

Colby D. Mangini, Ph.D., CHP

Independent Consultant

Education

Ph.D., Radiation Health Physics, Oregon State University, 2012

Masters of Health Physics, Oregon State University, 2008

B.S., Summa Cum Laude, Physics, Allegheny College, 2004

Professional Experience

Independent Consultant

(2017-present)

Health physics consulting with Risk Assessment Corporation (RAC) beginning May 2017. Contributions will be made in radioactive contaminant transport modeling, dose reconstruction, and other areas of environmental risk assessment.

St. Jude Children's Research Hospital

Radiation Safety Officer (2014-2017)

Organized and administered a comprehensive Radiation Safety Program for research laboratories and clinical facilities, which included: a Hitachi 230 MeV proton synchrotron, an IBA cyclotron with 18 MeV protons and 9 MeV deuterons, tritium labeling facility with a manifold loaded with 100 curies of H-3, a High Dose Rate (HDR) brachytherapy unit with Iridium-192 sources, and biomedical research and clinical laboratories with nearly 100 primary investigators. Managed a 10 CFR part 37 compliance program for Category 1 quantities of radioactive material. Developed, implemented, and maintained an effective radiation safety training program for both research and clinical users of radioactive material and radiation-producing equipment. Managed radiation safety staff to meet individual performance levels and divisional operational objectives.

Knolls Atomic Power Laboratory

Principal Scientist (2012-2014)

Investigated observed abnormalities with Naval Reactors' personnel dosimetry system through the use of Monte Carlo computational models. Performed technical reviews for new reactor design concepts in which shipboard dosimeter results could be used to assess and evaluate reactor shielding design objectives. Designed and executed laboratory experiments to validate anticipated dosimeter responses. Lead the Laboratory's Medical Decontamination Facility in support of Emergency Preparedness efforts. Provided Technical Training support as an initial assignment to the Laboratory. Responsible for administering current technical training curricula and integrating training and knowledge management initiatives throughout the

laboratory. Interfaced across the laboratory's technical business areas to identify training opportunities and implemented new technical training programs that support the engineering and science communities.

Oregon State University School of Nuclear Engineering and Radiation Health Physics

Graduate Research Assistant (2010-2012)

Developed an innovative beta-particle physics model for use in Nuclear Regulatory Commission (NRC) licensed skin dosimetry software through extensive programming in scripting, numeric and scientific computing, and radiation particle transport languages. Automated the input file writing, simulation execution, output parsing, and data analysis of over 15,000 Monte Carlo simulations. Reprogrammed FORTRAN source codes to incorporate novel and complex computational techniques for charged particle dosimetry. Influenced the research efforts of Masters Degree students, as well as undergraduates, in an effort to complete NRC funded work by the delivery date. Presented research findings at professional society national conferences. Worked on digital radiation detection systems using VHDL programmed FPGA devices. Selected to teach numerous undergraduate and graduate level courses in the NERHP department, including: Nuclear and Radiation Physics I and II, Nuclear Radiation Detection and Measurement, and Advanced Radiation Detection and Measurement.

Pacific Northwest National Laboratory

National Security Ph.D. Intern (2010)

Worked independently on atmospheric transport modeling in support of the Comprehensive Nuclear Test-Ban Treaty verification regime and the Automated Radioxenon Sampler and Analyzer (ARSA). Automated the modeling tool HYSPLIT (Hybrid Single Particle Lagrangian Integrated Trajectory) to provide real-time daily executions of backwards/forwards tracking simulations for 80 different International Monitoring System radionuclide stations. Completed assigned work by collaborating with other National Security interns using iterative and incremental code development techniques. Identified failure points of the modeling process and provided timely coding solutions.

Puget Sound Naval Shipyard

Health Physicist (2009-2010)

Engineered safety procedures for Radiographic Non-Destructive Testing Division and provided oversight to ensure compliance. Implemented REM reduction efforts associated with temporary shielding installation and nuclear functional areas.

United States Navy

Lieutenant, Nuclear Power School Instructor (2005-2009)

Awarded Master Training Specialist designation by the United States Navy, having trained more than 500 enlisted personnel in the following courses: Radiological Controls, Water Chemistry, Materials, and Heat Transfer and Fluid Flow. Promoted to Senior Instructor of Radiological Controls Division. Directed work of 8 junior officer and senior enlisted instructors while coordinating the successful training of over 300 new students every 4 months. Facilitated Applied Health Physics training to instructors on radiation detection and measurement, radioactive contamination control equipment and methods, airborne radioactivity measurement equipment and methods, and ALARA methods. Wrote detailed reports analyzing root cause and trend analysis for program attrition. Provided technical training to enlisted sailors on radiological release and decontamination procedures. Developed and revised over 1000 pages of training manuals, technical procedures, and reports for improved radiological controls training.

Honors

Outstanding Doctoral Dissertation Award in 2012
Inducted into Alpha Nu Sigma Honor Society in 2011
Selected as Achievement Rewards for College Scientists (ARCS) Fellow in 2010
Awarded Master Training Specialist (U.S. Navy) designation in 2007
Recipient of the Richard L. Brown Physics Prize in 2004
Inducted into Phi Beta Kappa Honor Society in 2003

Affiliations

American Academy of Health Physics since 2014
Health Physics Society since 2007
-Board Member: Medical Health Physics Section since 2016

Courses Taught and Offered

The 2nd International RAMP VARSKIN Workshop. Nuclear Regulatory Commission and Atomic Energy Council (of Taiwan). Taipei, Taiwan. April 24-28, 2017

The 1st International RAMP VARSKIN Workshop. Nuclear Regulatory Commission and National Nuclear Regulator (of South Africa). Pretoria, South Africa. May 16-20, 2016

Advanced Radiation Detection and Measurement (NERHP 536). Oregon State University. Corvallis, OR. Summer 2012

Radiation Detection and Measurement (NERHP 236). Oregon State University. Corvallis, OR. Spring 2012

Nuclear and Radiation Physics II (NERHP 235). Oregon State University. Corvallis, OR. Winter 2012

Advanced Radiation Detection and Measurement (NERHP 536). Oregon State University. Corvallis, OR. Summer 2011

Nuclear and Radiation Physics I (NERHP 234). Oregon State University. Corvallis, OR. Fall 2011

Enlisted Heat Transfer and Fluid Flow. U.S. Navy Nuclear Power School. Charleston, SC. 2005-2007.

Enlisted Chemistry, Materials, and Radiological Fundamentals. U.S. Navy Nuclear Power School. Charleston, SC. 2007-2009.

Presentations and Publications

Mangini, C.D.; Hamby, D.M. Scaling Parameters for Beta Dosimetry. *Rad. Prot. Dosimetry*. January 7, 2016

Mohaupt, T.H.; Thuo, K.; **Mangini, C.D.;** Farr, J. Air, Coolant, Beam Bock, and Concrete Shield Activation in a Proton Therapy Center. *Proceedings of the 60th Annual Meeting of the Health Physics Society*. Indianapolis, IN. Health Physics. July 12-16, 2015

Mangini, C.D., Beta-Particle Backscatter Factors and Energy-Absorption Scaling Factors for Use with Dose-Point Kernels. *Oregon State University Doctoral Dissertation*. Oregon State University. Available at: <https://ir.library.oregonstate.edu/xmlui/handle/1957/35364>

Mangini, C.D.; Caffrey, J.A.; Hamby, D.M. Beta-Particle Backscatter Factors and Energy-Absorption Scaling Factors for Use with Dose-Point Kernel Models. *Proceedings of the 58th Annual Meeting of the Health Physics Society*. Madison, WI. Health Physics. July 7-11, 2013.

Mangini, C.D.; Caffrey, J.A.; Hamby, D.M. Determination of Beta Dose-Point-Kernels for High-Z Sources in Non-homogeneous Geometries. *Proceedings of the 57th Annual Meeting of the Health Physics Society*. Sacramento, CA. Health Physics. July 22-26, 2012.

Mangini, C.D.; Hamby, D.M. Determination of Beta-Particle Dose-Point-Kernels for High-Z Sources Typical in Hot Particle Skin Dosimetry. *Spring Meeting of the Cascade Chapter of the Health Physics Society*. Corvallis, OR. May 4, 2012.

Mangini, C.D.; Caffrey, J.A.; Farsoni, A.T.; Hamby, D.M. A Signal Pulse Processor for Multi Component Signals. *The 44th Annual Midyear Meeting of the Health Physics Society*. Charleston, SC. February 6-9, 2011.

Caffrey, J.A.; **Mangini, C.D.**; Farsoni, A.T.; Hamby, D.M. A Phoswich Detector for Simultaneous Beta and Gamma Spectroscopy. *The 44th Annual Midyear Meeting of the Health Physics Society*. Charleston, SC. February 6-9, 2011.

Technical Reports

Hamby, D.M.; **Mangini, C.D.**; Caffrey, J.A.; Tang, M. VARSKIN 5: A computer code for skin contamination dosimetry. Nuclear Regulatory Commission. Office of Nuclear Regulatory Research. Rockville, MD: Report No. *NUREG/CR-6918, Rev. 2*; July 2014.