(even if you have already submitted your presentation).

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- HPS 2-hour technical PEPs will be granted 4 CECs each.
- HPS 1-hour technical CELs will be 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 Orientation**
Sunday, 25 July • 9:00 AM – 10:00 AM
North 221ABC

**Virtual Quiz Bowl**
On-going – July 18 through July 31
Facebook (facebook.com/HPSStuSupCo) E-mail (HPSQuizBowl@gmail.com)

**Virtual Speed Networking**
Thursday, 22 July 2021
7:00 PM – 8:30 PM (EST)/4:00 PM – 5:30 PM (PST)
Glimpse: (https://app.joinglimpse.com/room?key=DEFF4E5)

**In-Person Speed Networking and Mentor Reception**
Sunday, 25 July 2021 • 5:15 PM – 6:45 PM
North 232A

**Student Support Committee Meeting**
Wednesday, 28 July • 3:00 PM – 4:00 PM
North 229B

**Exhibitor Luncheons**
Monday, 26 July • 12:00 PM – 1:30 PM
Tuesday, 27 July • 12:00 PM – 1:30 PM
Exhibit Hall

**Welcome Reception**
Monday, 26 July • 5:00 PM – 7:00 PM
Exhibit Hall

## Phoenix Convention Center

100 North Third Street
Phoenix, AZ 85004 • 602-262-6225

# IMPORTANT EVENTS

## Virtual Quiz Bowl

The Quiz Bowl is a great chance to exercise your Health Physics muscles! Students and young professionals, meaning those yet to become a CHP, are encouraged to participate. This year's Quiz Bowl will be a bit different, in that will be fully remote. Health Physics questions will be posted to the Student Committee Facebook page at facebook.com/HPSStuSupCo on July 18th. The questions will range from "you should know this" to advanced. You can sign up as an individual or team by emailing HPSQuizBowl@gmail.com. Email your answers to the same address any time until the 31st of July. Questions will be graded by our team, with the harder questions being worth significantly more points. Top scores will be mailed a prize!

Please contact Norbert Hugger (HPSQuizBowl@gmail.com) for more information or to sign up!

## Virtual Speed Networking

The HPS Student Support Committee is pleased to announce that we will be holding a virtual speed networking event using the Glimpse platform! You do not need to download any software or create an account to join the event:

Please contact Caleigh Samuels (samuelsce@ornl.gov) for more information.

## In-Person Speed Networking and Mentor Reception

Join the HPS Student Support Committee for the second annual Speed Networking Event and Mentor Reception! After the resounding success of the first Speed Networking Event in 2019, the HPS Student Support Committee is excited to once again host the dynamic and engaging event aimed at allowing students and early career professionals to connect with more experienced individuals within the Health Physics Society in a fun and relaxed atmosphere. Everyone is welcome and snacks will be provided!

Please contact Dawn Montgomery (damontg@clemson.edu) for more information.

## Student Support Committee Meeting

Do you want to be more involved in the HPS and the Student Support Committee? We could always use volunteers to help plan and run our events, come up with new ideas to engage and support HPS student members, and act as student representatives of the Society. Our committee meeting is open to all who want to get involved or become a committee member!

## Exhibits

**Free Lunch! Free Lunch!** – Monday, 26 July and Tuesday, 27 July from 12:00 – 1:30 pm. All registered attendees are invited to attend a complimentary lunch in the Exhibit Hall B-C.

**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!

## Sessions and Course Locations

All sessions, courses, committee meetings, and events, Monday through Thursday, will take place at the Phoenix Convention Center.

## HPS Awards Luncheon

Join us Wednesday, 28 July for the Awards Program. We look forward to seeing you by 12:15 pm for the presentation at the Phoenix Convention Center. There will be a luncheon provided that begins at 12:15 pm.

## ABHP Part II Exam

Phoenix Convention Center, North 129A
Monday, 26 July • 12:30 PM – 6:30 PM

## AAHP and ABHP Awards Luncheon

Phoenix Convention Center, North 228AB
Tuesday, 27 July • 12:00 PM – 2:00 PM

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# HPS AWARDS LUNCHEON

## Wednesday, 28 July • Phoenix Convention Center, North 120CD
## 12:15 PM – 2:00 PM – Awards Luncheon

**Awards**
Introduction by Eric Goldin, President
Presented by Nolan Hertel, Awards Committee Chair

**Recognition of 50 Year Members**

**Recognition of Student Fellowship & Scholarship Recipients**

**Recognition of Student Travel Grant Recipients**

**Announcement of Health Physics-Related Awards**

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

**Fellow of the Health Physics Society Awards and Certificate Presentations**

**Honor Roll Award**

**Distinguished Public Service Award**

**Distinguished Scientific Achievement Award**

**Founders Award**

**Elda E. Anderson Award**

**Adjournment**

**2021 50 Year Members**

John D. Boice
Bobby J. Davis
Joseph E. Decicco
Naomi H. Harley
Phillip Jenkins
John Luetzelschwab
John Mauro
William J. Morris
Mehdi Sohrabi
Joseph Stencel
Jerry Thomas
Richard J. Vetter

**2020 50 Year Members**

Judith D. Foulke
Stanley E. Frost
Daniel A. Gollnick
James R. Goodgame
K.L. "Ken" Groves
Raymond A. Guilmette
Arnold F. Jacobson
Nancy P. Kirner
Henry W. Morton
Stephen Rudin
Ronald Scheele
Bruce Schoenbucher
James F. Stiver
Paul S. Webb
Robert J. Wilson

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

**Burton J. Moyer Memorial Fellowship**
2020-2021: Joshua Hayes, Colorado State University
2019-2020: Hadyn Kistle, Texas A&M

**Health Physics Society Fellowships**
2020-2021: Ethan Asano, Texas A&M
2020-2021: Paige Witter, Colorado State University
2019-2020: Aaron Torres, University of Houston - Downtown
2019-2020: Huihua Yang, RPI

**Robert Gardner Memorial Fellowship**
2020-2021: Keith Griffin, NIH
2019-2020: Joshua Hayes, Colorado State University

**Robert S. Landauer, Sr., Memorial Fellowship**
2020-2021: Suman Shrestha, University of Texas
2019-2020: Christian Dennes, University of Houston - Downtown

**Richard J. Burk, Jr., Fellowship**

2020-2021: Jordan Noey, University of Michigan
2019-2020: Joshua Hargraves, Oregon State

**J. Newell Stannard Memorial Fellowship**
2020-2021: Alexander Perry, Texas A&M
2019-2020: Qiuyun Cheng, RPI

**Dade W. Moeller Scholarship**
2020-2021: Samantha Labb, Colorado State University
2019-2020: Joseph Cope, North Carolina State University

**Dade W Moeller Scholarship Memorializing Kelly Austin**
2020-2021: Anna Deak, Colorado State University
2019-2020: Lisa Manglass, Clemson

**F. Ward Whicker Scholarship**
2020-2021: Robert Olsen, Oregon State University
2019-2020: Connor Parker, Clemson


Nuclear Sources & Services, Inc. (NSSI) was established in 1971 by Robert "Bob" Gallagher as a Texas based manufacturer of radioactive tracer materials and radioactive sealed sources. In conjunction with these manufacturing services, NSSI offered additional services and products including chemical and radioactive remediation, leak testing, radiation instrument calibration, and radiation safety training. Over the last 50 years, NSSI grew becoming more specialized to encompass the treatment, storage, and disposal of radioactive, RCRA/non-RCRA, and mixed radioactive/hazardous wastes. NSSI also possess the technology and capabilities for the recovery and reuse of Tritium through their Tritium Recovery Lab. The Tritium Recovery Lab captures 99.99% of the tritium contained for the reuse in the research community as a safe alternative to land disposal.

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Even though Bob is no longer with us, all of us at NSSI will continue his vision of providing value to our clients through creativity, ingenuity, innovation, and resourcefulness.

NSSI is ready for any challenge and will continue to provide superior solutions to the client as well as the environment. Looking forward to the next 50 years.

# HPS AWARDS LUNCHEON

### Student Travel Grant Recipients

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

Nikita Abbaraju
University of Michigan

Aidan Barker
Francis Marion University

Daniel Calco
University of Michigan

Yuiko Chino
Colorado State University

Long Kiu Chung
Stanford University

Margaret Cooney
University of Michigan

Sena Dalak
Texas A&M University

Alexandra Detweiler
Illinois Institute of Technology

Matthew Hanselman
Illinois Institute of Technology

Calvin Huang
University of Michigan

Oluwatobi Ife-Adediran
Federal University of Technology Akure

Victoria Irvin
Georgia Institute of Technology

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Illinois Institute of Technology

Emma Rekeweg
Purdue University West Lafayette

Andrew Rosenstrom
Texas A&M University

Aiden Sable
University of Michigan

Colin Stewart
University of Michigan

Emily Surry
Georgia Institute of Technology

Samar Tawfik
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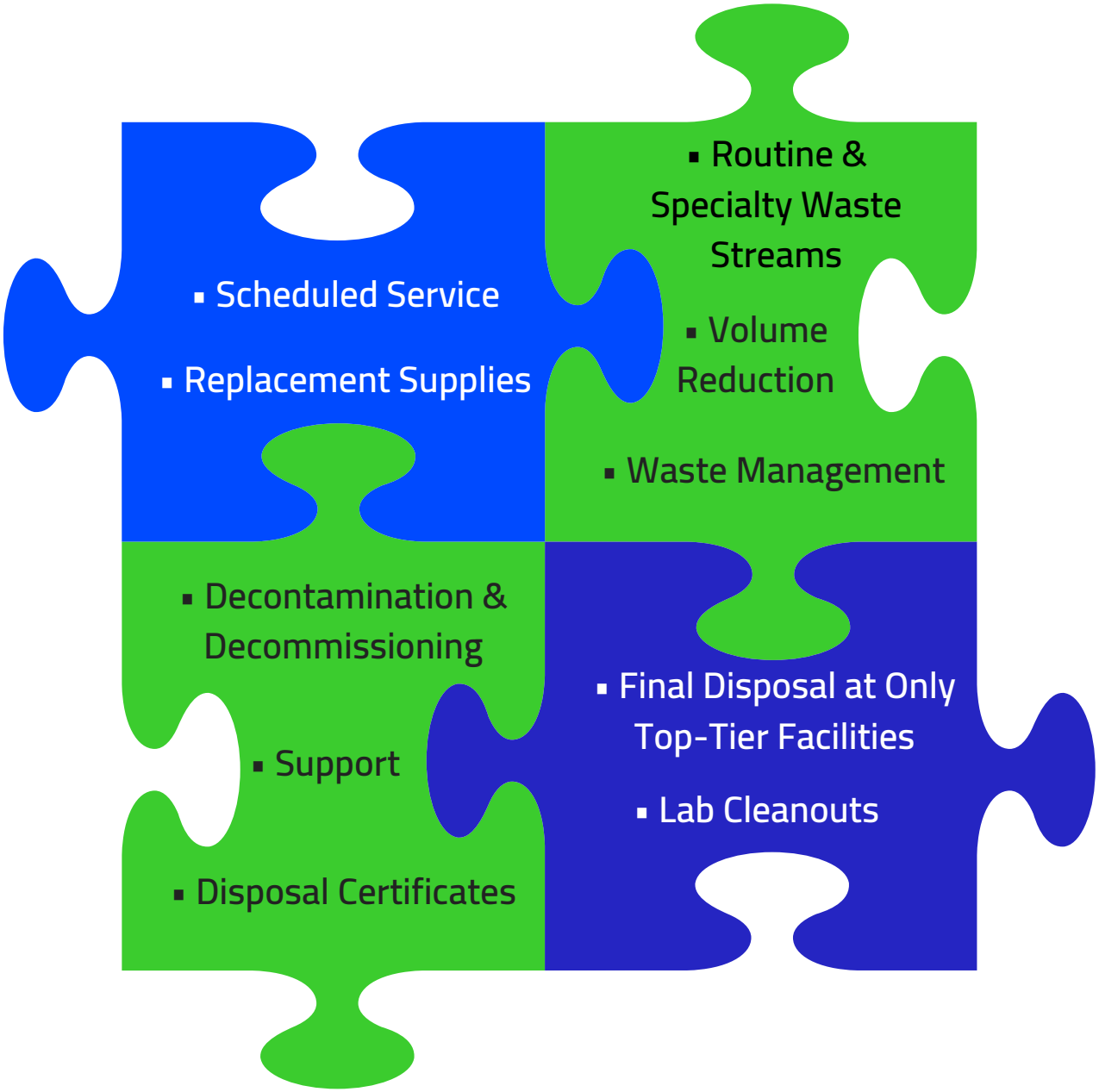
# Solving Radioactive and Mixed Waste Puzzles for Over 30 Years.

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# HPS AWARDS LUNCHEON

**Related Awards**

## American Academy of Health Physics

**2021 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.

**2021 Recipient: Wayne Gaul, Ph.D. CHP, CHMM**

**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.

**2021 Recipient: Charles Potter, PhD, CHP**

## 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.

**2021 Awardee: Adela Salame-Alfie**
**2020 Awardee: Glen Reeves**

## 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.

**2021 Awardee: James R. Cassata**
**2020 Awardee: Danny McClung**

**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.

**2021 Awardee: G.A. "Jerry" Falo**
**2020 Awardee: William "Bill" Harris**

## 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.

**2021 Awardee: Nadia Halim**
**2020 Awardee: Jeffery Caudill**

## Non-Ionizing Radiation Section Service Award

Established in 2018, this award is designed to acknowledge outstanding contributions to the science and technology of non-ionizing radiation safety. The recipient of the award is recognized for accomplishments of fundamental importance to the practice, acceptance, and advancement of Non-Ionizing Radiation Protection

**2021 Awardee: Kenneth Foster**

## Working Group Chairs for Published HPS/ANSI Standards

These ANSI/HPS Standards have been published since July 2019. The Society has prepared plaques in recognition of this significant accomplishment by the respective working group chairs.

**John Glissmeyer/Brian Asamoto/N13.1**
Title: Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities

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# HPS AWARDS LUNCHEON

## Published Standards for 2020 and 2021- N13

**N13.1** – *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities*

## Published Standards for 2020 and 2021- N43

**N43.4** – *Classification of Radioactive Self Luminous Light Sources* published January 2021

**N43.16** – *Radiation Safety for Cargo and Vehicle Security Screening Systems Using X-Ray or Gamma Radiation energies up to MeV*, Published January 2021

## Fellows

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

**2021 Fellows**

Brooke Buddemeier
John Crapo
Alan Jackson
Danny McClung
Nora A. Nicholson
Michael A. Noska

**2020 Fellows**

Daniel Blumenthal
Caridad Borras
William S. Harris, Jr.
Phillip Jenkins
Mike Mahathy
Christopher Martel
Robert May
Timothy Taulbee
Latha Vasudevan

## Honor Roll Award

This award is given posthumously to honor Society members who significantly contributed to the profession of health physics during their careers, but were not otherwise honored by the Society during their lifetimes. Such contributions may include, but are not limited to, education, research and administration.

**2020 Awardee: Thomas Johnston**

## Distinguished Public Service Award

To recognize outstanding contributions, or service to the community, that contributes to a positive relationship between the public and the health physics profession.

**2021 Awardee: Patricia Milligan**
**2020 Awardee: Mike Boyd**

## 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.)

**2021 Awardee Steve Simon**
**2020 Awardee John Till**
Award consists of a plaque and life membership in the Society

## Founders Award

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

**2021 Awardee: Robert Cherry**
Award consists of a plaque and life membership in the Society

## Elda E. Anderson Award

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

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

**2021 Awardee: Matt Mille**
**2020 Awardee: Emily Caffrey**
Award consists of a certificate and a $1,000 check

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ANSI N13.1-2011 Stack Sampling Location Qualification Testing & System Design

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# Committee/Business Meetings

Meetings take place at the Phoenix Convention Center

## Friday 23 July

**ABHP Board Meeting**
8:00 AM – 5:00 PM — North 225AB

## Saturday 24 July

**ABHP Board Meeting**
8:00 AM – 5:00 PM — North 225AB

**ABHP Part II Panel**
8:00 AM – 5:00 PM — North 231ABC

**Executive Committee Meeting**
2:00 PM – 5:00 PM — North 229A

## Sunday 25 July

**ABHP Part II Panel**
8:00 AM – 5:00 PM — North 231ABC

**AAHP Executive Committee**
8:00 AM – 5:00 PM — North 225AB

**HPS Board of Directors Meeting**
8:30 AM – 5:00 PM — North 230

## Monday 26 July

**Companion Orientation**
9:00 AM – 10:00 AM — North 229B

**ABHP Exam Part II**
12:30 PM – 6:30 PM — North 129A

**Science & Public Interest Committee Meeting**
12:30 PM – 2:00 PM — North 229B

**Academic Education Committee**
1:00 PM – 2:00 PM — North 229A

**IRPA 16 International Congress Organizing Committee**
2:30 PM – 4:30 PM — North 229A

## Tuesday 27 July

**Elda Anderson Breakfast**
6:45 AM – 8:00 AM — North 231C

**Membership Committee Meeting**
10:00 AM – 12:00 PM — North 229B

**Women in Radiation Protection Business Meeting**
11:00 AM – 12:00 PM — North 224AB

**International Collaboration Committee**
12:00 PM – 2:00 PM — Virtual

**ANSI N13.38 Development Committee**
1:00 PM – 2:00 PM — North 225B

**Instrumentation Committee**
2:00 PM – 4:00 PM — North 225B

**ATE Topic Editors**
2:00 PM – 2:30 PM — North 229B

**Program Director's Meeting**
2:30 PM – 3:30 PM — North 229A

**Public Information Committee**
4:00 PM – 5:00 PM — North 229B

**AAHP Business Meeting**
5:00 PM – 6:00 PM — North 221ABC

**Accelerator Section Business Meeting**
5:30 PM – 6:30 PM — North 226AB

## Wednesday 28 July

**President Meeting with BOD Designates**
9:00 AM – 12:00 PM — North 229A

**Military in Health Physics Business Meeting Business Meeting**
11:10 AM – 12:00 PM — North 226AB

**HPS Business Meeting**
5:30 PM – 6:30 PM — North 222ABC

## Thursday 29 July

**HPS Executive/Finance Committee Meeting**
8:00 AM – 10:00 AM — North 229A

**HPS Board of Directors Meeting**
10:00 AM – 12:00 PM — North 229A

**Homeland Security/Emergency Business Meeting**
12:00 PM – 1:00 PM — North 224ABC

**Program Committee Meeting**
12:30 PM – 2:00 PM — North 225A

**ANSI N13.1 Revision Meeting**
1:00 PM – 4:00 PM — North 229A


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# LECTURESHIP TRUST FUNDS

## 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.

# 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

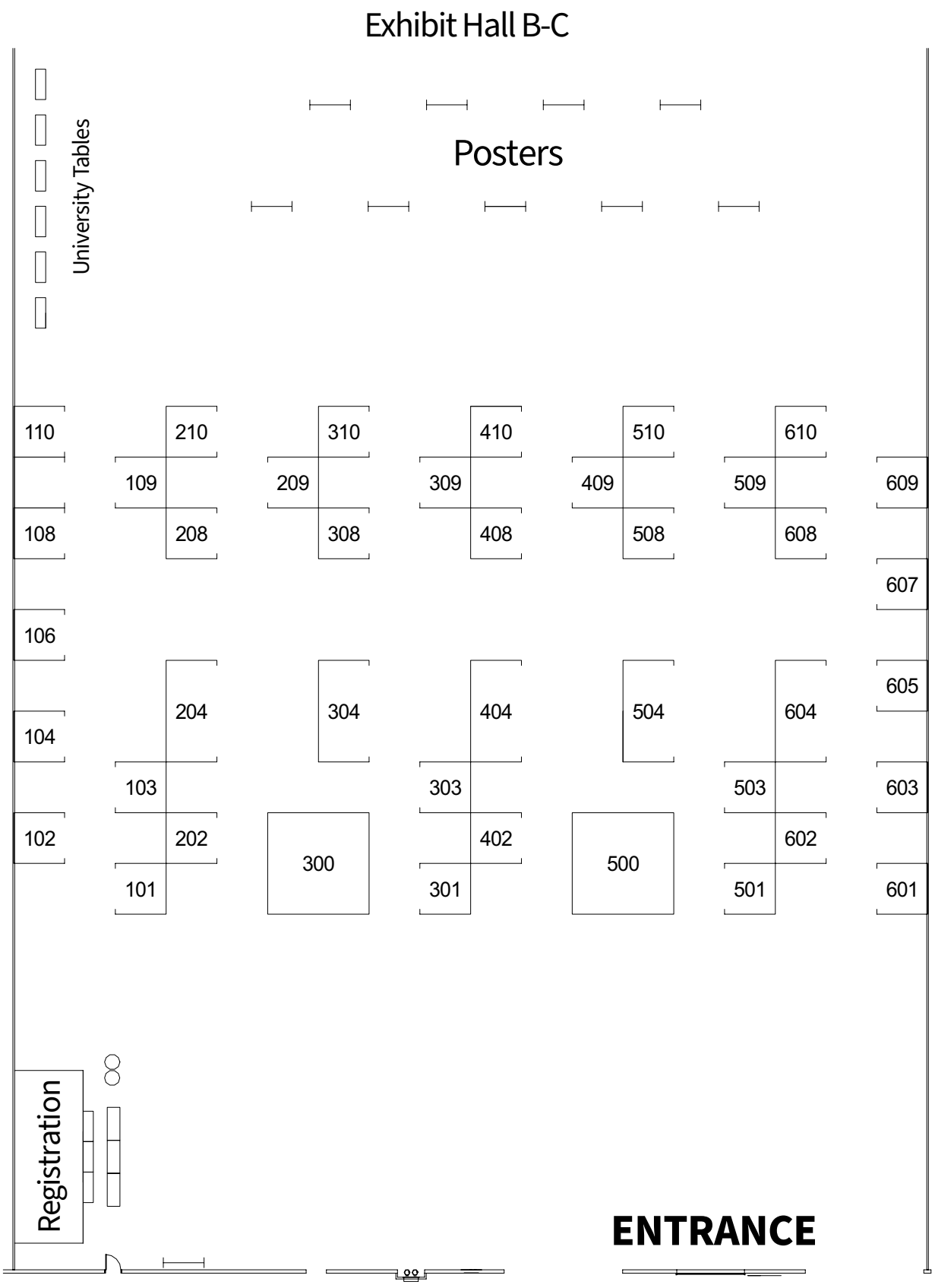
As a Mentor, you should be willing to have a "Shadow" for at least some time of the meeting. For example, you may invite your Shadow to a meal, social event, or exhibit hall lunch; have them go to committee meetings, PEPs, and/or a few presentations with you; introduce them to others who you think may 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.

# 2021 EXHIBIT HALL FLOOR PLAN



# EXHIBITOR LISTING



## EXHIBIT HALL HOURS

**Monday, 26 July**
12:00 PM – 7:00 PM

**Tuesday, 27 July**
9:30 AM – 5:00 PM

**Wednesday, 28 July**
9:30 AM – 12:00 PM

### Raymond H. Johnson, Jr. Coffee Breaks

Monday PM – Wednesday PM

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

### Lunches

Monday and Tuesday, 12:00 PM

All registered attendees are invited to attend a complimentary lunch in Exhibit Hall B-C.

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

### Welcome Reception

Monday, 5:00 PM – 7:00 PM

Join fellow attendees in the Exhibit Hall for a time to socialize and renew old acquaintances.

# 2021 HPS EXHIBITORS

## 2022 HPS Annual Meeting Spokane — Booth: 310

hps.org/meetings

Save the date to join us for the HPS 2022 Annual Meeting 16–21 July 2022 in Spokane, WA!

## AAHP / ABHP — Booth: 610

191 Clarksville Road
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888-282-3446
www.aahp-abhp.org

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

## American Nuclear Society (ANS) — Booth: 208

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The Conference of Radiation Control Program Directors (CRCPD) is a nonprofit, non-governmental professional organization that promotes consistency in addressing and resolving radiation protection issues, encourages high standards of quality in radiation protection programs, and provides leadership in radiation safety and education.

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708-879-0083
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www.ludlums.com

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## Mazur Instruments — Booth: 601

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Castle Rock, CO 80104
303-325-7463
www.mazurinstruments.com

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## Mirion Technologies — Booth: 500

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800-243-4422
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## NRRPT — Booth: 109

P.O. Box 3084
Westerly, RI 02891
401-637-4811
nrrpt.org

The objective of the Registry is to encourage and promote the education and training of Radiation Protection Technologists and, by doing so, promote and advance the science of Health Physics.

## NSSI

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www.perkinelmer.com

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Imagine a world where you could detect health issues sooner to treat them more effectively. Where food and water are always safe, even in remote corners of the earth. And where scientific and medical research are enhanced to solve the greatest challenges of our times. At PerkinElmer, we imagine this world every day. Then, we innovate and collaborate to make it happen everywhere. Our dedicated team of about 14,000 employees worldwide, pioneers scientific technologies for better detection, imaging, and informatics to help our customers work to create healthier families, improve the quality of life, and sustain the well-being and longevity of people globally.

## Philotechnics Ltd.

**Booth: 108**

201 Renovare Blvd.
Oak Ridge, TN 37830
865-483-1551
www.philotechnics.com

Philotechnics celebrates its 40th year as a radiological services company.
Now with offices in Tucson, we bring a unique combination of technical knowledge, waste management capabilities, and health physics experience that bring life cycle value to radiological projects. Philotechnics operates two licensed facilities and can mobilize to any location in the US to support client needs.

## PL Medical

**Booth: 508**

117 W Dudley Town Rd
Bloomfield, CT 06002
860-243-2100
www.plmedical.com

Silver Sponsor

Using OSL Dosimeters, PL Medical ensures the safety and well-being of our customers. Our OSL technology is the standard for organizations requiring accuracy in reporting as well as the advantages of being re-readable.

## Polimaster Inc

**Booth: 104**

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

Polimaster Inc. delivers the solutions for radiation control since 2004. Everyday our instruments help thousands of professionals all over the world to solve various tasks of radiation control – detection, localization, monitorization and, radionuclide identification.

Our product line includes: Electronic Personal Dosimeters, Personal Radiation Detectors, Radiation Portal Monitors, Radionuclide Identifiers, Radiometers, Spectroscopic Personal Radiation Detectors etc.

## Radiation Safety & Control Services — Booth: 303

93 Ledge Road
Seabrook, NH 3874
603-778-2871
www.radsafety.com

RSCS provides expertise radiation safety. We plan and execute nuclear and radiological work and solve unique problems from radiological tasks to ensure that work is performed safely and effectively. Contact us for radiological project management, professional consulting, technical staffing, radiation safety training, radiation training simulators, instrument and analytical lab services.

## RadQual Global Sources — Booth: 410

Silver Sponsor

4137 Commerce Circle
Idaho Falls, ID 83401
208-569.2851
www.radqual.com

RadQual offers an array of medical sealed radioactive sources as well as Alpha, Beta and Gamma Disc sources used in todays industry sector for monitoring Radioactive levels.

## Radwaste Solutions — Booth: 208

Silver Sponsor

555 N. Kensington Ave.
La Grange Park, IL 60526
708-579-8226
www.ans.org/rs

Radwaste Solutions provides expanded coverage of worldwide decommissioning projects, environmental site remediation, and waste management activities. Created out of industry demand by ANS in 1994, feature articles discuss the generation, handling, transportation, treatment, cleanup, storage, and disposal of radioactive waste. Visit ans.org/rs for information on subscriptions and advertising.

## S.E. International, Inc. — Booth: 408

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

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

## Spectral Labs Incorporated — Booth: 503

Silver Sponsor

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

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

## Spectrum Techniques — Booth: 102

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

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

## Teletrix — Booth: 607

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

Made in the USA for 25 years, Teletrix creates innovative solutions in radiation detection training simulators. Teletrix simulators deliver superior realism in radiation detection training that effectively educate and prepare personnel to perform skillfully. Teletrix eliminates hazards of handling, transporting and exposure to radioactive materials. NEW Simulated Source System!!!

## Thermo Fisher Scientific — Booth: 603

One Thermo Fisher Way
Oakwood Village, OH 44146
800-274-4212
www.thermofisher.com

The radiation detection and measurement portfolio of products from Thermo Fisher Scientific have been used in a wide range of applications throughout the world. From TLD crystal growth to spectroscopic handheld instruments, we have a solution for your radiation detection and identification needs.

## Thomas Gray And Associates — Booth: 608

1205 West Barkley Avenue
Orange, CA 92868
714-997-8090
TGAINC.com

Thomas Gray and Associates, Inc. (TGA) is a licensed radioactive services company that offers a full suite of health physics consulting that includes facility decommissioning, on-site services, training, radioactive materials processing, disposal brokerage, nuclide identification, transportation, packaging, and decay-in-storage services.

## Transco Products Inc. — Booth: 103

200 N. LaSalle St., Suite 1550
Chicago, IL 60601
312-896-8458
www.transcoproducts.com

Transco Products Inc. is proud to introduce RadVision3D – a suite of 3D gamma detection, visualization, and mitigation products and services. With over seven decades of experience in the power industry, Transco has provided products and services to over 200 nuclear power plants around the world. Visit our website at www.transcoproducts.com/products/radvision3dsolutions to learn more.

## Versant Medical Physics and Radiation Safety — Booth: 204

GOLD SPONSOR

119 N. Church St, Suite 201
Kalamazoo, MI 49007
888-316-3644
www.versantphysics.com

Versant Physics is the creator of Odyssey, a Radiation Safety Software suite used by Hospitals, Pharmaceutical companies, Businesses, and Universities. Versant Physics also provides exceptional quality consulting and support services including RSO support, Radiation Safety Audits, Surveys, Physics Calculations, Online Continuing Education Courses, and Personnel Dosimetry Badge Management services.

## Voss Radiation Safety — Booth: 409

PO Box 10
Abiquiu, NM 87510
505-753-6395
VOSSrdiationsafety.com

Voss Radiation Safety - J. Thomas Voss, NRRPT, CHP Fellow of the Health Physics Society Member of the American Nuclear Society Member of the American Association of Physicists in Medicine Current DOE "Q" Clearance Previous "Top Secret" DOD Clearance Previous AEC and NRC Security Clearances Procedure Development, Technical Training, Consultation

# UNIVERSITY TABLES

## Purdue University–School of Health Science

550 Stadium Mall Drive
West Lafayette, IN 47907
765-494-1419
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

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

UAB boasts the only Master's in Health Physics program in the state. UAB is in a unique position to train a new generation of health physicists that play a critical role in ensuring safety, with an emphasis on medical aspects of the field. Regardless of your ultimate career goals, choose excellence. Choose UAB.

## University of Michigan: Nuclear Engineering & Radiological Sciences

2355 Bonisteel Blvd
Ann Arbor, Michigan 48109-2104
734-763-9117
ners.engin.umich.edu

The University of Michigan offers undergraduate and graduate degrees in Nuclear Engineering and Radiological Sciences. This top-pranked deptarment offers a comprehensive set of courses relevant to the field of radiation protection, whether applied to nuclear power, medicine, the environment, or homeland security.

# Virtual Special Sessions

Presenter's name is asterisked (*) if other than first author.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## TUESDAY, JULY 20

**10:00 AM – 10:10 AM** **Virtual**

**10:00 am**
Welcome Address
*HPS*

**10:10 AM – 1:55 PM** **Virtual**

### VTU-A
### Special Session: Pandemic Experiences Part 1
*Chairs: Kim Kearfott, Bryan Lemieux, and Jordan Noey*

**10:10 am** **VTU-A.1**
Challenges and Opportunities in Medical Radiation Safety in a time of Pandemic
*Lemieux B*
*UK HealthCare*

**10:25 am** **VTU-A.2**
Medical Health Physics during COVID Pandemic at a Cancer Center
*Harvey RP*
*Roswell Park Comprehensive Cancer Center*

**10:40 am** **VTU-A.3**
A Medical Health Physicist's Experience During the COVID-19 Pandemic
*Wang C*
*Duke University*

**10:55 am** **VTU-A.4**
Supporting Cancer Research, Treatment and Staff Amidst the Epicenter of COVID-19 pandemic in the United States
*Chu BA*
*Memorial Sloan Kettering*

**11:10 am** **VTU-A.5**
The program goes virtual. HPS Program Committee Adaptation to COVID-19
*Tribbett ZC, Wilson CA, Shaw C*
*Yale University, University of Missouri, WCS*

**11:25 am**
Panel Discussion

**11:55 am**
BREAK

**12:25 pm** **VTU-A.6**
Subject Matter Experts: a Critical Need in a Catastrophic Emergency
*Irwin WE*
*Vermont Department of Health*

**12:40 pm** **VTU-A.7**
Pandemic lessons and silver linings from a D.C. Fed by way of West Michigan
*DeCair SD*
*US Environmental Protection Agency*

**12:55 pm** **VTU-A.8**
Regulatory and Emergency Response Considerations During the COVID-19 Pandemic
*Leek AE*
*Iowa Department of Public Health*

**1:10 pm**
Panel Discussion

**1:40 pm** **VTU-A.9**
Interesting times call for interesting questions
*Caffrey EA*
*Radian Scientific, LLC*

**10:10 AM – 1:55 PM** **Virtual**

### VTU-C
### Special Session: Homeland Security and Emergency Response
*Chairs: Gary Chen, Jason Davis*

**10:10 am** **VTU-C.1**
RadResponder Network – A Quick Walkthrough With The Newest Updates
*Chen G*
*U.S. EPA*

**10:25 am** **VTU-C.2**
New and Emerging Capabilities in RadResponder: Radiological Simulation, Real-Time Modeling Integration, and Customizable Data Assessment Policies
*Palmer B, Duling SM, Chapman J*
*Chainbridge Technologies, Department of Energy, Oak Ridge National Laboratory*

**10:40 am** **VTU-C.3**
Making the Radiological Operations Support Specialist a Profession
*Irwin WE*
*Vermont Dept. of Health*

**10:55 am** **VTU-C.4**
Using the EPA's Protective Action Guidelines to Develop Compensatory Response Plans During a Pandemic
*Leek AE, Semancik J*
*Iowa Department of Public Health, Connecticut Department of Energy and Environment*

**11:10 am** **VTU-C.5**
The CBRNE Medical Operations Science Support Expert (CMOSSE)
*Coleman CN, Koerner JF, Bader JL, Hrdina C, Farmer W, Cliffer KD*
*ASPR/DHHS*

**11:25 am** **VTU-C.6**
Working with Local Law Enforcement & First Responders
*Lorenzen WA*
*Boston Children's Hospital*

**11:40 am** **VTU-C.7**
The Veterans Health Administration Medical Emergency Radiological Response Team and Office of Emergency Management Disaster Response Operations
*Bravenec JS*
*Veterans Health Administration*

**11:55 am**
BREAK

**12:40 pm** **VTU-C.9**
Minimum Resolution Requirements for Gamma Identification Algorithms
*Ash AM, Marianno CM*
*Texas A&M University College Station*

**12:55 pm** **VTU-C.10**
Implementation of the Orphan Source Search and Secure Program in the Time of COVID-19
*Casatenda Y, Kahn RA*, Machado R, McRee B, Rolando J, Taplin T*
*PNNL, ANL, Mirion, SLI, DOE/NNSA*

**1:10 pm** **VTU-C.11**
Estimation of Protection Factors for the Transport of Radioactive Material
*Dalak S, Dewji S*
*Texas A&M University*

**1:25 pm** **VTU-C.12**
Dosimetry Assessment of Reference Populations Exposed to Prompt Radiation Fields from Nuclear Weapons
*Rosenstrom A, Asano E, Hooper D, Griffin K, Lee C, Dewji S*
*Texas A&M University, Oak Ridge National Laboratory, National Cancer Institute*

**1:40 pm** **VTU-C.13**
The Importance of Communication and Its Potential Impact on Public Perception and Understanding of Radiation-related Issues
*Sugarman SL*
*SummitET (Summit Exercises and Training)*

**10:10 AM – 12:40 PM** **Virtual**

## VTU-D
## Special Session: Nonionizing Radiation

*Chairs: Frederick McWilliams, Pete Springer*

**10:10 am** **VTU-D.0**
Introduction

**10:20 am** **VTU-D.1**
ANSI Z136.8 Laser Safety for Researchers, Second Edition Recognizing an Unmet Safety Guideance Need
*Barat KL*
*Laser Safety Solutions*

**10:40 am** **VTU-D.2**
Practical laser safety calculations: Case studies in supercontinuum lasers
*Spencer MA, McWilliams FW*
*Massachusetts Institute of Technology*

**11:15 am** **VTU-D.3**
Modeling a Thermoacoustic-based High Power Microwave Directed Energy Exposure Detection System
*Frey JJ*
*Air Force Institute of Technology*

**11:35 am** **VTU-D.4**
Did Microwaves Harm US Employees At Its Embassy in Havana?
*Foster KR*
*University of Pennsylvania*

**11:55 am** **VTU-D.5**
Section Awards

# THURSDAY, JULY 22

## 10:00 AM – 1:10 PM Virtual

### VTH-A
### Special Session: Rad Air NESHAPs

*Chairs: Matthew Barnett, Alicia Williamson*

**10:00 am** **VTH-A.1**
U.S. Environmental Protection Agency Update on the Radionuclide NESHAPs
*Walsh JP, Rustick JH*
*U.S. EPA*

**10:20 am** **VTH-A.2**
DOE Subpart H Report
*Williamson A, Snyder SF**
*DOE-HQ, PNNL Richland*

**10:40 am** **VTH-A.3**
U.S. Environmental Protection Agency Update on Compliance Codes
*Littleton BK, Stuenkel DO, Wood RP*
*U.S. Environmental Protection Agency, Trinity Engineering Associates*

**11:00 am**
BREAK

**11:30 am** **VTH-A.4**
Use of AERMOD as an Alternative Model for COMPLY-R
*Stuenkel DO, Littleton BK, Walsh JP*
*U.S. Environmental Protection Agency*

**11:50 am** **VTH-A.5**
Collective Analysis Using Mass Loading to Determine Sample Filter Self-Absorption
*Barnett JM, Edwards HZ*
*Pacific Northwest National Laboratory*

**12:10 pm** **VTH-A.6**
Discussion

## 10:00 AM – 2:00 PM Virtual

### VTH-B
### Special Session: AIRRS

*Chairs: Carl Tarantino, Cathy Ribaudo, Mark Linsley*

**10:00 am** **VTH-B.1**
AIRRS Special Session
*Tarantino CA, Ribaudo C, Linsley M*
*AIRRS*

Panelists include:
- Ike Hall
- Carolyn MacKenzie
- Mark Hoover
- Mike Welling
- Dan Arguello

*AIRSS Business Meeting will take place at the end of the session.*

## 10:00 AM – 2:30 PM Virtual

### VTH-C
### Special Session: Medical Health Physics

*Chair: Neil Whiteside*

**10:00 am** **VTH-C.1**
Experience with Lu-177 Treatment in Mobility Impaired Patients
*Georgiou K, Caracappa PF*
*Columbia University*

**10:15 am** **VTH-C.2**
Lutathera (Lu-177) Extravasation
*Berry KE, Kendrick JJ*
*Fox Chase Cancer Center*

**10:30 am** **VTH-C.3**
Waste handling suggestions for Lu-177 dotatate in nuclear medicine
*Miller MA, Amin K, Rayadurgam S, Banks R, Rowland A*
*Cleveland Clinic*

**10:45 am** **VTH-C.4**
Radiation Safety Considerations for Lu-177 PSMA Radiopharmaceutical Therapy
*Abdin K, Luechtefeld D, Harrod M, Amurao M*
*Washington University in St. Louis*

**11:00 am** **VTH-C.5**
Radium dichloride in peritoneal dialysate
*Saganich C, Zgaljardic M*
*Weill Cornell Medicine*

**11:15 am**
BREAK

**12:15 pm** **VTH-C.6**
Pharmaceutical Grade Ge/Ga-68 Generator
*Szatkowski D, Kim SH, Jefferies T*
*Washington University in St. Louis*

**12:30 pm** **VTH-C.7**
US NRC's Medical Decommissioning Rulemaking and Lu-177 Licensing Activities
*Figueroa SD*
*U.S. Nuclear Regulatory Commission*

**12:45 pm** **VTH-C.8**
USP 825 and How it Impacts Radiation Safety Compliance
*Panichi-Egberts M*
*Nuclear Diagnostic Products, Inc*

**1:00 pm** **VTH-C.9**
Your first year as a Medical RSO
*Register C, Nichols RP, England J, Wilson CA*
*University of Missouri*

**1:15 pm** **VTH-C.10**
How RSO Job Demands Differ in Pediatric and Adult Hospitals
*Metyko J*
*Seattle Children's*

**1:30 pm**
BREAK

**1:45 pm** **VTH-C.11**
Business Meeting

**10:00 AM – 12:00 PM** **Virtual**

## VTH-D
## Special Session: Veterinary Medicine Health Physics

*Chairs: Matt Arno, Nicole Martinez*

**10:00 am** **VTH-D.1**
Public Dose Assessment from Canine Sn-117m Treatment
*Arno MG, Simon J, Stevenson NR, Donecker J*
*Foxfire Scientific, Isotherapeutics Group, Exubrion*

**10:30 am** **VTH-D.2**
Veterinary Practice and the System of Radiological Protection
*Martinez NE, Van Bladel L*
*Clemson University, Oak Ridge National Laboratory, Federal Agency for Nuclear Control, Retired*

**11:00 am** **VTH-D.3**
Improving Radiation Protection and Safety in Veterinary Medicine
*Gilley D*
*IAEA*

**11:30 am** **VTH-D.4**
Evaluating Release Criteria for Feline Patients Following Radioactive Iodine Treatment for Hyperthyroidism
*Davila AR, Fletcher JF, Matthews KM, Wang WW*
*Tulane University, MedVet, Louisiana State University*

**11:45 am** **VTH-D.5**
Comparison of veterinary medicine radiation safety programs across the United States
*Nichols RP*
*University of Missouri*

# Sunday Professional Enrichment Program (PEP)

In-Person PEPs will be taught in at the Phoenix Convention Center.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## SUNDAY, JULY 25

### 8:00 AM – 10:00 AM

**PEP 1-A** **North 224AB**
Palomares Dose Reconstruction
*S. Rademacher, PhD, CHP*
*AFSES/SEW*

**PEP 1-B** **Virtual**
Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers
*M. Stabin, PhD, CHP*
*NV5/Dade Moeller and RADAR, Inc.*

**PEP 1-C** **North 222ABC**
Nonionizing Radiation: An Overview of Biological Effects and Exposure Limits
*B. Edwards*
*Cree Inc.*

**PEP 1-D** **Virtual**
Contemporary Topics Affecting Radiation Safety Program Operations: Session 1
*Robert Emery, Janet Gutierrez*
*University of Texas*

**PEP 1-E** **Virtual**
The Ins and Outs of Wound Counting
*Jason E Davis*
*ORAU-REAC/TS*

### 10:30 AM – 12:30 PM

**PEP 2-A** **North 224AB**
Integration of Health Physics into Emergency Response
*Stephen L. Sugarman, MS, CHP, CHCM*
*Summit Exercises and Training*

**PEP 2-B** **North 221ABC**
Federal Radiological Response Teamss
*Kenneth Groves, CHP*
*Sevorg Services, LLC*

**PEP 2-C** **North 222ABC**
Laser Safety for Health Physicists
*B. Edwards*
*Cree Inc.*

**PEP 2-D** **Virtual**
Contemporary Topics Affecting Radiation Safety Program Operations: Session 2
*Robert Emery, Janet Gutierrez*
*University of Texas*

**PEP 2-E** **North 226AB**
Gamma Spectroscopy for the Health Physicist
*Mike Clemmer*
*ORTEC*

### 2:30 PM – 4:30 PM

**PEP 3-A** **North 224AB**
Alpha Spectroscopy for the Health Physicist
*Mike Clemmer*
*ORTEC*

**PEP 3-C** **North 222ABC**
Performing ANSI Z136-Based Laser Hazard Calculations
*B. Edwards*
*Cree Inc.*

**PEP 3-D** **Virtual**
Getting started in consulting: Some practical things about consulting in private practice
*A. Karam, CHP*

# Scientific Program

Presenter's name is asterisked (*) if other than first author. In-Person Sessions will be taught in at the Phoenix Convention Center. All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## MONDAY, JULY 26

### 6:45 AM – 7:45 AM

**CEL-M1** **North 221ABC**
The 1976 Hanford Americium Accident: Then and Now
*Carbaugh EH*

**CEL-M2** **Virtual**
Working with emergency responders
*Karam A*

### 8:00 AM – 10:40 AM North 120D

**HPS Opening Plenary Session**

**8:00 am**
Welcoming comments
*Goldin E*

**8:10 am**
Landauer, Sr., Lectureship
*Passmore C*

**8:40 am**
G. William Morgan Lectureship - 50 Years of Risk Assessment 1971-2021
*Till J*

**9:10 am**
Dade W. Moeller Lectureship - Computational dosimetry methods and tools for patients undergoing computed tomography, nuclear medicine, and fluoroscopy procedures
*Lee C*

**9:40 am**
The International Basic Safety Standards
*Johnson P*

**10:10 am**
Radiation-Induced Cancers, a Potential Liability of US Air Carriers
*Shonka J*

**10:40 am** **Ballroom Foyer**
BREAK

### 11:00 AM – 12:00 PM North 221ABC

**MAM-A**
**Special Session: Pandemic Experiences Part 2**
*Chairs: Kim Kearfott, Dawn Montgomery*

**11:00 am** **MAM-A.1**
From Daily Travel to the Home Office
*Kent AJ*
*University of Michigan*

**11:05 am** **MAM-A.2**
Pandemic Experiences of a Lower-Division Nuclear Engineering and Radiological Sciences College Student
*Stewart CJ*
*University of Michigan*

**11:10 am** **MAM-A.3**
A perspective from a PhD candidate/mom in 2020: A tale of canceled and delayed plans, Zoom meetings, virtual school, and late nights
*Montgomery DM*
*Clemson University*

**11:15 am** **MAM-A.4**
Zoom High to Zoom-U: A College Freshman in the Pandemic
*Calco DB*
*University of Michigan*

**11:20 am** **MAM-A.5**
Perspective of a Graduating Senior
*Cooney MA*
*University of Michigan*

**11:25 am** **MAM-A.6**
Experience with COVID as a Graduate Student
*Chung LK*
*Stanford University*

**11:30 am** **MAM-A.7**
Living and Learning in a Pandemic
*Trager ME*
*University of Michigan*

**11:35 am** **MAM-A.8**
Panel Discussion

## 11:00 AM – 11:45 AM North 222ABC

### MAM-B
### Decommissioning and Decontamination

*Chairs: Ethan Asano, Latha Vasudevan*

**11:00 am** **MAM-B.1**
Hybrid Radiation Transport Methods for Detector Response Modeling of US EPA Superfund Counts Per Minute (CPM) Calculator
*Asano EA, Coleman D, Perry A, Davidson G, Dolislager F, Walker S, Dewji S*
*Texas A&M University, Oak Ridge National Laboratory, U.S. Environmental Protection Agency*

**11:15 am** **MAM-B.2**
Laboratory Exercises Illustrating Radiation Instrument Selection, Surveying, Source Search, and Decontamination for College Students and the General Public
*Noey JD, Kearfott KJ*
*University of Michigan*

**11:30 am** **MAM-B.3**
Design Concept for Autonomous Robot for Sub-surface Environmental Characterization at Decommissioning Sites
*Bayne CE, Smith CC, Smither WW, Torres JT, Fowler SM, Dewji SA*
*Texas A&M University*

## 11:00 AM – 12:00 PM North 224AB

### MAM-C
### Novel Ideas in Health Physics 1

*Chair: Alan Fellman*

**11:00 am** **MAM-C.1**
CZT-Based Quantification of the 2019 Nuclear Industry Proficiency Test Exercise Waste Barrel
*Goodman DI, Kaye WR*
*H3D, Inc.*

**11:15 am** **MAM-C.2**
Separation of Americium and Curium for Neutron Capture Cross Section Measurements
*Labb SA, Sudowe R*
*Colorado State University*

**11:30 am** **MAM-C.3**
Design Concept for Molten Salt Reactor Production of Molybdenum-99 using a Helium Bubbling Process Extraction
*Martinez EV, Macias AP, Sexton JK, Mechelsen JJ, Dewji S*
*Texas A&M University*

**11:45 am** **MAM-C.4**
Low Dose Radiation Treatment For Covid-19 Patients
*Fellman AL*
*NV5 Dade Moeller*

## 12:15 PM – 2:15 PM

**PEP-M.1** **Virtual**
Nuclear Space Launch Policy and Planning
*Hallam C, Marshall E*
*EPA, AFSES/SES (Dawson)*

**PEP-M.2** **North 224AB**
RDD Primer
*Potter G*
*SNL*

**PEP-M.3** **Virtual**
Understanding Alpha Radiation Therapy: From Pre-clinical Considerations to Clinical Outcomes
*Lin FI, Alder S, Phelps T*
*National Cancer Institute (NCI), National Institutes of Health (NIH)*

## 11:00 AM – 12:00 PM North 226AB

### MAM-D
### Novel Ideas in Health Physics 2

*Chair: Katharine McLellan*

**11:00 am** **MAM-D.1**
Revision of Department of Energy (DOE) Institutional Controls Implementation Handbook
*McLellan KE, Favret D, Wallo III A*
*Department of Energy*

**11:15 am** **MAM-D.2**
Implementation of a Virtual Reality Game about Radiation Protection in Unity for an Oculus Quest
*Zheng X, Calco DB, Abbaraju N, Sable AJ, Trager ME, Saltus BJ, Noey JD, Kearfott KJ*
*University of Michigan*

**11:30 am** **MAM-D.3**
Three-dimensional Rendering of Radiation Sources, Shields, and Detectors for Extended Reality and Other Applications
*Abbaraju N, Sable AJ, Calco DB, Zheng X, Trager ME, Saltus BJ, Noey JD, Kearfott KJ*
*University of Michigan*

**11:45 am** **MAM-D.4**
Implications of COVID masks for fecal bioassay monitoring
*Klumpp JA*
*Los Alamos National Laboratory*

**1:00 PM – 3:00 PM** **Exhibit Hall B-C**

## P
## Poster Session

**P.1** Estimation of Average Radiation Dose by Age Due to General Radiographic Examinations
*Lee MY, Nam HW, Na HJ, Lee BM, Kim KP**
*Kyung Hee University, Republic of Korea, Kim, Kyung Hee University, Republic of Korea*

**P.2** Analysis of foreign representative person concepts to establish appropriate representative person concept for domestic dose assessment
*Seo HS, Kim KH, Jin YH, Kim KP**
*Kyung Hee University, Republic of Korea*

**P.3** Radioactive Potassium (K-40) in All Purpose Fertilizers (13-13-13), an Estimated and Experimental Approach
*Billa JP, Adzanu SK, Didla SP, Atkins MA, Billa JK*
*Centerville High School, Alcorn State University*

**P.4** Estimation of Radioactivity Levels in Soilless Growth Media Collected from Agricultural Research Site in Quincy, Florida.
*Osei GK, Abazinge MD, Ngatia LW, Jagoe C, Bolques A, Owens MA, Billa JK*
*Florida A&M University Tallahassee, Alcorn State University Lorman*

**P.5** Developing a more Methodical Audit Program for Non-Human Use Radioactive Material Laboratories through Clinical Inference.
*Wutkowski MJ*
*Memorial Sloan Kettering Cancer Center*

**P.6** Impact of Monte Carlo physics choice on out-of-field dosimetry for pencil beam scanning proton therapy
*Griffin KT, Yeom YS, Mille MM, Lee CI, Jung JW, Hertel NE, Lee CS*
*National Cancer Institute, University of Michigan, East Carolina University, Georgia Institute of Technology*

**P.7** Creation of Scalable Vector Graphics Images for Use in Internal Dosimetry Visualizations
*Barker AB, Jokisch DW*
*Francis Marion University*

**P.9** Estimation of Skin Dose Rate Contamination from I-131 Therapy Patients
*Willis A, Adadi S*, Dewji S*
*Texas A&M University*

**P.10** Cells' Biological Response to Galactic Cosmic Rays using Neutron Irradiation
*Irvin VI*
*Georgia Institute of Technology*

**P.11** TLD Sensitivity Analysis for Improvement of Dose Reconstructions for the Department of Energy Radiation Exposure Monitoring System
*Dalak S, Mendleski RH, Hiller M, Golden A, Dewji SA, Kalinowski A*
*Texas A&M University, Oak Ridge Associated Universities*

**2:30 PM – 4:30 PM** **North 120D**

## MPM-A
## Special Session: Conservatism Approach in Radiation Safety

*Chair: John Caraderlli*

**2:30 pm** **MPM-A.1**
Conservatism Approach to Radiation Safety
*Pinak M, Holahan V, Cool D, Fellman A, Boyd M*
*IAEA, NRC, EPRI, NV5, EPA*

# TUESDAY, JULY 27

## 6:45 AM – 7:45 AM

**CEL-T** **North 221 ABC**
Therapeutic Uses Nuclear Medicine Pharmaceuticals
*Stabin M*
*NV5/Dade Moeller, RADAR, Inc.*

## 8:00 AM – 12:45 PM North 221ABC

### TAM-A
### AAHP Special Session - Nuclear Site Decommissioning
*Chair: Jay Tarzia*

**8:00 am** **TAM-A.1**
Decommissioning Challenges at the Molten-Salt Reactor Experiment Site
*Ablequist E, Morgan T*
*UCOR*

**8:45 am** **TAM-A.2**
Decommissioning of the Nuclear Ship Savannah
*Koehler E*
*Maritime Administration*

**9:30 am** **Exhibit Hall**
BREAK

**10:00 am** **TAM-A.3**
Measurement and Control of Special Nuclear Material During D&D of the MSRE and K-25
*Chapman J*
*NNSA*

**10:45 am** **TAM-A.4**
Nuclear Energy Institute Regulatory Update
*Phalen M*
*NEI*

**11:30 am** **TAM-A.5**
Methods to Address Discrete Particles during Final Status Surveys at Nuclear Power Sites
*Darois E*
*Radiation Safety & Control Services, Inc.*

## 8:00 AM – 10:50 AM North 222ABC

### TAM-B
### Special Session: The HPS Government Relations Program
*Chairs: Craig Little, David Connolly*

**8:00 am** **TAM-B.1**
The HPS Government Relations Program: How the HPS Has Impact in Washington
*Little CA*
*HPS*

**8:20 am** **TAM-B.2**
Commenting on Proposed Regulations
*Ring JP*
*Beth Israel Deaconess Medical Center*

**8:40 am** **TAM-B.3**
Department of Energy Radiation Protection Rulemaking Process
*Chiu GY*
*Department of Energy*

**9:00 am** **TAM-B.4**
NRC/HPS: A Relationship that Informs Radiation Protection
*Flannery CM*
*US NRC*

**9:20 am** **Exhibit Hall**
BREAK

**9:50 am** **TAM-B.5**
The Stakeholder Process as Part of EPA Rulemaking
*Boyd MA, Lee RH, Egidi PV*
*U.S. EPA*

**10:10 am** **TAM-B.6**
HPS Interaction With Congress
*Connolly DA*
*HPS*

## 8:00 AM – 12:00 PM North 224AB

### TAM-C
### Special Session: Women in Radiation Protection

*Chair: Wendy Kuhne*

**8:00 am** **TAM-C.1**
Using DiSC® Assessment Profiles for Strengthening Working Relationships In Radiation Protection: A Professional Development Seminar
*Kuhne WW*
*Savannah River National Laboratory*

**10:30 am** **Exhibit Hall**
BREAK

**10:30 am** **TAM-C.2**
Business Meeting

## 9:00 AM – 11:45 AM North 226AB

### TAM-D
### Special Session: Be A Part of the Future

*Chairs: Mike Mahathy, Dan Sowers*

**9:00 am** **TAM-D.1**
Engage! Give Memorable HPS Presentations
*Mahathy M*
*ORAU*

**9:15 am** **TAM-D.2**
Fighting Risk Communication on a Future Battlefield
*Sowers DA*
*Retired*

**9:30 am** **TAM-D.3**
Radiation Communications: Why I Love My Job
*Wieder JS*
*U.S. EPA*

**9:45 am** **TAM-D.4**
Be Part of the Future: The Future of Your Professional Society
*Caffrey EA*
*Radian Scientific, LLC*

**10:00 am** **TAM-D.5**
Mentors in Health Physics
*Berry KE*
*Fox Chase Cancer Center*

**10:15 am** **Exhibit Hall**
BREAK

**10:45 am** **TAM-D.6**
Introducing the Subject Matter Expert (SME) Resource for HPS Members
*Taulbee TD*
*HPS Board of Directors*

**11:00 am** **TAM-D.7**
Should we encourage students to join our field? Case studies from recent HP graduates across the country
*Wilson CA, Nichols RP*
*University of Missouri*

**11:15 am** **TAM-D.8**
COVID-19: A Paradigm Change?
*Mahathy JM*
*ORAU*

**11:30 am** **TAM-D.9**
HPS Strategic Plan Goals - How Do We Get There From Here?
*Lewandowski MA*
*HPS Strategic Planning Advisor*

## 12:15 PM – 2:15 PM

**PEP-T.1** **Virtual**
Understanding and Using the CAP88-PC Compliance Code
*Stuenkel D, Littleton B, Wood R*
*U.S. Environmental Protection Agency, Trinity Engineering Associates*

**PEP-T.2** **North 221ABC**
Where Did This Come From? Lessons Learned from High-Routine Bioassay Investigations
*Carbaugh EH*

**PEP-T.3** **Virtual**
Technical Basis and Operational Experience for Clearance of Personal Property From SLAC Accelerator Facilities
*Rokni S*
*SLAC*

## 2:30 PM – 4:30 PM North 221ABC

### TPM-A
### AAHP Special Session - Nuclear Site Decommissioning

*Chair: Jay Tarzia*

**2:30 pm** **TPM-A.1**
Integrating Diverse Technology into a Powerful Characterization Tool
*Straccia F*

**3:15 pm** **TPM-A.2**
Use of CZT Gamma Camera for Characterization Measurements during Decommissioning
*Goodman D*
*H3D Inc.*

**4:00 pm** **TPM-A.2**
3D Digital Models to Support Radiological Decommissioning Projects
*Darois M*
*Radiation Safety & Control Services, Inc.*

## 2:30 PM – 5:45 PM North 222ABC

### TPM-B
### Environmental Monitoring

*Chairs: Aaron Orechwa, Frederic Mis*

**2:30 pm** **TPM-B.1**
US EPA Superfund Counts Per Minute (CPM) Model
*Walker ST*
*U.S. Environmental Protection Agency*

**2:45 pm** **TPM-B.2**
Radiation Drones: Flying into the Future
*Orechwa AS*
*Tetra Tech*

**3:00 pm** **TPM-B.3**
Design of a Database for a Multi-station Weather and Radiation Monitoring System
*Huang CC, Kent AJ, Tawfik S, Noey JD, Kearfott KJ*
*University of Michigan*

**3:15 pm** **Exhibit Hall**
BREAK

**3:45 pm** **TPM-B.4**
Calibration of Charcoal Canister Radon Measurement Devices in an Environmental Chamber and a Natural Indoor Environment
*Kennings TW, Mata LA, Piersma NP, Noey JD, Kearfott KJ*
*University of Michigan*

**4:00 pm** **TPM-B.5**
Assessing Radon Exposure in the Vicinity of a Residential Radon Mitigation System Exhaust
*Lebel LS, John A, Vu K, Korolevych V*
*Canadian Nuclear Laboratories*

**4:15 pm** **TPM-B.6**
Distribution of Natural Radionuclides in Surface Soils around Nevada National Security Site
*Liu X, Warren RW*
*MSTS*

**4:30 pm** **TPM-B.7**
Using Spanish Moss as a Bio-indicator for Air Pollution in the Low Country of Savannah River Basin
*Sun Z, Hall C, Frey W*
*Unversity of Nevada Las Vegas, University of California Davis*

**4:45 pm** **TPM-B.8**
Radiological Assessment of Groundwater from Selected Water Treatment Plants in Saudi Arabia
*Asuni GA, Qahtani SM*
*Saudi Aramco*

**5:00 pm** **TPM-B.9**
Assessment of radiological content of imported bottled drinking water purchased in Saudi Arabia
*Al-Somali OA*
*Saudi Aramco*

**5:15 pm** **TPM-B.10**
Unique Techniques To Estimate Key Parameters For The Clarification Of The Age and Source of A Ground Water Leak At A Nuclear Power Plant
*Mis FJ, Jones GC*, Darrah TH*
*M.I.S., Inc., Ohio State University*

**5:30 pm** **TPM-B.11**
Major ions and Uranium content in groundwater around some large-scale mineral mining and processing sites in Nigeria
*Ife-Adediran OO, Arogunjo AM, Ajayi OS, Walther C*
*Federal University of Technology Akure, University of Medical Sciences Ondo, Institute of Radioecology and Radiation Protection Hanover*

## 2:30 PM – 3:30 PM North 224AB

### TPM-C1
### Vendor Special Session

*Chair: Spencer Mickum*

**2:30 pm** **TPM-C1.1**
Thermoluminescent Dosimetry, Low-level Signal Analysis
*Ramlo MR*
*Thermo Fisher Scientific*

**2:45 pm** **TPM-C1.2**
Thermo Fisher Scientific NetDose Dosimetry Solution
*Ramlo MJ*
*Thermo Fisher Scientific*

**3:00 pm** **TPM-C1.3**
Optimizing Co-60 Source Composition for Radiation Effects Testing with the Model GR420
*Mickum GS*
*Hopewell Designs, Inc.*

**3:15 pm** **TPM-C1.4**
Pixelated CdZnTe 3D Technology Applications in Nuclear Power, Medicine & IAEA Safeguards Instrumentation
*Wang W, Goodman D*
*H3D, Inc.*

## 3:45 PM – 5:30 PM North 224AB

### TPM-C2
### Instrumentation

*Chair: Kim Kearfott*

**3:45 pm** **TPM-C2.1**
Standardized Geiger-Mueller Tube Testing and Characterization using a Custom Computerized Radiation Detection System
*O'Neil CE, Noey JD, Kent AJ, Trager ME, Kearfott KJ*
*University of Michigan*

**4:00 pm** **TPM-C2.2**
Understanding the Uncertainty Associated with Radiological Measurements
*Zamora JE, Lopez AU, Walnicki SA*
*Perma-Fix Environmental Services*

**4:15 pm** **TPM-C2.3**
Quantification of Uranium in Aqueous Solution Using a Photon Counting Method
*Sistryak RV*
*Clemson University*

**4:30 pm** **TPM-C2.4**
Comparison of Different Simple Circuit Designs for a Raspberry Pi Based and Cell Phone Controlled Geiger-Mueller Radiation Detection System
*Jautakas L, Tawfik S, Kent AJ, Cooney MA, O'Neil CE, Noey JD, Kearfott KJ*
*University of Michigan*

**4:45 pm** **TPM-C2.5**
Characterization of a Prototype Thermoluminescent Dosimetry System and Determination of Optimal Heating Rates for Seven Different Dosimetric Materials
*Thiesen JH, Irvine CA, Stewart CJ*, Yu W, Noey JD, Kearfott KJ*
*University of Michigan*

**5:00 pm** **TPM-C2.6**
Optimization of Data Flow Infrastructure for a Weather and Radiation Monitoring System with Different Sensor Stations Types
*Tawfik S, Huang CC, Kent AJ, Noey JD, Kearfott KJ*
*University of Michigan*

**5:15 pm** **TPM-C2.7**
Evaluation of a Low-pass Filter Algorithm for the Removal of Photomultiplier Tube Impulse Noise
*Thiesen JH, Yu W, Kearfott KJ*
*University of Michigan*

## 2:30 PM – 5:15 PM North 226AB

### TPM-D
### External Dosimetry

*Chairs: Nolan Hertel, Yigal Horowitz*

**2:30 pm** **TPM-D.1**
Revision of the ANSI N13.11, Personnel Dosimetry Performance – Criteria for Testing
*Ushino T, Benevides LA, Harris Jr. WS, Isbell KM, Jones DF, Lantz MW, Perle SC, Piper RK, Soares CG*
*The MJW Companies, U.S. Army, Oak Ridge National Laboratory, DOE Radiological and Environmental Sciences Laboratory, Pacific Northwest National Laboratory, National Institute of Standards and Technology*

**2:45 pm** **TPM-D.2**
Automated Thermoluminescence Glow Curve Analysis Software for Any Common Dosimetric Material
*Thiesen JH, Yu W*, Irvine CA, Kearfott KJ*
*University of Michigan*

**3:00 pm** **TPM-D.3**
Implementation of a Designed Experiment for Phase II Quality Control of a 137Cs Dosimetry Calibration Facility
*Noey JD, Stewart CJ, Kearfott KJ*
*University of Michigan*

**3:15 pm** **TPM-D.4**
Dose Rates and LET Distributions from Neutron Sources Relevant to the Space Radiation Environment
*Hertel NE, Biegalski S, Kesarwala A, Dynan W*
*Georgia Institute of Technology, Emory University*

**3:30 pm** **TPM-D.5**
Altering Dose Rates and LET Distributions for Neutron Sources in Tissue for Radiation Biology Studies
*Surry E*
*Georgia Institute of Technology*

**3:45 pm** **Exhibit Hall**
BREAK

**4:15 pm** **TPM-D.6**
Modeling Eye Lens and its Conversion Coefficients using MCNP6
*Niemisto MG*
*Georgetown University*

**4:30 pm** **TPM-D.7**
Organ and detriment-weighted dose rate coefficients for exposure to radionuclide-contaminated soil in pregnant women
*Domal SJ, Kofler CB, Bolch WE*
*University of Florida*

**4:45 pm** **TPM-D.8**
Atomic bomb survivor dosimetry of Nagasaki Factory Workers
*Domal SJ, Correa C, Paulbeck C, Griffin K, Sato T, Funamoto S, Cullings H, Egbert S, Endo A, Hertel N, Lee C, Botch W*
*University of Florida, Medical College of Wisconsin Milwaukee, National Cancer Institute, Japan Atomic Energy Agency, Radiation Effects Research Foundation, Consultant, Georgia Institute of Technology, University of Florida*

**5:00 pm** **TPM-D.9**
Reanalysis of Site Specific Cancer Mortality Using Reconstructed Organ Absorbed Dose: A Japanese Nuclear Facility Worker Cohort 1991-2010
*Furuta H, Kudo S, Ishizawa N, Saigusa S*
*Radiation Effects Association*

## 6:45 AM – 7:45 AM

**CEL-W** **North 222ABC**
NRRPT: Advantages to Membership
*Barcal K*

## 7:30 AM – 12:00 PM North 221ABC

### WAM-A
### Special Session: Pandemic Experiences Part 3
*Chairs: Kim Kearfott, Nicole Martinez*

**7:30 am** **WAM-A.1**
Experiences Teaching a Senior and Graduate Level Applied Radiological Measurements Laboratory Course during a Global Pandemic
*Kearfott KJ, Noey JD, Kent AJ*
*University of Michigan*

**7:45 am** **WAM-A.2**
The University of Michigan Radiological Health Engineering Research Laboratory During a Pandemic: Dust Storms, Flash Floods and Mirages while Panning for Gold
*Kearfott KJ*
*University of Michigan*

**8:00 am** **WAM-A.3**
Health Physics and COVID-19 Experiences at a Canadian University
*Moscu DF*
*McMaster University*

**8:15 am** **WAM-A.4**
Experiences Teaching Higher Ed During a Pandemic
*Martinez NE*
*Clemson University*

**8:30 am**
Panel Discussion

**8:45 am** **WAM-A.5**
Pandemic Perspectives from a 25-Year Remote Employee
*Brackett EM*
*MJW Corporation*

**9:00 am** **WAM-A.6**
Operating Source Material Licenses at 19 Far-Flung Sites During a Pandemic
*Cherry RN, Valadez E*
*US Army Installation Management Command*

**9:15 am** **WAM-A.7**
Plugging along during the pandemic
*Cervera MS*
*US NRC*

**9:30 am** **WAM-A.8**
Challenges amid the COVID-19 pandemic: A nuclear power plant Health Physicist's perspective
*Cunningham Beckfield FJ*
*Callaway Energy Center, Ameren Missouri*

**9:45 am** **WAM-A.9**
Radiation Protection during a Global Pandemic: Personal and Professional Silver Linings and Lessons Learned
*Botzer AE*
*Naval Nuclear Laboratory*

**10:00 am** **WAM-A.10**
Providing Radiological Worker and Radiological Control Technician Training During The Pandemic
*Hoskison GH*
*Sandia National Laboratories*

**10:30 am** **Exhibit Hall**
BREAK

**10:45 am** **WAM-A.11**
Overview of the impact of the COVID-19 pandemic crisis restrictions on activities involving radiation sources and radiation safety in Saudi Arabia
*Shubayr NA*
*Jazan University*

**11:00 am** **WAM-A.12**
Research and Work Experiment in China as a Young Academic at the beginning of my career and during the Pandemic
*Xu SL*
*University of South China*

**11:15 am** **WAM-A.13**
The 2020 Global Pandemic: Experiences of a Pakistani Doctoral Student
*Tareen AD*
*University of Azad Jammu, Kashmir Muzaffarabad*

**11:30 am** **WAM-A.14**
Pandemic-inspired construction of radon measurement field for testing a new alpha imaging detector
*Morishita YM, Kearfott KK, Wakaida IW, Miyabe MM*
*Japan Atomic Energy Agency, University of Michigan*

**11:45 am** **WAM-A.15**
Personal and Professional Experience during Covid-19 Pandemic
*Tahlak MM*
*Cleveland Clinic Abu Dhabi*

**8:00 AM – 11:50 AM** **North 222ABC**

## WAM-B
## Special Session: The Contamination of the Harborview Research and Training Building, Seattle, Washington

*Chairs: John Bliss, Richard Pierson*

**8:00 am** **WAM-B.1**
Response to Inadvertent Contamination of the Harborview Research and Training Building, Seattle, Washington
*Bliss JL*
*Los Alamos National Laboratory*

**8:20 am** **WAM-B.2**
Harborview Research and Training Building Initial LANL Response
*Rasmussen R, Fanning M, George G*
*LANL*

**8:35 am** **WAM-B.3**
Integration of the the Nuclear Emergency Support Team (NEST) assets to the Harborview Breached Source Incident
*Hoover SC, Fishburn MR*
*Los Alamos National Laboratory, Hanford Mission Integration Solutions*

**8:50 am** **WAM-B.4**
Initial Characterization and Planning for Recovery of the Harborview Research and Training Building (HRT) Following the Cesium-137 Contamination Event
*Bliss JL*
*Los Alamos National Laboratory*

**9:10 am** **WAM-B.5**
Harborview Research and Training Building, Recovery Phases 2Ai, 2B and 2Aii: Reentry in to Ground Zero and Source Removal
*Fanning M, George G, Rasmussen R, Schramm G, Bliss J, Hoover S, Rees B, Pierson R*
*LANL, PNNL*

**9:50 am**
Panel Discussion

**9:50 am** **Exhibit Hall**
BREAK

**10:20 am** **WAM-B.6**
Radiological Clearance of a Biomedical Research Facility (Cleanup Goals, ALARA, & Remediation)
*Pierson RM, Bliss JL*
*Pacific Northwest National Laboratory, Los Alamos National Laboratory*

**10:50 am** **WAM-B.7**
Assessment of Contamination within the Harborview Research and Training Building (HRT) Exhaust Ventilation Systems
*Bliss JL, Pierson JM*
*Los Alamos National Laboratory, Pacific Northwest National Laboratory*

**11:10 am** **WAM-B.8**
Contribution of Los Alamos National Laboratory's Radiation Protection Services Group to the Harbor View Research and Training Building (HRT) Remediation and Release Effort
*Bland JR, Douglas JJ, Fresquez LL, Lopez R, Jaramillo M, Justus AL, McLean TD*, Montoya RE, Purdy RJ, Quintana CE, Roybal CD, Seagraves DT, Simpson CT, Trujillo JJ*
*Los Alamos National Lab*

**11:30 am** **WAM-B.9**
Panel Discussion

**8:00 AM – 12:00 PM** **North 224AB**

## WAM-C
## Internal Dosimetry

*Chairs: Derek Jokisch, Nolan Hertel*

**8:00 am** **WAM-C.1**
A Standard for Plutonium Internal Dosimetry
*Carbaugh EH*
*Retired CHP*

**8:15 am** **WAM-C.2**
USTUR Whole-body Case 0680: 53-year Follow-up of a Manhattan Project Worker
*Šefl M, Avtandilashvili M, Tolmachev SY*
*U.S. Transuranium and Uranium Registries, Washington State University*

**8:30 am** **WAM-C.3**
Analysis of Long-term Retention of Plutonium in the Respiratory Tract Tissues of Four Workers: Bound Fraction vs. Scar-tissue Compartments
*Poudel D, Avtandilashvili M, Klumpp JA, Bertelli L, Tolmachev SY*
*Los Alamos National Laboratory, USTUR, Washington State University*

**8:45 am** **WAM-C.4**
Comparison of two methods to estimate skeletal plutonium concentration from limited sets of bones
*Tabatadze G, Avtandilashvili M, Tolmachev SY*
*U.S. Transuranium and Uranium Registries, Washington State University*

**9:00 am** **WAM-C.5**
Latent Bone Modeling Approach to Estimate Plutonium Activity Concentration in Human Skeleton
*Zhou JY, Avtandilashvili M, Tolmachev SY*
*U.S. Department of Energy, U.S. Transuranium & Uranium Registries, Washington State University*

**9:15 am** **WAM-C.6**
Effect of Osteoporosis on Latent Bone Models to Estimate Plutonium Activity Concentration in Human Skeleton
*Tolmachev SY, Avtandilashvili M, Zhou JY**
*U.S. Transuranium & Uranium Registries, Washington State University, U.S. Department of Energy*

**9:30 am** **WAM-C.7**
Uncertainty Evaluation of Skeleton Plutonium Activity Concentration Estimated from a Latent Bone Model
*Zhou JY, Avtandilashvili M, Tolmachev SY*
*U.S. Department of Energy, U.S. Transuranium & Uranium Registries, Washington State University*

**9:45 am** **WAM-C.8**
Latent Bone Modeling Approach to Select Best Combination of Bones for Estimating Plutonium Activity Concentration in Human Skeleton
*Tolmachev SY, Avtandilashvili M, Zhou JY*
*U.S. Transuranium & Uranium Registries, Washington State University, U.S. Department of Energy*

**10:00 am** **Exhibit Hall**
BREAK

**10:30 am** **WAM-C.9**
Visualizations of Temporal and Tissue Variations in Activity and Dose from Intakes of Radionuclides
*Jokisch DW, Barker AB*
*Francis Marion University*

**10:45 am** **WAM-C.10**
Dose coefficients for the embryo/fetus for a comprehensive set of radionuclides
*Schwahn SO, Samuels CE*, Leggett RW*
*ORNL Center for Radiation Protection Knowledge*

**11:00 am** **WAM-C.11**
Testing decision level (DL) and minimum detectable amount (MDA) for Hanford in vivo counting systems
*Rosenberg BL, Lynch TP, Antonio CL*
*HMIS/NV5*

**11:15 am** **WAM-C.12**
S-Values for Brain Subregion and Lacrimal Gland Sources to Support Radionuclide and Radiopharmaceutical Dosimetry in the Mesh-Type ICRP Reference Phantoms
*President BN, Brown JL, Correa Alfonso CM, Domal SJ, Bolch WE*
*University of Florida*

**11:30 am** **WAM-C.13**
Incidence of the Pseudo Pelger-Huet Mutation In Radium Dial Painters Reflects Effectiveness of Regulation
*Goans RE*
*MJW Corporation*

**11:45 am** **WAM-C.14**
Should (alpha,n) Neutrons Be Considered in Internal Dosimetry?
*Hertel NE, Griffin K, Samuels C, Jokisch D., Eckerman KF*
*Georgia Institute of Technology, ORNL Center for Radiation Protection Knowledge, Francis Marion University*

**8:00 AM – 11:55 AM** **North 226AB**

## WAM-D
## Special Session: Military Health Physics

*Chairs: Alan Hale, Ricardo Reyes*

**8:00 am** **WAM-D.1**
Assessing and Remediating Fallout of Operational Equipment
*Fairchild GR, Durosseau WA, Farrand DE*
*U.S. Navy*

**8:20 am** **WAM-D.2**
A Mechanistic Mathematical Model for Wound Healing After Radiation Combined Injury and the Effects of Pathological Inflammation
*Jennings RL, Creel AR, Romanowski CA, Sewsankar KK*
*Applied Research Associates, Inc.*

**8:40 am** **WAM-D.3**
Impact Analysis of Different ENDF Libraries and Estimating the Fallout Environment
*Dant JT, Molgaard JJ*
*Applied Research Associates, DTRA*

**9:00 am** **WAM-D.5**
United States Air Force Dosimetry Program Conversion from TLD to OSL: Technical Aspects
*Pugh DL, Wang JJ, Cezeaux JR, Duncan SG*
*U.S. Air Force*

**9:40 am** **Exhibit Hall**
BREAK

**10:10 am** **WAM-D.6**
Defense Health Agency Integrated Radiation Safety Program
*Reyes RA, Bower MW, Keeney NG, Shivji S, Wagner RN, Ely KO*
*U.S. Army, Defense Health Agency*

**10:30 am** **WAM-D.7**
Radar for Tracking Postdetonation Debris—Preliminary Findings
*Hooper DA, Kabela ED, Cooke CD, Brown MR*
*Oak Ridge National Laboratory*

**10:50 am** **WAM-D.8**
Estimating Operational Internal Dose from Predicted Localized Fallout
*Frey JJ*
*Air Force Institute of Technology*

**11:10 am** **WAM-D.9**
Business Meeting

## 2:30 PM – 5:25 PM North 221ABC

### WPM-A
### Special Session: 10 Reasons you can thrive in HP, #7 will shock you

*Chairs: Mike Mahathy, Charles Wilson, Michael Kennedy*

**2:30 pm** **WPM-A.1**
Welcome to the first Early-Career Professionals Special Session
*Wilson IV CA, Kennedy MJ*, Nieves A, Wang C, Register C*
*University of Missouri, University of Pittsburgh, Yale New Haven, Duke University*

**2:35 pm** **WPM-A.2**
Value of Certification - CHP
*Schwahn S*
*AAHP*

**2:50 pm** **WPM-A.3**
Early-Career Professional value of certification - NRRPT
*Murdock R*
*Waste Control Specialists LLC*

**3:05 pm** **WPM-A.4**
Strategic Planning for Early-Career Radiation Safety Professionals: Bridging the Gap to Other Safety Needs
*Emery RJ*
*Univ of Texas Houton*

**3:20 pm** **WPM-A.5**
What it's like to be a University HP
*Vasudevan L*
*Texas A&M University*

**3:35 pm** **WPM-A.6**
What It's Like to be a Health Physicist at a US Nuclear Reactor
*Adams R*
*Xcel Energy*

**3:50 pm** **North 222 Foyer**
BREAK

**4:05 pm** **WPM-A.7**
What it's like to be a Medical HP
*Whiteside NR*
*Yale New Haven Medical*

**4:20 pm** **WPM-A.8**
A Look at Military Health Physics From Below, At, and Above Sea Level for Early Career Health Physicists
*Sowers DA*
*Retired*

**4:35 pm** **WPM-A.9**
What its like to be a Federal HP
*Nguyen L*
*EPA*

**4:50 pm** **WPM-A.10**
What it's like to be a Decomissioning HP
*Miller D*
*Jacobs Environmental Group*

**5:05 pm** **WPM-A.11**
The Need of the Health Physicist to be Verse in NIR
*McWilliams FF, Sprenger PJ, Bushberg JT, Haes DL*
*MIT, US Navy, UC Davis Medical Center, Consultant*

**5:20 pm** **WPM-A.10**
Business Meeting

## 2:30 PM – 4:55 PM North 222ABC

### WPM-B
### Special Session: The Contamination of the Harborview Research and Training Building, Seattle, Washington Part 2

*Chairs: John Bliss, Richard Pierson*

**2:30 pm** **WPM-B.1**
Harborview Research and Training Building Ventilation System Hold Up Measurements: Spectral Nondestructive Assay Platform (SNAP)
*Fanning M, Bliss J, Hoover S, Rees B, Stults K, Myers S, Pierson R*
*LANL, PNNL*

**2:45 pm** **WPM-B.2**
Harborview Research and Training Building (HRT) MARSSIM, FSS, and FSS Report Overview
*DiCello DC, Cushman M*, Lopez A, Bliss JL, Pierson RM, Fanning M*
*LANL/Radiation Safety & Control Services (RSCS), PermaFix Environmental Services, PNNL*

**3:00 pm** **North 222 Foyer**
BREAK

**3:45 pm** **WPM-B.3**
Stakeholder Engagement at Harborview Critical for Project Success
*Smith MA, Pierson RM*, DiCello DC, Bliss JL*
*Pacific Northwest National Laboratory, Radiation Safety & Control Services, Inc., Los Alamos National Laboratory*

**4:00 pm** **WPM-B.4**
University of Washington Harborview Research and Training Building Environmental Sample Plan for Cs-137 in Soils and Sediments
*Bullock CA, Whicker JJ, Chastenet MJ*
*LANL*

**4:15 pm** **WPM-B.5**
Putting the Pieces Together: What Was Learned During Restoration of the Harborview Research and Training Building
*Bliss JL, Pierson RM*
*Los Alamos National Laboratory, Pacific Northwest National Laboratory*

**4:35 pm** **WAM-D.9**
Panel Discussion

## 2:30 PM – 5:15 PM North 224AB

### WPM-C
### Academic Institutions

*Chairs: Kim Kearfott, Maggie Cooney*

**2:30 pm** **WPM-C.1**
A Computerized Build-Your-Own Geiger-Mueller Radiation Detection System: Design Improvements for Performance and User-Friendliness
*Cooney MA, Noey JD, Kent AJ, Huang CC, O'Neil CE, Tawfik S, Jautakas L, Trager ME, Li M, Kearfott KJ*
*University of Michigan, Kearfott*

**2:45 pm** **WPM-C.2**
Comparison of Common Methods for Single Detector Radiation Source Localization
*Liebler KJ, Cooney MA*, Chung LK, Kent AJ, Noey JD, Kearfott KJ*
*University of Michigan, Stanford University*

**3:00 pm** **WPM-C.3**
Hardware and Software Design for an Affordable Indoor and Outdoor Weather and Radon Monitoring Station
*Li M, Tawfik S, Trager ME, Kent AJ, Noey JD, Kearfott KJ*
*University of Michigan*

**3:15 pm** **WPM-C.4**
Computer Aided Design and Manufacturing for a University Health Physics Research Laboratory
*Trager ME, Noey JD, Kearfott KJ*
*University of Michigan*

**3:30 pm** **North 222 Foyer**
BREAK

**4:00 pm** **WPM-C.5**
Use of Naturally Occurring Radon in a Basement Storage Space to Teach First Order Linear Kinetics
*Chung LK, Noey JD, Kennings TW, Keartott KJ*
*Stanford University, University of Michigan*

**4:15 pm** **WPM-C.6**
Construction and Characterization of a Smart Geiger-Mueller System for a Senior and Graduate Level University Course on Applied Radiation Detection
*Noey JD, Kent AJ, O'Neil CE, Barr KE, Kearfott KJ*
*University of Michigan*

**4:30 pm** **WPM-C.7**
Educational Experiments for the Public Using a Custom Smart Geiger-Mueller Radiation Detection System
*Noey JD, Kearfott KJ*
*University of Michigan*

**4:45 pm** **WPM-C.8**
Design of a Virtual Reality Game for Teaching Radiation Protection Principles
*Calco DB, Zheng X, Sable AJ, Abbaraju N, Trager ME, Saltus BJ, Noey JD, Kearfott KJ*
*University of Michigan*

**5:00 pm** **WPM-C.9**
Realistic Implementation of Radiation Physics for a Virtual Reality Game Programmed in Unity for an Oculus Quest
*Sable AJ, Abbaraju N, Zheng X, Calco DB, Saltus BJ, Noey JD, Kearfott KJ*
*University of Michigan*

## 2:30 PM – 5:15 PM North 226AB

### WPM-D
### Special Session: Environmental Justice

*Chairs: Lisa Manglass*

**2:30 pm** **WPM-D.1**
An Introduction to Environmental Justice
*Manglass LM*
*Francis Marion University*

**2:45 pm** **WPM-D.2**
Justice as a Core Value in the System of Radiological Protection
*Martinez NE*
*Clemson University, Oak Ridge National Laboratory*

**3:00 pm** **WPM-D.3**
G. William Morgan Lectureship – Using a multidisciplinary approach to address the ramifications of the Cold War era on Indigenous Peoples.
*Joseph CN*
*Arizona State University*

**3:30 pm** **North 222 Foyer**
BREAK

**4:00 pm** **WPM-D.4**
Leveraging State Standards To Embed Science Ethics Education In High School Curricula
*Ortiz AH*
*University of Arizona*

**4:30 pm** **WPM-D.5**
Elemental Contamination of Navajo Unregulated Water Sources
*Ingram JC*
*Northern Arizona University*

**5:00 pm** **WPM-D.6**
Socio Environmental Impacts at Uranium Mine Impacted Sites
*Hargraves JT, Kustka SM, Newmyer J, Elmore II BF, Higley KA*
*Oregon State University*

## 6:45 AM – 7:45 AM

**CEL-TH** **North 221ABC**
Chemical Interactions and How They Can Complicate Decontamination
*Davidson T*

## 8:00 AM – 9:45 AM North 221AABC

### THAM-A1
### Power Reactor Health Physics
*Chair: Bryan Pell*

**8:00 am** **THAM-A1.6**
Getting to Net-Zero Carbon Emissions
*Pell BS*
*Duke Energy*

**8:15 am** **THAM-A1.7**
Net-Zero Carbon Emissions and Base Power Challenges
*Pell BS*
*Duke Energy*

**8:30 am** **THAM-A1.3**
Design Basis Accident Dose Criteria - History and Perspectives
*Parillo JG*
*USNRC*

**8:45 am** **THAM-A1.4**
Response To COVID-19 Pandemic In US Nuclear Plants
*Adams RW*
*Xcel Energy*

**9:00 am** **THAM-A1.5**
Real-time Quantification of Primary Coolant Isotopics using Permanent Mount CZT Spectrometers
*Goodman DI, Wang W, Kaye WR*
*H3D, Inc.*

**9:15 am** **THAM-A1.1**
Introduction to Small Modular Reactors
*Pell BS*
*Duke Energy*

**9:30 am** **THAM-A1.2**
Small Modular Reactor Health Physics Challenges
*Pell BS*
*Duke Energy*

## 10:15 AM – 11:15 AM North 221ABC

### THAM-A2
### Radiation Effects
*Chair: Lisa Manglass*

**10:15 am** **THAM-A2.1**
Proteomic biomarker analysis of serum from Japanese field mice (Apodemus speciosus) collected within the Fukushima difficult to return zone
*Sproull M, Hayes J, Ishiniwa H, Nanba K, Shankavaram U, Camphausen K, Johnson TE*
*NIH/NCI/ROB, Colorado State University, Fukushima University*

**10:30 am** **THAM-A2.2**
The development of track structure microdosimetric models for bacteria exposed to pluotnium-239 and iron-55
*Manglass LM, Martinez N*
*Francis Marion University, Clemson University*

**10:45 am** **THAM-A2.3**
Response of the Pseudo Pelger-Huët Anomaly in Rhesus Macaques (Macaca mulatta) as a Function of Age
*Chino Y, Cline JM, Olson JD, Balajee AS, Johnson TE, Hayes JM*
*Colorado State University, Wake Forest University, Oak Ridge Institute for Science and Education*

**11:00 am** **THAM-A2.4**
Radiation Protection Survey at Saudi Pediatric Hospitals
*Almashhki AM*
*Ahmed*

## 8:00 AM – 10:15 AM North 222ABC

### THAM-B
### Medical
*Chairs: Deirdre Elder, Matthew Wilson*

**8:00 am** **THAM-B.1**
Brachytherapy For Brain Metastases: Radiation Safety Considerations For Cs-131 GammaTile
*Prasad K, Moss NS, Aramburu-Nunez D, Chu BP, Dauer LT*
*Memorial Sloan Kettering Cancer Center*

**8:15 am** **THAM-B.2**
Managing Third Party Lasers in a Healthcare System
*Elder DH*
*UCHealth*

**8:30 am** **THAM-B.3**
Estimated Dose Rates to Members of the Public from External Exposure to Pediatric Patients Receiving 131I Thyroid Treatment
*Aziz LC, Dewji SA*
*Texas A&M University*

**8:45 am** **THAM-B.4**
Exposure Rate and Detector Response Data for Operational Monitoring of I-131 Patient Release
*Aziz LC, Dewji SA*
*Texas A&M University*

**9:00 am** **THAM-B.5**
Patient release and patient trash; building relationships with sanitation departments
*Williamson MJ, Shuksta M, Chu B*
*Memorial Sloan Kettering Cancer Center, The City of New York Department of Sanitation*

**9:15 am** **THAM-B.6**
Design of a Mobile Brachytherapy Unit to Deliver Treatment to Patients in Remote Locations.
*Dewji SA, Willis A, Dailey MI*, Steinohrt M, Tezel S*
*Texas A&M University*

**9:30 am** **THAM-B.7**
Radiation Protection Considerations for High Power Linear Accelerators Used in FLASH Radiotherapy
*Rosenstrom A, Santana M, Rokni S, Dewji S, Loo B*
*Texas A&M University, SLAC National Accelerator Laboratory, Stanford University*

**9:45 am** **THAM-B.8**
Radiation Dosimetry following Inadvertent Extravasation Events in Nuclear Medicine
*Fisher DR*
*Versant Medical Physics and Radiation Safety*

## 7:45 AM – 12:00 PM North 224AB

## THAM-C
## Homeland Security and Emergency Response

*Chairs: Carolyn MacKenzie, Bill Irwin*

**7:45 am** **THAM-C.1**
Preventing a Dirty Bomb: Case Studies and Lessons Learned
*Iliopulos IM, Bufford J**
*Nuclear Threat Initiative*

**8:00 am** **THAM-C.2**
Uncertainty Propagation in ICRP 66 Human Respiratory Tract Model (HRTM) Applications in DCAL
*Margot DE, Cochran LD, Jelsema CM, Dewji SA*
*Texas A&M University, Sandia National Laboratories*

**8:15 am** **THAM-C.3**
A Graded Approach to Emergency Preparedness for Nuclear Power Reactors
*Kahler RE, Smith T**
*U.S. Nuclear Regulatory Commission (NRC)*

**8:30 am** **THAM-C.4**
Non-Radiological Health Effects from Evacuation and Relocation
*Smith TR, Adams TG*
*U.S. Nuclear Regulatory Commission (NRC), Gryphon Scientific*

**8:45 am** **THAM-C.5**
Radiation and Nuclear Countermeasures Program at NIAID/NIH
*Rios C*
*NIH*

**9:00 am** **THAM-C.6**
Gamma Irradiators and Financial Liabilities
*Kamen JK*
*Mount Sinai*

**9:15 am** **THAM-C.7**
Increased Safety Measures for Cesium and Cobalt Irradiator Removals (LA-UR-21-21590)
*Cocina F, MacKenzie CJ, Taplin T*
*Los Alamos National Laboratory, Systematic Management Services, National Nuclear Security Administration*

**9:30 am** **North 222 Foyer**
BREAK

**10:00 am** **THAM-C.8**
In-Situ, Field Gamma Spectrometry in a Radionuclide Air Sampler
*Lebel LS, Barlow K, Clouthier T*
*Canadian Nuclear Laboratories*

**10:15 am** **THAM-C.9**
2019 Harborview Irradiator Incident Overview
*Hay TR, Maharjan R*, Napier JB*
*WA Department of Health*

**10:30 am** **THAM-C.10**
Using a 2D array of dosimetric material to retrospectively reconstruct a 3D image of Special Nuclear Material (SNM) using Optically Stimulated Luminescence (OSL)
*O'Mara RP, Hayes RB**
*North Carolina State University*

**10:45 am** **THAM-C.11**
Nuclear Accident Simulation Study for River Bend Station: 2017 vs. 1992 Protective Action Guidelines
*McMahon MD*
*Tulane University, Louisiana State University*

**11:00 am** **THAM-C.12**
Radiation Source Mapping and Navigational Path Determinations for Radiation Source Searches
*Chung LK, Cooney MA, Kent AJ, Liebler KJ, Noey JD, Kearfott KJ*
*Stanford University, University of Michigan*

**11:15 am** **THAM-C.13**
Data Security Considerations for Networked and Remote Stations in a Radiation and Weather Monitoring System
*Kent AJ, Huang CC, Tawfik S, Kearfott KJ*
*University of Michigan*

**11:30 am** **THAM-C.14**
Rad/Nuc Smart Training Tool - A Powerful Alternative to Training with Live Sources
*Rolando JB, Cao SD, Hayden MC, Cosby CJ*
*Spectral Labs Incorporated*

**11:45 am** **THAM-C.15**
Optimization of a Ground Sampler Network for Postdetonation Debris Collection
*Hooper DA, Kabela ED, Lefebvre JP*
*Oak Ridge National Laboratory*

**8:00 AM – 11:00 AM** **North 226AB**

## THAM-D
## Risk Assessment
*Chair: Shraddha Rane*

**8:00 am** **THAM-D.1**
Continuing Efforts for NORM Regulatory Development and Risk-Informed Decision Making: Results of a Stakeholder Workshop
*McBurney RE*
*Conference of Radiation Control Program Directors, Inc.*

**8:15 am** **THAM-D.2**
ICRP TG114: The "Rs" of Reasonable in Radiation Protection
*Wieder JS, Martinez NE**
*U.S. Environmental Protection Agency, Clemson University*

**8:30 am** **THAM-D.3**
An Investigation of Medical Countermeasure Requirements Needed to Meet Lifetime Astronuat Career Radiation Exposure Limits for Cancer Death
*Werneth CM, Slaba TC, Simonsen LC*
*NASA Langley Research Center*

**8:45 am** **THAM-D.4**
The Potential Facility-level Risk Index (PFRI) – an assessment tool for radiological security
*Rane SV, Harris JT*
*Purdue University*

**9:00 am** **North 222 Foyer**
BREAK

**9:30 am** **THAM-D.6**
Research Reactor Nuclear Safety and Security Risk Analysis with Vulnerability and Consequence Values
*Bragers EM, Rekeweg EK, White DB, Harris JT*
*Purdue University*

**9:45 am** **THAM-D.7**
Air Exchange Rate Impact on Actinon, Thoron, and Radon Activity Equilibrium Factor and Inhalation Fractional Equilibrium Factor Determination in Vapor Intrusion Risk and Dose Models
*Asano EA, Dolislager F, Walker S*
*Texas A&M University, Oak Ridge National Laboratory, U.S. Environmental Protection Agency*

**10:00 am** **THAM-D.8**
Comparison of Cancer Risk Estimates from Internalized Uptake of Environmental Radionuclides
*Kalinowski A, Pawel D, Eckerman K, Bellamy M, Jokisch D, Dewji S*
*Texas A&M University, United States Environmental Protection Agency, Oak Ridge National Laboratory, Memorial Sloan Kettering Cancer Institute, Francis Marion University*

**10:15 am** **THAM-D.9**
Clarifying Some Misconceptions about EPA's Superfund Approach
*Walker ST*
*U.S. Environmental Protection Agency*

**10:30 am** **THAM-D.10**
Quantitative evaluation of the conservativeness in the committed dose concept for radiation workers
*Sasaki M, Hattori T*
*Central Research Institute of Electric Power Industry*

**10:45 am** **THAM-D.11**
Relationship Between Terrestrial Background and Remedial Criteria for Naturally Occurring Radioactive Material in the United States
*Brown SH*
*SHB Inc*

# AAHP Continuing Education Courses

Saturday, July 24 • Phoenix Convention Center.

All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

*Any personal or professional opinions presented within these courses reflect those of the presenters, and not necessarily those of the Academy.*

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**8:00 AM – 5:00 PM** **AAHP 1**

**Radiation Risk Assessment**

*Stuart Walker, Fred Dolislager*

**In-Person Only; Location: North 221ABC**

(16 CECs)

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.

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**8:00 AM – 12:00 PM** **AAHP 2**

**Y-90 Boot Camp**

*Andy Miller, CHP*

**Hybrid; Location: North 224AB**

(8 CECs)

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

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**8:00 AM – 5:00 PM** **AAHP 3**

**Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers**

*M. Stabin, PhD, CHP; RADAR, Inc.*

**Virtual Only**

(16 CECs)

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.

# PROFESSIONAL ENRICHMENT PROGRAM (PEP)

Sunday, July 25 through Tuesday, July 27 • In-Person PEPs will be taught in Phoenix, AZ.
All times shown below are Pacific Daylight Time (PDT). Virtual attendees must adjust for their local time.

## 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.

## Continuing Education Credits

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

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, July 25, a series of 13 courses will be offered between 8:00 AM – 4:30 PM.

In addition to the above-mentioned sessions for Sunday, 6 PEP lectures are scheduled on Monday and Tuesday, 12:15 PM – 2:15 PM. Registration for each two-hour course is $105 and is limited to 60 attendees on a first-come, first-served basis. Those whose registrations are received before the preregistration deadline will be sent confirmation of their PEP course registration.

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

### 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 8:00 AM – 10:00 AM

### PEP 1-A Palomares Dose Reconstruction

*S. Rademacher, PhD, CHP, AFSES/SEW*

**North 224AB**

In January 1966, two USAF aircraft collided over Palomares, Spain. One of the aircraft was a B-52 carrying 4 hydrogen bombs as part of its payload. Plutonium was released into the environment and over the years, thousands of USAF personnel have been involved in the clean-up.

A significant effort was undertaken to prepare dose estimates for all the personnel involved in the incident response and recovery. This PEP will highlight that work.

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### PEP 1-B Harmony in Concepts and Units for Internal Dose Calculations for Nuclear Medicine Applications or for Protection of Radiation Workers

*M. Stabin, PhD, CHP; NV5/Dade Moeller and RADAR, Inc.*

**Virtual**

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.

NOTE: This is a repeat of the virtual PEP offered in October 2020. The AAHP will not offer continuing education credits for participation in both sessions.

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### PEP 1-C Nonionizing Radiation: An Overview of Biological Effects and Exposure Limits

*B. Edwards Cree Inc.*

**North 222ABC**

This course provides a fundamental overview of nonionizing radiation (NIR) hazards and biological effects. Course attendees will learn the basic terminology and nomenclature, spectral region designations, regulatory framework, and consensus guidance associated with NIR. The course material will begin at the edge of the ionizing part of the electromagnetic (EM) spectrum and walk participants through a tour of the optical, radiofrequency (including microwave), and extremely low frequency (ELF) portions of the EM range, finally ending with static electric and magnetic fields. The existence of a series of exposure limits covering the entire NIR spectrum forms one of the course's basic themes. This continuous line of "safe" exposure levels helps establish the concept that NIR dose-response curves are at least well enough understood at all parts of the spectrum to provide a reasonably safe exposure envelope within which we can operate. After completing this course, attendees will be conversant in the major sources and associated hazards in each part of the NIR spectrum, along with the recognized exposure limits and control measures for those sources. Armed with this information, safety professionals can better recognize, evaluate, and communicate the hazards associated with the spectrum of significant NIR sources and address workers' concerns in a credible, fact-based, knowledgeable, and professional manner .While some knowledge of optical, radiofrequency, ELF, and static electromagnetic field characteristics may be helpful, both experienced and novice health physicists with NIR interests or responsibilities will benefit from this course.

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### PEP 1-D Contemporary Topics Affecting Radiation Safety Program Operations: Session 1

*Robert Emery and Janet Gutierrez, University of Texas*

**Virtual**

The practice of radiation safety is actually the convergence of a variety of professional disciplines, thus changes and developments that affect the field can emerge from a variety of sources. This PEP is designed to address two contemporary issues confronting radiation safety program operations:

- The promise and peril of "citizen science"
- Anticipating and adapting to change within your organization

Ample time will be allotted for participant questions and discussion. The particular topics included in the PEP series have been recently identified as extraordinarily useful to participants in the highly successful week-long "University of Texas EH&S Academy"

### PEP 1-E The Ins and Outs of Wound Counting

*Jason E Davis, ORAU-REAC/TS*

**Virtual**

This Professional Enrichment Program course addresses practical aspects of evaluating the extent, location, and quantity of radioactive material in and around a wound. The course includes an overview of the equipment available for wound counting, and the appropriate use and care of this equipment. Sources of uncertainty in measurements, their impact on dosimetry and medical decision making, and techniques for accounting for these sources of error are also discussed. Cases involving contaminated injuries involving fission-activation products and transuranic radionuclides are reviewed to emphasize the unique aspects of the care and treatment of contaminated wounds.

## Sunday 10:30 AM – 12:30 PM

### PEP 2-A Integration of Health Physics into Emergency Response

*Stephen L. Sugarman, MS, CHP, CHCM, Vice President and Corporate Health Physicist, Summit Exercises and Training*

**North 224AB**

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 2-B Federal Radiological Response Teams

*Kenneth Groves, CHP, Sevorg Services, LLC*

**North 221ABC**

This PEP will offer a review of both Federal and State (Federally-Funded) Radiological/Nuclear Emergency Response Teams/Assets. 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 critical 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!

### PEP 2-C Laser Safety for Health Physicists

*B. Edwards Cree Inc.*

**North 222ABC**

This course provides an overview of laser physics, biological effects, hazards, and control measures, as well as a concise distillation of the requirements in the ANSI Z136 .1-2014 Standard for the Safe Use of Lasers. Non beam hazards, emerging issues, and accident histories with lessons learned will also be covered. Course attendees will learn practical laser safety principles to assist in developing and conducting laser safety training, performing safety evaluations, and effectively managing an institutional laser safety program. While some knowledge of laser hazards will be helpful, both experienced and novice health physicists with laser safety responsibilities will benefit from this course. Attendees may find it helpful to bring their own copy of ANSI Z136.1-2014.

### PEP 2-D Contemporary Topics Affecting Radiation Safety Program Operations: Session 2

*Robert Emery and Janet Gutierrez, University of Texas*

**Virtual**

The practice of radiation safety is actually the convergence of a variety of professional disciplines, thus changes and developments that affect the field can emerge from a variety of sources. This PEP is designed to address two contemporary issues confronting radiation safety program operations:

- A radiation protection program logic model: considering inputs, outcomes and benchmarking opportunities
- Radiation protection measures and metrics that matter (and how to display them)

Ample time will be allotted for participant questions and discussion. The particular topics included in the PEP series have been recently identified as extraordinarily useful to participants in the highly successful week-long "University of Texas EH&S Academy"

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**PEP 2-E Gamma Spectroscopy for the Health Physicist**

*Mike Clemmer, ORTEC*

**North 226AB**

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.

## Sunday 2:30 PM – 4:30 PM

**PEP 3-A Alpha Spectroscopy for the Health Physicist**

*Mike Clemmer, ORTEC*

**North 224AB**

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.

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**PEP 3-C Performing ANSI Z136-Based Laser Hazard Calculations**

*B. Edwards Cree Inc.*

**North 222ABC**

This course provides a step-by-step guide to performing laser hazard calculations based on the principles and methodology in the ANSI Z136.1-2014 Standard for the Safe Use of Lasers. Attendees will gain an understanding of how to complete these calculations for continuous wave, pulsed, and repetitively pulsed laser systems. While some knowledge of laser hazards will be helpful, both experienced and novice health physicists with laser-safety responsibilities will benefit from this course. However, anyone not already familiar with the fundamentals of radiometry and the arcane conventions of the Z136 series of standards for the safe use of lasers would benefit from attending the Laser Safety for Health Physicists PEP so they'll have some familiarity with the concepts under discussion. Attendees will also find bringing their own copy of ANSI Z136.1-2014 a useful reference.

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**PEP 3-D Getting started in consulting: Some practical things about consulting in private practice**

*A. Karam, CHP*

**Virtual**

Ahh…the life of a consultant! Interesting projects, variety, setting your own hours, and finally having a boss you respect… and finding work, setting rates, writing work and cost proposals, taxes, waiting to get paid, and wondering if you ought to incorporate and/or have liability insurance. It turns out there are a lot of practical aspects to being in private practice that a lot of folks don't think about when they decide to start consulting – and especially when they make the leap from consulting part-time to relying on it to pay the bills. That's what we'll be going over in this PEP – a few examples of fun or interesting projects, and then all the other stuff that also needs to be attended to; the stuff that brings in the work, gets us paid, and keeps us out of trouble.

## Monday 12:15 PM – 2:15 PM

### PEP M-1 Nuclear Space Launch Policy and Planning

*Chris Hallam, EPA; Elaine Marshall, AFSES/SES (Dawson)*

**Virtual**

Nuclear power and propulsion systems have been instrumental parts of the United States' space exploration portfolio for decades. These systems have allowed the US to be a leader among space-faring nations. The US is committed to applying this technology safely, securely and sustainably in what will soon be a very busy space nuclear industry.

This PEP will speak to history of the space nuclear power and propulsions systems, the nuclear safety review, and the recent changes to space policy. The second part will address the ongoing collaborative efforts of governmental and commercial organizations to implement national space policy. Finally, this course will also speak to how one organization plans to implement the requirements.

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### PEP M-2 RDD Primer

*Gus Potter, SNL*

**North 224ABC**

This PEP is a RDD primer. Because of the nature of the discussion, this session will only be offered in person and will not be recorded.

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### PEP M-3 Understanding Alpha Radiation Therapy: From Pre-clinical Considerations to Clinical Outcomes

*Frank I. Lin, MD, Stephen Alder, PhD, Timothy Phelps, PhD, National Cancer Institute (NCI), National Institutes of Health (NIH)*

**Virtual**

This PEP will offer viewers an insight to several studies conducted using the alpha radiation therapies conducted through the National Institutes of Health (NIH). Each study presented will provide a conceptual understanding of the medical research use of the therapies, in correlation to the researcher's perspective in health physics. The presentations will include information about: (1) patients with osteoblastic bone metastases being candidates for radium-223 ($Ra223Cl_2$) therapy and potentially undergoing sodium floride-18 (F18-NaF) positron emission tomography-computed tomography imaging to identify bone lesions, (2) reviewing the challenges to image radium for dosimetry calculations, (3) Pb-211 contamination caused by the outgassing of Rn-219 from Ra-223 in dry, liquid, and murine tissues samples made to help design proper handling procedures for Ra-223 in preclinical bio-distribution work and (4) the promise and successes of alpha therapies.

## Tuesday 12:15 PM – 2:15 PM

### PEP T-1 Understanding and Using the CAP88-PC Compliance Code

*D. Stuenkel1, B. Littleton, R. Wood; U.S. Environmental Protection Agency, Trinity Engineering Associates*

**Virtual**

4.1, updates the existing Version 4.0 with new dose and risk conversion factors and includes some small modifications to the user interface. This 2-hour course will help users of the CAP88-PC users to understand the changes in this new version relative to previous versions; describe the bases for the underlying model; explain similarities and differences with other similar models and codes; and instruct users on proper use of the code and model for demonstrating regulatory compliance. The course will include a brief description of the model, information about the code's architecture, along with demonstrations on how to install and use the code. Additional information on future update paths and regulatory approaches will also be presented.

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

*Eugene H. Carbaugh, CHP*

**North 221ABC**

This PEP class provides actual case studies of high-routine bioassay measurements and discusses the investigation process, resolution, and lessons learned from each. High routine bioassay results can come from several sources, including normal statistical fluctuation of the measurement process, interference from non-occupational sources, and previous occupational intakes, as well as new intakes. A good worker monitoring program will include an investigation process that addresses these alternatives and comes to a reasonable conclusion regarding which is most likely. A subtle nuance to these investigations is the possibility that a newly detected high-routine measurement might represent an old intake that has only now become detectable. This can result from the worker being placed on a different bioassay measurement protocol, a change in analytical sensitivity, unusual biokinetics associated with highly insoluble inhalations, or lack of a clear work

history. As sites close down, the detailed dosimetry records of specific worker exposures are archived, becoming relatively inaccessible, with only summary dose information available. Likewise, the "tribal knowledge" of the site becomes lost or seriously diluted as knowledgeable employees retire or move on. Therefore, it is incumbent upon the site performing a potential intake investigation to thoroughly address the possible alternatives or face the consequence of accepting responsibility for a new intake. The presenter has encountered all of the foregoing issues in the course of investigating 30 years of high-routine bioassay measurements at the U.S. 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.

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### PEP T-3 Technical Basis and Operational Experience for Clearance of Personal Property From SLAC Accelerator Facilities

*S. Rokni, SLAC*

**Virtual**

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.

# CONTINUING EDUCATION LECTURES (CELs)

Monday, July 26 through Thursday, July 29

## CEL Courses
**(included in registration fee)**

To download a CEL talk, use this link and type in the corresponding CEL Code:

**http://burkinc.net/HPS2021AMPEP.php**

| | |
|---|---|
| CELM1-28671 | CELW-42920 |
| CELM2-73581 | CELTH-53220 |
| CELTU-29484 | |

## Monday

**CEL-M1** **6:45 AM – 7:45 AM**

**The 1976 Hanford Americium Accident: Then and Now**

*Eugene H. Carbaugh, CHP*

**North 221ABC**

On August 30, 1976 an americium-241 ion exchange column exploded in a Hanford Site waste management facility causing significant damage to the hood containing the column, extensive facility radiological contamination, and spraying an operator with highly contaminated nitric acid and debris. The worker underwent medical treatment for acid burns, as well as wound debridement, extensive personal skin decontamination and long-term DTPA chelation therapy for decorporation of americium-241. Because of the contamination levels and prolonged decontamination efforts, care was provided for the first three months at a unique emergency decontamination facility with gradual transition to the patient's home occurring over another two months. The accident underwent an extensive investigation as to cause, response, lessons learned, therapy, and dosimetry, and has been well documented in numerous reports and journal articles. The worker incurred the largest recorded internal deposition of americium-241 and became known in the press as The Atomic Man. The lessons learned with regard to patient treatment and effectiveness of therapy still form the underlying philosophy of treatment for transuranic-contaminated injuries. Changes in infrastructure and facilities as well as societal expectations make for interesting speculation as to how responses might differ today.

**CEL-M2** **6:45 AM – 7:45 AM**

**Working with emergency responders**

*A. Karam, CHP*

**Virtual**

There are a lot of health physicists working with emergency responders – or planning on working with emergency responders in the event of a radiological or nuclear emergencies. This can be incredibly rewarding, or amazingly frustrating, depending on what both sides expect from each other and how they adjust to working together. Responders have a broader mission, they have to be aware of a wider variety of concerns, and they're often not nearly as interested in the details of our profession as we think they ought to be. In this CEL we'll talk about some of these differences and how to use this understanding to work effectively with the cops and firefighters who will rely on us in the event of a radiological or nuclear emergency.

## Tuesday

**CEL-T** **6:45 AM – 7:45 AM**

**Therapeutic Uses Nuclear Medicine Pharmaceuticals**

*Mike Stabin, NV5/Dade Moeller and RADAR, Inc.*

**North 221ABC**

There are many radiopharmaceuticals used in nuclear medicine therapy. Some are called 'theranostics', which means 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, while the therapeutic application seeks to treat a specific disease. This session will describe the applications of several radiopharmaceuticals, including the well-established I-131 NaI In the treatment of hyperthyroidism and thyroid therapy, the use of Y-90 microspheres in the treatment of hepatic cancers, and newer therapies, including Lu-177 DOTATATE for neuroendocrine tumors and Ra-223 chloride for bony metastases. Clinical successes will be discussed, but the focus will be on the radiation dosimetry aspects.

## Wednesday

**CEL-W** **6:45 AM – 7:45 AM**

**NRRPT: Advantages to Membership**

*Karen Barcal, NRRPT*

**North 222ABC**

The NRRPT provides many advantages to its members, including a synergistic relationship with the HPS. This CEL will talk to the history of the organization and its relationships with other professional organizations, the advantages to becoming a Registered Radiation Protection Technologist, and membership requirements. It will also speak to the realized benefits and experiences as a member of the NRRPT, HPS and AAHP.

## Thursday

**CEL-TH** **6:45 AM – 7:45 AM**

**Chemical Interactions and How They Can Complicate Decontamination**

*Todd Davidson*

**North 221ABC**

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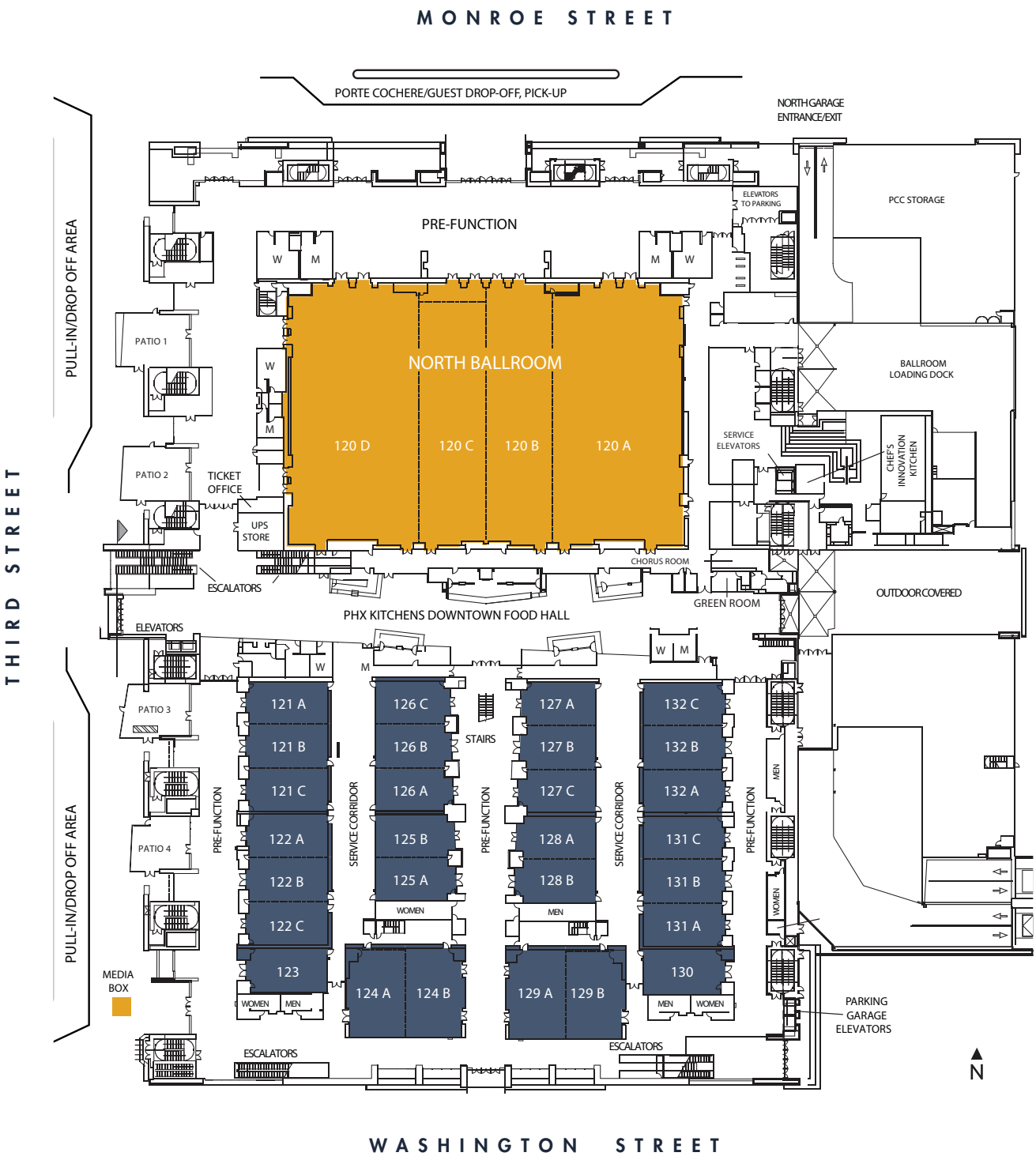

SAVE THE DATE

## 2022 IRPA
## North American Regional Congress

"Meeting the Challenges in the Practice of Radiation Protection"

**20–24 February 2022**
**Union Station Hotel • St. Louis, MO**

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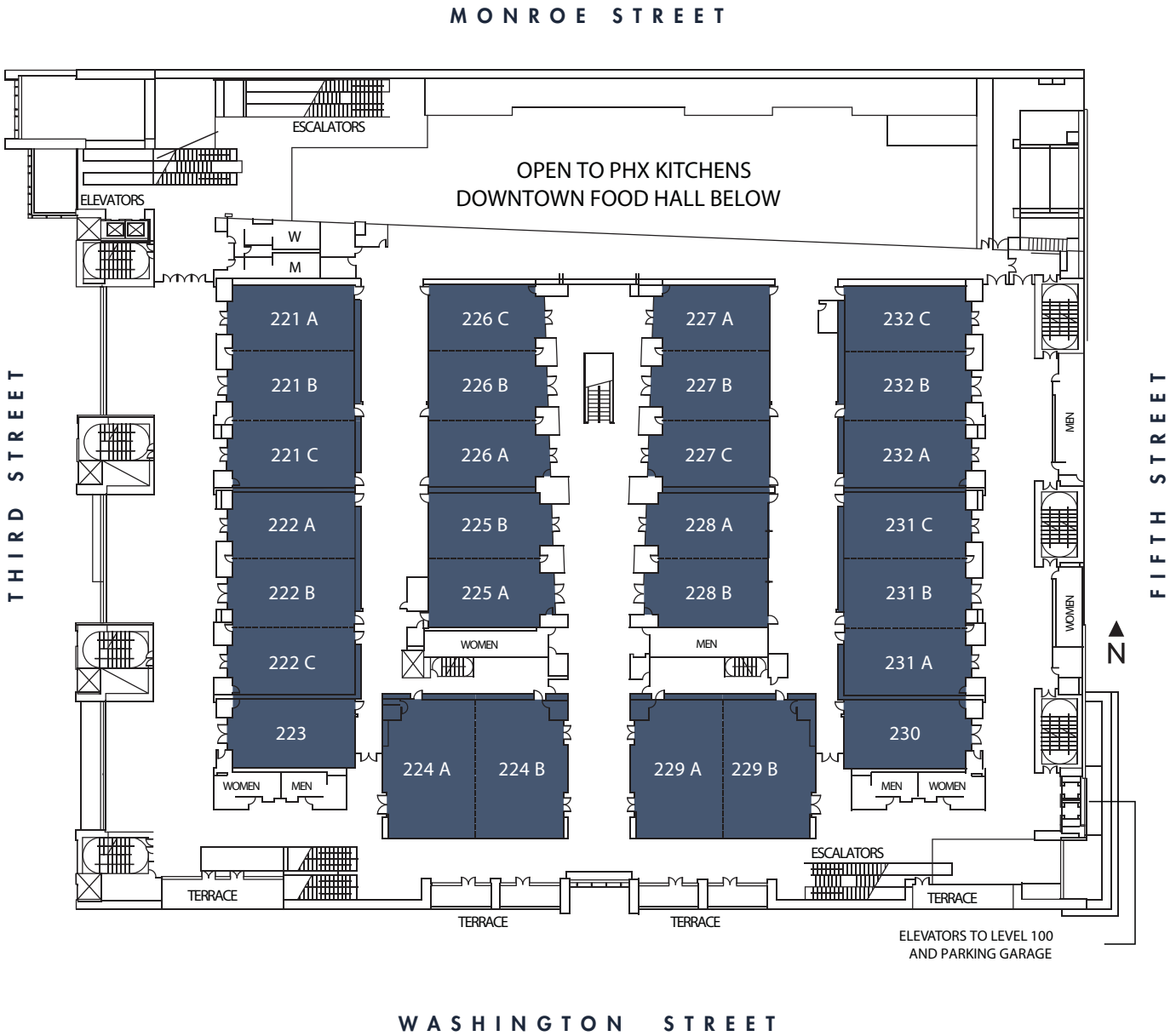

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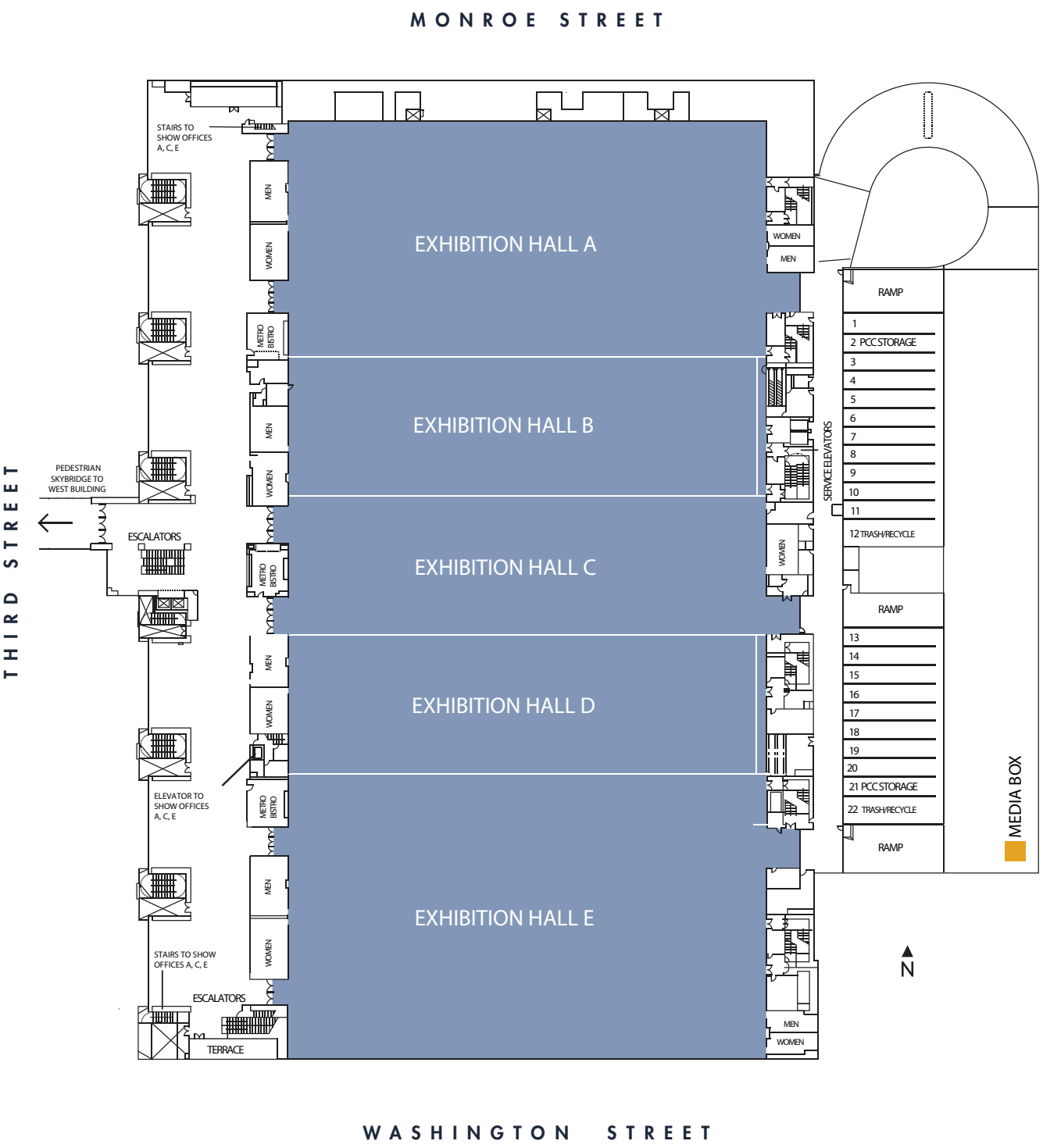

# Notes

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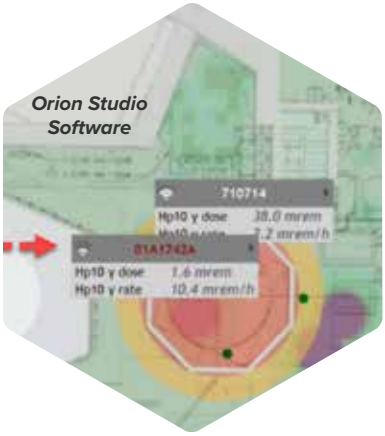

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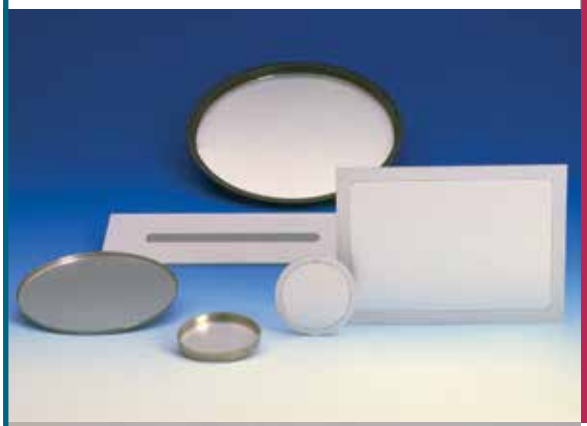


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