FeaturedLab

BY LOUISA DALTON

Janelia Farm: Cultivating Scientists

The folks at Howard Hughes Medical Institute who dreamed up Janelia Farm say it is as much a social innovation as a scientific one. "We are creating a different culture here," says **Gerald Rubin**, **PhD**, director of HHMI's first freestanding research institute under construction in Loudoun County, Virginia. "Most professors don't do lab work anymore. They spend time on committees, write grant proposals, and teach. We want to be on the much more adventuresome end of things."

Researchers at Janelia Farm, Rubin says, will above all do research with their own hands. They will have small, easy-to-manage laboratories and no teaching, grant-writing, or administrative responsibilities. They will work on a campus designed to promote run-ins with other researchers, especially those from vastly different backgrounds. And they will self-assemble into novel, cross-disciplinary collaborations to work on long-term, unwieldy scientific problems difficult to tackle in a single laboratory.

That's the idea behind the social experiment of "The Farm." Built on a 689-acre tract of land 30 miles outside of Washington, D.C., Janelia Farm is due to start operating this summer and will have its grand opening in early October 2006.

When **Sean Eddy**, **PhD**, associate professor and a computational biologist at Washington University School of Medicine in St. Louis, heard Rubin speak in 2001 about the creation of Janelia Farm, he wanted in. "Gerry said, 'We don't know what we are going to do yet.' I said, 'I don't care. Keep me posted. The culture by itself is an attractive thing for me. Hopefully scientifically, it'll be a good fit.'"

Top: Gerald M. Rubin, PhD, HHMI vice president and director of the Janelia Farm Research Campus. Above: Janelia Farm buildings are designed to foster impromptu conversations. Photos by Paul Fetters.

HHMI eventually settled on two broad initial goals for Janelia Farm: first, develop computational tools for image analysis and second, identify how neuronal circuits process information. HHMI deliberately chose ambitious goals that are best suited to a 50-year multidisciplinary collaboration rather than goals that could be addressed with a five-year federal grant.

Eddy was chosen as one of the Janelia Farm group leaders, even though he specializes in computational genome sequence analysis rather than neuroscience or image analysis. He's thrilled with the challenge of working his way over to neurobiology. He lists some of the research ideas he has been throwing around in rank order from most to least sane. Perhaps he'll take software he has already developed for identifying mRNA secondary structures and apply it to the study of neuronal mRNA localization. Or, in collaboration with others, he might use computational techniques to build synthetic promoters for specific neurons in the fly, the worm, and the mouse. For that, he'd want to work with other group leaders such as **Julie Simpson**, **PhD**, who just finished a postdoctoral fellowship at the University of Wisconsin-Madison and has been mapping the brain of the fruit fly; **Karel Svoboda**, **PhD**, a neuroscientist at Cold Spring Harbor who has found a way of monitoring individual synapses in the mouse brain; and Rubin, who led the effort to sequence the fruit fly genome. One of Eddy's

HHMI's new research campus is located on a 689-acre tract in northern Virginia. Photo by Paul Fetters.

more crazy ideas, he says, is to try to simulate the behavior of the *C. elegans* worm from its wiring diagram. He's organizing one of the first onsite scientific meetings at Janelia Farm to discuss this challenge.

Although only eight of what will eventually be 24 Janelia Farm group leaders have been picked so far, Eddy's already collaborating with most of them. That's exactly what Rubin hoped would happen. Whatever their current expertise, all of the group leaders are extremely creative thinkers. Most have heavily quantitative backgrounds in areas such as computer science, physics, or mathematics. And most make a habit of inventing things—physical tools, gene lines, or analysis techniques.

Even the director of information technology at Janelia Farm, **Marshall Peterson**, who worked as vice president of IT at Celera Genomics, will invent tools to help the researchers as they need them. Peterson says that the goal for IT at Janelia Farm "is to build a very flexible shared computing environment that we can scale and adapt as needed when people come to us with computational challenges." He is starting off with 1200 CPUs and 150 terabytes of storage and leaving room for whatever else they might need. "The trick is to not paint yourself into a corner," he says.

Other tools at Janelia Farm include equipment for electron microscopy, light microscopy, genomic sequencing, instrument fabrication, transgenic animal studies, and more. Peterson emphasizes, however, that at Janelia Farm, "it's not all about tools. It is about people getting together, talking, interacting, exploring, giving full reign to their imaginations." Almost more important than the 1200 CPUs and the 10,000 mouse-cage vivarium, Peterson says, are the large round tables in the dining room, the housing for visiting scientists, and the pub, where "productive collisions" between researchers are sure to occur.

Eddy is counting on at least one of those productive collisions happening to him. "From osmosis, from hanging out with all of these neurobiologists," he says, "I'm hoping to eventually have a smart idea." If Janelia Farm works the way it has been designed to work, Eddy and his colleagues will have many. □

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JANELIA FARM QUICK FACTS

WHAT: Howard Hughes Medical Institute's first freestanding research institute

WHERE: Ashburn, Virginia—roughly 30 miles northwest of Washington D.C.

STAFF: Will have up to 300 resident research staff (including group leaders, postdocs, and graduate students) and 80 support staff, plus up to 100 visiting scientists

FACILITY: $500 million research campus (including a 900-feet-long laboratory building, conference facilities and hotel, and visiting scientist housing) designed by Rafael Viñoly to foster collaborative science and adapt to changing needs

FUNDING SOURCE: Howard Hughes Medical Institute

HISTORICAL MODELS: Medical Research Council Laboratory of Molecular Biology (MRC LMB) in Cambridge, England, and AT&T's Bell Laboratories in New Jersey

SCIENTIFIC CONFERENCES: Will host at least twelve per year

WEB PAGE: http://www.hhmi.org/janelia/