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Former University of Dayton researcher, the late Karl J. Strnat, has joined the ranks of Alfred Nobel, Marie Curie and Charles Goodyear in a new compilation of the 100 "Greatest Moments in Materials Science and Engineering" – a list that spans roughly 30,000 years.

Starting in 28,000 BC, when scientists believe the first ceramics were fired, the list — compiled and published by the Journal of Materials — yields some household names and events, such as Charles Goodyear's invention of vulcanized rubber in 1844, Alfred Nobel's patenting of dynamite in 1867, and Pierre and Marie Curie's discovery of radioactivity in 1896. Scroll down 70 years, and there in 1966 is Karl Strnat, noted along with coworkers for the discovery of "magneto-crystalline anisotropy in rare earth cobalt intermetallic compounds," which "leads to the fabrication of high-performance permanent magnets of samarium-cobalt and, later, neodymium-iron-boron for use in electronic devices and other areas."

Say again? If you own a car, have flown in an airplane, talked on a cell phone, operated a video or digital camera or have been subjected to an MRI, you are "benefiting from the discovery of the amazing magnetic properties of rare earth-cobalt alloys by Dr. Karl Strnat and his co-workers," said former colleague Alden Ray, who with Strnat and fellow researcher Herb Mildrum established the Magnetics Laboratory in the University of Dayton Research Institute.

"Permanent magnets made from these and later-generation related materials (REPMs) are many times stronger and more stable than the magnets they replaced. This permitted not only the miniaturization of devices that previously required heavy and bulky magnets, but also gave rise to the development of many electronic devices that require tiny motors, speakers, transmitters and receivers and more. The U.S. Air Force Materials Laboratory considered REPMs one of the most, if not the most, important materials development in its 75 year history."

Strnat was manager of the magnetics program and a professor of electrical engineering at UD from 1968 until his retirement in 1990. He died in 1992.

"Karl was an excellent teacher, a tireless researcher and an amiable friend," said Distinguished Research Engineer Shiqiang "Sam" Liu, who worked with Strnat and Ray as a doctoral student and later returned to UDRI to continue his mentor's work in the magnetics lab. "Our world is better because of his work."

Pioneering work in magnetics has continued at UDRI, where researchers have in recent years again achieved significant breakthroughs in rare-earth permanent magnet technology. Led by Liu, the research team discovered a way to manipulate nanometer-sized particles of hard and soft materials to create "nanocomposite" magnets. Lighter but tougher than their existing counterparts, they possess the potential for great magnetic strength and have already produced record-breaking energy levels in the Research Institute lab.

Liu said the groundbreaking research and development of first- and second-generation rare earth permanent magnets that came out of the lab paved the way for high-performance magnets now used in countless commercial and military applications, and the refinement of nanocomposite magnets will again yield significant improvements to the way people live, work, travel and communicate.

"The impact of this new technology will be far-reaching, with benefits to the fields of scientific, medical and technological research and development – as well as to the environment and economy. It will effect everything, from faster and smaller computer hard drives to more efficient hybrid and hydrogen-powered automobiles to improved communication, electronic and medical devices."