U TEAMS WITH GERMAN INSTITUTE

Europe's Leading Applied Research Group sets up a Utah Lab
April 24, 2006 - The University of Utah College of Engineering has entered into cooperative research agreements so that a branch of Europe's leading contract research organization - MP3 pioneer Fraunhofer-Gesellschaft - can establish a laboratory at the Salt Lake City campus.

Florian Solzbacher, an assistant professor of electrical and computer engineering, estimates that $3 million to $4.5 million annually in new research funding and 20 to 30 new researchers ultimately may come to the University of Utah due to the agreements with Fraunhofer IZM (Institute for Reliability and Microintegration) and the Technical University of Berlin.

Under an initial two-year agreement, Fraunhofer's investment at the University of Utah is approximately $200,000 annually - the cost of paying to have Fraunhofer chemist Michael Toepper, a graduate student and a technician work and rent lab space at the Utah campus, Solzbacher says. But within a year, he expects Toepper will have attracted three or four new research contracts and will have more people working here.

The U-Fraunhofer collaboration should attract more research funding from private industry seeking to make practical use of university and Fraunhofer technology. The collaboration "will help leverage the tremendous technological know-how developed at the University of Utah to promote more high-tech industry," Solzbacher says.
The German institute expects to gain from the University of Utah's expertise in bioengineering and medicine, he adds.

Fraunhofer-Gesellschaft is Europe's largest nonprofit, applied research organization, with 12,500 employees and an annual research budget exceeding $1.2 billion, 90 percent of which comes from performing research under contract to companies and governments. Its role is to help transfer research findings by academia and national laboratories so they are used by private industry. Another branch of Fraunhofer-Gesellschaft - not Fraunhofer IZM - pioneered MP3 technology that made it possible to compress audio and video files and send them over the Internet or replay them on small MP3 players.

Fraunhofer's Institute for Reliability and Microintegration is "one of the largest - if not the largest - institutes in the world for microelectronics

and microsystems," which involve assembling (also known as "microintegration"), packaging and testing small electronic devices such as computer processors for automotive, industrial and biomedical uses; pressure and acceleration sensors; micro fuel cells; and micro dispensing systems, such as those to dispense ink or medications, Solzbacher says.

Fraunhofer's presence at the university's College of Engineering means "they are giving us access to the newest and best in system integration and packaging worldwide," Solzbacher says. "They are making it possible for us to deliver finished products rather than a box of pieces," which should attract more private industry to seek University of Utah engineering expertise. "They are kick-starting the activity by putting one of their best researchers here, supporting him and giving us access to their infrastructure and technology."

Biomedical needs are driving the new microtechnologies as researchers invent new and better devices to measure blood sugar, monitor infections, determine if drugs are effective and otherwise measure conditions in the body. Fraunhofer developed technologies that make it possible to integrate electronics, sensors, micropumps, dispensing systems, communications and other components into small systems.

Solzbacher says Toepper is an expert in wafer-level packaging, a technology that makes it cheaper to build computer chips by putting components together not on a chip-by-chip basis, but at once on a large "wafer" that is then cut into individual chips.

Among other projects, Fraunhofer IZM and the Fraunhofer Institute for Biomedical Technology (IBMT) will subcontract for the University of Utah on a Defense Department-funded project to develop a new, life-like prosthetic arm for soldiers with amputated arms.

Fraunhofer IZM will help develop a system to supply electrical power wirelessly to a device that is implanted in the remainder of the amputated arm and relays impulses from the nerves to the artificial arm. It also will package a Utah Electrode Array with other components to build the device. The device will relay signals from the nerves that normally operate the arm, and send those signals to a belt-pack computer, which in turn will translate the signals and send them to the artificial arm so it moves in a lifelike manner and can feel objects and its position in space.

"System integration is the enabling technology for the arm," Solzbacher says. "The general problem with making microsystems that can solve health care problems is they all need a sensor, electronics, communication and power, and they need to be able to survive in the human body without harming the human body."

Fraunhofer IZM and the Technical University of Berlin are located together, with the institute focusing on applied research while it hosts basic researchers and students from the technical University of Berlin. Under the new agreement, students from the Berlin school will be able to get credit for University of Utah courses and vice versa.

Solzbacher began his career in 1994 at another branch of the European research organization, the Fraunhofer Institute for Biomedical Technology (IBMT). He came to the University of Utah as a visiting scholar in 1996, and joined the faculty in 2004. He co-founded a 100-employee company in Berlin, First Sensor Technology GmbH, which makes pressure and force sensors for automotive, industrial, biomedical and aerospace uses.