



Alumna Betty Mansfield, founder and managing editor of Human Genome News, also maintains several Web sites about genetics. She was one of 12 recipients of the DOE Biological and Environmental Research Program Recognition Award in 1997.

## A story of genes and Madison family links

***A scientist publishing Human Genome project information on the biological transmission of family traits is part of a family legacy with multiple links to Madison***

As group leader for Bioinformation Systems in the Life Sciences Division of Oak Ridge National Laboratory in Tennessee, **Betty Kay Keyser Mansfield** ('75, '86M) presides over the federal flow of information to researchers and the public about the state of genetic knowledge. As one of 10 family members who attended Madison College or JMU, she credits a supportive faculty for inspiring her career.

Mansfield has worked for 25 years at Oak Ridge, where in 1989, she became task leader for Human Genome Management Information System (HGMS). Its initial mission was to provide up-to-date information on the Human Genome Project (HGP), completed in 2000. That massive enterprise, funded by the U.S. Department of Energy and National Institutes of Health, mapped the arrangement of bases (rungs along the DNA double helix) for chromosomes on human beings' approximately 30,000 genes.

Many assumed the HGP ended when its draft was published in 2000. Anything but, says Mansfield, who is founder and managing editor of *Human Genome News* and maintains several related websites. Labs have been jumping with studies that build on the HGP.

These include research funded by the DOE's new project, *Genomes to Life*. "This is really going to be a *hot* program," says Mansfield, who hopes DNA knowledge will lead to new energy sources and global warming reduction. More must be learned first. Though the HGP mapped genes on human DNA, Mansfield says, "We're totally in our infancy understanding" how genes operate.

"If we had all of the parts of a 747 jet laid out on the runway, could we really understand what they would produce if they were put together? No! We wouldn't know how the components would work together and when they'd be needed." Mansfield foresees GTL developing large facilities for sharing "the diverse and collective brain power of scientists all over the world-kind of like an Internet for biology."

For those who want to know more, her websites are:

\_ The Human Genome Project Information site has received several awards and includes a genetics primer and information for lay readers on ethical, legal and social issues.

<http://www.ornl.gov/hgmis>

\_ The Genomes to Life site lists goals and calls for grant applications.

<http://DOEGenomesToLife.org>

\_ The Gene Gateway serves as an entry point to computational resources created by many scientists, including the vast HGP sequence.

<http://www.ornl.gov/hgmis/posters/chromosome>

"We provide an entry to these computational resources, although we don't actually make the resources. This is all consistent with our philosophy to make genetic information-including the information that scientists actually produce and use-available to students, educators and the public. Our ultimate goal is to provide accurate and relevant information so that more informed personal genetic and public policy decisions can be made," Mansfield says.

For a high-quality education, Mansfield insists, "A big-name school doesn't matter. It's up to you." Yet Mansfield, who received honors with both her Madison degrees, says seven professors "had more impact on my life than one could ever measure:" biology professors **Norm Garrison, Peter Nielson, Janet Winstead, Wilbur Dean Cocking** and **Beverly Silver**; plus English professor **Robert Hoskins** and the late chemistry professor **Liberty Casali**. Winstead and Casali, adds Mansfield, mentored women in science before "mentoring" became a buzzword.

During Mansfield's senior year, Garrison invited her to meet a speaker from Oak Ridge at a dinner. That meeting would lead to her beginning work in cancer research at Oak Ridge in 1977.

She wrote her JMU master's thesis about her research at Oak Ridge with leukemia cells. Unlike healthy red blood cells, which stop dividing after producing hemoglobin, leukemia cells, if fed, keep dividing forever. "All normal cells die. Cancer cells don't die" spontaneously, says Mansfield. Showing her flair at translating technical information to the lay public, she describes normal cells as "polite"-respectful of others' space-while "cancer cells go, 'I don't care.'" Mansfield and her colleagues treated leukemia cells with a chemical, DMSO. Though toxicity rules it out for treatment, DMSO made the cells "terminally differentiated"-i.e., acting like normal cells, producing hemoglobin and then dying.

In the 1980s, Mansfield set up a protein two-dimensional gel electrophoresis laboratory at NIH's National Institute of Environmental Health Sciences in North Carolina. In 1997, she was one of twelve recipients of the DOE Biological and Environmental Research Program Recognition Award.

In the 26 years since arriving at Oak Ridge and first using computers, Mansfield has watched biology become more quantitative. She says more careers are opening up that combine "bench" (like her past lab work) and "desk" (her present focus): "The era of people who are experts in a small esoteric area is over."

Mansfield grew up in Marshall and graduated from Fauquier High School. The first Madison alumna in Mansfield's family was her paternal grandmother, **Edith May Bowling Keyser**, who attended Madison in 1918-19. Mansfield attributes her educational motivation to the next family alumna-her mother, **Madoline Poe Keyser** ('44)-who taught 6th and 7th grade math and art for 30 years in Fauquier County schools, and died in December 2002. "Even when we were little kids, she said 'You will go to college,'" recalls Mansfield.

Mansfield would often visit with her aunt, alumna **Dorothy Poe Johnson** ('45) of New Market during the summers. It was when she and Johnson, who taught business courses in Luray, took a side-trip to the public library in Harrisonburg that Mansfield caught her first glimpse of the bluestone campus.

Mansfield enrolled in 1972 at what was then Madison College. She and high school sweetheart Jack Mansfield - now a lieutenant with the Oak Ridge police force - were married during Betty Mansfield's first semester. The Mansfield newlyweds had one car and rented a five-bedroom farmhouse on U.S. 11 North from the late **Anna Laura Mauck Ward** ('30) for \$75 a month. Ward would let the Mansfields stay with her in Harrisonburg during inclement weather.

Except for time in labs (with each science class entailing three or four hours per week), Mansfield says, "I practically lived in the library." Jack, meanwhile, worked for Nielsen Construction, helping build Miller Hall across from what was then the campus library entrance.

She says her brother, **Jay Keyser** ('79), first boasted that business students like himself enjoyed lives of leisure. But as demands of his accounting and management majors increased, "I would look up from my studies and see him sitting behind a pile of books." Keyser is now executive vice president for Chantilly site construction contractor William A. Hazel Inc.

The JMU family also came to include three cousins of those siblings: **Judy Johnson Bowman** ('79, '80M, '82 Ed.S.), a deaf sign language interpreter and mother of three in the Leesburg area; **Brenda Johnson Wunder** ('83), a nurse in Winchester who majored in political science and had worked in Washington, D.C., for years before entering nursing school; and **Vickie Keyser Hirt** ('90), employed by the computing firm SAIC (Scientific Applications International Corp.) Adding to the already impressive list is Mansfield's sister-in-law, **Susan Byron Keyser** ('77), an SAIC vice president and program manager; and Judy's husband, **Bill Bowman** ('79), a senior analyst for BAE Systems.

Wherever genetic research may lead, a high probability exists of Mansfield nieces, nephews and cousins appearing on JMU's 21st Century campus.