

# Joint Council Symposium

## Celebrating Recent Accomplishments of the AAPM

### Education Council:

## Promoting Medical Physics through the AAPM Public Education Committee Website

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# UC San Diego

RETHINKING MEDICAL PHYSICS



# Disclosures

- Speaker & Consultant
  - Merit Medical
  - Varian Medical
- Board of Directors
  - UC Center for Laboratory Safety
- Funding
  - Department of Defense



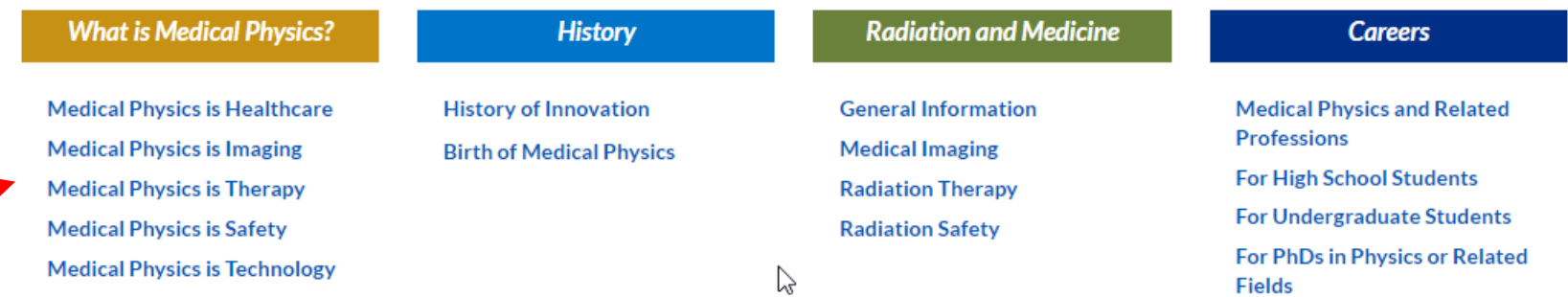
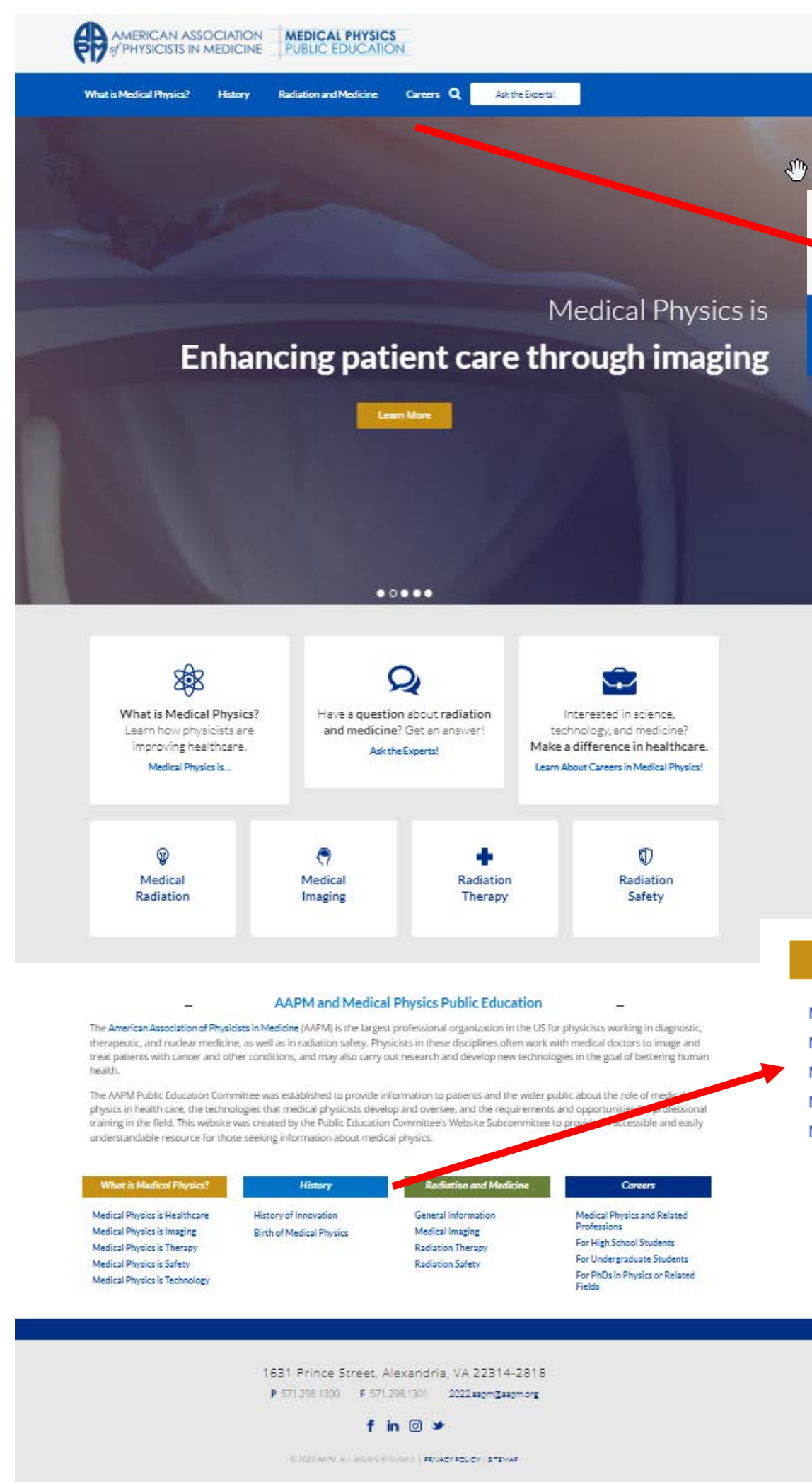
# Public Education Committee Website

[www.medicalradiationinfo.org](http://www.medicalradiationinfo.org)

- Go-live: March 21<sup>st</sup>, 2022 @ 12 Eastern
- Purpose: Provide a high quality website that is an accessible and easily understandable resource for those seeking information about medical physics.
- Media Format: Text, Picture and Video
- Funding: AAPM and American Institute of Physics (AIP) for Ask the Experts
- Collaborations: American Association of Physics Teachers (AAPT)



# Main Page



# Sections

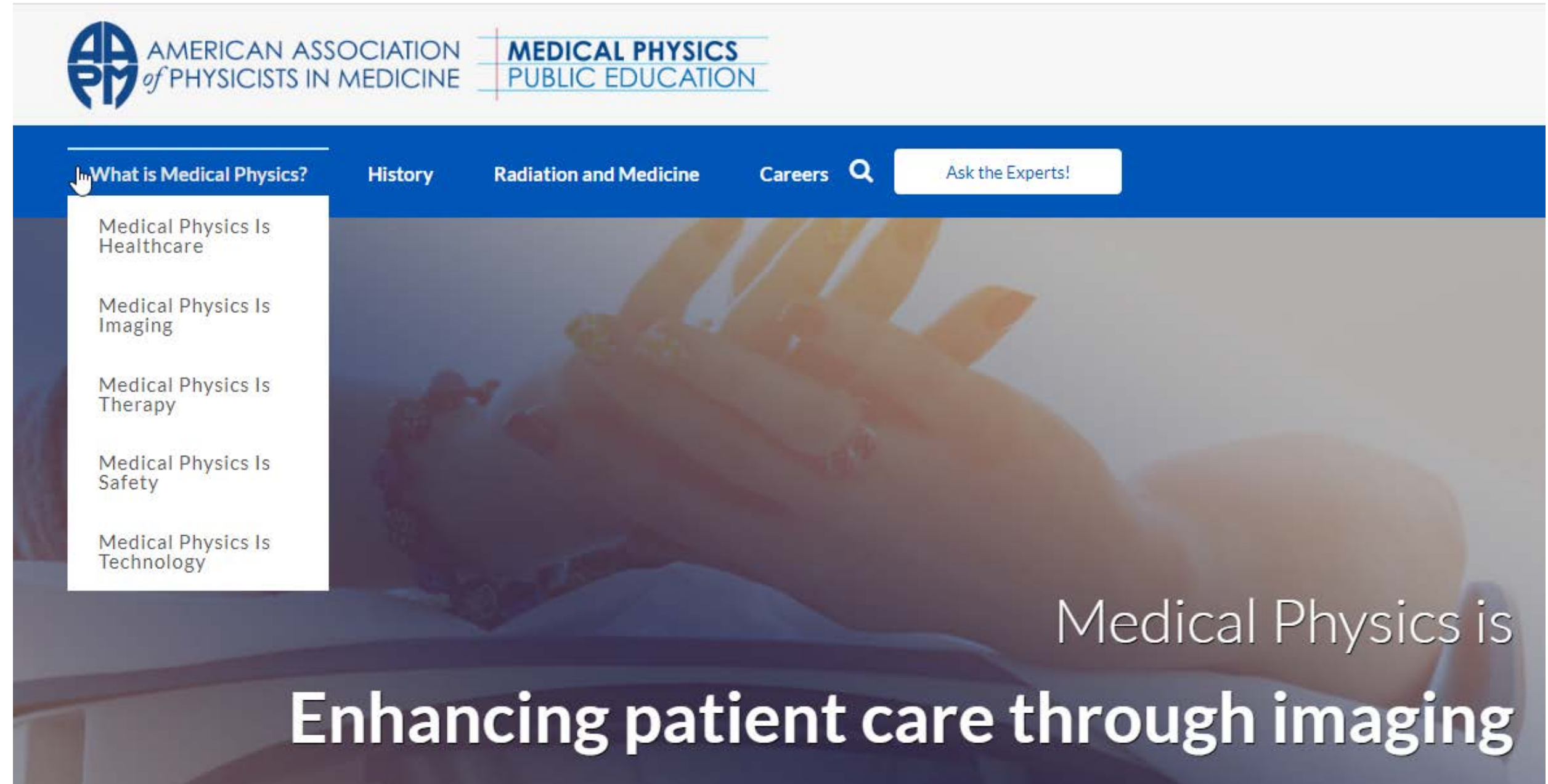
- What is Medical Physics?
- History
- Radiation and Medicine
- Careers
- Ask the Experts



<i>What is Medical Physics?</i>	<i>History</i>	<i>Radiation and Medicine</i>	<i>Careers</i>
<a href="#">Medical Physics is Healthcare</a> <a href="#">Medical Physics is Imaging</a> <a href="#">Medical Physics is Therapy</a> <a href="#">Medical Physics is Safety</a> <a href="#">Medical Physics is Technology</a>	<a href="#">History of Innovation</a> <a href="#">Birth of Medical Physics</a>	<a href="#">General Information</a> <a href="#">Medical Imaging</a> <a href="#">Radiation Therapy</a> <a href="#">Radiation Safety</a>	<a href="#">Medical Physics and Related Professions</a> <a href="#">For High School Students</a> <a href="#">For Undergraduate Students</a> <a href="#">For PhDs in Physics or Related Fields</a>

# What is Medical Physics?

- Healthcare
- Imaging
- Therapy
- Safety
- Technology



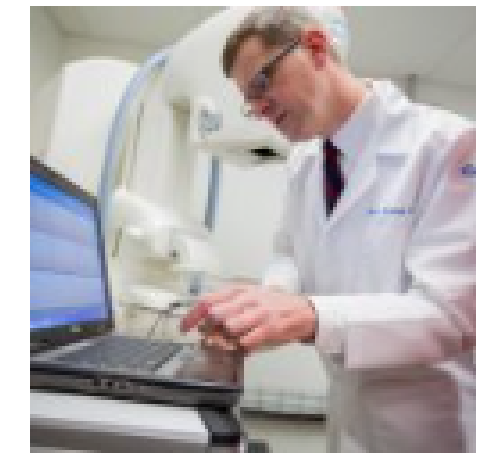


# What is Medical Physics? (Example)

- Imaging

Medical physics is **enhancing patient care through imaging**

High-tech imaging is an integral part of modern health care. [CT](#), [PET](#), and [MRI](#) scanners in particular have become invaluable tools for [imaging](#) patient anatomy and identifying disease. (This field of medicine is known as “diagnostic imaging.”) Medical physicists are closely involved in the calibration and operation of these scanners to help optimize image quality and minimize safety risks.

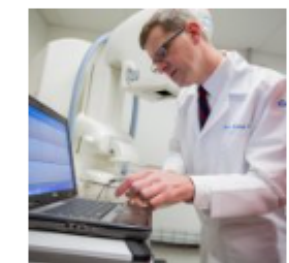


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Medical physics is **enhancing patient care through imaging**

PET, or positron emission tomography, is an imaging method that uses low amounts of radioactive material to identify areas of disease.

High-tech imaging is an integral part of modern health care. [CT](#), [PET](#), and [MRI](#) scanners in particular have become invaluable tools for [imaging](#) patient anatomy and identifying disease. (This field of medicine is known as “diagnostic imaging.”) Medical physicists are closely involved in the calibration and operation of these scanners to help optimize image quality and minimize safety risks.



# History

- History of Innovation
- The Birth of Medical Physics Acts and Institutions





# History - Timelines

## Timeline: A History Of Innovation And Discovery



### A History of Innovation and Discovery

#### 1800s

##### 1895

- Wilhem Conrad Roentgen produces and discovers x-rays.

##### 1896

- Antoine Henri Becquerel discovers natural radioactivity.

##### 1898

- Marie Skłodowska-Curie and Pierre Curie announce the discovery of radium, a radioactive element.

#### 1900s

##### 1901

- The first Nobel Prize in Physics is awarded to Wilhelm Conrad Roentgen for discovering x-rays.

##### 1903

- The Nobel Prize in Physics is awarded to Antoine Henri Becquerel for "his discovery of spontaneous radioactivity," and to Pierre Curie and Marie Skłodowska-Curie for "their joint researches on the radiation phenomena discovered by Professor Henri Becquerel."
- An afterloading technique for brachytherapy is proposed by Hermann Strebel.

##### 1908

# Radiation and Medicine

- General Information
- Medical Imaging
- Therapy
- Safety

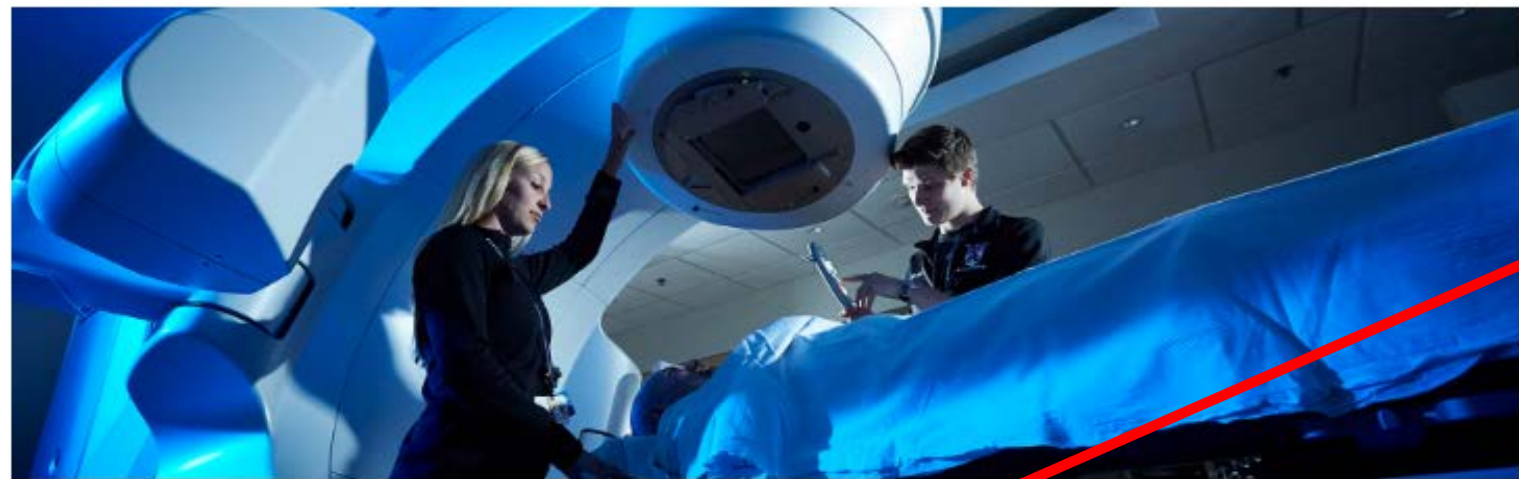


# Radiation and Medicine (Example)

- Radiation Therapy

Home / Radiation And Medicine / Radiation Therapy

## Radiation Therapy



### Radiation Therapy Treatment Options

- What is a medical linear accelerator (linac)?
- What is CyberKnife?
- What is Gamma Knife?
- What is brachytherapy?
- What is proton therapy?
- What is immunotherapy?

### Additional Radiation Therapy Topics

- Are there any side effects to radiation therapy?
- How do medical physicists ensure the quality of radiation therapy?
- MR-Linacs

Home / Radiation And Medicine / Radiation Therapy / What Is A Medical Linear Accelerator (Linac)?

## What Is A Medical Linear Accelerator (Linac)?

A medical linear accelerator, or *linac*, is a particular type of machine that produces high-energy x-ray or electron beams for use in radiation therapy. This method of treatment is commonly referred to as "external-beam radiation therapy" because the radiation beams are generated at a distance outside the patient's body.



Home / Radiation And Medicine / Radiation Therapy / What Is Brachytherapy?

## What Is Brachytherapy?

Brachytherapy refers to **radiation** treatments performed at short distances. (The prefix "brachy" comes from the Greek word for "short.") This typically involves placing small radioactive sources inside or next to the patient's body, usually to treat cancer. Brachytherapy sources are usually small pellets of radioactive material, though in some cases small electronic x-ray devices may be used.

What are the **advantages** of brachytherapy?



# Careers

- Medical Physics and Related Professions
- High Schoolers
- Undergraduates
- Grads





# Careers (Example)



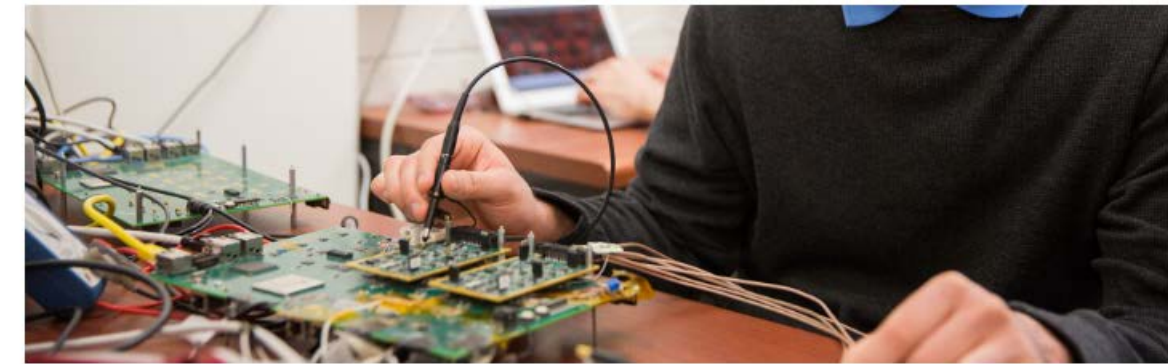
## Interested in a Medical Physics Career?

Interested in healthcare, technology, and physics? Read on to learn how to become a medical physicist!

Careers in Medical Physics and Related Professions	Information for High School Students
Information for Undergraduate Students	Information for PhDs in Physics or Related Fields

## References

- [SDAMPP Student Guide to a Medical Physics Career](#)  
The Society of Directors of Academic Medical Physics Programs (SDAMPP), 2016
- [Academic Program Recommendations for Graduate Degrees in Medical Physics](#)  
AAPM Report #197, 2009
- [Essentials and Guidelines for Clinical Medical Physics Residency Training Programs](#)  
AAPM Report #249, 2013
- [The Essential Medical Physics Didactic Elements for Physicists Entering the Profession Through an Alternative Pathway](#)  
AAPM Report #197S, 2011
- [Alternative Clinical Medical Physics Training Pathways for Medical Physicists](#)  
AAPM Report #133, 2008



The purpose of a high school education is to prepare maturing teenagers for the transition into self-sufficient adults contributing to a vibrant society. High school cultivates the skills and academic talents necessary for young adults to become the next generation of business leaders, entrepreneurs, skilled laborers, teachers, doctors, engineers, health care professionals, and other workers needed to keep society thriving.

If you are currently in high school, you might be considering continuing your education at the university or technical college levels to acquire the skills needed to qualify for entry into intellectually stimulating and interesting occupations.



If you have a PhD in physics or a related field, you can pursue an alternative pathway to becoming a medical physicist.

To become a *clinical* medical physicist, you will need to fulfill the following requirements:

1. **CAMPEP-Accredited Medical Physics Certificate Program**  
Medical Physics certificate programs in North America are accredited by the [Commission on Accreditation of Medical Physics Education Programs \(CAMPEP\)](#), and provide medical physics didactic coursework required to enter a residency program.
2. **CAMPEP-Accredited Medical Physics Residency**  
Medical physics residency programs provide hands-on clinical training in diagnostic/nuclear medical physics or therapeutic medical physics. Residency training is required in order to be board eligible and work as a Qualified Medical Physicist (QMP) in the clinic.
3. **Board Certification**  
Clinical medical physicists typically seek board certification in their clinical specialty. Board certification is organized by entities such as the [American Board of Radiology \(ABR\)](#), the [American Board of Medical Physics \(ABMP\)](#), the [Canadian College of Physicists in Medicine \(CCPM\)](#), or the [American Board of Science in Nuclear Medicine \(ABSNM\)](#). A certificate showing that you've graduated from a CAMPEP-accredited residency program is required to take the board exam.

# Ask the Experts (ATE)

- Easily submit questions
- Response ~ 1 week
- Pre-populated questions
- 7 questions submitted so far
- Technical
  - Why is Co-60 SSD 80cm?
  - How to measure FWHM in CT with Gafchromic film and Image J?
- Career
  - Why are gov MPs paid so much less than private sector MPs?
- 1 x Patient

The screenshot shows the 'Ask the Experts' page from the American Association of Physicists in Medicine (AAPM) Medical Physics Public Education website. The page features a blue header with navigation links: 'What is Medical Physics?', 'History', 'Radiation and Medicine', 'Careers', and a search icon. A prominent white button labeled 'Ask the Experts!' is located in the top right of the header. Below the header, a dark blue banner contains the text 'Home / Ask The Experts!' and 'Ask The Experts!' in white. The main content area has a white background and contains a welcome message: 'Welcome to AAPM’s “Ask The Experts” page! This is where you can get answers to your medical physics questions. We invite you to express your curiosity about physics in medicine, especially the applications that our team of experts specialize in – medical imaging and radiation therapy. We ask for your email address to acknowledge receipt of your question and to provide you with a response. We may add your question to our public question & answer list, but your email address and identity will not be made public.' Below this message is a 'Submit a question' section with two email input fields labeled 'Email \*' and 'Confirm Email'. A 'Your Question \*' text area is positioned below the email fields. A blue 'SUBMIT' button is located below the question text area. At the bottom of the form, there is a search section with the text 'Search for words in a previously asked question or answer:' and a search input field with 'Search' and 'View all Q&A' buttons.



# Ask the Experts (ATE) (Examples)

Do patients need to cease breastfeeding after a chest x-ray exam? —

No, patients do not need to cease breastfeeding after a chest x-ray exam. The x-ray interactions with the body are complete as soon as the machine finishes taking the image. There is no lingering radiation inside of the body.

How should I interpret the sounds I hear during an MRI exam? —

While you are inside the scanner, the various clicking, buzzing and vibration noises that you hear are produced by magnetic field gradient coils that localize the information inside your body and produces images. It is important to keep still while you hear these noises throughout the exam, or else the images produced will be distorted or blurred. The technologist should advise you when it is ok to move or adjust your position, such as during the quiet period in between imaging sequences. While imaging is taking place, it is generally ok to make small movements using parts of your body not in the imaging field, such as toes or fingers during a head or body exam.

I recently had a brain aneurysm treated, the first treatment included stents and coils and had around 2140 mgy of radiation. Recently, about 6 months later I had an angiogram and they saw coil compaction and added more coils, with the second treatment having around 2100 mgy. My question is, from these did I increase my cancer risk significantly? +

Am I radioactive when I go home after an EBRT or HDR procedure? —




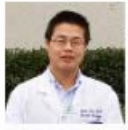









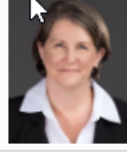







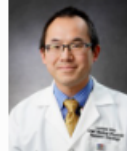









No. You are not radioactive and pose no risk to those around you. The radiation you were treated with is a special kind of energy delivered to your disease in the form of small particles (electrons) or waves (gamma or x-ray radiation). When delivered, some of this energy passes through, reflects off, or is absorbed by your body. The portion of that energy that does not pass through or bounce off the body is absorbed and transfers its energy to tissues (which is how it kills cancer cells). None of this energy remains as a radiation source inside of the body.

This concept is distinct from the term "radioactive" which describes something that emits radiation as part of its physical nature. If you were treated via high dose-rate brachytherapy (HDR), you were treated with a form of the metal iridium which is radioactive. This source emitted radiation, which interacted with your body as described above, and then was retracted from your body. Since the radioactive source is no longer in your body, you are not radioactive and are no longer receiving the radiation. If you were treated with a linear accelerator, nothing radioactive ever entered your body.

I am Colombian medical physicist (10 experience years in radiation therapy) and I would like to work as medical physicist in United States, its possible take a residencia and next present the three parts of ABR?, what I have to do? Thanks. +

# Thank you

- AAPM HQ and staff
- Education Council
- Public Education Committee & PE Subcommittees
- George Sandison and many others

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