Europe chips in for training

The United States may have more coordinated funding, but Europe is taking the lead in training biomedical engineers. Ralf Jox reports.

Almost 20 years ago, Peter Fromherz, a biophysicist at the Max Planck Institute of Biochemistry in Munich, Germany, connected living cells to microchips to measure the electrical signals at the interface between the two. With sensor-chip capacity steadily increasing, he has since made significant progress in getting neurons and silicon chips to communicate with each other.

Meanwhile, the chip industry has started to catch up with what once sounded like science fiction, by exploring the commercial opportunities the nascent field offers. The German semiconductor company Infineon Technologies based in Munich, for example, has invested several million euros in the production of a prototype super-chip, tailor-made for Fromherz's research.

Industry's investment is fuelling a growth in biomedical engineering (BME), an emerging discipline at the crossroads of engineering, life sciences and health care. BME research institutes and training courses have sprung up rapidly during the past ten years. Although the United States may be leading the field with its National Institute of Biomedical Imaging and Bioengineering (NIBIB; see page 324), BME is growing in Europe too. Universities throughout the European Union (EU) have responded by developing innovative training programmes at all levels.

Although Europe has no special BME funding body comparable to NIBIB, Ferdinando Grandori, the director of the Italian Institute of Biomedical Engineering in Milan, says that European funding opportunities for biomedical-engineering projects are "excellent".

COLLECTIVE FORCE

Joachim Nagel, head of the BME department at the University of Stuttgart in Germany, would like to see a more centralized approach to BME research and training in Europe. The creation of the European Alliance for Medical and Biological Engineering and Science (EAMBES) is a start. This umbrella organization brings together numerous national scientific societies and academic institutions, with the goal of promoting medical and biological engineering at European and national levels.

Nagel has compiled for EAMBES profiles of BME courses offered at more than 200 universities in 28 European countries. His goal is to create a European-wide accreditation system so courses in different countries can be both comparable and competitive.

INFINEON

Bridging the gap: a neurochip, based on the work of Peter Fromherz, links biology and technology together.

Academic training of biomedical engineers in Europe has long been regarded as a postgraduate specialism. But this is changing with the recognition that the next wave of pioneers must get an early start, says Jos Vander Sloten, a bioengineer at the Catholic University of Leuven in Belgium, and secretary-general of EAMBES. "For young scientists to succeed in this field, the best way is to combine biology and engineering science right from the beginning of their studies," he says.

In 1997, Eindhoven and Maastricht universities in the Netherlands established undergraduate BME courses. Other universities throughout Europe are now following their lead. Some of the first students to take those programmes are now into graduate work — and leaving some of their mentors behind. "They are so well trained that some professors find it hard to grasp what their research is about," says Fons Sauren, a biomedical engineer who oversees the University of Eindhoven's BME programme. PhD programmes and postgraduate masters courses are also proliferating.

Fromherz views the budding euphoria with caution. "My work on neurochips has stirred incredible public interest," he says. "But I'd rather carry on working than bask in the hype." And there he goes, listening again to the slowly rising whispers between neurons and silicon chips. ■

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