Top 10 Things You Didn't Know You Loved About Nuclear Physics

1. ***Radiocarbon Dating*** - This technique that revolutionized modern archeology was developed from basic research on cosmic rays in the 1940s. It makes use of the fact that the rare isotope ^{14}C is continually created in earth's atmosphere by cosmic rays.

2. ***Smoke Detectors*** - This technology was first conceived in 1890 "by accident" during an experiment on the light-refracting properties of ionized gases. Modern versions rely on a technology developed in the 1960s using a rare isotope of americium, ^{241}Am.

3. ***Well Logging for Oil and Gas Exploration*** – First applied in the early 1960s, modern radiation sensors and neutron generators are commonly used to measure the potential of new oil field finds before major drilling commences.

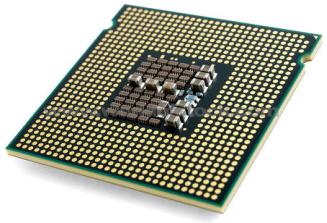
4. ***Advanced Medical CT Scanners*** - The first tomographic imaging concept was developed by an Italian radiologist exploring early uses of photographic film to study radioactive decay. The step to modern CT scans needed the application of X-ray detector technology from nuclear science and more and more powerful computational capability. The new big thing is next generation methods that use advanced particle accelerators of protons to make even more sensitive scans.

5. ***Medical Diagnostic Procedures*** – In 1936 the first cancer patient was treated by radioisotopes produced by E.O. Lawrence, winner of the Nobel Prize for the invention of the cyclotron. Now, each year more than 16 million Americans benefit from diagnostic procedures based on the use of radioisotopes. Progress continues with new applications found yearly including better ways to diagnose and understand Alzheimer's disease.

6. ***Food Irradiation*** - First widely employed during World War II to help preserve rations for U.S. troops, use of gamma rays from radioactive cobalt for food irradiation now helps eliminate pathogens and extend the shelf-life of more than 500,000 tons of food each year.

7. ***Radiation Detectors at Ports*** - The first radiation detector was invented in 1908 by scientists searching for the nature of the atomic nucleus. With modern accelerator technology and advanced radiation detectors developed for basic research we have a means to monitor material coming into the U.S.

8. ***MRI Imaging*** - The concept of nuclear magnetic resonance was discovered in the 1930s by researchers studying the physics of spinning nuclei by placing them in strong magnetic fields and irradiating them with radio waves.



9. ***Modern Manufacturing*** – Particle beam technology developed for nuclear science in the 50s and 60s is now used to treat or inspect a wide range of products worth over $500 billion per year. New accelerator technology inspired by nuclear science is leading to the next generation of these methods.

10. ***The Next Big Thing*** - Right now a nuclear physics researcher, possibly even one of the ATLAS, FRIB, JLAB, or RHIC users, is working on research that will lead to the next innovation that will change the world! The question is not if, but when and where.