

# *Oregon Medical Physics Program*

# *Graduate Student Handbook*

## *Academic Year 2015-2016*

### A note from the Director:

Welcome to the Oregon Medical Physics Program – a joint graduate program in medical physics between Oregon Health & Science University (OHSU) and Oregon State University (OSU).

This handbook is intended to help you get settled and answer some of the questions you might have as a new graduate student in our program. If, after reading the contents, you have unanswered questions, please feel free to ask for help. The staff, faculty, and fellow graduate students are available and willing to help solve any issues as they arise.

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm>

Additional information on deadlines, procedures and requirements is provided by the current Oregon Health & Science University Graduate Handbook which may be found here:

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Student-handbook-2015-16.pdf>

Graduate students in the Oregon Medical Physics Program (OMPP) are responsible for complying with the rules of the University, the School of Medicine, and the Program. Policies, deadlines, and other pertinent items can be found at:

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm>

In some instances, the requirements of the Program are more restrictive than those of the School of Medicine. *In such cases, the departmental and programmatic requirements specified in this document will apply.*

The program requirements that an OMPP student must satisfy for the degree are those contained in the version of the handbook that is current at the time of your matriculation into the medical physics program.

The student and graduate advisor should consult the correct handbook version for appropriate guidelines.

The faculty hopes that your time in the OMPP will be rewarding, memorable, and the beginning of a fruitful career in the medical physics field.

-Dr. Krystina M. Tack

# ***OHSU Office of Graduate Studies***

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Student-handbook-2015-16.pdf>

This office supports graduate program activities including admissions, progression and degree completion. The office is located in the Dean's Office for the School of Medicine on the fourth floor of Mackenzie Hall.

Phone: 503-494-6222; E-mail: [somgrad@ohsu.edu](mailto:somgrad@ohsu.edu)

## ***Office Staff***

Associate Dean for Graduate Studies: Allison Fryer, PhD

Program Manager: Rick Goranflo, Ed.M. | [goranflr@ohsu.edu](mailto:goranflr@ohsu.edu)

Administrative Coordinator and CONJ Course Support: Brenda Donin | [doninb@ohsu.edu](mailto:doninb@ohsu.edu)

Admissions Coordinator: Lorie Gookin | [gookinl@ohsu.edu](mailto:gookinl@ohsu.edu)

Administrative Coordinator: Rita Rand | [randr@ohsu.edu](mailto:randr@ohsu.edu)

PMCB Program Coordinator: Crystal Paredes | [paredes@ohsu.edu](mailto:paredes@ohsu.edu)

MD/PhD Program Coordinator: Johanna Colgrove | [colgrovj@ohsu.edu](mailto:colgrovj@ohsu.edu)

Director of Professional Development Center: Jackie Wirz, PhD | [wirzj@ohsu.edu](mailto:wirzj@ohsu.edu)

## ***Program Contact List***

A full list of current contacts for each program can be found at:

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/contact.cfm>

# *OHSU Graduate Council*

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Student-handbook-2015-16.pdf>

The Graduate Council oversees all graduate programs in the School of Medicine and advises the Dean on all matters related to graduate education. These include but are not limited to, transfer of credits, transfer of programs, setting stipend levels, program evaluations, course evaluations, new program and new course approvals. The Associate Dean for Graduate Studies convenes the Council, which includes faculty representatives from all graduate programs and two student representatives selected by the Graduate Student Organization (see listing below).

The Council meets monthly from September to June.

<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Graduate-Council-Bylaws-2015.pdf>

Meeting minutes are regularly posted on the Graduate Council website at <https://o2.ohsu.edu/school-of-medicine/faculty/faculty-affairs/grad-council.cfm>

<b>Graduate Program</b>	<b>Representative</b>	<b>Email</b>	<b>Phone</b>
<b>Behavioral Neuroscience</b>	Suzanne Mitchell	mitchesu@ohsu.edu	503-494-1650
<b>Biochemistry &amp; Molecular Biology</b>	David Farrens	farrensd@ohsu.edu	503-494-0583
<b>Biomedical Engineering</b>	Owen McCarty	rmccartyo@ohsu.edu	503-418-9307
<b>Biostatistics Program</b>	Jodi Lapidus	lapidusj@ohsu.edu	503-494-1167
<b>Cancer Biology</b>	Matt Thayer	thayerm@ohsu.edu	503-494-2447
<b>Cell &amp; Developmental Biology</b>	Philip Copenhaver	copenhav@ohsu.edu	503-494-4646
<b>Clinical Research</b>	Cynthia Morris	morrisc@ohsu.edu	503-494-3262
<b>Computer Science &amp; Engineering</b>	Peter Heeman	heeman@ohsu.edu	503-346-3755
<b>Division of Management</b>	Niki Steckler	steckler@ohsu.edu	503-346-0366
<b>Electrical Engineering</b>	Peter Heeman	heeman@ohsu.edu	503-346-3755
<b>Environmental &amp; Biomolecular Systems</b>	Brad Tebo	tebob@ohsu.edu	503-346-3438

<b>Graduate Program in Human Nutrition</b>	Diane Stadler	stadlerd@ohsu.edu	503-494-4959
<b>M.D.-Ph.D. Program</b>	David Jacoby	jacobyd@ohsu.edu	503-494-7692
<b>Medical Informatics &amp; Clinical Epidemiology</b>	Karen Eden	edenk@ohsu.edu	503-494-2456
<b>Molecular &amp; Medical Genetics</b>	Mike Liskay	liskaym@ohsu.edu	503-494-3475
<b>Molecular Microbiology &amp; Immunology</b>	Eric Cambronne	cambronn@ohsu.edu	503-418-0927
<b>Neuroscience Graduate Program</b>	Sean Molloy	molloyes@ohsu.edu	503-494-5238
<b>Physician Assistant Studies</b>	Ted Ruback	ruback@ohsu.edu	503-494-1411
<b>Physiology &amp; Pharmacology</b>	Robert Duvoisin	duvoisin@ohsu.edu	503-494-0497
<b>Program in Molecular &amp; Cellular Biosciences</b>	Cheryl Maslen	maslenc@ohsu.edu	503-494-2011
<b>Public Health &amp; Preventive Medicine</b>	William Lambert	lambertw@ohsu.edu	503-494-4998

# Faculty in the OMPP

## *Oregon Health & Science University Medical Physics Faculty*

### ***Richard Crilly***

*Associate Professor and Radiation Therapy Physicist*

B.S. Physics (1979), University of Saskatchewan, M.S. Biophysics (1987) University of Alberta (Edmonton), Ph.D. Medical Physics (1995), Wayne State University.

*Member of:* American Association of Physicists in Medicine (AAPM).

Certified by ABMP in Radiation Oncology (American Board of Medical Physics).

*Fields of interest:* Small Field Dosimetry, Ion Chamber Design, Helical Tomotherapy Planning, Helical Tomotherapy QA.

### ***Thomas Griglock***

*Assistant Professor and Chief Diagnostic Imaging Physicist*

B.S. Physics (2003), University of Scranton; M.S. Physics (2005), Lehigh University; M.S. Medical Physics (2009), University of Florida; Ph.D. Medical Physics (2012), University of Florida.

*Member of:* American Association of Physicists in Medicine (AAPM). Diplomate, American Board of Radiology (DABR®). Eagle Scout.

*Fields of interest:* Computed Tomography Dosimetry, practical approaches to radiation dose management.

### ***Wolfram Laub***

*Associate Professor and Director of Medical Physics, Radiation Medicine*

M.S. Physics (1995), Eberhard-Karls-Universitat Tubingen, Germany, Ph.D. Physics, Eberhard-Karls-Universitat Tubingen, Germany, MBA (2007), George Fox University.

*Member of:* American Association of Physicists in Medicine (AAPM), European Society of Therapeutic Radiology and Oncology (ESTRO), American Society for Radiation Oncology (ASTRO), Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM), editorial board of Radiation Oncology, manuscript reviewer for Medical Physics and Physics in Medicine and Biology. Certified by ABMP in Radiation Oncology (American Board of Medical Physics).

*Fields of interest:* Monte-Carlo dose calculations, Intensity modulated arc therapy QA, in-vivo electronic portal imaging dosimetry.

### ***Susha Pillai***

*Assistant Professor and Radiation Therapy Physicist.*

M.S. Physics (1996), M.G. University, Kerala, India, M.S. Nuclear Engineering (1999), University of Missouri-Columbia.

*Member of:* American Association of Physicists in Medicine (AAPM), American Society of Therapeutic Radiology and Oncology (ASTRO). Diplomate of the American Board of Radiology (DABR®).

*Fields of interest:* Developing innovative treatment delivery techniques, Heterogeneity correction algorithms for treatment planning systems, In Vivo dosimetry, Intraoperative Radiation Therapy, Total Marrow Irradiation.

***Lindsay DeWeese (Sinclair)***

*Assistant Professor and Diagnostic Imaging Physicist.*

B.S. Nuclear Engineering (2007), University of Florida; M.S. Nuclear Engineering (2009), University of Florida; Ph.D. Medical Physics (2013), University of Florida.

*Member of:* American Association of Physicists in Medicine (AAPM).

*Fields of interest:* Computed Tomography Dosimetry.

***Krystina Tack***

*Director of Medical Physics and Assistant Professor, Diagnostic Radiology*

B.S. Pre-Medicine (2002), Oregon State University. M.S. Radiation Health Physics (2006), Oregon State University. Ph.D. Medical Physics (2010), University of Texas Health Science Center at San Antonio. Diplomate of the American Board of Radiology (DABR®).

*Member of:* American Association of Physicists in Medicine (AAPM), American Brachytherapy Society (ABS), American Society for Radiation Oncology (ASTRO), Society of Directors of Academic Medical Physics Programs (SDAMPP).

*Fields of interest:* prostate brachytherapy, high dose rate (HDR) brachytherapy, clinical trials (correlation of dosimetry with clinical outcomes).

***James Tanyi***

*Associate Professor and Radiation Therapy Physicist.*

B.S. Physics (with Distinction), United States Naval Academy, M.S.E. Nuclear Engineering and Radiological Sciences (2002), Ph.D. Medical Physics (2005), University of Texas Health Science Center at San Antonio.

*Member of:* American Association of Physicists in Medicine (AAPM), European Society of Therapeutic Radiology and Oncology (ESTRO), American Society for Radiation Oncology (ASTRO), American Association for Cancer Research, Radiological Society of North American (RSNA), Golden Key International Honor Society, Alpha Nu Sigma Society, American Nuclear Society (ANS), International Foreign Language Honor Society (Phi Sigma Iota), National Physics Honor Society (Sigma Pi Sigma). Diplomate, American Board of Radiology (DABR®).

*Fields of interest:* Non-invasive methods of treatment response detection, motion correction in radiotherapy, stereotactic image-guidance, and deformable image registration (DIR) for adaptive radiotherapy (ART).

***Charles Thomas***

*Professor and Chairman Department of Radiation Oncology OHSU.*

B.A. Biology (1979), Dartmouth College, M.D. Education Medicine (1985), Dartmouth College, Internal Medicine Residency (1988), University of Illinois, Fellowship Medical Oncology (1991), Baylor College of Medicine, Residency Radiation Oncology (1997), University of Washington.

*Member of:* AACR Radiation Oncology Subcommittee, Editorial Board of Gastrointestinal Cancer Research (GCR), Oral Examiner for the American Board of Radiology (ABR), American Society for Radiation Oncology (ASTRO).

*Fields of interest:* Combined-modality clinical trials.

***Junan Zhang***

*Assitant Professor and Radiation Therapy Physicist.*

B.A. Electrical Engineering (1998), Tsinghua University, Beijing M.S. Electrical Engineering (2002), University of California, San Diego, Ph.D. Electrical Engineering (2005), University of California, San Diego, PostDoc Radiation Physics (2007), Duke University Medical Center, Residency Radiation Physics (2009), Duke University Medical Center.

*Member of:* American Association of Physicists in Medicine (AAPM). Diplomate, American Board of Radiology (DABR®).

*Fields of interest:* improving image quality and reduction of dose in 3D and 4D CBCT, improving spatial resolution of IMRT and RapidArc quality assurance.

## ***OHSU Clinical Teaching Faculty***

***Monica Kishore***

*Staff Radiation Therapy Physicist*

B.S. Physics (2009), Haverford College, M.S. Medical Physics (2011), Duke University. Completed Radiation Therapy Physics Residency at Oregon Health & Science University in 2013.

*Member of:* American Association of Physicists in Medicine (AAPM), American Society of Therapeutic Radiology and Oncology (ASTRO).

## ***OSU School of Nuclear Science and Engineering Faculty***

***Abi T. Farsoni***

*Associate Professor.*

B.S. Applied Physics (1992), University of Tehran; M.S. Nuclear Engineering (1999), Sharif University of Technology; Ph.D. Radiation Health Physics (2006), Oregon State University. Esfahan Nuclear Technology Center (1992-2000). Radionuclide expert, National Nuclear Security Administration (2005-present). At Oregon State University since 2006.

*Fields of interest:* health physics, neutron activation analysis, radiation detection and spectroscopy, advanced digital readout electronics, digital signal processing, nuclear detection systems for homeland security.

***David M. Hamby***

*Professor.*

B.S. Physics (1984), Mercer University; M.S. Health Physics (1986), Ph.D. Health Physics (1989), University of North Carolina. Environmental Transport Section, Savannah River Laboratory (1989-1994); Assistant Professor, University of Michigan School Public Health (1994-1999); Faculty Appointee, Argonne National Laboratory (1995-present); Associate Editor, Health Physics (1996- present); Editorial Advisory Board, Environmental Monitoring and Assessment (1999-present); Technical Expert, International Atomic Energy Agency (IAEA) in Lithuania (1998); scientific committee member, National Council on Radiation Protection (NCRP). Member, National Health Physics Society, Radiation Research Society; Fulbright

Scholar awardee. Funded by the Department of Energy, the Nuclear Regulatory Commission, the Centers for Disease Control and Prevention, NATO, and the U.S. Civilian Research and Development Foundation. At Oregon State University since 1999.

*Fields of interest:* radiation dose assessment, skin dosimetry, radiation instrumentation, environmental health physics, environmental transport, fate and transport model analysis, beta spectroscopy, radiation risk.

***Kathryn A. Higley***

*Head, Department of Nuclear Engineering and Radiation Health Physics; Professor.*

B.A. Chemistry (1978), Reed College; M.S. Radiological Health Sciences (1992), Ph.D. Radiological Health Sciences (1994), Colorado State University. Environmental radiation monitoring (1976-1979), Trojan Nuclear Power Plant; Environmental Health Physicist (1980-1989), Battelle Pacific Northwest Laboratory. Consultant to U.S. Department of Energy's Office of Environment, Safety and Health, Pacific Northwest National Laboratory, and Argonne National Laboratory. Member, Health Physics Society, International Union of Radioecologists, BIOMOVs II (Biospheric Model Validation Study). President, Environmental Section Health Physics Society (1998-1999), NCRP Scientific Committees, Member, ABHP Panel of examiners. Elda E. Anderson Award Winner (1995). Certified Health Physicist. At Oregon State University since 1994.

*Fields of interest:* human and ecological risk assessment, environmental pathway analysis, environmental radiation monitoring, radionuclide and hazardous chemical transport, radiochemistry, neutron activation analysis, nuclear emergency response planning, and environmental regulations.

***Andrew C. Klein***

*Professor.*

B.S. Nuclear Engineering (1977), Pennsylvania State University; M.S. Nuclear Engineering (1979), Ph.D. Nuclear Engineering (1983), University of Wisconsin. Editor-Designate, Nuclear Technology, (2013-present); Director, Educational Partnerships, Idaho National Laboratory, Idaho Falls, ID, on loan from Oregon State University, (2005-2009); Board of Directors, American Nuclear Society, (2000-2003 and 2012-2015); Board of Managers, Battelle Energy Alliance/Idaho National Laboratory, (2011-2013); Member, National Nuclear Accrediting Board, Institute for Nuclear Power Operations, Atlanta, GA, (2010-present); Member, Board of Directors, Foundation for Nuclear Studies, Washington, DC, (2009 present); Member, Space Science Advisory Committee, National Aeronautic and Space Administration (2003-2006); Nuclear Energy Research Advisory Committee, U.S. Department of Energy (2001-2005); William C. Foster Fellow U.S. Arms Control and Disarmament Agency (1996); Department Head, Department of Nuclear Engineering and Radiation Health Physics, Oregon State University (1996-2005); Director, Radiation Center, Oregon State University (2002-2005); Director, Oregon Space Grant Program (1993-2002). Consultant to INL, PNNL, LLNL, ANL, and Thermacore, Inc. Member, American Nuclear Society, Health Physics Society, American Society for Engineering Education, Alpha Nu Sigma, Tau Beta Pi. Registered Professional Engineer (Nuclear). At Oregon State University since 1985.

*Fields of interest:* Nuclear Systems Analysis and Design, Space Applications of Nuclear Technology, Radiation Shielding and Health Physics.



**Wade R. Marcum**

*Assistant Professor.*

B.S. Mechanical Engineering (2006), M.S. Nuclear Engineering (2008), Ph.D. Nuclear Engineering (2010) Oregon State University. Faculty Advisor, American Nuclear Society (2011-2014). Faculty Advisor, Alpha Nu Sigma Honor Society. Member, American Nuclear Society, American Society of Mechanical Engineers. Editorial Board Member, Journal of Nuclear Energy Science & Power Generation Technology. Currently Funded by Department of Energy, National Nuclear Security Administration, the Nuclear Regulatory Commission, the International Atomic Energy Agency, and the Idaho National Laboratory. At Oregon State University since 2010.

*Fields of interest:* experimental and computational thermal hydraulics, reactor safety, multi-physics experimentation and computation, fluid structure interactions, hydro-mechanics, and computational fluid dynamics.

**Todd S. Palmer**

*Professor.*

B.S. Nuclear Engineering (1983), Oregon State University; M.S. Nuclear Engineering (1989), Ph.D. Nuclear Engineering and Scientific Computing (1993), University of Michigan. Physicist, Defense Sciences, Lawrence Livermore National Laboratory (1991-1994). Consultant to Lawrence Livermore National Laboratory, Pacific Northwest National Laboratory, Siemens Nuclear Power Corporation. Member, American Nuclear Society. Loyd Carter College of Engineering Teaching Award (2001). Research funding from Department of Energy, Lawrence Livermore National Laboratory, Argonne National Laboratory-West, Pacific Northwest National Laboratory, Portland General Electric, and Nuclear Regulatory Commission. At Oregon State University since 1995.

*Fields of interest:* numerical techniques for particle transport and diffusion, computational fluid dynamics, reactor physics, general numerical methods, nuclear criticality safety, Monte Carlo methods, transport in stochastic mixtures.

**Alena Paulenova**

*Associate Professor. Director of Laboratory of Transuranic Elements.*

Ph.D. Physical Chemistry (1985) Moscow/ Kharkov State University; M.S. Radiochemistry (1991), Comenius University. INEST Fuel Cycle Core Committee member (2009-2013); Joint faculty in Idaho National Laboratory with the Radiochemistry and Aqueous Separation Division (2008-). International Advisory Board for the Global 2013 conference, Conference on Separation of Ionic Solutes (2003-present); General Manager, “Foundation Curie” (1996-2000); Executive Secretary of International Conferences: “Cyclotron Produced Radiopharmaca” (1997) and NATO AIW workshop “Applications of Natural Sorbents in Waste Treatment” (1998). Member of American Chemical Society: Division of Nuclear Chemistry and Technology and the ACS Nuclear Chemistry Summer School committee. Distinguished Member of Editorial Board of the Journal of Radioanalytical Nuclear Chemistry and Editorial Board of the International Journal of Nuclear Energy Science and Engineering; reviewer for Inorganic chemistry, Analytical chemistry, Environmental Science and Technology. At Oregon State University since 2003.

*Fields of interest:* Separation and speciation chemistry of actinides and fission products for: fuel cycle and waste forms; production and application of radiotracers, behavior and mobility of radionuclides in natural bio-geochemical systems; nano-radiochemistry in material science; radiation chemistry and post-irradiation processes.

**Steven R. Reese**

*Director, Radiation Center.*

B.S. General Science (1991), Oregon State University; Ph.D. Radiological Health Sciences (1997), Colorado State University. External dosimetry section (1991-1993), Battelle Pacific Northwest Laboratory; OSU Radiation Safety Office (1997-1998). Reactor Administrator (1998-2005), OSU Radiation Center. Director, OSU Radiation Center (2005-present). Member, Health Physics Society, American Board of Health Physicists, and American Nuclear Society. At Oregon State University since 1997.

*Fields of interest:* radiation protection, activation analysis, radiation shielding, neutron radiography and dosimetry.

**José N. Reyes, Jr.** (currently on assignment at NuScale Power Inc.)

*Professor; Henry W. and Janice J. Schuette Chair in Nuclear Engineering and Radiation Health Physics, Director, Advanced Thermal Hydraulics Research Lab.*

B.S. Nuclear Engineering (1978), University of Florida; M.S. Nuclear Engineering (1984), Ph.D. Nuclear Engineering (1986), University of Maryland. Research Engineer, and Project Manager, U.S. Nuclear Regulatory Commission. Member, USNRC International Code Assessment Program (since 1988); Chairman, ANS Thermal Hydraulic Division. Special Achievement Awards for Outstanding Contributions to the USNRC (1986 and 1987); Austin-Paul Engineering Faculty Award (1990). Thermal Hydraulic Expert, United Nations IAEA (1995). College of Engineering Research Award (1997). College of Engineering Carter Teaching Award (2000), Member, American Nuclear Society, American Society of Mechanical Engineers. Registered Professional Engineer (Nuclear). At Oregon State University since 1987.

*Fields of interest:* thermal hydraulics, multi-phase fluid flow, scaling analyses, ALWR Safety, fluid-structure interactions, reactor system design, and probabilistic risk assessment.

**Brian Woods**

*Professor.*

B.S. Mechanical Engineering (1988), University of Virginia, M.S. Nuclear Engineering (1999), Ph.D. Nuclear Engineering (2001), University of Maryland. Nuclear Safety Analyst, Dominion Energy (2000-2003). Consultant to Idaho National Laboratory, International Atomic Energy Agency. Member, American Nuclear Society. Chair, ANS Thermal Hydraulic Division (2011-2012). President, Alpha Nu Sigma Honor Society National (2009-2011). College of Engineering Research Award (2010). At Oregon State University since 2003.

*Fields of interest:* reactor thermal hydraulics, reactor safety, high-temperature gas reactor design, experimental fluid dynamics and heat transfer.

**Qiao Wu**

*Professor.*

B.S. Engineering Physics (1983), M.S. Engineering Physics (1985), Tsinghua University; Ph.D. Nuclear Engineering (1995), Purdue University. Assistant Professor, Engineering Physics, Tsinghua University (1985-1990). Research Associate, Nuclear Engineering, Purdue University (1995-1997). Member, American Nuclear Society Technical Exchange Delegation to China (1998); Visiting Scientist, Argonne National Laboratory (2001); Scientific Investigator,

International Atomic Energy Agency, United Nations (2004). Member, American Nuclear Society. Institute of Multifluid Science and Technology. Technical Reviewer, Science Center of US Department of State. Best Paper Award, ANS Thermal Hydraulics Division (1997). At Oregon State University since 1998.

*Fields of interest:* thermal hydraulics and reactor safety, reactor engineering and design, multi-phase flow and boiling heat transfer, ALWR and IFR stability and safety, thermal hydraulics instrumentation.

### ***Haori Yang***

*Assistant Professor.*

B.S. Engineering Physics (2001), M.S. Engineering Physics (2003), Tsinghua University; Ph.D. Nuclear Engineering and Radiological Sciences (2009), University of Michigan. Assistant Professor Assistant Professor, University of Utah (2011-2013). Research Scientist, Canberra Industries (2008-2010), At Oregon State University since 2013.

*Fields of interest:* non-destructive interrogation techniques, development of innovative radiation sensors, nuclear material detection, detectors for medical imaging, high-energy physics, and nondestructive testing, and general applications of nuclear engineering.

# Facilities

## *OHSU Radiation Medicine*

Radiation Oncology at OHSU consists of the main campus (Sam Jackson Park Road hospital – all new in 2007), and two satellite facilities. Under the OHSU umbrella, students have access to:

- Linacs:
  - 2 Elekta Versa HD
  - Elekta Infinity
  - Elekta Infinity (satellite campus)
- Mobetron IORT Linac
- Intrabeam IORT
- TomoTherapy
- Imaging / Localization / TP / RV Systems:
  - CBCT
  - Novalis (SRS) w/ Big Bore CT
    - Novalis Robotic Tabletop (Varian)
      - Exactrac (BrainLab)
  - Calypso Prostate Localization
  - Respiratory Gating
  - VisionRT Laser Scanning Patient Positioning System
  - Eclipse TPS – with Rapidarc license
  - Pinnacle TPS – with Smartarc license
  - Monaco (CMS) – with VMat license
  - iPlan TPS (BrainLab)
  - IMPAC RV (Mosaiq RBV)
- Treatment types include:
  - IMRT / Conventional / 3DCRT / EBT
  - SRS / SBRT
  - TBI
  - TSE
  - Novalis / Exactrac
  - Eye Plaques
  - LDR Seed Implants (permanent and temporary)
  - HDR
  - TomoTherapy
  - IORT (Mobetron, Intrabeam)

## *OHSU Diagnostic Radiology*

The Department of Diagnostic Radiology at OHSU consists of the main campus (Marquam Hill campus hospital and the Center for Health and Healing), and seven satellite facilities. Within these facilities, students have access to the following equipment:

- 14 general radiographic rooms (all DR)
  - with 12 utilizing wireless DR
- 6 radiographic & fluoroscopic rooms
- 6 interventional suites
  - including 2 bi-plan rooms and 5 utilizing flat-panel detectors (FPDs)
- 4 cardiac catheterization angiography suites
- 24 portable x-ray units
  - including 5 with wireless DR detectors
- 24 portable fluoroscopic units
  - including 4 with FPDs
- 8 diagnostic CT scanners (16-320 slice);
  - 5 with iterative reconstruction technology
  - 2 with iterative model based (IMR) technology
  - *This fleet includes a Toshiba Aquilion ONE Prime 320 slice CT and a Philips Brilliance iCT 256 slice.*
- 2 mobile head CT scanners
- 6 MRI scanners
  - two 3.0 Tesla magnets, three 1.5 Tesla magnets, and one open
- 22 diagnostic ultrasound units
- 3 full-field digital mammography units
  - one digital breast tomosynthesis (DBT) unit and one additional stereotactic breast biopsy (SBB) unit
- 2 PET/CT units
  - one with time-of-flight technology
- 1 SPECT/CT unit
- 2 gamma cameras with flat-panel cone-beam CT
- 2 C-arm interventional radiology units used for animal research at the Dotter Research Institute
- C-arm fluoroscopy and mobile CT used for animal research at the Oregon National Primate Research Center

## *OSU Nuclear Science and Engineering (NSE)*

The Department of Nuclear Engineering and Radiation Health Physics is housed in the Radiation Center, an instructional and research facility established specifically to accommodate research programs involving nuclear science and engineering, to provide a location for the use of radionuclides and ionizing radiation sources, and to provide sources of fast and thermal neutrons and gamma rays. Major facilities at the OSU Radiation Center include: a 1.1 MW TRIGA research reactor and associated facilities, including a rotating sample rack, a pneumatic transfer irradiation system, a thermal column, in-core irradiation tubes (with and without cadmium), and four beam port facilities; a cobalt-60 gamma-ray irradiator; state-of-the-art digital gamma-ray spectrometers and associated germanium detectors; and various radiochemistry laboratories.

The Department of Nuclear Engineering and Radiation Health Physics is equipped with state-of-the-art nuclear and radiation protection instrumentation and computing facilities. Computers include a number of PC and UNIX based workstations. The department's computers also provide access through networking to larger computers, such as supercomputing facilities, on and off campus. In addition to radiation facilities, there are laboratories dedicated to the investigation of other phenomena important to the study of Nuclear Science and Engineering, including a number of large-scale experimental test facilities. The major facilities and laboratories are:

### *1.1 MW TRIGA*

Mark II Pulsing Research Reactor is a water-cooled, swimming pool type of research reactor which uses uranium/zirconium hydride fuel elements in a circular grid array. The reactor is licensed by the U.S. Nuclear Regulatory Commission to operate at maximum steady state power of 1.1 MW, and can also be pulsed up to a peak power of about 3000 MW. The reactor has a variety of irradiation facilities available.

### *ATHRL*

Advanced Thermal Hydraulic Research Facilities incorporates two facilities: Advanced Plant Experiment (APEX), a three story test facility that assess the safety systems of Westinghouse's next generation of nuclear power plants (AP600, APEX-CE, and AP1000), and the Multi-Application Small Light Water Reactor (MASLWR) test facility, a Generation IV design concept. ATHRL offers excellent opportunities for student research and training in instrumentation, quality assurance, safety, operations, and nuclear and mechanical design.

### *ANSEL*

The Advanced Nuclear Systems Engineering Laboratory is the home to two major thermalhydraulic test facilities—the High Temperature Test Facility (HTTF) and the Hydro-mechanical Fuel Test Facility (HMFTF). The HTTF is a 1/4 scale model of the Modular High Temperature Gas Reactor. The vessel has a ceramic lined upper head and shroud capable of operation at 850°C (well mixed helium). The design will allow for a maximum operating pressure of 1.0MPa and a maximum core ceramic temperature of 1600°C. The nominal working fluid will be helium with a core power of approximately 600 kW (note that electrical heaters are used to simulate the core power). The test facility also includes a scaled reactor cavity cooling system, a circulator and a heat sink in order to complete the cycle. The HTTF can be used to simulate a wide range of accident scenarios in gas reactors to include the depressurized

conduction cooldown and pressurized conduction cooldown events. The HMFTF is a testing facility which will be used to produce a database of hydro-mechanical information to supplement the qualification of the prototypic ultrahigh density U-Mo Low Enriched Uranium fuel which will be implemented into the U.S. High Performance Research Reactors upon their conversion to low enriched fuel. This data in turn will be used to verify current theoretical hydro- and thermomechanical codes being used during safety analyses. The maximum operational pressure of the HMFTF is 600 psig with a maximum operational temperature of 450°F.

#### *TRUELAB*

Laboratory of Transuranic Elements is a state-of-art radiochemical research laboratory, equipped with a variety of instrumentation for characterization of actinides and fission products and their chemical reactivity with organic and inorganic ligands and evaluation of postirradiation changes in solutions: Vibrational spectroscopy (Nicolet Fourier Transformation Infrared and Raman and FTIR and Raman spectroscopy) which allow to characterization of solid and liquid samples, Microcalorimetry (quantification of chemical thermodynamics of studied processes); UV-Vis and NIR spectroscopy (speciation of irradiated solutions, complexation of actinides in aqueous and organic matrices) with the stop-flow cell and syringe titrator; Dionex Ion-exchange and Finnigan liquid chromatography, potentiometric titration, glove box, electrochemistry (cyclic voltammetry). Preparation of samples for LSC and alpha-and gamma spectrometry.

#### *Other Labs and Facilities*

Cobalt-60 Gamma Irradiator; Neutron Radiography facility; Neutron Activation facility, Gamma and Alpha Spectrometry laboratory; Liquid Scintillation Counter (LSC Perkin Elmer); Radiological Instrument Calibration facilities; Thermoluminescent Dosimetry systems; large inventory of radiation detection instrumentation; student computer laboratory; student nuclear instrumentation laboratory; green house and wet chemistry laboratories.

# ***Health Insurance***

OHSU's Student Health Insurance plan is with Aetna. All students are required to enroll in the health insurance plan unless they can prove comparable coverage elsewhere. Students who do waive out of the insurance must do so annually. Waiver forms can be found on the JBT Health & Wellness website. Any additional questions about waiving out of the insurance should be directed to Student Health Services: 503-494-8665 ext. 1.

<http://www.ohsu.edu/xd/education/student-services/joseph-trainer-health-wellness-center/>

For more information on health insurance requirements, please visit:

<http://www.ohsu.edu/xd/education/student-services/joseph-trainer-health-wellness-center/student-requirements/newstudents.cfm>

## ***Joseph B. Trainer Health & Wellness Center***

Oregon Health & Science University

Baird Hall Room 18

3181 S.W. Sam Jackson Park Road, Mail Code L-587

Portland, Oregon 97239

Phone: 503 494-8665

Fax: 503 494-2958

E-mail: [askshs@ohsu.edu](mailto:askshs@ohsu.edu)

<http://www.ohsu.edu/xd/education/student-services/joseph-trainer-health-wellness-center/>

The Joseph B. Trainer Health & Wellness Center wants to be your "medical home" providing routine outpatient care and counseling services to meet a wide variety of your health care needs. We are open Monday through Friday from 8:30 am until 4:30 pm and are located in room 18 (Primary Care) and room 6 (Counseling and Wellness Services) of Baird Hall. Services offered include primary care, well woman exams, contraception, STD screenings, travel medicine, immunizations, counseling and medication management. All registered full-time students in degree and certificate training programs that pay the required health fees in addition to their tuition at OHSU are eligible for health and counseling services at JBT. A student's spouse or domestic partner who is not enrolled at OHSU may also be seen at JBT if an additional Student Health Fee is assessed to the student's account.

A referral is required to see any health care provider outside of JBT, with the exception of women's health providers. There is no cost for a JBT visit, so this should be considered your primary care place and is always cheaper than seeking outside providers.

A Resource Fee fund is available to the School of Medicine basic science PhD graduate students for spouse/partner/family health insurance. Please contact the Graduate Studies Office for information and paperwork needed to enroll ([somgrad@ohsu.edu](mailto:somgrad@ohsu.edu)).



# ***Tuition & Fees***

## ***Registrar and Financial Aid Office***

If you need financial assistance to attend OHSU, please visit the Financial Aid Office in Mackenzie Hall. Federal aid applications are available beginning in December and should be received by the federal processor by March 1 to qualify for priority processing. Late applications are accepted, but funding may be exhausted in some programs. Additional information can be found in your school catalog and the OHSU publication, Student Financial Aid Explained, available in the Financial Aid Office.

The Registrar's Office services include registration for courses, grade reports and official transcripts. It is particularly important that students register for courses by the term deadlines listed in the academic calendar. The Registrar and Financial Aids office also receives requests for financial aid and deferral of student loans. It should be noted that many actions that affect student status are initiated at the program level before being officially recorded by the Registrar. These actions include change of grade, advancement to candidacy, request for oral exam and leave of absence. Graduate Studies Coordinators within each department can assist students with these procedures and other requests.

For important policy information on tuition and fees, please visit:

<http://www.ohsu.edu/xd/education/student-services/registrar/registration-information/tuition-fees/index.cfm>

The current academic year fee book can be found here:

[http://www.ohsu.edu/xd/education/student-services/registrar/registrar-forms/upload/2015-16-Feebook-Text\\_Final-3.pdf](http://www.ohsu.edu/xd/education/student-services/registrar/registrar-forms/upload/2015-16-Feebook-Text_Final-3.pdf)

Tuition information for the current academic year can be found here:

<http://www.ohsu.edu/xd/education/student-services/registrar/registrar-forms/index.cfm>

The current academic year tuition refund schedule can be found here:

<http://www.ohsu.edu/xd/education/student-services/registrar/registrar-forms/upload/Refund-Schedule-2015-16.pdf>

## ***Registration***

Registration for all courses takes place solely through the OHSU Registrar's Office. Enrollment in OSU-delivered courses will occur behind the scenes, (students will select a CRN in the OHSU system that reflects an OSU-based course).

# Course Information & Program Structure

At a minimum, students in the Medical Physics program are required to enroll in and pass the following courses (or be able to show equivalency). These courses should be taken in the order laid out below. *It should be noted that not all courses shown below are offered in every academic year.*

Medical Physics students will choose to pursue a track either in Radiation Therapy or in Diagnostic Imaging. Students begin taking track-specific courses in the fall of their second year of studies.

ALL 1st Year Medical Physics Students						
Term		Designation	Number	Major Core Course Title	Credits	School
Year 1 Fall	Required:	MP	531	Radiophysics (OSU eCampus)	3	OSU
		MP	521	Radiological Anatomy & Physiology	4	OHSU
		CONJ	650	Principles of Scientific Conduct	2	OHSU
		MP	507	Seminar Medical Physics	1	OHSU
Year 1 Winter	Required:	MP	570	Radiation Biology for Medical Physics	4	OHSU
		MP	541	Diagnostic Imaging Physics I	3	OHSU
		MP	561	Radiation Therapy Physics I	3	OHSU
Year 1 Spring	Required:	MP	535	Rad. Shielding & Ext. Dosimetry (OSU eCampus)	3	OSU
		MP	542	Diagnostic Imaging Physics II	3	OHSU
		MP	562	Radiation Therapy Physics II	3	OHSU
		MP	507	Journal Club	1	OHSU
Year 2 Summer	Required:	MP	545	Diagnostic Imaging Physics Practicum	3	OHSU
		MP	565	Radiation Therapy Physics Practicum	3	OHSU
		MP	536	Advanced Radiation Detection (OSU eCampus)	4	OSU

Key: Seminar / Journal Club - 3 total required

**Year 2 Medical Physics Students**  
**Seeking RADIATION THERAPY Concentration**

Term		Designation	Number	Major Core Course Title	Credits	School
Year 2 Fall	Required:	MP	563	Applied Radiation Therapy Physics Lab I	3	OHSU
		BSTA	511	Est. & Hyp. Testing for Applied Biostats	4	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU
Year 2 Winter	Required:	MP	564	Applied Radiation Therapy Physics Lab II	3	OHSU
		MP	507	Journal Club	1	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU
Year 2 Spring	Required	MP	537	Shielding	3	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU

Total Credits ≥ 60

**6 Thesis Credits Required to Graduate**

**Year 2 Medical Physics Students  
Seeking **DIAGNOSTIC IMAGING** Concentration**

Term/ Location		Designation	Number	Major Core Course Title	Credits	School
Y2 Fall	Required:	MP	543	Advanced Diagnostic Imaging Physics	3	OHSU
		BSTA	511	Est. & Hyp. Testing for Applied Biostats	4	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU
Y2 Winter	Required:	MP	544	Nuclear Medicine Imaging	3	OHSU
		MP	507	Journal Club / Seminar	1	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU
Y2 Spring	Required:	MP	537	Shielding	3	OHSU
	Optional:	MP	503	Thesis (need 6 or more credits)		OHSU
		MP	XXX	Research		OHSU

Total Credits ≥ 60

**6 Thesis Credits Required to Graduate**

The above courses are required for all Medical Physics degrees awarded by the OMPP (MS, MMP, PhD). *These courses satisfy the CAMPEP-required didactic elements of a graduate program in medical physics.*

# *PhD Requirements (in addition to above courses)*

Additional Requirements for those pursuing a PhD in Medical Physics from the OMPP (based on OSU NSE requirements):

## **COURSE OF STUDY**

1. The requirements for the doctorate include the following:
  - a. at least 108 graduate credits beyond the bachelor's degree;
  - b. at least 50% of the course work must be graduate stand-alone courses;
  - c. a presentation of an original dissertation for which a minimum of 36 credit hours of dissertation research (thesis course) has been accumulated;
  - d. a minimum of one year of residence, continuously, at OHSU (i.e., three consecutive quarters as a full-time student);
  - e. passing a preliminary oral examination in the major subject; and
  - f. successfully defending the dissertation in an oral presentation to a panel of experts.

For other regulations and policies, see the OHSU Graduate School website:  
<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm>.

2. In addition, OMPP (OHSU/OSU-NSE) requirements include:
  - a. passing a written qualifying examination for candidacy;
  - b. on assignment from the student's doctoral committee, taking and passing (B average or higher) such courses as judged desirable by the doctoral committee for satisfactory progress in doctoral research;
  - c. calling regular (every 6 months recommended, but at least annual) meetings of the Doctoral Committee so that the student's progress can be evaluated and guidance offered; and
  - d. preparation and presentation of a written dissertation proposal - this paper will include a thorough literature review, outline of the proposed research project, and a description of the importance of the research with a perspective on the current state of the area of specialty. This written dissertation proposal will be delivered to the student's committee a minimum of two weeks prior to the student's Preliminary Oral Examination.
3. As noted above, the student's principal direction in the course of study comes from the doctoral committee, in which the major professor has final approval. The OMPP and OSU-NSE faculty members on the doctoral committee will generally expect to see:
  - a. a minimum of 36 thesis credits; and
  - b. total course work credit of 72 hours or more, **not** including thesis. The minimum Graduate School requirement is 108 hours, including thesis/dissertation hours.

These, however, are guidelines and the doctoral committee can change them at its discretion.

# *Degree Process / Steps to Completion*

1. **Enroll** in (and successfully pass) required MP courses (listed above) with a B average or higher.
2. **Review OHSU graduate school policies and deadlines:**  
<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm>
3. **Select your research advisor.** (←this should happen within the first 6 months in the OMPP)
4. **Begin working on research project.**
  - a. (most students work for about 1 year on a research project while they complete their coursework / apply for residencies / etc.)
5. **Establish your research committee.** <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Master-Request-for-Thesis-Advisory-Committee-3-2015.pdf>
6. **Set the date for your Oral Examination.**  
<http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Oral-Examination-Request-Form-January-2012.pdf>
7. **Distribute your written thesis.** Thesis **MUST** be distributed to each committee member at least 2 weeks prior to scheduled defense date to give your committee ample time to review your work.
8. **Oral Examination.** <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/upload/Oral-Examination-Request-Form-January-2012.pdf>
9. **Submit all paperwork / written thesis to OHSU Graduate School in accordance with:** <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/students/upload/Guidelines-and-Regulations-revised-9-2010.pdf>
10. **Apply for Graduation.** (Note: each year there is a final defense date, after this date you will not be able to walk at graduation. Plan to defend prior to this date).

## *Guidelines and Regulations for Completion of Master's and Ph.D. Degree*

It is your responsibility to read it thoroughly and understand the guidelines and regulations for your specific degree type. Find it online here: <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm> and the detailed document at: <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/students/upload/Guidelines-and-Regulations-revised-9-2010.pdf>

## *Calendar & Deadlines*

It is important to be aware of and note dates and deadlines as you work toward your graduate degree. The current academic year calendar can be found here:

<http://www.ohsu.edu/xd/education/student-services/registrar/registration-information/academic-calendar/> Deadlines for this academic calendar can be found here:

[http://www.ohsu.edu/xd/education/student-services/registrar/registration-information/academic-calendar/deadlines\\_15-16.cfm](http://www.ohsu.edu/xd/education/student-services/registrar/registration-information/academic-calendar/deadlines_15-16.cfm)

## *Forms*

All forms can be found on the Student Portal.

<http://student.ohsu.edu>

## *Graduation*

### *Degree Award Dates*

OHSU awards diplomas for the term that degree requirements are completed. The degree requirements can be fulfilled at any time during the academic year. **Degrees will not be awarded** until all academic requirements have been met and the student pays all debts and discharges all other obligations. The academic requirements can be found in the Guidelines and Regulations for Completion of Master's and PhD Degrees online at <http://www.ohsu.edu/xd/education/schools/school-of-medicine/academic-programs/graduate-studies/admin-resources.cfm>

### *Commencement*

The Hooding and Commencement ceremony is held in early June each year. Graduate students who have applied for degree may participate in the event. Additional criteria will be sent to individual programs and communicated to students in the Spring.