

RIT's NanoPower lab wins \$1.2 million to build tiny power supplies for military

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Defense Advanced Research Projects Agency funds three-year project

Scientists at Rochester Institute of Technology's NanoPower Research Laboratories (NPRL) won \$1.2 million from the Defense Advanced Research Projects Agency (DARPA), part of the U.S. Department of Defense, to develop **tiny power supplies for military use**.

This three-year project will improve the efficiency of alpha voltaic batteries to operate miniature military devices with sensing and communication abilities. A team of RIT researchers, led by Ryne Raffaele, professor of physics and microsystems engineering and director of the NPRL, will work in collaboration with scientists at the NASA Glenn Research Center.

Alpha voltaic batteries use a radioisotope such as Americium, the substance commonly used in smoke detectors, coupled with a semiconductor device that acts like a solar cell to convert alpha energy into usable electricity.

While the use of radioisotopes promises a long-lasting battery, problems with radiation damage have stalled this technology for half a century. Damage occurs from alpha particles emitted by the radioisotope hitting and degrading the semiconductor and rendering the battery inoperable.

Raffaele's team will use a new application of nanotechnology materials to protect the semiconductor from radiation damage. This solution will

buffer the semiconductor with a layer of radiation-tolerant quantum dots- or granules of semiconductor material-placed on the surface of the semiconductor to protect it from the harmful particles.

The project will conclude with the full manufacture of the device and plans for commercial production with Alpha V Inc.

Source: RIT

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