

A Transforming Energy

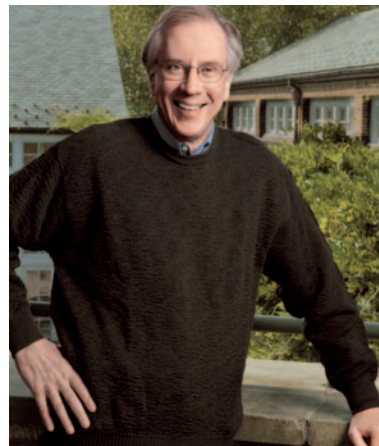
AT UNIVERSITY AND COLLEGE CAMPUSES AROUND THE country, early autumn brings the energy of new beginnings sparked by enthusiastic students, fresh intellectual challenges, and renewed collegial interactions. Measured against this standard, HHMI began the season in a particularly dynamic and eventful fashion. I'd even call it joyful.

After nearly seven years of thinking and planning—concurrent with four solid years of construction—the Institute opened its Janelia Farm Research Campus. With laboratories and offices still filled with moving boxes and equipment crates, Director Gerry Rubin and his colleagues hosted their first meeting of HHMI investigators immediately after Labor Day. Everyone lived to tell the tale—as the saying goes—and the Janelia team immediately began readying the campus for the biennial gathering of HHMI's International Research Scholars, who came from every continent save Antarctica. It's fair to say that these inaugural meetings will be remembered for years to come, both for their scientific content and for the palpable sense of excitement generated by Janelia Farm.

The week of activities that marked the official opening of Janelia Farm began on an extraordinary note with the announcement of the 2006 Nobel Prize in Physiology or Medicine. Craig Mello, an HHMI investigator at the University of Massachusetts Medical School in Worcester, received the early-morning phone call from Sweden along with his colleague, Andrew Fire, who was at the Carnegie Institution in Baltimore when the two collaborated. Their discovery, called RNA interference (RNAi), is a normal regulatory mechanism that allows cells to shut down individual genes during embryonic development. What really made RNAi famous was its utility as a research tool. In less than a decade, it became widely used to selectively silence specific genes in plants and animals. Several companies are exploring its potential in new therapeutic approaches. Because most human ailments, from viral infections to cancer and immunological diseases, involve specific RNA molecules, the list of possible applications is long.

Mello and Fire (now at Stanford University School of Medicine) wanted to find a better way to block gene expression during embryonic development. So they inserted RNA into their model organism, the microscopic roundworm *Caenorhabditis elegans*—a blocking maneuver that worked all too well. Interference spread from cell to cell, from generation to generation. Undeterred by these puzzling results, the two scientists persisted in their efforts to understand what they were seeing. They determined that the active agent was double-stranded RNA—a piece of the messenger and its pairing partner. It was a fundamental, transforming insight.

The path to discovery followed by Mello and Fire offers a framework for thinking about science and for the evolving research community that is taking shape at Janelia Farm. We intend Janelia Farm to be a place that fosters risk taking and collaboration. To help



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shape its scientific culture, we studied salient historical models, among them Bell Labs in Murray Hill, New Jersey, and England's Laboratory of Molecular Biology. The initial areas of research have been identified: understanding how the brain processes information and inventing imaging technologies and computational methods for image analysis. Scientists have been recruited. The first laboratories are up and functioning. An ambitious program of meetings and workshops has been scheduled. Graduate students will soon be identified through our joint program with the University of Cambridge and the University of Chicago. In short, this experiment is starting to take on a life of its own.

As Janelia Farm opens for discovery, it is impossible to predict what will unfold in the coming years. Will this vision—that physicists, computer scientists, engineers, and chemists can work shoulder-to-shoulder with biologists to explore the frontiers of biology—be as robust as we claim? We have talked about risk, but will the risk pay off in terms of discoveries? These are heady questions given the success of HHMI's existing approach to supporting biomedical research. Our investigators—as Craig Mello illustrates—are leaders in discovery. Janelia is a different model, with different expectations, but it too will rely on creative, daring individuals given the freedom and support to explore the big scientific problems of our time. As the Janelia scientists set down roots and begin their work throughout this fall season, we await, with great anticipation, the fresh new ideas, new approaches, and new findings that no doubt will arise this spring and in the years to come.