Course builds community of biomedical entrepreneurs

A NEW MULTIDISCIPLINARY COURSE at the University of Wisconsin-Madison is preparing entrepreneurial graduate students to bring biomedical innovations to the patients who need them.

The UW-Madison Bio Innovations and Opportunities in Medicine and Engineering (BIOME) course brings together students from academic backgrounds as diverse as engineering, medicine, education and business. "This breadth is essential for providing the creativity needed to find innovative solutions for complicated problems," says first-year biomedical engineering master's student Ben Schoepke.

Like the ecological term "biome" that describes distinctive, yet interdependent plant and animal inhabitants of a given geographical area, the course acronym BIOME evokes the interaction among UW-Madison faculty, staff and students, the biomedical industry, and the community of patients and health care providers.

Robert G. Radwin (*large image*)

Working in multidisciplinary teams, BIOME participants research and identify clinical needs that can have technological solutions. Ultimately, they unite UW-Madison experts who can address those needs and develop commercially viable products. "This gives graduate students an opportunity to learn about entrepreneurship and translational research," says Robert Radwin, UW-Madison biomedical engineering professor and chair.

Radwin developed BIOME along with UW-Madison College of Engineering Assistant Dean for Research and Technology Transfer Lawrence Casper and other UW-Madison faculty. Working with Radwin and Casper, a student team developed the course syllabus.

Lawrence A. Casper (*large image*)

The course, which also is part of a new graduate program in clinical investigation in the UW School of Medicine and Public Health, represents the final piece in the UW-Madison Department of Biomedical Engineering effort to extend translational research opportunities to its faculty and students at all levels. Those opportunities range from a novel undergraduate design curriculum to faculty research in the Coulter Translational Research Partnership.

However, says Radwin, BIOME appeals to graduate students from across UW-Madison-and in particular, those interested in the medical device and biomedical industries.

Such is the case for third-year medical physics master's student Matt Christensen. "My career goal is to start one, if not more, medical imaging device companies. I would also like to stay close to academia in an adjunct role," he says. "The BIOME course fits nicely into those goals by providing a framework to develop and create ideas, and giving guidance on how to foster industry-academia partnerships."

Course lectures include such topics as FDA regulations, medical economics, intellectual property, production issues, the market research process, and proposal writing. Master's student Schoepke enrolled in BIOME because of its emphasis on teaching students how to transform clinical needs into commercial products.

"I'd like to eventually be a leader in the medical device industry," he says. "To get there, I would like to work in industry doing research and development of innovative new products."

Early in the course, each BIOME team identifies approximately 40 clinical needs. The teams narrow their choices to four ideas, for which they develop a complete design specification. The students then present their ideas to a panel of faculty and professionals in medicine, business, engineering, pharmacy and entrepreneurship.

With input from those experts, the teams select their most promising idea based on such factors as marketability, clinical impact, technical feasibility, intellectual property, regulatory barriers and others. For the next seven weeks, each team identifies the best path for advancing its idea and crafts a full business or development plan for doing so. Part of the process includes seeking out faculty and clinicians who have the technological and clinical background and interest to devise a solution.

Third-year materials science doctoral student Mariana Kersh says learning the business aspects of translational research has been an eye-opener. "Needs without a market seem to go unfilled, no matter how compelling the need or potential solutions," she says. "This was a hard pill to swallow, but it is the reality."

One component of BIOME is that each team prepares a full intellectual property disclosure for review by the Wisconsin Alumni Research Foundation (WARF), the university patenting and licensing organization.

In addition to its technology-transfer expertise and rich intellectual capital, UW-Madison also is home to a wealth of resources that facilitate translational research. “We would not envision that the BIOME problems get solved in one semester, or even in one year-but over several years,” says Radwin. “These projects, these ideas, are seeds that will end up being funded by other programs that we have on campus.”

BIOME research proposals could receive follow-on funding or support under the UW-Madison Coulter Translational Research Partnership in Biomedical Engineering, the Industrial and Economic Development Research grant program, the Draper Technology Innovation Fund grant program, among others. Project end points include intellectual property, commercial products and startup companies.

The course is based around the concept of an “innovation community” that involves not only UW-Madison faculty, staff and students, but also opens opportunities for broader participation from business, industry and the larger health care community, says Casper. “Ultimately, patients are impacted by new technologies that improve the outcomes of medical care,” he says.

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