

A low-angle shot of a woman lying down, looking up. She is wearing a radiation therapy mask. Above her, a traffic light is visible, with its lights blurred into a bokeh effect. The scene is dimly lit, with a blue and orange color palette.

the new face of
radiation oncology at OHSU



look how much we've



grown.

**First X-ray machine
in Oregon**

*Owned by George
Houck, M.D., of
Roseburg*

**First papers on
radiation therapy**

*(called "clinical
roentgenology")
presented at the
Oregon State
Medical Society*

**First X-ray services
at Multnomah
County Hospital,
forerunner of OHSU**

**Wantz Jr. X-ray machine
installed on Marquam Hill**

**Drs. Milton and Selma
Hyman arrive to direct
radiation therapy at the
University of Oregon Medical
School and Portland
Veterans Administration
Hospital** – *In 1956, the Hymans
began using the first Cobalt-60
machine on the West Coast
for skin and bone-sparing
deep tumor treatment. With
Irving Horowitz, M.D., another
pioneer in radiation therapy
and oncology, they cared for
patients from around Oregon
and the Northwest.*

1902

1903

1915

1921

1943

firsts for radiation oncology at OHSU

Ivan Woolley,
M.D. (UOMS class
of '19) publishes
*Roentgenology in
Oregon: The First
Fifty Years*

Radiation therapy
residency program
founded

Graduation of first
resident specializing
solely in radiation
therapy

*Today, the Department of
Radiation Medicine trains
six residents per year in
radiation oncology.*

Department of Radiation
Therapy/Oncology
established at UOMS

First independent department
of radiation oncology at a U.S.
medical school.

*Clifford Allen, M.D., was
chairman from 1967 to 1972.
Allen was influential in using
high-dose preoperative radiation
for rectal cancer in 1959, many
years before other departments
adopted it.*

1955

1964

1967

Department moves
into dedicated floor
on OHSU's South
Hospital

1972

1974

1981

1992

William T. Moss, M.D., becomes chairman

*While at OHSU, he continued to revise and edit his classic text *Radiation Oncology: Rationale, Technique, Results*.*

William T. Moss, M.D., receives the American Society for Radiation Oncology's Gold Medal.

He also received the American Radium Society's Gold Medal in 1990 and the St. George Medal in 1993. In 2006, he was inducted into the inaugural class of Fellows of the American Society of Therapeutic Radiology and Oncology.

Kenneth Stevens, M.D.,
becomes chairman

– 1992- 2005

(interim 1989-1992)

Department of Radiation Medicine moves
into Peter O. Kohler Pavilion

*The department occupies a 17,000-square-foot,
specially designed floor of OHSU's Peter O. Kohler
Pavilion, with space for four large radiation
therapy vaults.*

Carol Marquez, M.D.,
serves as interim
chairwoman

Charles R.
Thomas, Jr.,
M.D., becomes
chairman

Oregon Medical Physics program is
launched as the Northwest's only
accredited training program in
medical physics

*The program is a collaboration with
Oregon State University.*

*Department is first and only Oregon
health care provider offering Calypso
image-guided radiation therapy and
dedicated stereotactic body radiation*

2005

2007

2010

welcome

Dear colleagues and friends,

We are delighted to share this report on the Department of Radiation Medicine at Oregon Health & Science University. It chronicles our growth over the years, documents current programs and points to an exciting future.

Our growth has been particularly rapid since 2007, when we moved into a new 17,000-square-foot space in OHSU's Peter O. Kohler Pavilion. The move allowed us to strategically add faculty and staff and expand our education programs. The new space, which includes four large vaults, also allowed us to bring state-of-the-art imaging and treatment technologies together in truly unique installations for the benefit of patients.

My predecessors, Drs. Clifford Allen (1967-1972), William Moss (1974-1989) and Kenneth Stevens (1989-2005) laid a solid foundation for this growth. In 1967, our department had the distinction of being the first formal radiation oncology department at any U.S. medical school. Today, education is more important than ever as we train the next generation of radiation medicine specialists.

Research is also a top priority. From internationally recognized faculty developing new treatments to highly trained nurses and radiation therapists presenting at national conferences, we pursue and share the most effective and compassionate treatments. We collaborate with our colleagues at OHSU Knight Cancer Institute, across the OHSU family and around the world.

New growth is made possible by our generous donors. Committed supporters such as Dick and Deanne Rubinstein, the Doug and Lila Goodman family, Dr. Peter and Judy Kohler and others are helping us expand research, teaching and education.

In these pages, we invite you to explore radiation medicine at OHSU, from its roots with the pioneers of West Coast radiology to the extraordinary technologies available to patients today. Come see how we've grown – and what we're planning next.

Yours cordially,

Charles R. Thomas, Jr., M.D.



*Charles R.
Thomas,
Jr., M.D.*

Table of Contents

02 ...	History
04 ...	Technology
09 ...	Physicians
11 ...	Medical physicists
	Medical physics
	graduate program
14 ...	Radiation therapists
16 ...	Dosimetrists
18 ...	Nurses
20 ...	Residents and fellows
	Resident-Alumni Society
22 ...	Medical students
26 ...	Community partners
28 ...	Research
30 ...	Donor board
32 ...	Awards

making history

Department Leadership 1967-present

Clifford Allen, M.D.
1967-1972



William
Moss, M.D.
1974-1989

Kenneth
Stevens, Jr.,
M.D.
1989-2005
(interim 1972-74,
1989-92)



Carol Marquez, M.D.
interim, Aug.-Nov. 2005

Charles R. Thomas, Jr., M.D.
2005-present

Half a century of radiation therapy at OHSU

Physicians from the University of Oregon Medical School, now the OHSU School of Medicine, pioneered radiation treatment in Oregon. Portland radiologist Ivan Woolley, M.D., a 1919 graduate of the UOMS, began making “radiographs” in 1915. He used a machine with a gas X-ray tube, testing it with a hand fluoroscope and timing the exposure with a watch. Even earlier, Herbert Merton Greene, UOMS class of 1904, operated what may have been the state’s first X-ray machine.

In the 1930s, the medical school began an X-ray therapy program within the Department of Radiology. Milton Hyman, M.D., and Selma Hyman, M.D., directed treatment until the early 1950s. Clifford Allen, M.D., took over from the Hymans.

The Department of Radiation Therapy was established at the UOMS in 1967 with Allen as the first chairman. It was the first independent radiation oncology department at a U.S. medical school. That same year, the department graduated its first resident to specialize in only radiation therapy. The field advanced in the 1970s with publication of studies on safe radiation dosage and the use of treatment simulators, computerized planning and CT imaging.

The department took its present name, the Department of Radiation Medicine, in 2006. In 2007, it moved from OHSU’s South Hospital to a full floor in the new Peter O. Kohler Pavilion. On the heels of MRI imaging in the 1980s and stereotactic radiosurgery in the 1990s, OHSU began offering intensity modulated radiation therapy in the 2000s and using the most advanced imaging techniques. Radiation therapy is not only more effective, but much safer for patients and providers than in the days of Woolley and Greene.



Providing treatment and education across Oregon

From its base on Marquam Hill, the department cares for patients from OHSU, OHSU Doernbecher Children's Hospital and the Portland Veterans Affairs Medical Center.

"We've cared for the full spectrum of patients," says Carol Marquez, M.D., former interim chairwoman, who has been with Radiation Medicine since 1993. "We've always provided some specialty care, such as pediatric radiation therapy. We do more of certain types of therapy, such as total body irradiation and total skin electron beam therapy, than any other provider in the state."

Since the 1990s, the number of patients seen has approximately doubled. OHSU Radiation Medicine offers treatment at the OHSU Beaverton Cancer Center in Beaverton, Ore., and the Tuality/OHSU Cancer Center in Hillsboro, Ore. Patients also travel from around Oregon, southwest Washington and even farther away.

Since 1967, the department has always had at least one radiation therapy resident each year. Today, there are six residents in radiation therapy and several medical physics residents in a joint program with Oregon State University. "We've also had a training program for radiation therapists for many years," says Marquez. "Many of our former medical residents and radiation therapy trainees work in Oregon, so we are connected to many practices around the state."

Improving technology, continued growth

"The biggest change in technology is intensity modulated radiation therapy, which makes treatment much more precise," says John Holland, M.D., who joined the department in 1994. "We also have better imaging than we had 20 years ago. Every patient receives a CT scan, and we have MRI and PET CT that allow us to identify the tumor, treat it and spare normal tissue. Developments such as IMRT, image-guided therapy, stereotactic body radiation and cranioradiotherapy lead to better control of tumors with fewer side effects."



going high-tech

advanced treatment and imaging technology

The five treatment machines in the Department of Radiation Medicine all include image guidance capability. The department space that opened in 2007 was specifically designed to take advantage of these capabilities to benefit patients.

Department vice chairman Martin Fuss, M.D., says the benefits of precise image guidance include better dose control and sparing of normal tissues. “Direct visualization of the tumor and indirect assessment using implanted markers or Calypso beacons allow accurate delivery of the prescribed dose each and every day of a radiation therapy course,” Fuss says.

Precision imaging also allows the reduction of safety margins, the healthy tissue surrounding the radiation target. Fuss notes that for this reason, image-guided radiation therapy courses are better tolerated than courses delivered with more conventional paradigms.

Radiation and imaging technology

Radiation technology includes:

- Two Varian Trilogy linear accelerators with cone beam CT imaging devices. The scanners allow extremely precise imaging while the patient is on the treatment couch. Volumetric image guidance allows assessment of the target’s position immediately before treatment.
- Oregon’s first Calypso unit installed on one of the Trilogy linear accelerators. The Calypso is used to treat intact prostate cancer and prostate tumors that have recurred or are at risk for local recurrence.
- A BrainLab Novalis Tx unit housed in the same vault with a 16-slice large-bore CT scanner. This installation, which Fuss

notes is unique in the world, is possible because of the size of the vaults. “Large rooms allow more technology in one vault,” Fuss explains. “Having four very large vaults available made it possible for us to consider imaging technologies that further enhance our image guidance capabilities.” The Novalis Tx is used to treat cancers of the brain, spine and other areas.

- A dedicated stereotactic treatment machine. Fuss, one of the world’s leading experts on stereotactic body radiation, notes that this is particularly suited to treating small tumors of the brain, lung, liver and spine. The department is a U.S. leader in stereotactic body radiation.
- First U.S.-installed TomoTherapy HD unit. Installed in 2011, this is the second generation of TomoTherapy, with enhanced planning and radiation delivery capabilities. This image-guided intensity-modulated radiation therapy is used to treat a variety of cancers, including anal, rectal and pancreatic cancers and pediatric cancers.
- Hyperthermia unit. This unit allows treatment of superficially located tumors by a combination of heat and radiation that enhances the response to therapy. The department is the only provider in Oregon offering hyperthermia. “It is helpful in treating melanoma, such as a lymph node in the groin or armpit that is relatively close to the skin,” says Fuss.
- Oregon’s only brachytherapy for eye cancer. Brachytherapy seeds are implanted in a plaque placed in the eye. This treatment is used for choroidal and uveal melanoma. “We have the goal of preserving the eye and vision by providing a high likelihood of cure,” Fuss says.

In collaboration with OHSU’s department of radiology, Radiation Medicine has access to a host of dedicated imaging devices. Such a range of imaging technology is not available at most centers. It includes:

- One of just two Vision RT optical guidance systems on the West Coast. This 3D surface imaging system allows continuous monitoring of a patient’s position during radiation delivery, avoiding the variations that small patient movements can cause. “It assures sub-millimeter precision,” says Fuss.
- Two big-bore CT scanners
- Phillips time-of-flight PET/CT unit
- SPECT/CT simulator

Apart from the SPECT/CT simulator in a nearby building, all technologies are on one floor, “fully integrated into our workflow,” says Fuss. In addition, the department has one of Oregon’s largest groups of medical physicists (see related story on page 11.) Physicians, physicists and other staff continue to strive to use the advanced treatment and imaging technologies at OHSU to give patients the best outcomes possible.



Research from the OHSU Department of Radiation Medicine has been published in the following journals:

Acta Oncologica	Journal of the American Medical Association (JAMA)
American Journal of Hospice & Palliative Care	Journal of the American College of Radiology
American Journal of Surgery	Journal of Cancer Education
Applied Radiation Isotopes	Journal of Clinical Investigation
Annals of Surgical Oncology	Journal of Clinical Oncology
Archives of Surgery	Journal of Gastrointestinal Cancer
British Journal of Radiology	Journal of Gastrointestinal Oncology
CA: A Cancer Journal for Clinicians (American Cancer Society)	Journal of Neurosurgery Pediatrics
Cancer	Journal of Oncology Practice
Cancer Letters	Journal of Thoracic Oncology
Carcinogenesis	Laryngoscope
Clinical Cancer Research	Medical Dosimetry
Current Problems in Cancer	Medical Physics
Gastrointestinal Cancer Research	Molecular Carcinogenesis
Gynecologic Oncology	New England Journal of Medicine
Head & Neck	Otolaryngology Head & Neck Surgery
International Journal of Otolaryngology	Physics in Medicine & Biology
International Journal of Radiation Oncology, Biology, & Physics	PLOS One
	Radiation Oncology (BioMed Central)
	Radiographics
	Radiotherapy & Oncology

teamwork



physicians

Charles R. Thomas, Jr., M.D.

Professor and Chairman of Radiation Medicine

Dr. Thomas received his M.D. from the University of Illinois College of Medicine. He did a residency in radiation oncology at the University of Washington and an internal medicine residency at Baylor College of Medicine. He completed a fellowship in medical oncology at Rush University. He is board certified in internal medicine, radiation oncology and medical oncology.

Subspecialty interests: Gastrointestinal and thoracic malignancies

Languages: English

Research and other interests: Translational and outcomes research

Joined OHSU: 2005



Martin Fuss, M.D.

Professor and Vice Chairman of Radiation Medicine

Dr. Fuss received his M.D. and Ph.D. from the University of Heidelberg, where he also did a residency in radiation oncology. He did an additional residency at the German Cancer Research Center in Heidelberg. Dr. Fuss completed a fellowship in proton radiation therapy at the Loma Linda University Medical Center

Subspecialty interests: Image-guided radiation therapy, intensity-modulated radiation therapy, stereotactic (intracranial and extracranial/stereotactic body) radiosurgery and fractionated treatments for various solid tumors.

Languages: English, German

Research and other interests: Delivery of radiation therapy with the modalities above.

Joined OHSU: 2006



John Holland, M.D.

Associate Professor of Radiation Medicine

Director, Residency Training Program

Dr. Holland received his M.D. from Washington University in St. Louis and completed a residency in radiation oncology at the University of California, San Francisco. He is board certified in radiation oncology.

Subspecialty interests: Thoracic and head and neck malignancies

Languages: English

Research and other interests: Chairman of weekly lung cancer conference and program director, radiation oncology residency program.

Joined OHSU: 1994





Arthur Hung, M.D.

Assistant Professor of Radiation Medicine

Director, Medical Student Clerkship Program

Dr. Hung received his M.D. from the Ohio State University College of Medicine. He completed a residency in radiation oncology at the University of Texas MD Anderson Cancer Center and a fellowship in medical oncology at Rush University. He is board certified in radiation oncology.

***Subspecialty interests:** Soft tissue sarcomas and genitourinary cancers, with a special interest in prostate cancer treatment.*

***Languages:** English, Mandarin*

***Research and other interests:** Developing clinical trials; refining radiation techniques to eliminate side effects.*

***Joined OHSU:** 2002*



Charlotte Kubicky, M.D., Ph.D.

Assistant Professor of Radiation Medicine

Dr. Kubicky received her M.D. from the University of Pennsylvania, where she also earned a Ph.D. in cancer genetics. She completed a residency in radiation oncology at the University of California, San Francisco, and is board certified in radiation oncology. Dr. Kubicky serves as the medical director for the Tuality OHSU Cancer Center in Hillsboro, Ore.

***Subspecialty interests:** Breast cancer, thyroid cancer, central nervous system tumors and gastrointestinal cancer*

***Languages:** English*

***Research and other interests:** Radiation therapy delivery systems, breast and prostate cancer risk assessment.*

***Joined OHSU:** 2007*



Carol Marquez, M.D.

Associate Professor of Radiation Medicine

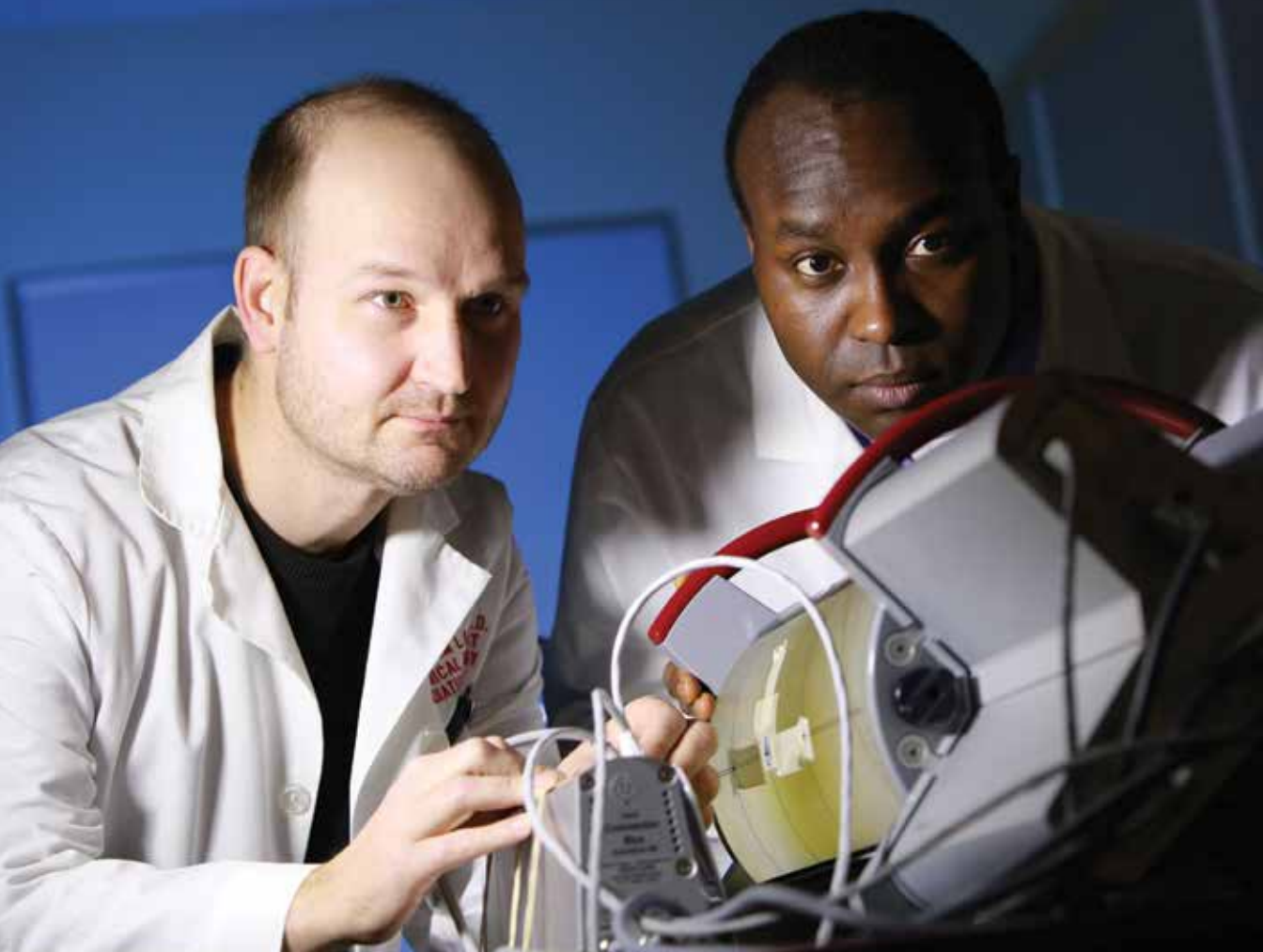
Medical Director, Radiation Therapy Technology Training Program

Dr. Marquez received her M.D. from the University of California, San Francisco, where she also did her residency in radiation oncology. She completed a fellowship in radioimmunotherapy and radiosensitizers at Stanford University and is board certified in radiation oncology.

***Subspecialty interests:** Breast and gynecologic tumors, central nervous system tumors, pediatrics*

***Languages:** English*

***Joined OHSU:** 1993*



medical physicists

OHSU's Radiation Medicine department has one of Oregon's largest groups of medical physicists. The medical physicist plays a key role in treatment planning before patients ever come to the clinic.

Chief medical physicist Wolfram Laub, Ph.D., M.B.A., explains, "As a medical physicist, I am part of the team that decides which technologies best serve our patients and referring providers and what equipment to purchase." Physicists collaborate with radiation oncologists on each patient's treatment plan. They calibrate the department's equipment and review data from every treatment to ensure that all doses are given correctly and radiation is used safely.

Laub holds a Ph.D. in physics with emphasis in medical physics and training in radiation therapy. A master's degree or Ph.D. is

Wolfram Laub, Ph.D., M.B.A., left, associate director of medical physics, with James Tanyi, Ph.D.

Medical Physicists

Wolfram Laub, Ph.D., M.B.A.

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

Brandon Merz, M.S.

*Assistant Professor of
Radiation Medicine*

James Tanyi, Ph.D., M.C.R.

*Associate Professor of
Radiation Medicine*

Junan Zhang, Ph.D.

*Assistant Professor of
Radiation Medicine*

Susha Pillai, M.Sc., M.S., D.A.B.R.

*Assistant Professor of
Radiation Medicine*

Richard Crilly, Ph.D.

*Assistant Professor of
Radiation Medicine*

typical in this field. In addition, he notes that all OHSU medical physicists are certified by the American Board of Radiology. The board exam includes two written tests and a two-and-a-half-hour oral exam. Laub, who serves as an ABR examiner, says, “The pass rate is about 40 percent. It’s a tough test.”

The department’s physicists work as a team, but each also has expertise in one or more specific applications, such as stereotactic radiation or TomoTherapy. OHSU’s medical physicists are also nationally known experts who serve on task groups of the American Association of Physicists in Medicine within their subspecialties.

In addition to their clinical missions, OHSU’s medical physicists teach in the radiation therapy technology training program and the Oregon Medical Physics program, including serving as advisors to Ph.D. students. They also conduct grant-funded research and participate in other OHSU collaborations.

The end goal of such advanced training, education and research is always patient safety, Laub says. “A strong medical physics team is essential to patient safety and making sure the newest technology is utilized to give patients the best care.”

collaborating to train medical physicists

OHSU Radiation Medicine is educating the medical physicists who will treat tomorrow’s patients. The Oregon Medical Physics program, a collaboration between OHSU and Oregon State University, is the Northwest’s only accredited training program in medical physics.

Students begin their education in the Radiation Center at Oregon State University in Corvallis, Ore. After completing core coursework in radiation physics, they come to OHSU to study therapeutic medical physics in clinical applications. The OMP program offers masters and Ph.D. degrees.

Wolfram Laub, Ph.D., M.B.A., associate director of medical physics, says, “Students from all over the world inquire about the OMP

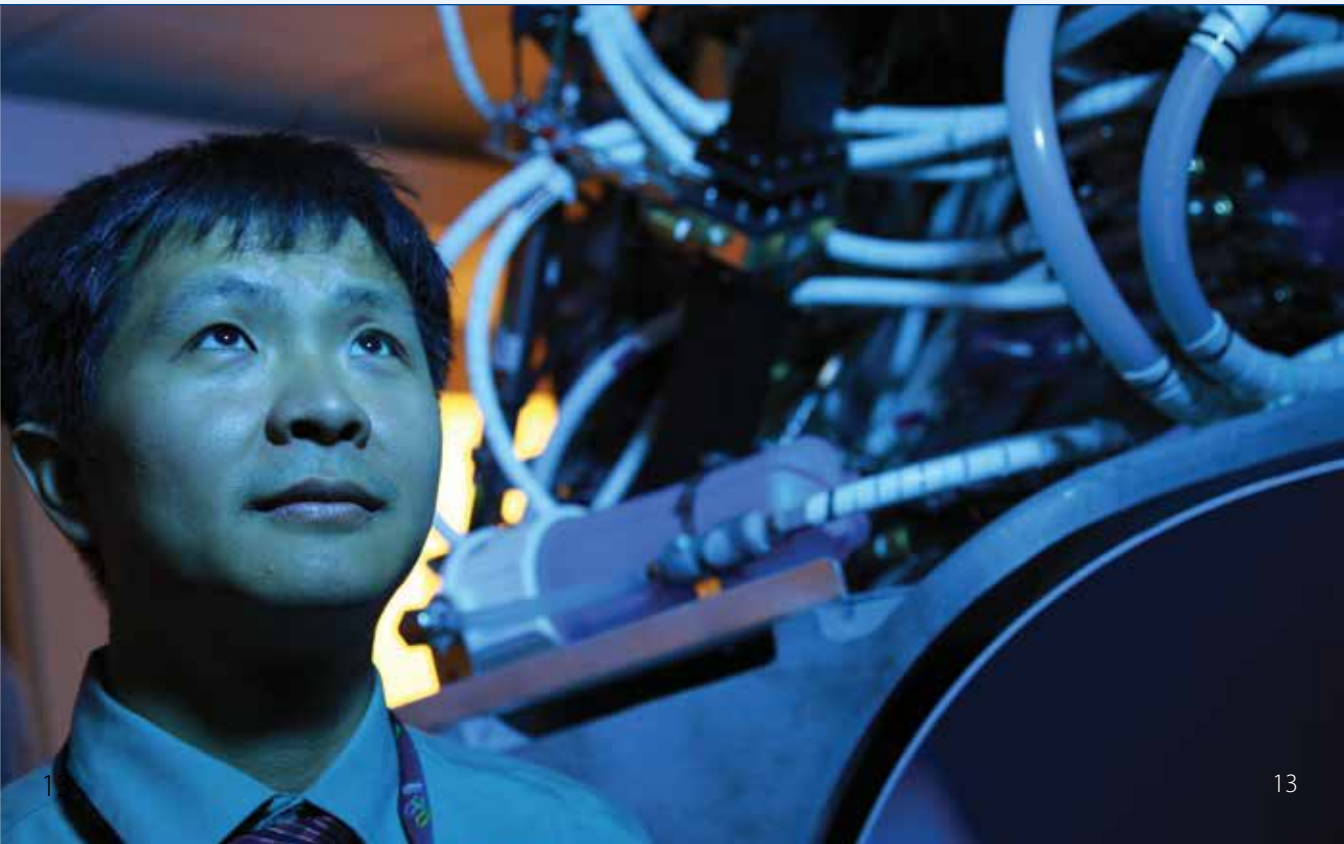
program. Its joint nature makes it especially valuable to students.” He explains, “Students acquire a strong scientific foundation in their first year at Oregon State. When they come to OHSU in the second year, we show them how all the physics they’ve learned is used – how we treat patients, how we take advantage of our technology. OSU offers in-depth coverage of the fundamental science and we bring all the clinical background to the classroom. The combination is good for students.”

During the year at OHSU, students participate in clinical research. “Two students just submitted papers for publication, and another former student’s manuscript was just accepted,” Laub says. “Since the program is just getting started – 2012 was the first fall term we’ve taught the second-year students – we expect to see many more publications.”

Having a graduate program in medical physics also benefits patients. “Research and education change our department’s culture,” says Laub. “Patients benefit because we don’t sit back and get comfortable. We think ‘OK, what’s next?’ We’re always changing and innovating.”

To learn more about the Oregon Medical Physics program, visit www.ohsu.edu/medphysgrad.

*Below, physicist Junan Zhang,
Ph.D.*





radiation therapists

Department vice chair Martin Fuss, M.D., (standing) and chief radiation therapist Dorothy Hargrove, M.S., R.T.T., ensure precise delivery of hyperthermia. The Knight Cancer Institute is Oregon's only hyperthermia provider.

Providing Hands-On Treatment and Care

When a patient is in the treatment room, the radiation therapist becomes the primary caregiver. The relationship starts when patients come in for simulation – imaging and marking the treatment areas and determining treatment positioning. The radiation therapist also fashions immobilization devices, such as a personalized cushion or mask, to help patients hold their positions during treatment.

Before treatment starts, the radiation therapist checks everything for accuracy. Correct prescription? Check. Personalized cushion, mask or frame? Check. Correct treatment area and dose? Check.

Caring for patients' emotional and physical comfort is an important part of our jobs

Chief radiation therapist Dorothy Hargrove, M.S., R.T.T., says each patient's first treatment takes about an hour. The therapist explains the procedure, helps the patient onto the treatment couch and makes sure any tattoos or other marks are correctly aligned. Imaging, usually with two separate techniques, is used to ensure everything lines up. "We align the patient based on those images so the treatment position is accurate to within millimeters or submillimeters," Hargrove says. After a check by the attending physician, treatment begins.

Radiation therapists reassure patients before and during treatment. "Caring for patients' emotional and physical comfort is an important part of our jobs," says Hargrove. "A patient might be anxious, scared or even angry at first, but by the time we're done with treatment, we've usually won them over."

OHSU's radiation therapists are also teachers. OHSU offers a radiation therapy technology training program, so "we almost always have RT students rotating through," Hargrove says. Radiation therapists, in conjunction with their assigned attending physician, also help medical residents in radiation medicine, often showing them how the software works and how to read images to ensure correct positioning.

In keeping with OHSU's mission to advance knowledge, the therapists share their knowledge at national meetings. For example, in October 2012 two OHSU radiation therapists spoke at the American Society of Radiologic Technologists national meeting.

Working closely with patients is rewarding, says Hargrove. When people remark that radiation therapy must be a difficult profession, she tells them the job is uplifting. "Our patients are full of life," she says. "Even if they are coming for palliation, their appreciation for the care they receive is incredible. That's why we radiation therapists do this job. It's the perfect blend of technology and patient care."

Radiation Therapists

Aaron Martin, R.T.T.
Andrea Dale, R.T.T.
Adrian Posteuca, R.T.T.
Andrea Tewson, R.T.T.
Barb Kroon, R.T.T.
Beth Schultz, R.T.T.
Bonnie Luedloff, R.T.T.
Dan Shankle, R.T.T.
Dorothy Hargrove, M.S., R.T.T.
Elsbeth Allanketner, R.T.T.
Erica Oh, R.T.T.
Hilary Dekker, R.T.T.
Janet Garrett, R.T.T.
Jennifer McLaughlin, R.T.T.
Jo Price, R.T.T.
Joanne Reasoner, R.T.T.
Linea Dymond, R.T.T.
Linette Chapman, R.T.T.
Morgan Oishi, R.T.T.
Ramon Sison, R.T.T.
Rebecca Botaitis, R.T.T.
Robert Breckenridge, R.T.T.
Scott Madsen, R.T.T.
Trang Nguyen, R.T.T.



dosimetrists

Above, lead dosimetrist Barb Agrimson, C.M.D., B.S.R.T., R.T., reviews a scan with dosimetrist Steve Rhodes, C.M.D., R.T.T.

Dosimetrists are the radiation medicine team members who determine how each patient's prescribed radiation dose is delivered. In a room filled with computers and monitors, the dosimetrists view patient CT scans and other imaging results. Based on what they see, they input treatment parameters and calculate the angle of each radiation beam onscreen. Their goal? Deliver the right dose to the tumor while avoiding as much healthy tissue as possible.

Advanced imaging and computer models allow dosimetrists to plan treatment down to the millimeter or sub-millimeter.

The three-dimensional computer models replicate each patient's anatomy down to the millimeter, including the location of the tumor. Depending on the treatment area and surrounding structures, the dosimetrist might suggest using a beam modification device to reach the target more effectively, or special shielding to protect areas outside the treatment field. Every patient's treatment is run on a computer simulator before he or she arrives to make sure it works as planned.

Dosimetrists work with all members of the radiation medicine team, from the radiation oncologists who prescribe treatment goals to the radiation therapists who carry out treatment. They may also assist the medical physicists in calibrating equipment and help train radiation oncology residents, medical students and Oregon Medical Physics program graduate students. At OHSU, all the medical dosimetrists are certified by the American Association of Medical Dosimetrists.

OHSU Dosimetrists

Barbara Agrimson, C.M.D.,
B.S.R.T., R.T.

Charles L. McCracken, C.M.D.,
R.T., R.T.

Debra Monaco, C.M.D.,
R.T., R.T.

Paul H. Cooper, Phys., C.M.D.

Steve Rhodes, C.M.D., R.T.T.

Below, left to right: Dosimetrist Deb Monaco, lead dosimetrist Barb Agrimson, dosimetrist Steve Rhodes and medical physicist Rick Crilly.





radiation medicine nurses

The radiation medicine nurse is a point person for patient care.

Caring for Patients Every Step of the Way

The Radiation Medicine nursing staff has grown from two to five full-time RNs in recent years. Nurses are central to patient care, providing education at every step of radiation therapy and coordinating care across departments.

“The RN is a point person,” says charge nurse Jennifer Lockhart, R.N. “We’re involved from the beginning of each patient’s therapy, and we know what’s going on at all times.”

Radiation Medicine nurses see patients at least once a week during therapy. “We know what time they come in every day, where they are on the continuum of care and what comes next,” Lockhart says. “We make sure each step is followed so the patient gets the best care.”

The trust patients build by constantly interacting with their nurses makes for better symptom management. “Treatment effects are often addressed right away because patients feel confident about coming to us with questions,” Lockhart says.

Our nurses are confident, and they work very autonomously because they have the training and experience to do so.

Radiation Medicine is an important part of OHSU's Knight Cancer Institute, so all the nurses have oncology expertise. This makes for effective triage. "We know whether an effect is typical of the second cycle of chemo or third week of radiation treatment, or whether it's unusual," says Lockhart.

Nurses are valued members of the Radiation Medicine team. "The department really listens to our input," says Lockhart. "Everything from 'this blood pressure machine would work better than that one' to 'We need representation at the American Society for Radiation Oncology meeting.' They listen and make it happen."

In turn, nurses make professional development a priority. "We all seek opportunities for learning in oncology and other areas," Lockhart says. "Our nurses are confident, and they work very autonomously because they have the training and experience to do so."

Every patient is seen at least weekly during therapy. The constant interaction builds patient trust.





residents and fellows

Residents Nima Nabavizadeh, M.D., and Joe Waller, M.D., with staff member Tracey Browning.

Radiation Medicine Residents

David Elliott, M.D.

Faisal Siddiqui, M.D., Ph.D.

Joseph Waller, M.P.H., M.D.

Kristina Young, M.D., Ph.D.

Nima Nabavizadeh, M.D.

Sravana Chennupati, M.D.

Sophia Bornstein, M.D., Ph.D.

Radiation Medicine Residency

The department offers a four-year radiation medicine residency with guidelines established by the Accreditation Council for Graduate Medical Education Radiation Oncology section. Residents participate in clinical care, educational activities and research as fully as possible and are encouraged and supported in creating new knowledge within our specialty. They participate in the annual collaborative Rubinstein Research Retreat and work with colleagues in multiple specialties from OHSU, OHSU Doernbecher Children's Hospital, the Portland Veterans Affairs Medical Center and the Portland Shriners Hospital.

The program has a broad and flexible research focus that includes health services and outcomes-based research, clinical and translational research and basic science research opportunities in the greater OHSU community. It aims to give residents the opportunity for meaningful research experiences in these critical years of postgraduate residency training.

Residents are encouraged to enroll concurrently in OHSU's Human Investigations Program. The residency is structured to allow all ACGME and ABR requirements to be met while residents participate in research activities, which do not alter the length of training.



Research Fellows in Radiation Medicine

Research fellows work with department faculty and medical physicists to advance knowledge within the specialty. The department hosts research fellows from around the world.

Keeping Alumni Connected

Department chairman Charles R. Thomas, Jr., M.D., started the Resident Alumni society in 2006. The society aims to maintain connections with former radiation medicine trainees and keep them updated on the department's progress. Former OHSU residents and fellows are eligible, and are automatically inducted when they complete training at OHSU.

The society held alumni mixers at the 2006 meeting of the American Society of Radiation Oncology in Philadelphia, Pa., and the 2011 American Society for Radiation Oncology meeting in Miami Beach, Fla.

For a full list of members of the William Moss and Kenneth Stevens Resident Alumni Society please visit www.ohsu.edu/



medical students

Radiation therapist Jo Price, R.T.T., helps radiation therapy student Laura Jay with a customized treatment mask.

Introducing Students to Radiation Medicine

Radiation medicine is a rewarding specialty, but one that many students do not encounter in training. The Radiation Medicine Student Interest Group provides information on the specialty to high school, college, graduate and medical students interested in learning how radiation is used to combat cancer and other diseases today. The RMSIG's goals are:

- Providing early, close-up exposure to the highly gratifying process of cancer care and the technical aspects of radiation delivery, including the latest developments in this rapidly changing field.
- Helping students learn to become scientific researchers.
- Providing strong mentorship from practicing doctors, including mentoring for minority students underrepresented in radiation oncology.

Students in the RMSIG participate in a wide range of research and scholarly activities, including publishing in peer-reviewed journals and presenting posters at the American Society for Radiation Oncology annual meetings. They also participate in department activities, including the annual Rubinstein Research Retreat. In 2012, several medical students participated in the retreat, which facilitates collaboration between Radiation Medicine investigators and those in OHSU departments such as medical oncology, surgery and palliative care.

“The opportunity to present work at the Rubinstein retreat allows investigators – from students to attending physicians – to improve their research based on thought-provoking insights from other OHSU scientists,” says fourth-year medical student Leonel Kahn, co-leader of the RMSIG. Along with other medical students, Kahn presented work at the fall 2012 retreat.

Interest Group Provides Career, Funding Opportunities for Students

Kahn, who is currently applying to radiation oncology residency, says, “The RMSIG has provided me with the support to become actively involved in multiple clinical investigations aimed at understanding outcomes that directly apply to patient care. With the support of Drs. Thomas, Tanyi and Hung, I have gained the skills to conduct and present research. This ability will be invaluable to me as I continue my academic endeavors.”

Through strong mentoring from OHSU Radiation Medicine faculty, three medical students secured competitive national funding in 2012. Kahn, Ruth White, Ph.D., and Joshua Walker, Ph.D., all of the OHSU School of Medicine class of 2013, received Radiological Society of North America Research Medical Student Grant awards. To date, eight students from the Radiation Medicine Student Interest Group have received RSNA grants. More information on these students and their projects is available on the department website at www.ohsu.edu/radmedicine.

Our RSNA grants are especially notable in light of the challenging extramural grant funding environment that currently exists. This unprecedented academic achievement speaks to our commitment to training the next generation of leaders in academic radiation medicine.

– department chairman Charles R. Thomas, Jr., M.D.

Past and Present Members of the Radiation Medicine Student Interest Group

Adeline Plesiu

Aaron Grossberg, Ph.D. (coauthor, paper in *Journal of Neuroinflammation*)

Basma Saadoun (OHSU School of Medicine class of 2015)

Bethany Samuelson (2011 Rubinstein Research Scholar)

Brandon Dyer (2011 predoctoral training grant (TL1), ASTRO 2012)

Christy Le (SOM '15)

David Sanders

Eric Muñoz (SOM '10; resident, diagnostic radiology, University of Louisville)

Faisal Siddiqui, Ph.D.

Joshua Walker, Ph.D. (Characterization of CD8+ T cells following vaccination with an inactivated whole virus vaccine)

Katelyn Atkins, Ph.D. (OHSU Medical Scientist Training Program, 2011 Tartar Trust awards, RSNA grant)

Kristen O'Donnell (SOM '09; resident, radiation oncology, University of Arizona)

Kristina Young, Ph.D. (MSTP; SOM '10; resident, radiation oncology, OHSU)

Leonel Kahn (2011 Tartar Trust awards)

Michael C. Ryan (2011 TL1 Grant)

Oleg Sostin, B.S.N. (SOM '14, ASTRO 2012)

Reed E. Cope

Ruth White, Ph.D. (SOM '13)

Sophia Bornstein, M.D., Ph.D. (SOM '10; resident, radiation oncology, OHSU)

Ted Braun, Ph.D. (MSTP candidate; coauthor, paper in *Journal of Neuroinflammation*)

Student Interest Group Highlights

With a Research and Education grant from the Radiation Society of North America, Katelyn Atkins, Ph.D., a Medical Scientist Training Program student, is working to understand the molecular basis of cells' response to acute radiation. Such understanding is critical to developing drugs that augment the effectiveness of radiation therapy in cancer treatment.



Katelyn Atkins, Ph.D., with scientific advisor Gary Thomas, Ph.D., at left and OHSU Radiation Medicine chairman Charles R. Thomas, Jr., M.D., right.

Former RSNA Research Medical Student grant recipient Sophia Bornstein, M.D., Ph.D., now a Holman Research Pathway resident in radiation medicine, received a \$20,000 grant from the Medical Research foundation in October 2012. Her study, "Functional significance of tumor-initiating cells in recurrent head and neck squamous cell carcinoma," is conducted with clinical research advisor Charles R. Thomas, Jr., M.D., and scientific advisors Joe Gray, Ph.D., and Melissa Wong, Ph.D. Dr. Bornstein co-directs the radiobiology didactic core lecture series for house staff.

The Holman Research Pathway is an initiative of the American Board of Radiology to address the shortage of physician investigators in diagnostic radiology and radiation oncology. It is named for Leonard Holman, M.D., who first proposed it.



Sophia Bornstein, M.D., Ph.D., former RSNA Research Medical student grant recipient, Holman Research Pathway resident and Medical Research Foundation grant recipient.



in the community

OHSU Radiation Medicine in the Community

The department values its relationships with community physicians, hospitals and clinics. These include:

- A unique collaboration with Bay Area Hospital in Coos Bay, Ore. Radiation Therapy Center director Carl Jensen, M.D., spends one week each quarter at OHSU to facilitate continuing education and professional development. At the same time, OHSU faculty and medical physicists visit Bay Area Hospital and collaborate with colleagues there on medical physics and other topics of interest. This exchange enhances knowledge, strengthens relationships and contributes to better patient care.

- The Tuality/OHSU Cancer Center in Tuality, Ore., brings the latest radiation oncology treatments to western Washington County, allowing patients to receive the same high-quality care offered at OHSU's Marquam Hill location without traveling to Portland. At Tuality, the OHSU Radiation Medicine team includes attending physicians, a medical physicist and dosimetrist, radiation therapists, nurses and support staff.

As part of the OHSU Knight Cancer Institute, the Department of Radiation Medicine is dedicated to personalizing patient care and making referrals as convenient as possible.

- Since March 2012, the department has paired a nurse and administrative staff member to help with insurance authorizations for patients.
- A long-term survivorship program is available to help patients with life beyond illness and to help identify any recurrences early.
- Attending physicians respond to referral requests the same day, and patients can be seen within the week.

OHSU Radiation Medicine serves patients with complex needs, including caring for children with brain tumors through OHSU Doernbecher Children's Hospital.

RADIATION ONCOLOGY & IMAGING





making advances

Department faculty and house staff jointly edited and coauthored one of the first comprehensive board review books in radiation oncology, the Radiation Oncology Study Guide published by Springer in early 2013. Lead editor Celine Bicquart Ord, M.D., is a former chief resident at OHSU, now assistant professor at Texas A&M. Charles R. Thomas, Jr., M.D., is a coauthor. Radiation Medicine contributing authors include Drs. Chennupati, Gagnon, Hung, Holland, Kubicky, Marquez, Mutyala, Siddiqui and Young.

Research in OHSU Radiation Oncology

The department maintains an active research program aimed at improving treatments and adding to basic knowledge in the field of radiation medicine. Faculty, staff and trainees publish widely and make presentations within the department and around the world. A sampling of recent work:

- Three department trainees have received the highly coveted and prestigious American Society of Clinical Oncology Young Investigator Award. The YIAs were awarded to Drs. C. David Fuller (2011), Patrick Gagnon (2009) and Samuel J. Wang (2008).
- Since 2008, nearly a dozen Radiation Medicine Student Interest Group members have been awarded Research Medical Student Grants by the Radiological Society of North America Research and Education Foundation. This record is nearly unprecedented for a medical school in the western United States.

- Three department trainees have been recipients of the highly competitive RSNA Research Resident/Fellow Grant. The grantees include Drs. Marka A. Crittenden, Tasha S. McDonald and Samuel J. Wang.
- Four of our residents have been accepted into the American Board of Radiology's Holman Research Pathway, comprising a full 10 percent of the total national participants in the initial decade of the program.
- Between 2007 and 2011, 100 percent of all graduating radiation oncology resident physicians had successfully secured competitive extramural research grant funding at some point during their training at OHSU.

Through the generous benevolence of Deanne and Dick Rubinstein,

- Six original research papers were presented by staff at the 95th annual American Radium Society meeting in 2013, including four oral presentations, the most ever selected from OHSU at the annual meeting of this nearly century-old cancer research organization.
- Five original research papers were presented by staff at the 2012 SRS/SBRT* Scientific Meeting of the Radiosurgery Society. These include three oral presentations, the most ever selected from OHSU by the ARS.
- A record 17 abstracts were submitted for presentation to the 55th Annual Meeting of the American Society of Radiation Oncology. Since 2006, the department has consistently presented double-digit numbers of original abstracts at this major international forum for our specialty.
- The department's annual Rubinstein Research Retreat has taken place every fall since 2007.
- The Rubinstein Research Scholar program, established in 2009, has designated 11 OHSU medical students who have shown significant academic productivity. This includes seven physician-scientist (M.D.-Ph.D.) trainees within the prestigious Medical Scientist Training Program at OHSU.
- More than 100 articles have been published by department faculty and staff since 2005.
- During this same time, department faculty have edited or coedited eight textbooks.
- More than 150 original abstracts have been presented and published at national and international research forums since 2005.
- Nearly 50 outstanding visiting research investigators have been hosted by the department.

Presentations, publications and additional research highlights are updated regularly at www.ohsu.edu/radmedicine. Visit us to learn more about current research.



donor support

Supporting the Latest Research and Treatment

OHSU's Department of Radiation Medicine was the first independent department of radiation oncology at a U.S. medical school. Since it was established in 1967, it has benefited from supporters with the foresight to advance radiation medicine.

Approximately 60 percent of people with cancer receive radiation therapy at some point in their treatment. Support for OHSU's radiation medicine department helps advance research to improve cancer care. It is also essential to our mission of educating and inspiring the next generation of radiation oncologists.



From left, Deanne Rubinstein, 2012 Rubinstein scholars Joshua Walker, Ph.D., Leonel Kahn, B.S., Ruth White, Ph.D., and Dick Rubinstein.

Dick and Deanne Rubinstein

Dick and Deanne Rubinstein are longtime supporters of OHSU, including the OHSU Knight Cancer Institute and Department of Radiation Medicine. The Rubinstein Research Scholar award provides funding to develop the research careers of the next generation of academic radiation oncology investigators, consistent with OHSU's mission of discovery. This program is made possible by the generous philanthropic support of Deanne and Dick Rubinstein. The Rubinsteins also support an annual Radiation Medicine research retreat that promotes cross-disciplinary collaboration in radiation medicine research.

We are inspired by the Department of Radiation Medicine's commitment to excellent care, innovative research and education. We chose to support the Endowed Fund for Radiation Medicine because it provides resources to advance the work of outstanding faculty and make educational opportunities possible for high school and college students.

– The Doug and Lila Goodman family

Endowed Professorship in Radiation Medicine

Recruiting and retaining exceptional faculty is the OHSU Knight Cancer Institute's top strategic priority. An endowed fund in Radiation Medicine will ensure the department's long-term capacity for research excellence.

The resources that accompany an endowed professorship provide a powerful tool in today's competitive academic market. Endowed support gives a leader the prestige and resources to pursue the most promising ideas immediately and the time to focus on activities that advance the center's mission, such as program development and education.

The annual support generated by a \$1 million endowed fund would provide essential resources for a visionary leader in the field of radiation medicine. In addition to being an important investment in advancing cancer research and care, this professorship would be a potent catalyst for regional partnerships to implement what we know in radiation medicine, extending the OHSU Knight Cancer Institute's unique expertise into communities across the state. The impacts of an investment at this level would be felt broadly and for generations to come.

To learn how you can make a gift to support the Department of Radiation Medicine, please contact Caitlin Wilson, associate director of development for the OHSU Knight Cancer Institute, at 503-494-1891 or wilsocai@ohsu.edu. Visit www.ohsu.edu/radmedicine for the latest department updates.

OHSU Knight Cancer Institute Council

Rob Shick, *Chair*
Wayne Drinkward, *Vice Chair*
Jeff Baker
William A. Berg
Alex Druker
Andrea Edelson
John D. Eskildsen
Nancy Fischer
Ruth J. Fisher
Bill Foster
Mark Goodman
Peter Kohler, M.D.
Julie Leuvrey
Charles S. Lilley
Debbie Maymi
Ty Pettit
Tim Phillips
William H. Reilly
Richard Rubinstein
James H. Rudd
Nicholas Stanley
Vanessa Sturgeon
Gary Takahashi
Malia Wasson
Dwight E. Weber



department awards in radiation medicine

Award Recipients

Platinum Baton

2012: *Stephanie Martindale*
2011: *Janet Garrett, R.T.T.*
2010: *Dan Tupper, B.S., M.A.I.S.*
2009: *James Tanyi, Ph.D.*
2008: *Jo Price, R.T.T.*
2007: *Parag Sanghvi, M.D., M.P.H.*
2006: *Dianna Ramirez*

William T. Moss, M.D., Excellence in Teaching Award

2012: *Carol Marquez, M.D.*
2011: *Charlotte Kubicky, M.D., Ph.D.*
2010: *Arthur Hung, M.D.*
2009: *Samuel Wang, M.D., Ph.D.*
2008: *Carol Marquez, M.D.*
2007: *John Holland, M.D.*
2006: *John Holland, M.D.*

Outstanding Research Award for Residents and Fellows

2010: *Patrick Gagnon, M.D.*
2009: *Tasha McDonald, M.D.*
2008: *Marka Crittenden, M.D., Ph.D.*
2007: *Tasha McDonald, M.D.*

Rubinstein Research Scholars

2012: *Leonel Kahn, B.S., Joshua Walker, Ph.D., and Ruth White, Ph.D.*
2011: *Bethany Samuelson, B.A.*
2010: *Sophia Bornstein, Ph.D.*
2009: *Kristina Young, Ph.D.*

Interdisciplinary Teaching Award

2009: *Mark Deffebach, M.D., OHSU Division of Pulmonary and Critical Care Medicine and Portland VA Medical Center.*

Since 2005, the Department of Radiation Medicine has recognized outstanding faculty, staff and trainees with annual awards. These include:

- **Platinum Baton Employee Recognition Award** – Unique to the Department of Radiation Medicine at OHSU, this award was instituted in 2006. The Platinum Baton honors an employee who shows one or more of the OHSU values of compassion, innovation, respect, collaboration and accountability. Department members may nominate colleagues for this award.
- **William T. Moss, M.D., Excellence in Teaching Award** – Named for a pioneer in radiation oncology who was also the department's second chairman, this award was established in 2006. It honors a faculty member who demonstrates teaching excellence.
- **Outstanding Research Award for Residents and Fellows** – OHSU has the highest funding rate of all U.S. radiation oncology programs in funded grants for research residents and fellows. The Outstanding Research Award recognizes the best among our stellar trainees.
- **Rubinstein Radiation Research Scholar Award** – In recent years, Radiation Medicine has developed philanthropic funding for medical student research. This award is given to OHSU medical students or graduate students from other fields. Dick and Deanne Rubinstein are longtime supporters of the OHSU Knight Cancer Institute.
- **Interdisciplinary Teaching Award** – This award honors a faculty member with a primary appointment in another OHSU department. It recognizes the importance of multidisciplinary care for cancer patients and interdepartmental and collaborative education in the training of radiation oncologists at OHSU.

Special Recognition

Carol Marquez, M.D.

Dr. Marquez has been recognized by the OHSU Medical Professional Board as one of the outstanding clinicians in providing service excellence.

Kristina Young, Ph.D.

Dr. Young was the recipient of the 2009 RSNA Research Medical Student Award.

The Department of Radiation Medicine at Oregon Health & Science University is dedicated to the health of our patients and the compassion needed to provide superior care. Based on the four pillars of patient care, service, research and education, we take pride in teaching our patients about available treatments and what to expect during each treatment. Because OHSU is a teaching institution, our staff maintains high professional standards, furthering their professional educations by attending seminars and working closely with academic colleagues. These standards give us an advantage in fighting cancer, as we stay competitive in the latest techniques. These include stereotactic body radiation therapy, stereotactic radiosurgery, brachytherapy, Calypso-based image guidance and intensity-modulated radiation therapy.



Oregon Health & Science University

Department of Radiation Medicine
3181 S.W. Sam Jackson Park Road, L337
Portland, OR 97239-3098

www.ohsu.edu/radiationmedicine

888 222-OHSU (6478)
503 494-8756
503 346-0237 fax