Industrial User - Ed Flynn

Magnetic sensors provide early disease detection using nanotechnology

Dr. Edward Flynn, founder and president of Senior Scientific, LLC, has developed a nanotechnology-based, magnetic imaging method for early diagnosis and treatment of cancer that could provide a significant increase in detection sensitivity; much earlier detection of certain cancers; more targeted therapies; and potentially better treatment outcomes. Senior Scientific operates out of a 3,500-square-foot laboratory at the University of New Mexico's Science and Technology Park and received about $3.5 million in research grants from the National Institutes of Health since 2002 to develop this technology.

Flynn's methodology uses a superconducting quantum interference device (SQUID) sensor array to measure the magnetic fields of labeled magnetic nanoparticles that are injected into the body. The nanoparticles are attached to cells carrying specific antibodies that bind with cancer cells, and pinpoints the exact location of diseases. The sensor system can detect 50,000 cells at a distance of 4 cm. A typical mammogram needs about 10 million cancer cells for detection.

Characterization of the properties of these nanoparticles is important in order to provide proper selection of particles and optimize cell sensitivity. Facilities at the Center for Integrated Nanotechnologies are currently being used to investigate these properties. "CINT has become Senior Scientific's primary resource for characterization because of their ability to develop, characterize, and produce nanoparticles reliably," said Flynn. "Characterizing the properties of the nanoparticles involves determining the particles magnetic strength, size, and coating, using instruments that are not available at the university, and working with CINT gives Senior Scientific control of this process." Dale Huber, a principal member of the technology staff at CINT, said, "[Flynn] is a brilliant scientist and is driven by his commitment to tackling cancer. That CINT opened its labs to Senior Scientific reflects the caliber of Flynn's achievements."

In 1998, after Flynn's second wife was diagnosed with breast cancer, Flynn began his research using magnetic particles to detect cancer cells. Flynn said, "If we can detect cancer much earlier before it spreads, there is higher likelihood for successful

From Discovery to Innovation…

treatment." Flynn's technology could lead to more targeted treatment because the method detects precisely where a cancer is located. Senior Scientific's diagnostic methods include the detection and localization of breast cancer, ovarian cancer, leukemia, rejection of transplanted organs, and Alzheimer's Disease.

Flynn's medical diagnostic breakthrough has grabbed the attention of high-tech investment firm Manhattan Scientifics Inc., leading to an agreement with Flynn and his company to acquire all the manufacturing and marketing rights, together with all commercial rights associated with Flynn's patents and intellectual property in the emerging field of nanomedicine. Marvin Maslow, chairman emeritus of Manhattan Scientifics, said, "It is not merely our goal, but our obligation to bring Dr. Flynn's extraordinary work in the field of early cancer detection and potential treatment to the world medical community. Just as we have demonstrated in the past, we intend to identify one or more appropriate Fortune 500 industrial partners in the pharmaceutical and medical device industries to bring product to market."

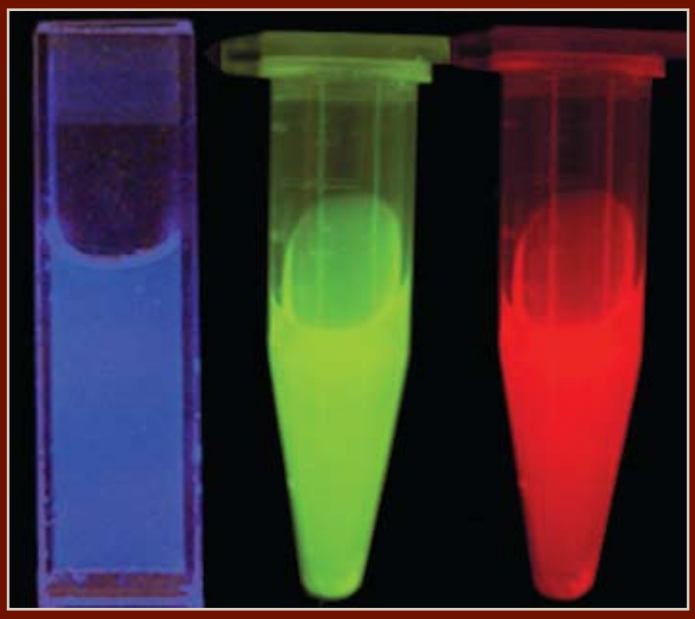
"Translating research into development by demonstrating that a method can be commercially marketed and used clinically is a major goal and challenge of the program," said Flynn. "I am confident that partnering with Manhattan Scientifics will achieve this goal, and bring the product to the medical community."

Flynn, a Los Alamos National Laboratory (LANL) Fellow, worked at LANL for 38 years, publishing 185 scientific papers in the field of nuclear physics. After the death of his first wife, Flynn began his research into medical physics, where he launched the Biophysics group, initiated the Brain Research Program at LANL, published 65 scientific papers, and was the founding Director of the Mind Research Network. Thereafter, he founded Senior Scientific, a privately-held company, pioneering his important cancer research.

For Flynn the primary reward for his cancer research would be, "To see it working; that research moves to development and becomes reality in the clinical environment. My ultimate reward is in helping people."

Scientific discovery inspires the innovation that drives economic prosperity – but discovering new properties of nanometer-size materials is insufficient to ensure technological innovation and benefit to humankind. This is why CINT focuses on integration issues. What knowledge is needed in order to exploit nanomaterials for various applications?

By attracting researchers interested in these problems, CINT creates scientific communities that tackle these challenges. In fact, virtually all of CINT's user projects involve teams of researchers: consisting of researchers from academia, research laboratories or private-sector companies working with CINT Scientists. Approximately half of the user projects involve multiple CINT Scientists, thereby pulling together the combined expertise that cannot be found in one institution.



CINT accepts hundreds of user-defined projects each year, generating knowledge that ranges from the most basic physics to valuable intellectual property protected by patents. Although the majority of the user projects involve pre-competitive research that will be published in the peer-reviewed technical literature, CINT users can conduct proprietary research as well. User proposals containing proprietary information are reviewed via a separate process to maintain confidentiality under protection of an executed Non-Disclosure Agreement between CINT (Los Alamos National Laboratory and Sandia National Laboratories) and the prospective user's institution.

CINT also recognizes that the pace of innovation often requires rapid investigation. Hence, CINT accepts "Rapid Access" user proposals, submitted via the web site, that clearly demonstrate a need for immediate access to conduct well-focused, short-term work with extremely high-impact potential. If approved, Rapid Access User Projects remain valid only until the beginning of the next available regular application cycle.

For further information about private-sector research at CINT (either pre-competitive or proprietary), please contact the CINT User Program Manager, Neal Shinn (ndshinn@sandia.gov).