



Ph.D. DEGREE PHYSICS

Medical Physics Concentration



UToledo graduate programs in Physics and Astronomy develop a strong and broad foundation in fundamental physics, while simultaneously teaching the mathematical and problem-solving skills necessary to advance knowledge of our physical world. Coursework is tailored to your specific area of research concentration, with flexibility, so you acquire the skills necessary to complete an innovative, important and original thesis research project.

UToledo boasts nationally and internationally recognized faculty members in physics and astronomy. Students in our Ph.D. in Physics with Medical Physics concentration must satisfactorily complete the core physics courses and pass the physics Qualifying and Comprehensive Exams. In addition to satisfying all of the requirements for the physics Ph.D., students will complete the medical physics courses and the required clinical clerkship within the College of Medicine and Life Sciences, and will pursue appropriate dissertation research applicable to medical physics.



Physics Ph.D. with Medical Physics Degree Highlights:

- *The only CAMPEP-accredited program in the State of Ohio with both M.S. and Ph.D. degrees and a residency program.*
- *Graduates from the Ph.D. in Physics with Medical Physics concentration at UToledo have become exceptional medical physicists who are community leaders in both clinical and professional settings!*
- **Financial support.** Graduate physics students are supported through teaching and research assistantships. We also offer incentive and stipend enhancements for exceptionally qualified applicants.
- **High-tech labs and research facilities.** UToledo physics graduate students have access to state-of-the-art equipment on Main Campus (several parallel computing clusters, as well as access to the Ohio Supercomputer Cluster; radiation and diagnostic equipment to perform research in medical physics; and the Toledo Heavy Ion Accelerator (THIA). In addition to state of the art linear accelerators, high dose rate brachytherapy and a full range of diagnostic radiology equipment, access is available to the UToledo Instrumentation Center) and on the Health Science Campus (Treatment Planning Systems including Pinnacle, Eclipse, RayStation, a wide range of radiation measuring equipment including a full range of dosimetry and quality control test equipment, Wellhoffer computerized beam scanning system, an array of ionization chambers, packages for film dosimetry and analysis, oscilloscopes and test phantoms are available. Also available are multichannel analyzer scintillation detectors, autogamma, and liquid scintillation counters, diode, thermoluminescent dosimetry (TLD) systems as well as OSLDs, RIT software package and scanners for regular film and chromic film dosimetry system).
- **Research opportunities.** Faculty and students in UToledo's Ph.D. in Physics with Medical Physics concentration work closely together to conduct world-class research. Our primary areas of research include: Medical Physics - Radiation Oncology, Medical Physics - Diagnostic Radiology, Biological Physics and Applied Accelerator-Base Physics.

PROGRAM OVERVIEW

Ph.D. Degree in Physics with Medical Physics Concentration

The doctoral degree in physics is awarded to a student who has demonstrated mastery in the field of physics and a distinct and superior ability to make substantial contributions to the field. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in research and related activities. Publication of research in peer-reviewed journals is expected.

This degree provides a foundation in medical physics. A strong training may be expected in research methodologies and practices, rigorous hypothesis-driven scientific investigation and the dissemination of research results and ideas through scholarly article publication as well as presentation at conferences, other universities and research settings. In general, work for the Ph.D. takes five years of study beyond the bachelor's degree.

A substantial portion of this time is spent in independent research leading to a dissertation. Normally, 90 credit hours of study beyond the bachelor's degree are required for the Ph.D.; some students may opt to get a M.S. degree during their Ph.D. program.

We encourage you to contact individual faculty members directly to discuss research interests and opportunities.

Faculty contact information is available at: utoledo.edu/med/depts/radther/pandfaculty.html

Faculty Member	Department	Area(s) of Research
Aldoohan, Sulaiman	Radiology	Spectral CT image modality and optimizing energy spectra in spectral CT
Amar, Jacques	Physics & Astronomy	Theoretical condensed matter physics, materials science and surface physics
Cheng, Song	Physics & Astronomy	Ion-atom and molecule collisions
Karpov, Victor	Physics & Astronomy	Theoretical condensed matter physics and photovoltaics
Lee, Scott	Physics & Astronomy	Biophysics and high-pressure physics
Maklad, Adel	Neurosciences	Anatomy and physiology
Parsai, E. Ishmael	Radiation Oncology	Development and implementation of new and innovative tools and treatment devices/techniques ...
Pearson, David	Radiation Oncology	Adaptive Therapy - the ability to change a patients plan based on the assessment of daily imaging ...
Ray, Aniruddha	Physics & Astronomy	Utilizing nanotechnology and optical imaging for biophysical and medical applications
Shvydka, Diana	Radiation Oncology	Thin-film radiation detectors, multilayer radiation detectors, radiation transport Monte Carlo ...
Sperling, Nicholas	Radiation Oncology	Monte Carlo based treatment planning using scalable computing cluster, exit portal image ...

- The Ph.D. in physics with medical physics concentration satisfies all of the requirements for a Ph.D. in physics degree while preparing students for a career in medical physics.
- The medical physics-related courses, which total at least 27 credit hours, are provided by the College of Medicine and Life Sciences.
- The student's faculty advisory committee will consist of faculty members from the Department of Physics and Astronomy and the medical physics fields. The committee may also include other members appropriate for this degree.
- A dissertation research project is chosen that will have relevance to both physics and medical physics.
- The Ph.D. requirement of 18 additional credit hours outside the core courses will be satisfied by the specified additional graduate courses in physics and in medical physics.

What to expect when you graduate ...

Graduates of UToledo's Ph.D. program in physics typically advance to postdoc programs or take jobs in the industry. Medical physics graduates pursuing clinical careers enter residency programs, often offering clinical/research training opportunities.

Alumni of UToledo's graduate programs in Physics with Medical Physics concentration have landed positions at institutions such as: Dana-Farber Harvard Cancer Center, Fox Chase Cancer Center, Johns Hopkins University, Radiation Oncology Department at Stanford University, Trident Cancer Center, University of Arkansas for Medical Sciences (UAMS), University of California System, University of Toledo College of Medicine and Life Sciences and more.

Admission requirements, guidelines, and application information can be found at: utoledo.edu/graduate/apply.

If you have questions about the application process, contact 419.530.4723 or graduateonlineapplication@utoledo.edu.