URI to develop 'lab-on-a-chip' technology

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Imagine an entire biotechnology laboratory reduced to the size of a pea and placed on a computer chip. While not yet a reality, that technology for detecting small particles in micrometer-sized channels – called microfluidics -- will soon revolutionize research into new pharmaceuticals, early detection of infections, and other health-related fields.

The University of Rhode Island has been awarded a highly competitive $2.4 million grant by the National Science Foundation to develop this technology and identify potential applications in partnership with the Technical University of Braunschweig in Germany. The grant, which will support up to 36 doctoral students over the next five years to participate in the research in Rhode Island and Germany, will build on URI's existing International Engineering Program and form the basis for a major new strategy to prepare American science and technology students for careers in the global workplace.

"We've identified a cutting-edge technology where we have unique expertise, and we're going to use it as a platform for developing a new multidisciplinary, multinational model to internationalize engineering research and education," said Mohammad Faghri, URI professor of mechanical engineering and the principal investigator on the project.

"This is a great niche for research and development at URI that has tremendous economic development potential for spin-off companies, patents, and workforce training," added Otto Gregory, professor of chemical engineering and former associate dean of the URI College of

Engineering.

The microfluidics technology could be used to detect biological molecules like bacteria, pathogens, or proteins that signal oncoming disease in an extremely small volume of a liquid. For instance, it could be used to monitor an individual's health status or potential exposure to a biological agent released by a terrorist, or to conduct a simple blood analysis in the field.

A key element of the project is the international collaboration with scientists and students at Braunschweig, which already has the technical infrastructure necessary to begin the research. URI is a leader in training engineers for the global marketplace through its renowned International Engineering Program. It has partnered with Braunschweig on engineering education for undergraduates for 10 years, and 200 URI students have earned dual degrees in engineering and German language. An international engineering master's degree program was launched in 2004, and this new grant will launch a doctoral level program beginning this year.

"We're training students to be globally competitive in the engineering field, which will make them much more marketable once they graduate," said John Grandin, URI professor of German and director of the International Engineering Program. "It will also help us attract the highest caliber engineering grad students in the country."

The National Science Foundation, through its Partnership for International Research and Education, will use URI as a national model for creating a multidisciplinary international doctoral program for engineers. The grant is one of the most prestigious awarded by the foundation. Approximately 175 universities competed for funding and just 12 were approved.

“I am very proud of the faculty team and their success in this proposal,” said Bahram Nassersharif, dean of the URI College of Engineering. “Two years ago, we set a goal in the college to focus on building multidisciplinary research teams to build multi-year, multi-million dollar research programs at URI with international significance. This program is our first major success.”

“This is the sixth multi-million dollar science grant URI has received in the last two years – for a total of more than $31 million – further demonstrating our success at putting together multidisciplinary teams for research and problem solving,” said URI President Robert L. Carothers. “These major grants are expanding the research capacity at the University and increasing our reputation among major research institutions in the country.”

In addition to Faghri, Gregory and Grandin, URI co-principal investigators on the NSF microfluidics research and education grant are Thomas Mather (entomology), Shahid Karim (entomology), Donna Meyer (mechanical engineering), Zongqin Zhang (mechanical engineering), Stephan Grilli (ocean engineering) and Christopher Baxter (ocean/civil and environmental engineering). URI’s Research Office also provided critical support in developing the grant.

Source: University of Rhode Island