news

Project the only one of its kind in North America

Microchip scientists set sights on billion

By David Carrigg
Staff writer

THERE'S LITTLE talk in UBC's new System-on-Chip research lab, just the gentle tapping on keyboards as students beaver away at a design project that could produce the world's first microchip with a billion transistors.

Prof. Resve Saleh, head of the just-opened $3.2-million laboratory, tries to explain the project as simply as possible, a difficult task given the labels on some of the high-tech electrical equipment in the lab—Picomotor Multiaxis Drive, Digital Sample Oscilloscope and Semiconductor Parameter Analizer.

"Chip design as we know it is running out of steam at about 20 to 30 million transistors per chip," said Saleh, who left a teaching position at Stanford University to head up the System-on-Chip project.

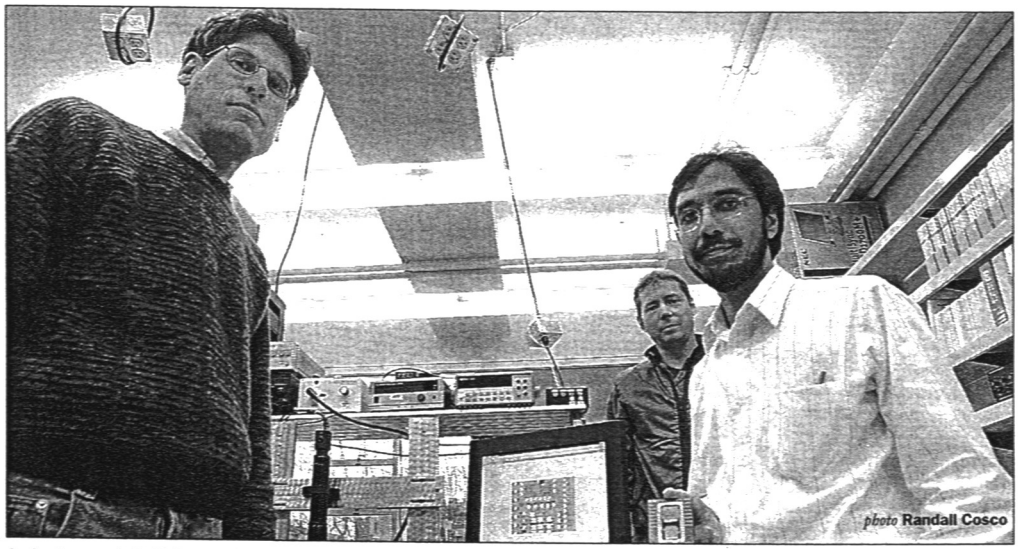

photo Randall Cosco

Andre Ivanov, left, Roberto Rosales background and Resve Saleh are trying to produce the world's most compact microchip.

Each transistor is effectively an on-off switch that starts or stops the flow of certain information, specific to a particular task.

"It's impossible to get to a billion transistors on one chip using existing technology, but there's a concept called system-on-chip where the chip is designed like a circuit board."

Saleh said current circuit boards, like those found in personal computer hard drives, have many chips on them, so up to a billion transistors can operate in the system. "Our idea is to compress that circuit board with several chips onto one silicon chip, using virtual components."

He said the new chips could be used in vehicles to track movement and mechanical conditions or even be planted inside salmon to monitor their spawning patterns.

Saleh said he was attracted to the project from the U.S., where he part-owns a successful Silicon Valley high-tech business, because research funding was already in place and the project is the only of its kind in North America. Funded by the federal government and chip manufacturer PMC-Sierra, System-on-Chip involves six professors and 25 students.

Becoming a world leader in chip design is one of the federal government's stated high-tech goals; it established a 30-person business—Canadian Microelectronics Corporation—solely to support research projects like System-on-Chip.

Saleh said the federal support has given his project a much-needed competitive advantage against research institutes in Europe that are working toward a similar design goal.

Saleh said the UBC project's three key goals are to find a way to reduce the design time needed for transistors, to get more transistors on a chip and to make them small and cheap.

"Everyone is heading in that direction. We've got to make sure we are there first."