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NIH Grant to Fund Biomaterials Graduate Training Program

By Mark Dwortzan

Biologically based materials are becoming increasingly critical to the success of tissue engineering. But only two FDA-approved tissue-engineered products —skin and cartilage — are available in the United States. Commercialization and clinical implementation challenges have prevented many others from getting off the ground.

Professor Mark Grinstaff (BME), director of the Translational Research in Biomaterials program

To improve prospects for biomaterials solutions for tissue engineering and drug delivery, the National Institutes of Health (NIH) awarded a five-year training grant to the Biomedical Engineering Department that will fund four new students per year in its nascent Translational Research in Biomaterials (TRB) program. Conceived in 2006 in response to student interest, the TRB program seeks not only to train Ph.D. students in scientific aspects of biomaterials, but also to provide them with a solid understanding of clinical trials, commercialization strategies and other concepts needed to effectively transition research ideas from the laboratory to the clinic.

BME graduate students should derive significant benefits from the educational activities and research collaborations organized by TRB, said Professor Mark Grinstaff (BME), director of the program.

“Our goal is to maintain a high quality, intense, in-depth training in biomedical engineering that will prepare our students to translate technology from the lab bench to the bedside,” he said. “We believe this additional education and training will enable them to be more successful in pursuing interdisciplinary research, development and commercialization activities.”

The program’s mission is to train Ph.D. students as interdisciplinary and translational research scientists, equipping them with a fundamental and quantitative understanding of biomaterials and related disciplines, exposure to relevant engineering technologies and characterization techniques, challenging interdisciplinary research experiences and a firm grasp of the societal impact of their research.

Key program components include quantitative science and engineering courses; interdisciplinary laboratory research modules; a student-organized journal club; translational training in clinical trials, business and ethics; clinical trial experiences; and industrial internships.

Representing biomedical and mechanical engineering, chemistry, orthopedic surgery, ophthalmology, rheumatology and other disciplines, about a dozen faculty members serve as TRB teachers, mentors and research collaborators. The program reflects BME’s commitment to science-to-application design of clinically effective solutions and exploits its established interactions with Boston University Medical Campus, the Harvard Teaching Hospitals, the Center for the Integration of Medicine and Innovative Technology (CIMIT) and the Coulter Foundation.

This year’s four NIH-funded students and additional BME Ph.D. students interested in the biomaterials area will convene for the first time on Oct. 26. Over the next two semesters, the four NIH-funded students will complete six-to-eight-week rotations in three different labs, exposing them to a variety of research topics and advisors before they join a lab in the summer. Current rotations focus on corneal wound repair and cartilage tissue engineering and imaging, bone and skeletal tissue engineering, vascular disease, drug delivery and lipids for contrast agents, and smooth muscle cells and new biomaterial substrates.

“I would like our students not only to acquire in-depth knowledge of their area of specialization, but also to have a broader knowledge of what it takes

to move a discovery closer to the clinic," said Grinstaff. "I hope that by learning to work in teams and interact with leading researchers, they will be able to collaborate more effectively in their professional careers."

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