



West Branch student engages in research on wear-resistant implants

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May 31, 2007, EAST LANSING, Mich. — One Michigan State University student believes that if baby boomers are expected to live longer, they will need more wear-resistant implants – those associated with knee, hip or other joint replacements.

Robert Friederichs, a junior from West Branch majoring in materials science and engineering, is melding his engineering and medical interests to study the corrosiveness and life expectancies of implant materials and coatings.

“Total joint replacements, or TJRs, such as knee and hip replacements, make it possible for people suffering from osteoarthritis and traumatic joint injuries to regain limited joint functions,” Friederichs said. “Wear of TJR implants in the body is a significant factor in shortening implant lifetimes. Improving the wear resistance has become a primary research focus with the goal of increasing the longevity of TJRs.”

Friederich has been researching diamond-like carbon, or DLC, coatings for biomedical applications with a team of MSU researchers and professors, and graduate students from Germany in the Fraunhofer Center for Coatings and Laser Applications at MSU.

Working with Melissa Baumann, associate professor of chemical engineering and materials science, and researchers in the center, who have recently developed a new type of proprietary DLC coating called Diamor, Friederichs is assessing the biocompatibility of the DLC coatings that have been applied to biomedical grade metal implant materials and alloys commonly used in hip- and knee-replacement materials.

Friederichs, who is one of three students to be named an MSU Goldwater Scholar for 2007, will use the scholarship to investigate potential problems associated with high wear of implant materials.

An Honors College student, his first foray into research was as a volunteer undergraduate research assistant with Baumann. He learned the basics of bone cell biology and biocompatibility testing. His research on how the bone cells interact with these DLCs will be submitted for publication in a biomedical engineering journal.

“My work as a part of the team of researchers who are investigating these coatings has been a valuable experience in furthering my education and career goals,” he said. “I will continue this research in the hope that I will be able to improve the quality of life for those suffering from debilitating joint diseases or injury.”

Last summer he was selected for the MSU College of Engineering Undergraduate Research Internship program, a program designed for junior engineering students.

“Despite my first-year status, the faculty, encouraged by my previous work in the classroom and in the laboratory, endorsed my internship,” he said, “I gained valuable insight into the graduate school experience and discovered I enjoyed and have an aptitude for research. Having a quality education is what makes you stand out from the crowd, and this is what has MSU provided me.”

“Rob has been a joy to mentor. Working with graduate students, he has learned how to grow bone forming cells and measure their ability to attach to materials,” Baumann said. “This research experience has fueled his goal to obtain a medical degree and also a doctorate in biomedical engineering.”

Friederichs, the son of John and Marjorie Friederichs, is a 2005 graduate of Ogemaw Heights High School.

Goldwater Scholarships, named in honor of former U.S. Sen. Barry M. Goldwater, are designed to foster and encourage outstanding students to pursue careers in mathematics, natural sciences and engineering. A total of 317 scholarships were awarded nationwide.

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