Scientists

Excitement for a New Era

Eric Lander

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Eric Lander's key role in the Human Genome Project and his tireless efforts in establishing and running the Broad Institute caught our attention. Curious to know more, *BioTechniques* contacted him to find out about the ambition, character, and motivation that led to his success.

What would you say has been your major research focus throughout the years?

What always fascinated me is the richness of information in the human genome. I would say my scientific career has focused on developing ways to read and interpret the human genome, from sequencing the genome during the Human Genome Project to our current work on interpreting the genome, understanding rare genetic variants that cause inherited disease, finding the genes that contribute to cancer, and understanding the roles of long non-coding RNAs.

How did you get involved in the Human Genome Project?

Totally by accident. By training, I was a pure mathematician. During the

1980s, when I was teaching managerial economics at Harvard, I randomly sat in on a cell biology course and also attended the lab. The graduate student who was teaching that lab section introduced me to his advisor, Peter Cherbas, who kindly offered me a bench in his lab. Peter and his wife Lucy taught me how to do molecular biology.

I got more involved in biology by moonlighting, first in a *Drosophila* lab and then in a *C. elegans* lab. Then one day after a seminar at MIT, I was introduced to David Botstein. We began debating what you might be able to do with the human genome if you had the sequence. That conversation led to collaboration. I put nearly everything else aside and worked with David on how to understand the basis of genetic traits. Then David Baltimore offered me a position as a Whitehead fellow, even though I had not yet published a single paper in biology. This eventually led me to the Human Genome Project, where I led the largest center focusing on that effort.

What do you think is the most important open question in genome biology at the moment?

One generation worked to sequence and understand the human genome. We now have that layer of information. The challenge for this next generation is to provide a comprehensive picture of the circuitry of the cell—to understand every regulatory element, how the cell integrates information, and then map the “wiring diagram” of the cell and its responses. This is a major challenge. But in the mid-1980s before PCR was even introduced, it also sounded insane to imagine that we would ever have the full sequence of the genome. I think, in the coming decades, observational and analytical experiments will propel us towards mapping a complete picture of cellular circuitry. This will depend on traditional experiments as

well as advances in synthetic biology. The ability to write our own regulatory elements and read out cellular responses will go a long way. I'm also excited about single cell analysis, since I think it will help us tremendously in these efforts, along with new editing tools like CRISPRs. For me, thinking about this “human circuitry era” has the same excitement as the human genome era did.

What has been the highlight of your career thus far?

Science is such a community effort, so for me, building the Broad Institute from scratch is clearly the highlight. We gathered a community of 2000 people, stretching across Harvard, MIT, and five different teaching hospitals, who now all work together to fulfill the promise of genomic medicine. It's such an amazing community of extraordinarily talented and generous people. While I maintain a very active lab, I feel as if the greatest impact I can possibly have is supporting and nurturing this tremendous community of young people across Boston.

What are your hobbies when you find time away from the lab?

Our kids' schools would hold yearly auctions for their fundraising efforts. One year, their auctioneer was unavailable and they needed somebody to fill in, so I volunteered. It turns out that I have a knack for exciting people and helping them give to a cause. I like this form of community involvement, and now I regularly serve as auctioneer for a number of local and national organizations.

Interviewed by Kristie Nybo, Ph.D.
Image courtesy of Tony Cenicola at the *New York Times*.

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