

Student Entrepreneurs:

Berkeley student researchers enhance semiconductor manufacturing

Making increasingly smaller electronic features on semiconductors both more reliably, efficiently, and cost-effectively is the primary goal of the worldwide semiconductor manufacturing industry. Two UC Berkeley graduate students found a way to do it - and started Timbre Technologies, a company they sold two years later to an international manufacturing firm for \$138 million.



Nickhil Jakatdar, Xinhui Niu and Junwei Bao remarkable student entrepreneurs

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of UC Berkeley Engineering Professor Costas Spanos on a research project focused on developing ways to measure features and spot errors on semiconductors. The project was funded by a UC Discovery Grant.

According to Spanos, “the original way of measuring consisted of using an electron microscope. Timbre Technologies’ alternative involved optical mathematical analyses. The technological development is now being introduced, worldwide.” Tokyo Electron Limited, which has a significant manufacturing presence in California and has nearly 80% of the worldwide market for lithography equipment, had been looking for a more efficient way of making semiconductors and for software to integrate their system. Timbre Technologies had a solution. “Timbre was the latest and the best technology available,” says Mindy

Russell, marketing communications manager at Tokyo Electron Limited. The technology is now considered essential for process controls and yield management in manufacturing semiconductor chip patterns at the sub-100 nanometer level.

How did they get from an academic research project to commercial success? First, they performed outstanding research, which culminated in a scientific publication that was awarded the IEEE 2001 Best Paper Award. Second, they entered the UC Berkeley Haas School of Business’ Annual Business Plan Competition, in 1999 and won the \$8,000 first prize. “There was enough press to catch the eye of potential customers,” says Jakatdar. “Without the competition, it’s hard to say where we would be, but we would not have gotten where we are so quickly without it.”

Through its California arm, Tokyo Electron, Ltd has joined a consortium of companies that support a renewal UC Discovery Grant that is enabling Professor Spanos and his colleagues working at several different UC campuses to extend their research and provide opportunities for additional students.

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