

## Pushing Scientific Boundaries

Mehdi Vaez-Iravani Named First KT Fellow

Scientific study is in Mehdi Vaez-Iravani's blood. Growing up in Iran, Vaez-Iravani observed and followed suit as his three older siblings excelled at mathematics, something of a tradition in the family. ***"Like all young kids, I was curious about things. In particular, I always had an interest in mathematical reasoning — trying to get to the essence of things."***



Today, Vaez-Iravani is still striving to get to the essence of things, applying his technical expertise as vice president of technology for KLA-Tencor's Wafer Inspection Group (WIG). In recognition of his efforts in developing innovative technologies that help customers accelerate their yield, Vaez-Iravani has been named the first KT Fellow.

*"As a KT Fellow, my role will include helping to ensure that with every technology we pursue, we are operating at the pinnacle. I will also be available to help new engineers develop their careers here,"* he explains. The responsibilities of the KT Fellow will continue to be defined. At any given time, there will be three or four KLA-Tencor technologists in this role.

### A Founder of Revolutionary Streak™ Technology

The fruits of one of Vaez-Iravani's most recent engineering successes can be found in the new Puma™ 9000 wafer inspection tool, which is designed to deliver high sensitivity at optimal throughput. This core capability is enabled by Streak technology, which combines high-resolution imaging with advanced ultraviolet (UV) illumination optics.

Vaez-Iravani collaborated with technologists Guoheng Zhao and Stan Stokowski to develop Streak technology. At the time, the team was also examining efficient, effective

ways to inspect wafer backsides for the Surfscan Division. While exploring oblique laser illumination angles and long, narrow line scans for backside inspection, the team found a way to apply these techniques to patterned wafer inspection. And, thus, the breakthrough Streak technology was born.

### Solving Real-world Problems

Vaez-Iravani's path to KLA-Tencor was paved in high school, where students challenged each other to push the boundaries in math, physics, and chemistry. He recalls, *"It was an environment where your best friends were also your biggest rivals, and you needed extra books—beyond the required texts—to get through the exams."*

While high school classes were primarily theoretical in nature, college courses at the University College London in England allowed Vaez-Iravani to apply the concepts he had explored. He experimented in optics, photo-acoustics, and laser-based microscopy. After earning his Ph.D. in electrical engineering, Vaez-Iravani became a researcher at Royal Philips Electronics Laboratories in New York and, later, a faculty member at the Rochester Institute of Technology's Center for Imaging Science. There, he taught students about high-resolution near-field optical microscopy, atomic force microscopes, and optical, acoustic, and photo-thermal photo-acoustic beam propagation.

*"I love translating theory into actual experiments," he says. "Early on, I was drawn to optics because of all of the possibilities of the laser. I was fascinated by how you could play modulation tricks with it to extract signals from a noisy background. It's fun."*

In 1995, he joined Tencor Instruments, which merged with KLA in 1997 to become KLA-Tencor. Over the years, Vaez-Travani has had the opportunity to mentor some of the company's brightest engineers. *"Young engineers have good ideas, but sometimes they need someone to be a sounding board, to help them develop those ideas into something practical,"* he notes.

That's a very familiar concept to Vaez-Travani. His career at KLA-Tencor has been all about developing practical products that help customers solve difficult problems. His current effort addresses the price vs. performance trajectory.

### **Taking the Right Risks to Generate Rewards**

Looking ahead, Vaez-Travani believes that the chip-making industry will need to take an increasingly holistic approach to chip design, addressing such challenges as heat management as the relevance of Moore's Law begins to wane. Technologists are pushing the limits of physics, and will need to continue incorporating new materials such as organic structures and leveraging nanotechnology to create "smart" materials. For KLA-Tencor, the future in process control tools will involve such requirements as improved algorithms, new light sources for enhanced sensitivity, and more efficient utilization of available processing power.

*"I believe in taking calculated risks, but not wasting money,"* he says. *"We have to challenge ourselves at every step, so that what we do is always state of the art. Ultimately, good work pays off in terms of the value we can deliver to our customers."*

## KLA-Tencor Trade Show Calendar

September 12-14, 2005

SEMICON Taiwan, Taiwan World Trade Center

September 20-21

DISKCON USA, Santa Clara, California

September 26-28

SEMICON Expo CIS, Moscow, Russia

October 4-5

BACUS/Photomask, Monterey, California

October 6

FSA, San Jose, California

December 7-9

SEMICON Japan, Makuhari, Japan