Rajeev Bansal

Never the Twain Shall Meet?

In the prologue to his new book [1], Canadian scientist Jacob Van Dyk reports the following incident from his own life:

> In 1978, I was summoned to jury duty in Peel County…I was part of a large jury pool of about 140 from which names were selected…Lo and behold, my name was called, "Jacob Van Dyk, 2315 Bromsgrove Rd., Mississauga, medical physicist." Even from the back of the room, I could read the lips of one of the lawyers for the accused lean over to his colleagues and whisper, "What's a medical physicist?"

Good question! When I was in high school, students on the engineering track chose advanced mathematics, while future doctors studied biology. It seemed "self-evident" in those days that there was not much in common between the two professions. As a result, I did not take my first biology course till I was in graduate school and became interested in the biomedical aspects of electromagnetic waves.

So what exactly is medical physics? Van Dyk notes that a treatise called *A Text-book of Medical Physics* was published in Philadelphia in 1885, which explained the following in its preface [1]:

> Broadly speaking, this work aims to impart knowledge of the relations between Physics and Medicine in their latest state of development, and to embody in the pursuit of this objective whatever experience the author has gained during a long period of teaching this special branch of applied science.

When I was in high school, students on the engineering track chose advanced mathematics, while future doctors studied biology.

He adds that the textbook touched on a wide range of topics, including microscopy, vision, electricity, and electromagnetism [1].

Modern medical physics, which focuses on the use of radiation (both ionizing and nonionizing) and radioactive sources for biomedical imaging and treatment, can trace its roots to the pioneering work of physicists at the end of the 19th century. In 1895, Wilhelm Roentgen discovered X-rays and used them to image the bones of a human hand [2]. In 1901, he received the very first Nobel Prize in Physics [2]. In 1896, Henri Becquerel discovered spontaneous radioactivity in uranium salts. He shared the 1903 Nobel Prize in Physics with the Curies [3]. While the discovery of X-rays was the steppingstone for medical imaging, it was the subsequent development of computer-assisted tomography (CT scans) that really expanded their role in diagnostics by creating cross-sectional images of the human body. For this, physicist Allen Cormack and engineer Godfrey Hounsfield were awarded the 1979 Nobel Prize for Physiology or Medicine [4]. In 2003, another physicist shared the Nobel Prize for Physiology or Medicine. This time it was Peter Mansfield, whose discoveries concerning nuclear magnetic imaging led the way to modern magnetic resonance imaging (MRI) [4]. It is interesting to note that MRI does not require the use of ionizing radiation for creating detailed maps of the tissues and organs inside the body.

If this capsule history of the Nobel Prizes related to medical physics piques your curiosity about the field, you may want to dip into Van Dyk's book [1], which brings the story of medical physics to the present day with contributions from 22 leading medical physicists from around the world. Happy browsing!

REFERENCES

[1] J. Van Dyk, *True Tales of Medical Physics: Insights into a Life-Saving Specialty*. Cham, Switzerland: Springer-Verlag, 2022.
[2] "The very first Nobel Prizes." Nobel Prize. Accessed: Nov. 5, 2022. [Online]. Available: https://www.nobelprize.org/prizes/themes/the-very-first-nobel-prizes/
[3] "Henri Becquerel: Facts." Nobel Prize. Accessed: Nov. 5, 2022. [Online]. Available: https://www.nobelprize.org/prizes/physics/1903/becquerel/facts/
[4] T. Freeman. "Breaking boundaries: How physicists won the Nobel prize for Physiology or Medicine." PhysicsWorld. Accessed: Nov. 5, 2022. [Online]. Available: https://physicsworld.com/a/breaking-boundaries-how-physicists-won-the-nobel-prize-for-physiology-or-medicine/

Digital Object Identifier 10.1109/MAP.2022.3223647
Date of current version: 30 January 2023