

## SEMICONDUCTORS

**M**ORE THAN A FEW people were saying “Who’s Marvell?” one day in June when Intel announced the sale of its mobile phone chip business. The buyer was Marvell Technology Group, an 11-year-old firm in Santa Clara, Calif. Marvell was spending \$600 million in cash for an operation that has never made money, and it rushed into this purchase only 22 days after Intel put the division up for sale. Who would be so brash?

Answer: Sehat Sutardja, 45, and Weili Dai, 44, the husband and wife who co-founded and run Marvell. The pair spent the next week jetting around the country to meet their new employees (numbering 1,400) and customers. At an Intel factory in Chandler, Ariz. Sutardja and Dai held a question-and-answer session with 300 engineers. “What’s Marvell’s culture and philosophy?” asked one worker.

Sutardja took the question. He could have warned them about how Marvell is a tough place to work, with its up-all-night work habits and short-fuse product devel-

opment. He could have painted a brighter picture: Hundreds of engineers have become millionaires from Marvell stock. Instead, he chose his words carefully.

“We’re a little like Hewlett-Packard,” he said. Engineers walk into each other’s cubicles to share ideas. But we’re also like Intel, he said, the tough old Intel under Andrew Grove, where engineers ruled and only the paranoid survived. The crowd’s products had so far failed commercially. Chips are supposed to be not just engineering marvels but moneymakers, too. Sutardja added: “By the way, some of you forgot about that. Do you remember that?” Nervous laughter ensued.

Sutardja, the chief executive, and Dai, the chief operating officer, are open about their ambitions. “We want to be the next Texas Instruments,” Sutardja says. He and his wife are billionaires, as is Sehat’s younger brother Pantas. Together the three own 22% of the shares.

Marvell has dominated every market it has chosen to enter, with superior designs at a premium price: It knocked Texas Instruments out of the disk-drive

chip business and rivals Broadcom in key communications markets like Ethernet ports and Wi-Fi radios. Rip open a Cisco switch, an Apple iPod, an Xbox 360 or any big corporate disk drive and you’ll find a Marvell chip inside.

With the Intel deal, Marvell is going after the more formidable cell phone franchises of Qualcomm, Freescale Semiconductor and TI. Intel had flashy customers like BlackBerry and Palm’s Treo. Marvell says it can wring profits where Intel failed by moving the manufacturing from Intel plants (which it did not acquire) to cheaper Taiwanese ones and marketing with more vigor than the PC-centric Intel ever could. “The unofficial motto,” says Marvell’s first investor and former chairman Diosdado Banatao, “is: ‘Wait for a market to get big enough and kill whoever is there.’”

The company has grown every quarter since it first sold shares to the public in 2000, and its shares are up fivefold. Marvell’s chips, which cost a few dollars each, typically feature what’s called mixed-signal circuitry. They translate analog signals that move through a cable or over the

# Meet Marvell

**This chip outfit has quietly and ruthlessly found a way to thrive in every market it has entered and made its founders into billionaires | By David Whelan**

Marvell's high-octane couple Weili Dai and Sehat Sutardja. That's her car, not his.





air into digital bits, which form the binary code that's comprehensible to a computer. Revenue this year should exceed \$2 billion, with \$400 million in profit, says Marvell. This is a company in a hurry. "I've never met anyone who executes as quickly in 25 years at Intel and doing hundreds of deals," says Intel Capital President Arvind Sodhani.

Sehat Sutardja and Dai run the company as an obsession and in their own image. The two never take vacations and have no hobbies. Current and former employees complain of unending work obligations and microscopic attention from the founders. At least one ex-employee claims he was capriciously fired over a seemingly trifling disloyalty. The company has gone through three sales vice presidents in six years and is dogged by ugly lawsuits and a criminal indictment for theft of trade secrets.

"They impaired their ability to recruit large talent because they had this incest thing going on," says Henry Nicholas, the billionaire cofounder of Broadcom, Marvell's archrival. Dai says Nicholas likes to spread misinformation.

The Marvell story starts with kids tinkering with electronics in Indonesia. The Sutardjas are of Chinese ancestry and grew up in Jakarta, part of a wealthy family that owned a Mercedes parts business. When Sehat was 12, he taught himself analog signal processing by taking apart his family's Philips six-transistor radio and rebuilding it one component at a time. Pantas almost electrocuted himself taking apart an air conditioner. The two separated when Pantas was sent to a Chinese boarding school in Singapore. But they would talk on the phone. Sehat needed Pantas to translate Hong Kong electronics magazines into Indonesian.

Sehat breezed through Iowa State University's electrical engineering program in six semesters. Pantas went to UC, Berkeley, followed by Sehat, and both eventually earned Ph.D.s in electrical engineering and computer science. While at Berkeley Sehat met and married Weili Dai, a sprightly undergraduate programmer from Shanghai.

After Sehat left Berkeley in 1988, he boasted that he was the best analog engi-

## Three Leaps Ahead

Marvell has a knack for breakthrough chips.

**1998** Marvell's disk drive chip shuttles data 20% faster than TI chips then in use. Seagate is first customer. Now has 90% of market for high-end corporate disk drives.

**2000** Releases the first "gigabit" Ethernet chip that moves data between computers ten times as fast as older chips. Cisco becomes a big customer.

**2005** Marvell produces a Wi-Fi chip that's smaller and uses half the power of other chips, perfect for handhelds. Sony embeds it in its PSP, Nikon in its Coolpix S6 camera. —D.W.



neer in the world, according to several sources. (Sehat says others might have said that but he never did.) "He was cocky at the time," Pantas remembers. "I was cocky earlier." Sehat went to work at a new analog chip firm. Pantas joined IBM's Almaden research lab. Canon hired Dai as a programmer.

Pantas says he was bored at IBM, and Sehat and Weili knew they wanted to start their own chip company. In 1995 the three founded Marvell with money from friends and family and \$200,000 from licensing one circuit design. They worked almost two years without pay before raising \$1 million from chip entrepreneur Banatao, who became chairman. Banatao was a legend in the business because he had started S3, the first big PC graphics-chip success.

Sehat and Pantas planned to design a fast analog chip but needed a market.

They picked disk drives, for two reasons: There were no standards bodies dominated by big companies. And hundreds of millions of drives are sold each year. Sehat says he knew he could make chips for processing disk data that were smaller, cooler-burning and speedier than chips then on the market.

Dai started cold-calling potential customers. She reached a scientist in Seagate's office in Minnesota named Kenneth Burns who was then struggling with speed. TI had been supplying a chip that ran data in and out of drives at 200 megabits per second. Dai told Burns that Marvell could do better and volunteered to send out her "two best engineers." The Sutardja brothers were soon on a plane and returned with a development deal.

Marvell spent a year designing a chip that moved data 20% faster than TI's. Sehat and Pantas were so sure of their design that they sent it to Seagate before it had been fully tested. It worked. Seagate kicked TI out of its line, and Marvell later chased NEC and Infineon out of other disk drive makers. Marvell now supplies chips for 90% of big corporate disk drives and half the chips for mass-market PC drives. Sehat and Pantas plan to double their storage business by getting their silicon into optical drives, especially the new high-definition DVD burners.

Dai and the Sutardjas next went after networking products, designing a chip that would transmit data through Ethernet ports at a billion bits per second, ten times the speed of the then current standard. Marvell and Intel signed a development pact.

The promise of the networking business fueled hopes for Marvell's initial offering in early 2000. The firm was already profitable, with \$88 million in annual revenue. But it wasn't the smoothest deal. Morgan Stanley reportedly rejected the group, as did late-stage venture capitalists, because of concerns over how the family-run company would handle corporate governance. Many also felt Marvell was too dependent on the hard-drive business.

To make matters worse, Marvell's chief financial officer, Gordon Steel, was fired unceremoniously two months

before the public offering. According to Steel's rendition of the story, he was summoned into a meeting with Banatao, along with other vice presidents, to ask for unfiltered feedback about the company on the eve of the initial offering. The other vice presidents kept silent, says Steel, who had previously been chief financial officer at chipmaker Xilinx. He told Banatao that Dai hired and fired too many secretaries. While he admired his bosses' technical abilities, they told underlings only what to do, not why they should do it.

The next day Sehat Sutardja summoned Steel to his office and, according to Steel, fired him. Steel says he was shocked by Banatao's betrayal. Sutardja says that he fired Steel because he wasn't working hard enough on the stock offering. Steel sued Marvell in August 2000 for wrongful termination and won a small award in arbitration.

Marvell's networking ambitions ignited the ire of Broadcom, the leader in chips for network switches, modems and set-top boxes. Broadcom's then chief, Henry Nicholas, tried to tank Marvell's offering, says Dai, by calling Fidelity and other institutional investors to tell them that Marvell's planned gigabit Ethernet chip would fail. Nicholas, who is no longer with Broadcom, denies ever having done that.

After the stock offering Marvell beat Broadcom to market with a gigabit chip

and stole away with 80% of Broadcom's business with Cisco Systems, which is now a \$100-million-a-year Marvell customer. "For a new company to come in and get it right is rare," says David Leonard, manager of desktop switching at Cisco.

Marvell has a certain win-at-all-costs reputation. In 2001 it was negotiating to buy the patents of a company called Jasmine Networks. Some Marvell executives forgot to hang up the phone after leaving a voice mail with Jasmine and were overheard seemingly plotting to steal the technology. Marvell's patent attorney Eric Janofsky wondered aloud if Sehat would go to jail and moments later remarked: "If we took the [intellectual property] on the pretense of just evaluating it. ..." Jasmine, now bankrupt, sued Marvell, which denies it was acting underhandedly. The case is in court.

In 2004 Marvell licensed chip designs and software to a firm called Alliant Networks that was designing a chip to handle both cellular and Wi-Fi signals. Months later Alliant stunned Marvell with news it was being sold to Broadcom. Marvell immediately sued Alliant, alleging theft of trade secrets. In a convoluted countersuit Alliant says Marvell was trying to "grab" its software and also buy it with a lowball offer. That case is also pending.

Last year a product development manager named Suibin Zhang at wireless-hardware maker Netgear allegedly spent

two hours downloading 78 documents from Marvell's extranet, a site restricted to customers. Problem was, Zhang had just received a job offer from Broadcom. Marvell tipped off federal prosecutors, who indicted Zhang in December for corporate espionage and computer fraud. (Zhang has pleaded not guilty.) Broadcom got revenge in May when, for the same crime, the feds indicted Tien Shiah, a manager Marvell poached from Broadcom. (Shiah's lawyer says he is innocent and is preparing for trial.)

Marvell's founders have had to loosen their grip as the company grows. Sehat and Pantas no longer rejigger circuits during the final design stage. Dai knows it's no longer possible to get involved in every sale. Paramesh Gopi, who manages Marvell's Wi-Fi business, used to tell Dai everything he's doing; he now says it's gotten harder to get on her calendar. "Saturdays were good, but they are getting full," he says.

Should Marvell employees care that their company is being run by a husband and wife? Marketing vice president Alan Armstrong shrugs: "When they go to a conference we save money on a hotel room."

These billionaires do have a life, sort of. "We have kids [sons aged 18 and 16] who are growing up by themselves," Sehat says. "But they know how to cook," Dai interrupts. Sehat says, "You can't say, 'It's time to play golf.' Life is full of tradeoffs." Adds Dai: "We like to say, 'This is just the beginning.'"

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