Research team receives $1.5 Million NSF NRI Grant to explore nanorobotics design for cancer diagnosis and treatment

A UW mechanical engineering professor will explore nanorobotics design based on magnetically-active helices for cancer diagnosis and treatment through a new $1.5 million Nano Robotics Initiative (NRI) grant from the National Science Foundation (NSF).

Nabtesco Endowed Professor Minoru Taya is the lead investigator for the team, which also includes researchers from electrical engineering and radiology.

Through the support of the grant, the team hopes to demonstrate how mechanical stress can be used to induce apoptosis/necrosis type cell death — the killing off — of cancer cells by using nanorobots under a magnetic field which is available within MRI chamber where the MRI can also be used to locate the nanorobots.

In particular, they have been exploring ways to synthesize mechanically flexible nanohelices. When these structures are made of magnetically active material and controlled under a magnetic field, the researchers contend that they can be designed into new robotics system for diagnosis and treatment of difficult-to-treat cancers.

The goal of the NSF's National Robotics Initiative is to accelerate the development and use of robots in the United States that work beside or cooperatively with people. The program supports the development of the next generation of robotics, to advance the capability and usability of such systems and artifacts and to encourage existing and new communities to focus on innovative application areas.

At the UW, Taya leads the Center for Intelligent Materials and Systems (CIMS), a lab that investigates the design of actuator materials, actuators and bio-inspired design of intelligent materials and systems. It is a partnership between the College of Engineering and the Department of Botany.

Taya is the author of *Metal Matrix Composites* with R.J. Arsenault (Pergamon Press, 1989) and *Electronic Composites* (Cambridge University Press, 2005). He has just completed a third book, *Bioinspired Actuators and Sensors* (Cambridge University Press, 2016), in collaboration with several biologists.

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