

SPECTRAL LINES

From Outsourcing To Botsourcing?

If Sony's cute little Qrio wants orchestra conductor Kurt Masur's job, will he want yours too?

As a publicity generator, Sony's new tot-bot Qrio, who dances, sings, and has even conducted an orchestra or two, is a huge success. His doggy stablemate, Aibo, and his friends from Mitsubishi and Fujitsu, Wakamaru and Maron-1, are also big hits [see "Qrio, the Robot That Could"]. For now, they are being positioned as high-end luxury toys, but it's clear that "a bot in every household" may not be the stuff of science fiction for much longer. The companies that are making them see a lucrative market for their creations in elder care and home services as the developed world's population ages.

Should we be worried about robots taking our jobs? The kind of behavior-based control needed for real "humanoid" activity is a quantum leap beyond the current industrial uses of robots. It's even well beyond the abilities of robots like the state-of-the-art semi-autonomous Mars Rover, which still needs long-distance direction by humans.

And yet, as microprocessors and other robot components get



Robot NS-5 stars in the upcoming movie, *I*,

smaller and increasingly powerful, and as our ability to transfer human sensorimotor and perceptual skills to these machines continues to improve, one can certainly imagine the introduction of simple forms of robot-assisted home care in a decade or two. At a recent robotics roundtable moderated by *IEEE Spectrum* and sponsored by Evolution Robotics of Pasadena, Calif., panelists agreed that a bipedal home humanoid was a distinct near-term possibility. If you're middle-aged now, perhaps your closest companion in your dotage will be a wirelessly connected android that traipses after you, bringing iced tea or martinis, and reminding you to take your medications, send a birthday card to your grandson, and sell your Cisco stock.

Are we ready? Well, some folks have already been dusting off Isaac Asimov's Three Laws of Robotics. A movie based on his classic collection of stories, *I, Robot*, is due out this summer, and one weblog has noted that when he saw the trailer for the movie, he thought at first it was a real advertisement for a "domestic personal assistant" with a positronic brain. ■

"They've Got the Silicon Transistor Down in Texas!"

It was exactly 50 years ago this month when the research director of a small company called Texas Instruments Inc. startled attendees at an Institute of Radio Engineers meeting by announcing that he happened to have a few silicon transistors in his pocket (see "The Lost History of the Transistor").

Even people who think they know the history of the transistor by heart may be surprised to learn that TI, in addition to the mighty Bell Telephone Laboratories, played an important role in making the momentous switch to silicon. What's wonderful about Michael Riordan's account is



1954: TI's silicon transistor

that it sends a shiver of recognition down the spine of anyone who has worked on a leading-edge technology and tried to grab the brass ring.

Picture the situation in the early 1950s. The two companies were working in an area where lots of research was coming together very quickly. Bell Labs had all the significant transistor milestones to that point—William Shockley, John Bardeen, and Walter Brattain had made the first transistor out of germanium there, and several ideas for branching into other semiconductor materials were already in development.

But then one of its key researchers, Gordon Teal, got homesick for Texas and jumped to TI, taking a wealth of knowledge with him. And while Bell Labs came up with a silicon transistor around the same time that TI did, it had several other irons in the fire and didn't appreciate why the silicon transistor it had in hand was so important. Teal's group knew what they had. And the rest is a nice little piece of history that put TI on the map, allowing it to dominate silicon transistor manufacturing for several years.

Some estimates suggest that today there are 100 million transistors for every human on the planet. Recently, researchers in France announced devices capable of operating in the terahertz range [see "French Team Demonstrates Terahertz Transistor"]. TI, still in the lead pack, expects to have sample 65-nanometer chips ready in the first quarter of 2005. Will they grab that ring too? History teaches us to bet cautiously. ■