

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). Contribute to a consulting team specializing in radioactive contaminant transport modeling, dose reconstruction, and other areas of environmental risk assessment. Serve as the team's expert on environmental and nuclear regulations as well as the primary GoldSim modeler on performance assessment work for low-level radioactive waste disposal facilities and RCRA landfills.

Renaissance Code Development, LLC

Director, Software Development (2018-present)

Specialize in radiological health and safety software development by providing state-of-the-art computational tools for public, worker, and environmental protection. Serve as subject matter expert on two Nuclear Regulatory Commission contracts: (1) revisions to Regulatory Guide 8.39 and development of a regulatory guide for emergent medical licensing, and (2) maintenance and upgrades to VARSKIN, a compliance-based skin dosimetry computer code.

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 of six to meet individual performance levels and divisional operational objectives.

Knolls Atomic Power Laboratory (DOE L Clearance)

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. Led the Laboratory's Medical Decontamination Facility in support of Emergency Preparedness efforts.

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. 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.

Puget Sound Naval Shipyard, Bremerton, WA (DOE L Clearance)

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. 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.

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

Select Courses and Presentations

Mangini, C.D.; VARSKIN+ Training: SkinDose, NeutronDose, EyeDose, and WoundDose Modules. 2021 Fall Users Virtual Meeting. Nuclear Regulatory Commission. Rockville, MD. October 25 – November 4, 2021.

Mangini, C.D.; Electron Dosimetry Training: VARSKIN 6. 2019 Fall Users Group Meeting. Nuclear Regulatory Commission. Rockville, MD. October 28 – November 1, 2019.

Mangini, C.D.; Nasal Cavity Dose Estimates Using VARSKIN and MCNP6. 2019 Fall Users Group Meeting. Nuclear Regulatory Commission. Rockville, MD. October 28 – November 1, 2019.

Mangini, C.D.; Shallow Dose Estimates Using EGS and MCNP. The 4th Annual RAMP User's Meeting. Nuclear Regulatory Commission. Ottawa, Ontario. October 29 - 30, 2018.

- Mangini, C.D.; VARSKIN Examples, Training Modules, Dosimetry Theory. The 4th Annual RAMP User's Meeting. Nuclear Regulatory Commission. Ottawa, Ontario. October 29 - 30, 2018.
- The 3rd International RAMP VARSKIN Workshop. Nuclear Regulatory Commission and Federal Authority for Nuclear Regulation (of UAE). Abu Dhabi, UAE. March 25-29, 2018
- Mangini, C.D.; Shallow Dose Estimates Using EGS and MCNP. The 3rd Annual RAMP User's Meeting. Nuclear Regulatory Commission. Rockville, MD. October 15 - 20, 2017.
- Mangini, C.D.; New in VARSKIN 6. The 3rd Annual RAMP User's Meeting. Nuclear Regulatory Commission. Rockville, MD. October 15 - 20, 2017.
- Mangini, C.D.; Case Study: 2008 Region IV Eye Dosimetry. The 3rd Annual RAMP User's Meeting. Nuclear Regulatory Commission. Rockville, MD. October 15 - 20, 2017.
- Mangini, C.D.; VARSKIN Electron Dosimetry. The 3rd Annual RAMP User's Meeting. Nuclear Regulatory Commission. Rockville, MD. October 15 - 20, 2017.
- The 2nd International RAMP VARSKIN Workshop. Nuclear Regulatory Commission and Atomic Energy Council (of Taiwan). Taipei, Taiwan. April 24-28, 2017
- Environmental Risk Assessment and Analysis, Training Course H-420. Training Course H-420 prepared and presented by Risk Assessment Corporation for the U.S. Nuclear Regulatory Commission at the NRC Professional Development Center, Three White Flint North, Maryland. May 8–12, 2017. 22 attendees.
- The 1st International RAMP VARSKIN Workshop. Nuclear Regulatory Commission and National Nuclear Regulator (of South Africa). Pretoria, South Africa. May 16-20, 2016

Select Publications

- O'Doherty, J., **Mangini, C.**, Hamby, D., Boozer, D., Singh, N., Hippelainen, E. Radiation dosimetry of nasally administered PET agents using Monte Carlo simulations. submitted to *Medical Physics*. October 2020. Accepted
- Rood, A.S., H.A. Grogan, H.J. Mohler, J.R. Rocco, E.A. Caffrey, **C. Mangini**, J. Cartwright, T. Mathews, C. Shaw, M.E. Packard, and J.E. Till, 2020. "Use of Routine Environmental Monitoring Data to Establish A Dose-Based Compliance System for a Low-Level Radioactive Waste Disposal Site." *Health Physics*, DOI: 10.1097/HP.0000000000001116.
- Caffrey, E.A., **Mangini, C.D.**, Rood, A.S., Grogan, H.A., Mohler, J.H., Rocco, J.R., Till, J.E., Cartwright, J., Shaw, C., and Matthews, T. 2019. Implementation of a Dose-based Compliance System for WCS. *Waste Management Symposia 2019*. Phoenix, AZ. 3–7 March.
- 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.;** Luitjens, J.M.; Boozer, D.L.; Tucker, Z.G.; Rose, C.T.; Flora, R.S. VARSKIN+ 1.0: A computer code for skin contamination and dosimetry assessments. Office of Nuclear Regulatory Research. Nuclear Regulatory Commission. Washington, DC: Report No. NUREG/CR-6918, Rev. 4. July 2021.

Hamby, D.M.; **Mangini, C.D.** VARSKIN 6: A computer code for skin contamination dosimetry. Office of Nuclear Regulatory Research. Nuclear Regulatory Commission. Washington, DC: Report No. NUREG/CR-6918, Rev. 3; final printing. April 2018.

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.