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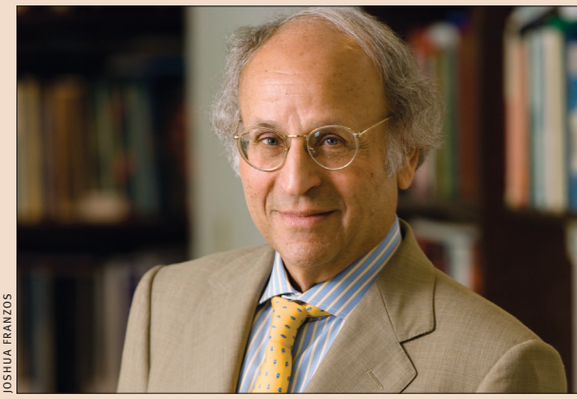
It has long been an axiom of mine that the little things are infinitely the most important.

—Sir Arthur Conan Doyle



JOSHUA FRANZOS

Well in advance of my getting to know Dr. José-Alain Sahel (our new chair of ophthalmology, see p. 12), I was already intrigued with the opportunities now afforded to extend what we are learning about the eye to the generality of biology. With this in mind, I'd invited Nathan Morehouse, an assistant professor of biological sciences, to lecture in my junior faculty seminar series. Among his research interests is the visual ecology of *Habronattus*, a genus of tiny jumping spiders known for their superior 360-degree vision.

Most jumping spiders are colorless and colorblind. But spiders in the *Habronattus* group are, as Nathan puts it, "little fireworks on the family tree of spiders," exhibiting explosions of color. Well, the males do anyway. The females, like their distant spider cousins, are quite drab; yet they have exquisite color vision—a key advantage of this trait is the ability to detect colorful but toxic prey. Males capitalize on the choosiness of females by presenting colors that their female counterparts—possible predators—are less likely to attack. (Eating a potential mate is a fairly definitive way of turning him down.) The species *H. pyrrithrix,* for instance, is named for the flame-red hair growing on the faces of males.

Nathan's work has shown that the females' sight has evolved with an amazing degree of sophistication and distinction; their complex photoreceptor filtering and trichromatic system may have arisen in response to changing coloration in males, and vice versa, over time. It's a fascinating example of coevolution. The males are evolving color, while the females are developing highly sensitive mechanisms to distinguish it.

I left Nathan's lecture thinking how easy it is to take for granted what is literally underfoot. These spiders—each about the size of a fingernail—have larger lessons for us. In this single instance of a coevolutionary conga between visual systems and visual signals, we see basic processes that ultimately lead to the biodiversity of our world.

Nathan is one of several evolutionary biologists who collaborate with faculty in the medical school. These partnerships are important because we see coevolution in many processes relevant to human health. The arms race between humans and bacteria, for example, has given rise to drug-resistant strains. And Amish children who live in homes in close proximity to horses and cows and the microbes they harbor are protected from asthma to a greater extent than children in Hutterite families who practice more industrialized farming and inhabit more "sterile" homes further removed from livestock. (Iowa's Peter Thorne, who did his postdoctoral work here at Pitt, was among the authors of this recent breakthrough *New England Journal of Medicine* paper.)

Our intellects and ideas also coevolve. It strikes me that the dawn of abstract art and atonal music may have influenced the fathers of molecular biology (and vice versa). At about the same point in time, art, music, and science all brought into focus the roots of what we see, hear, and inherit. It's not as much of a leap, so to speak, from tiny jumping spiders to much larger questions as one might think.

Arthur S. Levine, MD
Senior Vice Chancellor for the Health Sciences
John and Gertrude Petersen Dean, School of Medicine