

# SPECTRAL LINES

## Fly Guys

For most of us, the sight of houseflies zooming around the kitchen or executing precision landings on top of freshly baked bread unleashes a primal urge to kill, maim, or dismember these germy little creatures. Not so for Rafal Żbikowski and his colleagues [see “Fly Like a Fly” in this issue], who want to know how these insects are able to carry out their aerial acrobatics. The researchers are taking the lessons they learn from *Musca domestica* to try to build something called a micro air vehicle, or MAV, a tiny flapping-wing robot that could be used for military reconnaissance, disaster rescue efforts, or other kinds of work requiring remote sensing.



Nothing succeeds like success. And houseflies have plenty of it to share. At low speeds, for example, the fly can outmaneuver any human-built craft, reaching speeds of up to 50 kilometers per hour and accelerations of 3 g's. And it can fly straight up, down, or backward, and somersault to land upside down on a ceiling.

To understand the fly's unique flight control scheme from the fly's point of view, Żbikowski and his associates are building a tiny movie theater for their flies, complete with a panoramic screen and a tiny rotating cage to house the flies. Next year, they'll start showing the insects movies of flight scenes and begin observing how the flies' neurons light up in response to these pictures.

Although it sounds a bit like a skit from the British comedy

group Monty Python, this kind of experimental work has quite a bit of precedent. Indeed, a 1959 paper published in the *Proceedings of the Institute of Radio Engineers*, one of the IEEE's precursor associations, helped set the stage for the work described here. “What the Frog's Eye Tells the Frog's Brain,” written by cyberneticists Jerry Lettvin, Humberto Maturana, Warren McCulloch, and Walter Pitts, established that different neurons in the frog's brain responded to different features in the frog's environment. Frogs don't see much, but what little they do see is enough to help them catch bugs (small dark moving spots) and escape predators (larger moving dark areas). Elsewhere, in a series of landmark experiments conducted from the 1950s to the 1970s, David Hubel and Torsten Weisel showed various images to experimental animals and discovered that an animal's visual cortex contains a spatial map of its visual field. They received the Nobel Prize in Physiology or Medicine in 1981 for their discoveries concerning “information processing in the visual system.”

Turning to nature for scientific and technological inspiration is not new, and you could argue that most human-made designs are derived from natural phenomena. And why not take full advantage? As engineer Buckminster Fuller once remarked, “In nature, technology has already been at work for millions of years.” ■

## Is It a Good Thing?

Everywhere you turn these days, it looks as if we may soon be turning into the Jetsons. In the iconic American TV cartoon of the 1960s, robots prepared meals in seconds—and cleanup was a snap. Forty years after Rosie the Robot first made dinner for her Space Age family on the go, the devices she inspired are coming into being.

Via newsletter, Siemens AG informs us that it is now offering “an oven with a completely new design that's very easy to operate, remarkably energy efficient, and opens up unusual possibilities for kitchen designers.”

The new liftMatic oven attaches to a wall like a cabinet. You place your uncooked food at the bottom of the unit,

press a button, and the “floor” of the oven raises the food to a cooking position near the top of the oven, for maximum heating. Siemens says the liftMatic reduces baking times “by up to 30 percent.” Sharp Corp., meanwhile, is pushing the health benefits of Healsio, a new oven it says cooks food by spraying it with steam superheated to 300 °C. Hitachi Home and Life Solutions says its Healthy Chef—a combination oven and microwave—uses superheated steam after heating food with microwaves, also to save cooking time.

Will these shiny new machines make us more efficient and productive? While good-living mogul Martha Stewart might think so, Ruth Schwartz Cowan, the Janice and Julian Bers Professor of the History and Sociology of Science at the

University of Pennsylvania, would probably disagree. Author of *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*, Cowan is best known for her research on what impact things like household appliances have had on women's work at home. Her book concludes that these appliances actually make more work for Mom, not less. And in “The Consumption Junction: A Proposal for Research Strategies in the Sociology of Technology,” in *The Social Construction of Technological Systems*, she discusses why the criteria for “betterness” depend on who is using the technology—and why what's better from a technology maker's point of view is not necessarily better for the consumer.

Let the buyer beware. ■

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