



Chang-Jin Kim
Associate Professor of Engineering
School of Engineering and
Applied Science

Ten years ago, when Chang-Jin Kim suddenly decided to switch his doctoral studies at UC Berkeley from robotics to an obscure new area called micro-electro-mechanical systems (MEMS), friends told him he was making a horrible mistake.

Today, the 40-year-old engineering professor is one of the world's most prominent researchers in a cutting-edge field with seemingly unlimited possibilities.

Kim's work is big because it's so small. The micro-fuel injectors, micro-nozzle pumps and micro-slider actuators he and his graduate students cook up in his Micro-Manufacturing Laboratory could fit on the head of an ant. The fact that the tiny devices are so innovative they have yet to find commercial application apparently doesn't bother Kim.

"It's like when you find a way to make steel, and you ask, 'What's the application?' It can be anything," explains Kim.

Like the micro-accelerometers that currently activate automobile airbags in a crash. Soon, other micro-devices will enable aerospace companies to send mini-satellites into orbit and shrink chemical-analysis equipment so it can be taken out of the lab to process DNA samples at a crime scene.

Born and raised in Korea, Kim knew he wanted to be a scientist long before he came to the United States in 1983. His family had academics, lawyers and doctors — but no engineers.

"I got no advice from anyone around me," Kim says. "But I was lucky to be like that. I wasn't tainted by conventional engineering. The way I think is different from a typical engineer."

For instance: Typical engineer thinking would focus on problems of weight in a micro-device, because that is a dominant concern in traditional engineering. But it is almost meaningless in MEMS. What is a problem is the slightest hint of moisture. It would be a negligible factor in regular-sized machines, but it can completely shut down a submillimeter-sized device. Such problems to Kim are like child's play — literally.

"I'm in a world where nobody has been before. It's like being a child, playing with Legos, creating something every day," says Kim. "I'm one of the luckiest guys in the world."

— C.L.

Michael Stoll

Assistant Professor of Policy Studies
School of Public Policy and Social Research

Ask the person on the street why the urban poor can't get jobs and you'll get a range of guesses and opinions: laziness, drugs, lack of education.

Ask 33-year-old policy-studies maven Michael Stoll and you'll hear about such things as "spatial mismatch."

Stoll's National Science Foundation-funded groundbreaking study, *Race, Urban Inequality and Economic Opportunity*, postulates geography, as opposed to personal shortcomings, as the chief barrier to employment. Thus, spatial mismatch: low-skill workers living in the inner city, with low-skill jobs — and information about their availability — located predominately in the suburbs. Transportation between the two places is routinely difficult and expensive. And making matters worse, according to Stoll, data indicates that discrimination, particularly against African Americans, is greater in the suburbs.

Stoll's research, in many ways, is a natural outgrowth of his own life experience. He witnessed many of these same problems firsthand as a kid growing up in Los Angeles' lower-middle-class Crenshaw District.

"I was a kid interested in fairness, and I saw the problems on the side of town where my family lived were different from the Westside," recalls Stoll. "I knew that. But it wasn't something I could process intellectually."

That would be some years away. Stoll, an admitted "sports nut" in high school, didn't plan to go to college, let alone study urban employment. He had his sights on becoming a pro basketball player. That dream went bust. He was lined up for a course in welding when a friend of his father's nudged him into higher education. After undergraduate work at Cal State Northridge and UC Berkeley, Stoll earned his master's and Ph.D. degrees at the Massachusetts Institute of Technology, and was awarded several pre- and postdoctoral fellowships.

Today, Stoll still has his old neighborhood in mind as he looks for solutions to urban poverty. His study, testing his theories of spatial mismatch and examining which factors most affect job-seekers, will have direct implications for a number of federally sponsored initiatives to reduce unemployment. Notes Stoll: "I have a strong desire for people to have some chance at opportunities in life. That still drives me."

— C.L.

