

# Louisiana Tech professor receives patent for electromagnetic technology

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The United States Patent Office has issued a patent to Dr. Mark DeCoster, associate professor of biomedical engineering at Louisiana Tech University, for his invention of an "Electromagnetic Probe Device" - an innovative technology developed at Louisiana Tech's Institute for Micromanufacturing.

DeCoster, in collaboration with co-inventor Dr. Nicolas Bazan of the LSU Health Sciences Center in New Orleans, developed the device for use in conjunction with [magnetic materials](#), allowing for the movement of these materials to a desired location or for mixing in fluid fields.

"This device could be used in catheters or other medical devices to direct magnetically-tagged medicines," said DeCoster. "For example, [magnetic nanoparticles](#) linked to a drug could be directed using this device to fight cancer."

According to DeCoster, the invention allows users to see the electromagnetic probe within the microscopic field, enabling them to more easily observe and position the probe in relation to the magnetic materials. Prior to this invention, researchers had to use fixed magnets which were hard to position, and often bulky.

The probe, as an [electromagnet](#), can produce variable magnetic fields, as well as pulsed fields, and can be used in combination with a microscope for visualization, a micromanipulator for spatial control, and a catheter or endoscope for medical purposes.

DeCoster says the device is relatively inexpensive to build, and can be used both in air and in liquid, which is of great benefit for medical applications. The device can also be used to effectively control magnetic materials at both the nano- and micro-scale.

"The device could also help advance basic biomedical research by allowing research scientists to visualize how magnetic nanoparticles mix," said DeCoster.

"I will never forget when we first used this device. As we moved the probe towards a fluid containing magnetic nanoparticles, we saw a thin, even mixture of nanoparticles under the microscope form a sphere of concentrated material right before our eyes. When we turned off the device, this sphere disappeared as the nanoparticles dispersed. We videotaped this event and a picture from the video became part of the patent application."

DeCoster says that using this method could allow researchers to mix magnetic materials in liquid by turning the magnetic field on and off. Increasing the mixing rate might also be a way of heating the liquid as a result of frictional forces.

Provided by Louisiana Tech University

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