

Avalanche

The official newsletter of the
Cascade Chapter of the Health Physics Society

Spring 2009 Issue

Annual E. Dale Trout Meeting

This year's annual meeting will take place at Oregon State University in Corvallis on May 8th. We have a number of speakers lined up for this year's annual meeting. Most of our Affiliate members will also be available to demonstrate their newest gadgets and answer any questions you may have.

The featured speaker for this year's meeting will be HPS President-Elect, Howard Dickson. Recently retired from EG&G Technical Services, Inc., Howard received his MS in physics from the University of Tennessee in 1967. He spent the first part of his career in Oak Ridge, working first at Oak Ridge Associated Universities, then at Oak Ridge National Laboratory in both research and operational health physics, and finally with Bechtel Construction where he became Vice President (VP) of Health Services. His next duty station was with EG&G/REECO at the Nevada Test Site where he was Deputy General Manager and Sr. VP. After a brief stint at Livermore National Lab, Howard completed his career as VP with EG&G supporting their homeland security business line. He is certified by the American Board of Health Physics, the Board of Certified Safety Professionals, and the American Board of Industrial Hygiene. Howard has served as a Director and Treasurer of HPS. Howard retains membership in the five Chapters that he joined along his career path – East Tennessee, Lake Mead, Northern California, Baltimore Washington, and Florida Chapters. He and his wife Rita live in Tampa and currently enjoy spending quality time with their 4 children and 2 grandsons. The title and abstract of Howard's presentation can be found deeper in the newsletter.

The CCHPS annual meeting is named after E. Dale Trout, but how many people actually know who he was. Our sole Charter Member of the CCHPS, Art Johnson, will provide a history lesson about the meeting's namesake.

We also have four students lined up to talk about their research. The titles and abstracts of their presentations along with more meeting information are included in this newsletter as well.

President's Corner

Hello Colleagues. Thanks for a great year as President. It's been an honor to represent the Cascade Chapter of the Health Physics Society in this capacity. For my last President's Corner I would like to talk about the importance of continued service to the Chapter and National HPS not only as a way to connect with fellow Health Physicists, but also as a way to support the health and visibility of our profession.

The Cascade Chapter has established a number of committees that could use your help or input:

The *Fellows Nominating Committee* is chaired by Norm Dyer with the intention of nominating local Health Physicists as Fellows to the National Committee.

The *Community Relations Committee* was established in 2008 to link the Cascade Chapter with our local communities or professional entities that have a need for Health Physics support or education. Members on this committee are Danny Rice, Bill Tuttle, and Julia Sober.

The *Student Support Committee* consists of members Mike Zittle, Stan Addison, Jennifer Johnson, and Marj Slauson. The intention of this committee is to direct support to students. At our last meeting the committee suggested supporting students to national HPS meeting to help with travel costs of \$250, or supporting travel for students to the local CCHPS meetings. In return, the students ideally should be presenting a poster or talk. The committee has yet to draft guidelines for this support and present to the Chapter for vote.

If you have a community relations project, idea for student funding or Fellow nominee, or you want to serve on a committee, please contact a committee member, or CCHPS Officer. We can really use your help and support, even if you can't make regular meetings.

Another important way you can provide support to our Chapter is to run for office. Over the last few years we have seen a decline in members that want to commit to serving the CCHPS in an official capacity. It is vital to the health of our chapter that we have engaged leaders to perform our chartered responsibilities. And, it's really fun

and doesn't take up too much time. The next round of nominations will begin next winter. So, if you think this is something you would like to do, don't hesitate to contact the Chair of the CCHPS nominating committee, Marj Slauson.

2009 Dues

If you have not yet paid your 2009 dues, please do so as soon as possible. Your continued support of the CCHPS is greatly appreciated, and helps cover the operating costs of the chapter. If you are not sure if you are up to date on your dues, please contact the secretary to find out.

Dues Increase for 2010

It has been a few years since we have had an increase in dues. At the same time, costs have risen quite a bit. At the last Executive Council Meeting the Council voted to raise the Plenary membership dues from \$15 to \$25, and the Group membership dues from \$10 per person to \$20 per person. These raises also change the Student and Member Emeritus dues to \$12.50 each. The Affiliate membership dues will remain the same. These dues will take effect for next year, 2010.

More information about the different membership categories and the benefits of each type of membership can be found on the CCHPS website.

Times are not easy right now for anybody, but with these dues increases the chapter should be able to meet operating costs for the next few years.

2009 Elections

The 2009 election is underway. You should have received a ballot with this newsletter. The ballot will close on May 8, 2009 at 10:00 AM. If you will be attending the chapter meeting, you can turn in your ballot during the meeting registration. If you will not be attending the meeting, please return your ballot to the secretary by May 6th in order for it to be counted at the meeting. The ballots can be sent via email or regular mail. The ballots will be counted and the winners will be announced during the May 8th meeting. If you have any problems with your ballot contact the Secretary for assistance.

HPS President-Elect Presentation

H.W. Dickson, MS, CHP, CIH, CSP (President-Elect, Health Physics Society) – *“Will they ever learn? The public education game”*

We as health physicists have much at stake in the public education arena. In spite of our efforts, the public has been slow to warm to the use of radiation and radioactive material, except perhaps for some medical applications. Recently we are beginning to see a trend toward greater acceptance of nuclear power, probably driven largely by the exorbitant cost of oil and the perception that we are

being held hostage to foreign suppliers of same. Now may be the time to strike with all deliberate haste with maximum use of available resources to educate the public about radiation risks. The specter of terrorist attacks using radiological or nuclear weapons resulted in a great dissemination of knowledge about radiation to emergency response personnel of all ilk around the country. The further prospects of a nuclear power renaissance should produce a thirst for additional knowledge by many other stakeholders. The Health Physics Society (HPS) is well postured to deliver the credible, scientifically accurate information that the public seeks. Our recent restructuring efforts within the HPS have produced an organization that is more effective, efficient and productive than ever. We have made great strides in improving our responsiveness to educational gaps/needs through several current initiatives such as the Radiation Primer. Several other education initiatives are within our grasp. Allied with other organizations and agencies that share our interests and concerns, we have the opportunity to raise our public education profile even further. Your voluntary participation at both the national and the chapter levels will make a huge difference in just how successful we will be over the next few years.

Student Presentations

Wesley Frey (Radiation Health Physics PhD Student) – *“Use of BC-523a Liquid Scintillator for Simultaneous Neutron Spectroscopy And Gamma Detection with the Implementation of a Neutron History Reconstruction Algorithm”*

Real-time, high efficiency neutron spectroscopy has, historically, been a persistent challenge in the field of radiation detection and, for the most part, has gone unsolved. The most promising method to resolve this challenge is the boron-capture technique using an organic scintillation system (BC-523a). Detectors that utilize this method possess an unusual property that allows them to be used for estimation of initial neutron energy over a large range of incident energies with very high intrinsic efficiencies. The two most significant problems with this method are that the recoil proton light response is non-linear (resulting in inaccurate neutron energy spectra) and the amount of analog circuitry required to process the pulses is prohibitive. This research resolves these two problems. The non-linear response is corrected by implementing a neutron history reconstruction algorithm. This algorithm tracks the theoretical amount of scintillation light generated by each neutron collision with hydrogen. Neutron interactions that do not produce a measurable scintillation pulse (non-hydrogen collisions and inelastic scatter photons leaving the detector's active volume) will be characterized in MCNP, so that these signal losses can be accounted for. The majority of analog circuitry is replaced by a fast waveform digitizer and pulse processing program using digital filters. A plutonium beryllium neutron source was characterized. Results are available in

real-time and are in good agreement with a historically accepted spectrum. Potential applications for this system include real-time mixed field dosimetry, neutron/gamma-ray sensitive portal monitors, and the possible replacement of the He-3 tube.

Edward J. Cazalas (Nuclear Engineering MS Student) – “*Dosimeter Design Analysis using Monte Carlo Methods*”

A novel scintillation dosimeter design is being developed at Oregon State University for use in mixed beta and gamma fields with application emphasis on beta radiation legal dose verification dosimetry. Development of the dosimeter requires design modeling and optimization, physical construction, dosimetry algorithm development and implementation, dosimeter characterization with live sources, and experimental dosimetry benchmarking against known results.

Dosimeter design modeling and optimization is the primary focus of discussion with other steps toward a working prototype being briefly reviewed, along with areas of difficulty encountered while completing these steps. Analysis of design features and characteristics of the dosimeter for beta and gamma dosimetry is performed with simulations using Monte Carlo methods implemented in Monte Carlo Nth Particle (MCNP) computer code. Dosimetry concepts relating to dosimeter design will be covered, such as charged particle equilibrium and energy deposition averaging. Physical processes related to dosimetry, such as backscatter, energy deposition, particle range, and secondary particle production will be discussed. Analytical techniques are addressed in relation to their use in confirming simulation results and aiding design. Material properties will be discussed but only as they relate to physical interactions dominant in dose measurements, such as how scintillators convey dose, how the dosimeter can simulate tissue, and how density thicknesses need to be considered.

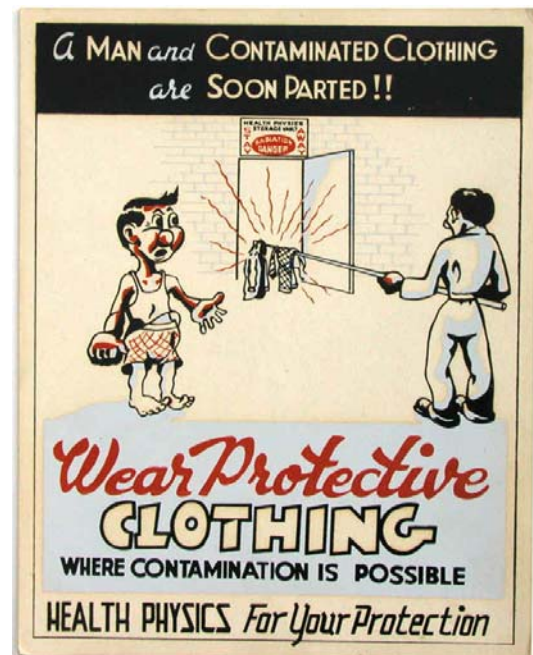
Kevin A. Makinson (Radiation Health Physics MS Student) – “*Tissue Weighting Factor Derivation and Analysis: ICRP 26, 60, 103*”

Tissue weighting factors are commonly utilized to convert equivalent dose to effective dose equivalent. They account for the differences in radiosensitivity of various organs and allow users to compare whole body dose to individual organ detriment. They are explicitly calculated in ICRP 26, 60, and 103, although the method of calculation, as well as the weighting factors themselves, vary greatly between reports. ICRP 26 bases its weighting factors solely on fatal cancer risk for eleven organs. ICRP 60 and 103 use detriment (with separate definitions in each report) to calculate the tissue weighting factors for twenty - two and twenty - eight organs, respectively. Each new report introduces levels of uncertainty which ultimately may *reduce* the meaning of the weighting factors. A review of the three methods used to calculate tissue weighting factors

in ICRP 26, 60, and 103 is covered, as well as an analysis of the influence of each weighting factor parameter.

Michael Ryan (Radiation Health Physics MS Student) – “*The New VARSKIN 4 Dosimetry Model of the Skin*”

Improvements to the current photon dose model have been developed for implementation in an updated VARSKIN 4. The VARSKIN code is a U.S. Nuclear Regulatory Commission (NRC) product used to assess radiation dose to the skin following skin contamination or skin exposure. Upgrades to VARSKIN 3 include an enhanced photon dosimetry model that is based on Monte Carlo simulations of hot-particle contamination. The relationship between KERMA and dose was obtained from simulations to develop a correction factor accounting for the lack of charged particle equilibrium (CPE) at shallow depths, thus providing a more accurate prediction of photon dose. The photon model is implemented such that mathematical formulations, rather than look-up tables, drive the estimation of dose. Various integration schemes for dose averaging were investigated to provide efficient convergence of the solution. The enhanced photon dosimetry model also incorporates parameters of energy, attenuation, dose-averaging area, air gap, protective clothing thickness, as well as simple volumetric sources. With the addition of these parameters, current deficiencies have also been addressed such as creating the capability to calculate dose while accounting for attenuation and correcting the assumption of using the same effective-Z for all materials. An overview of the enhanced photon dose model is presented along with a comparison of results obtained from Monte Carlo, VARSKIN 3, and the new VARSKIN 4.



2009 Dale Trout Annual Meeting

The 2009 Dale Trout Annual Meeting will be held **Friday May 8, 2009** at the LaSells Stewart Center at Oregon State University in Corvallis, OR.

Agenda

- 9:15 Executive Committee meeting
9:30 Breakfast
9:45 Registration
10:00 Ballot Closed
10:00 Chapter Business Meeting
- Appointment of New Officers
 - Treasurers Report
 - New Business
 - Old Business
- 11:00 Presentation – Art Johnson (Oregon State University, Retired) – “Who was E. Dale Trout?”
11:30 Student Presentations
12:00 Lunch
1:00 Student Presentations
2:30 Presentation – Howard Dickson, MS, CHP, CIH, CSP (President-Elect, Health Physics Society) – “Will they ever learn? The public education game”

Food

Breakfast goodies provided by Landauer and Seltech will be available in the morning during the registration period. Come early and enjoy coffee, juice and goodies.

Lunch will include:

- Radiatore Pasta with Choice of Sauce (Marinara, Meat Sauce, Pesto or Garlic Alfredo)
- Italian herbed polenta grilled and topped with roasted vegetables & marinara sauce.
- Green salad
- Rolls
- Coffee, lemonade or iced tea
- Chocolate covered strawberry

If you do not want to order the lunch please indicate that on your registration form.

Goodies will be provided during the afternoon break as well.

Registration

Please send your registration form to the chapter secretary before May 4th. If you would like to pay your 2009 dues at the same time, please indicate that on the form.

Cost

Prices for the meeting are:

	<u>Meeting Only</u>	<u>Lunch & Meeting</u>
Member	\$20	\$25
Non-member	\$25	\$30

Directions to the meeting:

LaSells Stewart Center is located at the corner of 26th Street and Western Boulevard in Corvallis, OR.

The physical address is: 875 SW 26th Street, Corvallis, Oregon 97331-3101 ([Google](#))

From I-5: Highway 34 to Corvallis, left on 4th Street, right on Western Boulevard, right on 26th Street
From the North on 99W: turn right on Western Blvd., right on 26th Street
From the South on 99W: turn left on Western Blvd., right on 26th Street
From Highway 34: turn on 26th Street
[Printable directions and map](#)(PDF)

Parking

The LaSells Stewart Center features ample parking across the street in the Reser Stadium parking lot. **The campus parking lots are pay lots from 7 am to 5 pm Monday through Friday.** Parking permits are available from automated kiosks in the lots and from the Parking Services office in Adams Hall. The full-day price is \$5.

Cascade Chapter Officers:

President:	Marge Slauson
President-Elect:	Howard Wallace
Secretary:	Philip Campbell
Treasurer:	Mike Zittle
Member-at-Large:	William Tuttle

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