

# Duke University Radiation Therapy Physics Residency Program





## About Duke Radiation Oncology

The Department of Radiation Oncology provides state-of-the-art cancer treatment for a wide variety of tumor types. Duke Radiation Oncology is a member of the Duke Cancer Institute and participates with colleagues in Surgical Oncology and Medical Oncology to facilitate a comprehensive, multidisciplinary team approach to the care of cancer. Our Department is a large-scale clinical operation. The Duke campus and its eight satellite sites treat hundreds of patients a day – we have a high patient volume with many complex cases.



### Our mission

We pledge to provide expert, compassionate and prompt clinical service to our patients; to generate new knowledge concerning causes, prevention and treatment of cancer; to transmit new knowledge from our clinical and laboratory research; and to actively participate in and further the missions of the Duke Cancer Institute, Duke Health and Duke University.

### Our vision

We envision the Department becoming a globally preeminent academic radiation oncology department; recognized for exceptional clinical care, the conduct and reporting of important research and the practice of effective teaching. As one of the largest and most active academic radiation oncology programs in the country, we recognize our responsibility to the public we serve.

## What procedures do you perform?

Duke provides a **broad range of radiation treatment techniques**, from 2D/3D techniques to advanced radiation therapy techniques including image-guided radiation therapy, SRS/SBRT, IMRT, VMAT, TBI/TSI, IORT and electron beam therapy. Further, we have an **active brachytherapy program** providing high dose rate brachytherapy for gynecological, prostate and intraoperative sites; low dose rate brachytherapy for treatment of prostate cancer; and eye plaque brachytherapy for treatment of ocular melanomas.

## What resources do you have?

Duke's Department of Radiation Oncology boasts an impressive array of resources. With **eight LINACs on the main campus**, and multiple satellite locations, residents are likely to participate in important clinical activities such as **LINAC commissioning**. Main campus includes the following Varian LINACs and HDR units as well as imaging equipment.

- 4 TrueBeams
- 2 TrueBeam Stx with HD MLCs, ExacTrac, 6D couch
- Philips Brilliance CT
- GE Discovery RT590
- Siemens Biograph mCT PET/CT
- BrainLab Airo Mobile CT
- Siemens 3.0T Skyra MR simulator
- 2 GammaMedPlus iX HDR afterloaders

Additionally, we have licenses for cutting edge software like VelocityAI, MIM, Brainlab iPlan and Varian Developer Mode.

## What are resident responsibilities?

From the first day of the residency, **residents are valued members of our team** and are responsible for many clinical activities under the supervision of our faculty members:

- Patient specific QA (IMRT and VMAT, electron cutout measurements, and in-vivo dosimetry)
- Machine-specific QA (monthly & annual) for: External Beam Therapy and Brachytherapy; imaging equipment (MR, PET, CT, CT simulator)
- Heavily involved in clinical treatment planning for all treatment sites
- Weekly chart rounds



Training at Duke played a large role in shaping the kind of physicist I am today. I was given the opportunity to not only learn from **some of the most renowned physicists and physicians in radiation oncology**, but to collaborate with them and help **make a difference in patient care**. While the technology and special procedures speak for themselves, the style of teamwork and commitment to training residents is really what distinguishes the Duke residency program. I was provided with all of the necessary tools to become an independent and safe medical physicist and **I couldn't be more grateful for that experience.**

*—Irina Vergalasova, PhD, Former Resident*



## What is the curriculum?

The residency program consists of the following clinical rotations covered in a 24-month training time:

- Machine-specific and patient-specific quality assurance
- Linac acceptance and commissioning
- Treatment planning for 2D, 3D, IMRT and VMAT
- Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy and Image Guided Radiation Therapy
- Brachytherapy for LDR and HDR sources
- Total Body Irradiation and Total Skin Irradiation
- Imaging for CT, US, PET/CT and MRI
- Radiation safety

Each rotation covers several training topics with multiple learning objectives. Each training topic is individually evaluated and summarized through a report, a competency assessment and an oral examination given by rotation supervisors and program directors. Rotation staff and examiners can provide formal feedback to program and resident on performance. Residents can provide feedback on the rotation to the program as well. Documentation of a resident's progress is maintained electronically.

Applicants are expected to have finished most or all of the courses (equivalency is determined by the residency program) prior to start of residency. The rest will be made up during residency. However, CAMPEP limits the number of makeup courses to two within the two-year clinical training period.



The didactic component of the program consists of a standard list of references for each rotation, weekly resident presentation series and participation in the AAPM Multi-institutional Residency Program Journal Club. Additionally, seminars include departmental weekly chart rounds, grand rounds and morning conference.



Duke provides a **well-structured, comprehensive and in-depth** radiation therapy physics training in a fast-paced and high-patient load academic setting. Our strong support of education, variety of resources and equipment and most importantly our exceptional staff and faculty are what make Duke unique. At graduation I am always so proud and impressed by the development of our residents into competent, independent and thoughtful medical physics professionals!

—*Anna Rodrigues, PhD, Program Co-Director*

## Are there research opportunities?

Research is an integral component of our residency training. Our residents have research opportunities in both cutting-edge novel technology development and clinically-oriented projects, as well as working with radiation oncologists on clinical trials. Further, residents have resources and opportunities in other partner departments (radiology, computer science, biomedical engineering) for research collaborations.

See our resident scholarly activities:

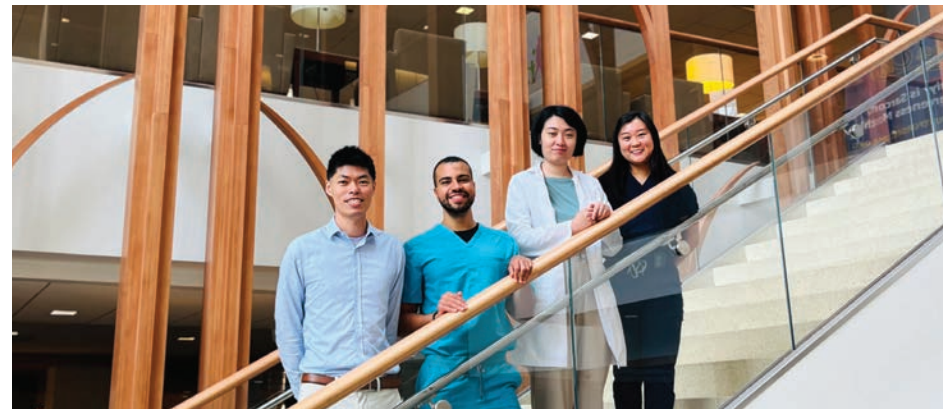
**[bit.ly/MedPhysScholarlyActivities](https://bit.ly/MedPhysScholarlyActivities) »**

## Our medical physics research

The medical physics division at Duke has a long history and a strong track record of physics research. The Duke School of Medicine, the Department of Radiation Oncology and the Medical Physics Division all actively encourage and strongly support physics research efforts.

Physicists recruited in the faculty track have 20% academic time, equivalent to 1 day per week, to work on self-initiated research projects and other academic activities. There are 5 physics faculty members that have previously received, or have currently ongoing, NIH R01 level research grants. There are currently 10 PhD students funded by research grants.

Duke physicists work closely with, and recruit graduate students from, the Duke Medical Physics Graduate Program. Duke physicists also work on joint research projects with physicists in the Department of Radiology, radiation oncologists and biologists in the Department of Radiation Oncology and faculty members in Duke's engineering school.



## Research directions

Duke physics research directions are broad due to the high number of physics faculty members engaging in research projects. Major research directions include novel radiotherapy techniques, 3D dosimetry and optical bio-imaging, 4D radiotherapy and motion management, quality assurance and safety, novel brachytherapy techniques, knowledge-based planning and decision support, radiosurgery, SBRT, image guidance, novel CBCT image acquisition and reconstruction, cardiac RT, medical imaging science, AI and applications, adaptive therapy and radiomic analysis. ***More details can be found here >>***

## Research support and resources

The Department of Radiation Oncology supports physics faculty members by providing protected time for research and academic efforts. There are two ongoing R01 grants in the physics division and four R01 grants were submitted in summer 2023. Dr. Deshan Yang was recruited as the physics research director in December 2021 to continue building the physics research portfolio, manage the physics research efforts and mentor physics faculty members on research projects and grant preparation.



Duke really cares about our resident life. We provide a balanced workload with plentiful clinical experiences that prepare residents for a future clinical practice and instill an initiative for academic medicine. We have a very diverse and nationally recognized team who are dedicated teachers. All are willing to listen to residents, help residents master clinical procedures, and promote the academic medicine environment. Our curriculum is supplemented by collaboration with other institutions for external training.

—**Yongbok Kim, PhD**, Program Co-Director

Duke University Hospital  
**Cancer Center**

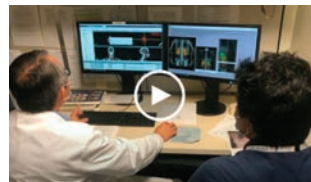


## Why Duke?

- Top-ten medical school and university
- Prestigious medical center
- Large and expanding practice (>150 patients/day)
- State-of-the-art equipment and advanced procedures
- Excellent teams of physicists, radiation oncologists, dosimetrists and therapists
- Research opportunities in various topics
- Travel funding for scientific meeting
- Excellent placement statistics
- Affordable and exciting life in the Research Triangle area

View our **Why Duke? residency program video**, with interviews from faculty, staff, alumni and residents

[bit.ly/DukeMedPhys](https://bit.ly/DukeMedPhys) »



## Duke Recognized as a 'Best Employer'

Duke has been named as a best place to work by many prestigious publications and organizations. **Learn more »** or for more on Duke's *Forbes* 'Best-In-State Employer' designation for 2024, **click here »**

## Duke Named Among 'America's Best Employers for Women' in 2024

Duke University is among the best employers for women in 2024, according to *Forbes*. **Learn more »**

## Duke Named Among 'America's Best Employers for Diversity' in 2024

Duke University and Duke University Health System both earned spots on *Forbes*' list. **Learn more »**



Our institutional culture is built upon our history and values. Our shared values – **respect, trust, inclusion, discovery and excellence** – are more than aspirations. Our values dictate our conduct and drive our culture.

—Duke University

**Learn more about Duke's values »**



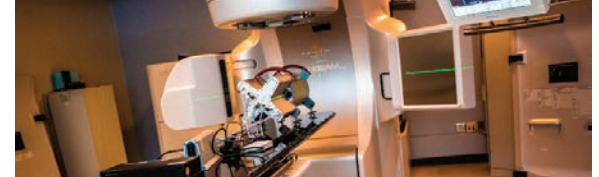
## Duke Benefit

- Competitive compensation level with annual salary reviews
- Excellent benefits package including medical, dental and vision (four health plan options)
- Health and dependent care reimbursement accounts
- Retirement plan that allows you to build retirement savings by contributing before-tax and/or Roth after-tax payroll deductions
- Employee tuition assistance program
- Children's tuition grant program
- 14 paid holidays annually
- Paid vacation
- Paid sick leave
- Employee Assistance Program
- Free health, financial and other relevant seminars and workshops
- Paid parent leave and childcare resources
- Discounted rates for Duke Fitness Club program
- Vendor discounts, including automotive, fitness, entertainment, restaurant, theater, home improvement, sporting events, hotels, technology, travel and more

***Learn more about Duke's benefits***

## Application Information

***radonc.duke.edu/education/  
radiation-therapy-physics-residency »***



### Current Residents

Kai-Cheng Chuang, PhD  
Xinyi Li, PhD  
Seifallah Emam, MS  
Lana Wang, MS

### Program Co-Directors

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