

Neuroscience News

HARVARD'S emerging Center for Systems Neuroscience got a double boost in late fall: the appointment of its first director and the approval by the Harvard Corporation of plans for a new laboratory building in Cambridge, part of which will house the center.

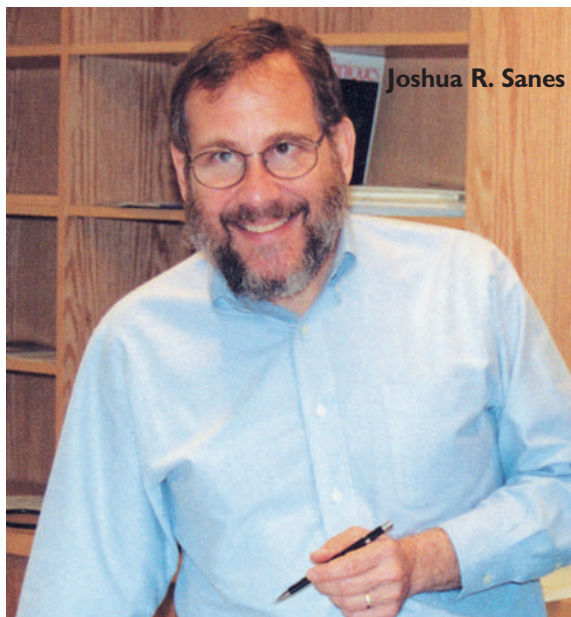
The effort to establish a neuroscience center in the Faculty of Arts and Sciences (FAS) began in 1999, when then-dean Jeremy R. Knowles decided to make a major investment in science, focused on three promising areas: genomics; imaging and mesoscale (atomic to macroscopic) structures; and neuroscience. The first two initiatives were established as the Bauer Center for Genomics, which consists of fellows (most newly minted postdocs engaged in pathbreaking research and free of teaching responsibilities), and the Center for Imaging and Mesoscale Structures (CIMS), which has required major investments in expensive infrastructure and technological support—a vibration-free clean room, for example—that can be shared across the University. Unlike these two centers, however, the neuroscience initiative is envisioned primarily as a new intellectual discipline, and as such involves a commitment to hire 10 new faculty members. All will be part of the traditional departmental structure, training and teaching the next generation of scholars as they pursue their research.

Heading the initiative will be Joshua R. Sanes, Ph.D. '76, a pioneer in the study of synaptic development and a major innovator in molecular and genetic approaches to analysis of the nervous system. A 1970 graduate of Yale who earned his doctorate in neurobiology from Harvard Medical School (HMS), Sanes currently holds an endowed chair in neurobiology at the Washington University School of Medicine, where he has taught since 1980. Elected to the National Academy of Sciences in 2002, he will become director of Harvard's Center for Systems Neuroscience on July 1.

What is neuroscience? "It spans practically every discipline you can imagine,"

says Pusey professor of neurobiology Carla Shatz '69, Ph.D. '76, Jf '76, who heads the neurobiology department at HMS. She has been working hard in the last two years to link neuroscience at the medical school with the neuroscience planning at FAS, because, she says, the field "goes all the way from the study of molecules, to behavior, to disease, so there is no one place—at any University, actually—that represents all of these different areas."

Researchers at HMS are studying everything from the processing of visual



information, to decision-making, to the creation of memories and its disease correlate, Alzheimer's, in order to understand what goes wrong. "[Within FAS]," Shatz says, "there is tremendous strength in the areas of behavior, perception, and psychophysics on the one hand, and also in some of the newer areas that we are looking to for the future, such as physics, statistics, and computer science," in which researchers "have the right quantitative scientific training to help deal with the complexity of the brain." Shatz believes the center will create a new intellectual format for neuroscience. "Because the field is so young and evolving and fluid—20 years ago there wasn't even a field called neuroscience—it gives us a real opportunity to do something novel," she says.

"Neurobiology as a discipline actually started at Harvard Medical School," notes HMS dean Joseph B. Martin, a neurobiolo-

gist himself. "[We had] the first department of neurobiology in the country and for a long time, almost every senior leader in the field, not only at medical schools but in university departments of neuroscience, was trained here." There has also been a tradition of collaboration with FAS, he says: "There have always been one or two or three students working in Cambridge who have been part of the HMS neuroscience program." With the establishment of the center, FAS and HMS will share faculty on their search committees, in order to coordinate their appointments in neuroscience. This, says

Martin, is a "true example of the University taking a new direction by trying to define, in a structural way, the value of interdisciplinary, inter-faculty efforts in a way that will benefit all of us."

"What FAS brings to this is access to the whole range of basic research in the physical and life sciences," says FAS associate dean for academic affairs Vincent J. Tompkins. "Efforts like neuroscience and genomics flourish over here because of the possibility of connecting to the surrounding disciplines," and the pattern of faculty appointments will likely reflect that as well.

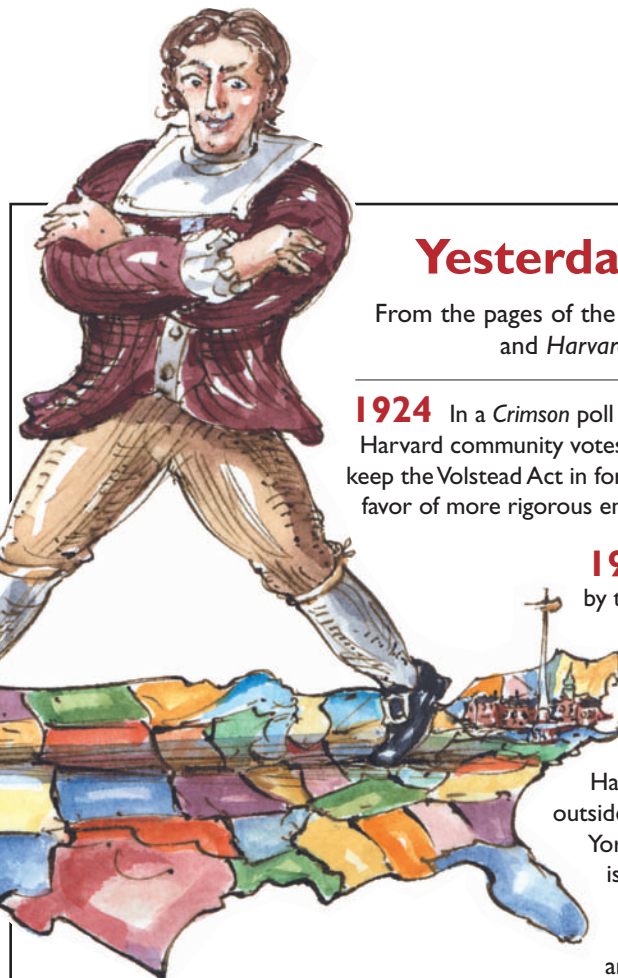
"The vision is for a series of appointments at both the junior and senior level, recognizing that some of the most exciting work being done in this area is probably being done by people trained more recently, whose training has been more interdisciplinary in nature," Tompkins explains. He cites Markus Meister, the physicist by training who is now Tarr professor of molecular and cellular biology and an instrumental advocate for the new initiative, as an example of such cross-disciplinary work.

Sanes, in an interview, said that he expects the 10 new faculty appointments to be made during a period of five or so years. All faculty members appointed to the center will also be part of an existing academic department—such as molecular and cellular biology, organismic and evolutionary biology, psychology, or the division of engineering and applied sciences—and subject to the rules and teaching load of that department. "The center has, essentially, 'half

appointments,” explained Sanes, “that it can use to enter into partnerships with departments. This will allow the departments to hire faculty who will want to participate in the center, without having to give up their other priorities. For example, suppose that the psychology department had two positions open, but three different areas in which it wanted to build. By partnering with the center, it could hire two neuroscientists, and still have a slot left over for another area.”

Already, a number of FAS faculty members are heavily involved in the center, including Catherine Dulac, Markus Meister, and Florian Engert in biology and Stephen Kosslyn and Marc Hauser in psychology. Several faculty members in the HMS neurobiology department are also enthusiastic participants. That gives Sanes hopes of gathering within five years up to 20 faculty members who are committed to the goals of the center. Some will have research space in their respective departments, but seven or eight will have laboratories in the “Northwest Lab” now being planned for the former Oxford Street parking lot, north of the University Museums complex. The building, consisting of about 200,000 square feet above grade and roughly the same square footage underground, will also house shared technical resources, an auditorium, meeting rooms, and the center’s administrative office.

A major goal is to tackle, “in a new way,” said Sanes, “the biology of behavior. During the past 25 years, psychology has made amazing advances in formulating questions about behavior. Brain imaging, computational methods, and cognitive methods have become much more sophisticated and have made it possible to ask precise questions about behavior and cognition. But [psychologists] lack the tools to get at the biological bases of these fascinating phenomena,” Sanes noted. Biology, on the other hand, “has had its best half-century in history” and “become



Yesterday's News

From the pages of the *Harvard Alumni Bulletin* and *Harvard Magazine*

1924 In a *Crimson* poll on Prohibition, the Harvard community votes nearly two to one to keep the Volstead Act in force, and 1488 to 940 in favor of more rigorous enforcement.

1949 Statistics compiled by the Alumni Records Office indicate that “John Harvard,” for the first time in history, lives west of the Hudson River: 50.5 percent of Harvard graduates now live outside New England and New York State, and their number is growing.

1954 The College announces that maids will no longer make students' beds, the first step in phasing out a housekeeping arrangement that began 295 years earlier.

1969 The Faculty votes to withdraw academic credit for Reserve Officers' Training Corps activities at Harvard—home of the oldest ROTC program in the country.

1979 The Science Center is evacuated after about 250 milliliters of nitroglycerine is discovered in a basement lab. The undergraduate who produced it, some in his dorm room, where he had been conducting experiments, leaves Harvard for the semester.

phenomenally good at answering questions using genetic, molecular, and proteomic methods. Biologists are ready to tackle the deepest mysteries left, those of the human mind, but need help from researchers who have really been studying the mind.” He envisions bringing biologists and psychologists together with a third group in the physical sciences: scholars with expertise in advanced imaging, nanotechnology, and computational methods, in order to study the relationship between neural circuitry and behavior. Tool-building, he said, “will be central to the program.”

Sanes expects to focus in part on organisms less complex than primates, “like mice or ants, that can navigate, that can

have complicated social behavior, that can have complex reactions that anybody would call emotions—like fear or maternal attachment—but where one can begin to look at the biological basis, which I think is going to be circuits of neurons. We want to understand something about the circuit diagrams that underlie these behaviors,” he said. “We will use molecules and genes as tools, not as ends in themselves. The behavior is what we want to understand.” Using such tools, biologists like Sanes can watch as the neurons in living animals make new connections. The center, Harvard’s leaders hope, will lead to new insights and innovative approaches to understanding how the brain works.