Elaine Mardis

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Born in North Platte, Nebraska on September 28, 1962 to Boyd and Jan Gentry, Elaine knew at a young age that her future lay as either a physician or a research scientist. This desire was nurtured by her father, a high school and community college chemistry teacher, as well as by her public school teachers. At the University of Oklahoma, her undergraduate research focused on *Drosophila* genetics with Gerald Braver, where she earned her B.S. in Zoology. Elaine then remained at OU to join my laboratory, completing her Ph.D. in Chemistry and Biochemistry in 1989. Her dissertation, "Automated Methods for DNA Isolation and Sequencing, and their Implementation," describes her pioneering work combining robotics and molecular biology within the context of genomic sequencing. Upon graduation, she moved to Bio-Rad Laboratories where she continued developing technological components to facilitate DNA sequencing.

In 1993, Rick Wilson, whom she knew from her time in my laboratory, invited her to join Washington University's Genome Sequencing Center (GSC) as the Director of Technology Development. There she continued to develop and implement the newest sequencing and robotics technology to facilitate the large-scale sequencing of the *Caenorhabditis elegans* genome. Elaine successfully directed a unique interdisciplinary group that included mechanical engineers, computer programmers, molecular biologists and enzymologists. Because of her excellence in both teaching and research, she rapidly was promoted from instructor to full professor at Washington University and was named Co-Director of the GSC. Concurrently the GSC became a major contributor to the HGP, producing the BAC scaffolding map, contributing 20% of the production data, and finishing human chromosomes 2, 4, 7, and Y. She subsequently contributed to sequencing the genomes of mouse, rat, chicken, chimpanzee, gibbon, rhesus macaque, and others.

While exploring next generation sequencing (NGS) instrumentation, Elaine and Rick began to realize that whole-genome NGS could rapidly yield the differences between the genomes of normal cells and tumor cells from the same individual. Working collaboratively with Tim Ley, they published the first NGS-based whole-genome mutational profile of a primary acute myeloid leukemia genome in 2008. This approach now has been widely adopted and resulted in thousands of sequenced cancer genomes, including hundreds of childhood cancers in a collaboration with St. Jude Children's Research Hospital.

Elaine now has joined Nationwide Children's Hospital, where she and Rick Wilson have established the Institute for Genomic Medicine. Here they will continue sequencing the genomes of additional childhood cancers by collaborating with clinicians using state-of-the-art whole-genome, exome, and RNA sequencing coupled with newer analysis techniques. As a result, knowledge of a patient's matched normal and tumor genomic sequences will become more rapidly obtained, and a detailed understanding of the specific cancer genomic alterations will emerge to direct successful cancer treatments.

By Bruce Roe