Interconnected

SCIENTISTS ARE ACCOMPLISHED NEOLOGISTS: MAKERS OF new words, inventors of new usages for old words, creators of specialized vocabularies. One might even say that scientists tend toward neophilia—defined by our friends at the *Oxford English Dictionary* as a love for, or great interest in, what is new.

Take some of the "newest" additions to the scientific lexicon. Writing in *The Scientist* some years ago, the late Joshua Lederberg and linguist Alexa T. McCray sought the origins of *-ome* and *-omics*, suffixes of choice in contemporary biology. The term "genomics" may have arisen in the 1970s, but Lederberg and McCray turned to Sanskrit and Greek to understand the holistic meaning of *-ome*, noting that the Sanskrit syllable Om "encompasses the entire universe in its unlimitedness" and that the Greek letter omega is "the greatest and very last character" of the alphabet, the symbolic last word.

So it is with some trepidation that this issue of the *HHMI Bulletin* introduces a graphical "interactome" that illustrates the interconnected research interests of the 56 scientists recently selected as new HHMI investigators (see page 20). This competition—our first major experiment allowing scientists to apply directly to the Institute—has already introduced new variables into the HHMI community. We received 1,070 applications, and while sifting through so many documents certainly required more work than in the previous nomination-based competitions, we achieved our goal of choosing investigators from a wider, deeper pool of candidates. Seven institutions will be represented by an investigator for the first time, and we are expanding into intriguing areas of research, including bioengineering, synthetic biology, and the ecology of infectious disease.

As an organization, we frequently describe our approach to supporting science as "people not projects"—that is, we identify highly creative researchers working across the spectrum of biomedically related projects and provide them with resources that will enable them to make discoveries for the long-term betterment of human health. We also work to ensure that participation in the HHMI community of scientists will generate new connections and new ideas. In fact, it would be a fascinating exercise to remap the "Class of 2008" in five or 10 years—along with the existing investigators, the lab heads at the Janelia Farm Research Campus, and our International Research Scholars—to view the collaborative networks that emerge as well as the ways these interactions modify the questions these scientists seek to answer.

The HHMI community also overlaps with other networks of researchers in this country and around the world—what you might describe as a human interactome seeking to unravel the mysteries of the biological interactome. It goes without saying that the map of science itself is both complex and dynamic.

Some try to capture the interactive nature of the scientific process by building maps. Researchers at both the Sandia National Laboratories and the Bergstrom laboratory at the University of Washington have built maps by sifting through publications, compiled by Thomson Scientific, to understand the strength of connections between various disciplines. The resultant diagrams resemble, in the words of one of the Sandia creators, "a filamentous microorganism you might see under a microscope."

Bruce Weller

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THOMAS CECH

What's compelling about these maps? For starters, they are beautiful abstractions that, in the words of Lederberg and McCray, direct one's attention "to an eventual goal, of which only a few parts may be at hand." They depict a familiar landscape in new ways; over time, they may tell us much about the evolving nature of scientific research, the emergence of new fields, the impact of decisions made today. Taken by themselves, however, these maps provide little guidance for navigating the present and it's the present that provides cause for concern, notwithstanding our very real excitement about the expansion of HHMI's scientific community.

The pressing question we face today is how to ensure the vitality of our nation's research enterprise, the future of which will most certainly rely on the next generation of investigators. Scientists who are about to launch their independent research careers after a decade of specialized postgraduate training currently face daunting obstacles; conservative funding decisions constrain their opportunities as well as the larger prospects for potentially transformative research.

A committee I chaired for the American Academy of Arts and Sciences released its findings in June on these very issues. The ARISE report—short for "Advancing Research in Science and Engineering"—concluded that, while we await a rebound in the level of research funding, we can't hold off making major changes in the mechanisms by which research dollars are distributed. Federal agencies, universities, and foundations need to take steps to nurture young faculty and invest in high-risk, high-payoff research. These entities can begin remapping their relationships with each other and with young investigators to sustain the landscape of strength and innovation that has long characterized the U.S. research enterprise.