

Mary E. Clutter

Our beloved mentor, friend, and colleague Mary E. Clutter, retired NSF assistant director for Biological Sciences, died peacefully on December 9, 2019, in Alexandria, Virginia, at the age of 89.

Mary Clutter was born March 29, 1930, in Charleroi, Pennsylvania, to Frank and Helen Clutter. She had two brothers and a sister. She earned a BS in biology from Allegheny College, where she developed a passion for plants. In her first job, in the Harvard laboratory of Ralph Wetmore, Mary mastered plant tissue culture. After team member Ian Sussex became assistant professor at the University of Pittsburgh, she returned to her hometown to be his first graduate student, earning both her MS and PhD there. Her work pioneered new techniques in eliciting novel developmental programs in differentiated cells—what today we call *reprogramming*.

Mary's capstone experiments on vascular element differentiation in tobacco pith were published as a solo-authored paper in *Science* in 1960 (Clutter, 1960). That year, the Sussex group moved to Yale University, and Mary started a position as a research associate. Work continued on auxin impact on differentiation and on auxin transport through vascular and nonvascular tissues. Motivated by the discovery of polytene chromosomes in suspensor cells of bean plants, Mary and her unofficial first graduate student, Tom Brady, were



the first to implement *in situ* chromosome gene detection in plants (Brady and Clutter, 1972).

Despite her flourishing independent research program, the prospects for a permanent position at Yale were not bright, as was typical at the time. Mary was deeply disturbed by the lack of career opportunities for women and by the lack of awareness among the then all-male undergraduate class. Instead of just lamenting, she and Virginia Walbot developed and taught a course on the interface of science and society that involved sampling river water at industry sites. They got all 100 students involved in assessing the impact of industry on the daily life of residents of New Haven, the start of Yale's involvement in improving the town.

On a second front, along with Walbot, Mary Lake Polan, and others, Mary was instrumental in organizing the women in science movement. In fact, her next *Science*

publication was a 1972 letter published with Walbot announcing that AAAS had authorized \$50,000 to establish a Women in Science Office, something they had lobbied for at the 1971 annual meeting (Clutter and Walbot, 1972). The Women in Science Office morphed into the many AAAS efforts today for inclusion and diversity in science.

"Shocking" was the reaction of Yale's male faculty when Mary was appointed as a rotator for the Developmental Biology Program at NSF in 1974. This reaction would be repeated across the country as Mary began to invite accomplished yet underappreciated woman scientists to serve on NSF review panels and later as rotators. Her experience at Yale as a woman scientist deeply offended her sense of fairness, and as she embarked on her new career, a major objective for Mary was opening NSF opportunities to everyone based on merit.

Upon her arrival at NSF, Mary quickly became involved in NSF activities beyond developmental biology. After several years, she became a permanent NSF employee and ascended the leadership ladder at NSF, moving up from program director, to division director for cellular biosciences, to science adviser to NSF Director Erich Bloch. In 1989, she was appointed assistant director for Biological, Behavioral, and Social Sciences (later changed to Biological Sciences [BIO] during reorganization), the position she held until her retirement in 2005.

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Throughout her NSF career, Mary's highest priority was always to facilitate the advancement of science by supporting the very best research. Those of us who worked with her often heard her ask, "What about the science?" Mary demanded that all our decisions be justified on the basis of science. She was a leader with vision, and the creation of the Bioinformatics Program in 1991 is an example of her visionary thinking. She also recognized the importance of collaboration across institutional and national borders and of the integration of disciplines to advance 21st-century science. She played a key role in developing international science programs such as the Human Frontier Science Program and the Global Biodiversity Information Facility.

Mary viewed nurturing the next generation of scientists and promoting the participation of underrepresented groups as essential to advancing science. As a program director, she made sure that the review panel members were balanced in terms of expertise, gender, institution type, and geographic location. When she became BIO assistant director, she made it directorate policy not to support conferences that lacked women speakers. She also issued an internal memorandum that required the appointment of women on panels and committees equal to their numbers in biology. This practice has since been adopted widely across NSF.

In terms of her role in support of the plant sciences, they would not be where they are today if it were not for Mary's vision, leadership, encouragement, and support. She spearheaded numerous initiatives and activities, ushering in a golden age of research that changed the face of biology. Her efforts in the early 1980s were focused on applying and integrating molecular biology and biotechnology concepts and technologies in plant research, represented by the NSF Postdoctoral Research Fellowships in Plant Biology and the Plant Molecular Biology course at the Cold Spring Harbor Laboratory launched in 1983. This "plant postdoc program" supported 236 fellows over the course of 12 years, including current and past ASPB presidents.

It is a little-known fact that Mary was intimately involved in setting up USDA's Competitive Research Grants Office, which opened in 1977 and was the precursor of the Agriculture and Food Research Initiative. She dispatched her trusted deputy Holly Schauer to serve as associate chief scientist and arranged the transfer of veteran grants specialists from NSF. Similarly, she was instrumental in establishing the McKnight Foundation's Plant Biology Program, which started in 1983. When representatives from the McKnight Foundation sought her advice about the next research area to support, she not only convinced them to support plant biology but also provided advice on the most

impactful mechanisms of support. This program provided training grants to institutions and individual no-strings-attached research grants, filling unmet needs of the plant community.

Mary's most ambitious initiatives were the Multinational Coordinated *Arabidopsis thaliana* Genome Research Project and the National Plant Genome Initiative. The Arabidopsis genome program was started when NIH decided against including Arabidopsis as one of the model organisms in the Human Genome Initiative. In her typical fashion, Mary quietly persuaded other funding agencies in the United States and abroad to coordinate and collaborate with NSF. The Multinational Coordinated *Arabidopsis thaliana* Genome Research Project was officially launched in 1990 with endorsement from Arabidopsis researchers from around the globe and the European Commission. Under the umbrella of this project, the complete genome sequence of Arabidopsis was accomplished in 2000 by six teams of scientists from France, Japan, the United Kingdom, and the United States.

The National Plant Genome Initiative sprang from community efforts initially led by the National Corn Growers Association and later joined by the diverse plant science community led by ASPB. It was a political process, although such an initiative also made scientific sense. When Congress was close to a vote on funding, Senator Christopher

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Bond (R-MO) asked Mary whether NSF would accept the funds and manage a new plant genomics program. Mary answered that NSF would accept the funds *if* he could guarantee that the funding was new money and *if* NSF was free to manage the program according to established NSF policies and procedures. Senator Bond agreed. The NSF Plant Genome Research Program (PGRP) started in 1998.

It was Mary's vision that transformed a potentially risky opportunity into a bold new direction for the plant sciences. She ensured that the PGRP enhanced rather than replaced the already vibrant research supported through the BIO core programs and at other agencies. As chair of the Interagency Working Group on Plant Genomes, Mary was an architect of the National Plant Genome Initiative five-year plans and the associated guiding principles. These principles—use of the highest standard of peer review to support merit-based funding decisions, rapid release of data and resources, and cooperation across national and international

agencies and the private sector—were reflections of her deeply held belief that this funding should have the widest possible impact.

Mary received many honors in her long, distinguished career. Among them are the Leadership in Science Public Service Award from ASPB, Presidential Rank Awards from three presidents (Ronald Reagan, George H. W. Bush, and Bill Clinton), and honorary doctorates from Allegheny College and Mount Holyoke College.

After her retirement from NSF, Mary served as a consultant for the Cosmos Group, among other organizations, and as a member of the Boyce Thompson Institute board of directors. She also continued to enjoy attending the annual Plant and Animal Genome Conferences and AAAS meetings. To the end of her life, she remained enthusiastic about and interested in the many scientists whose careers she had helped to establish.

Although her contributions to science undoubtedly will continue to reverberate after her death, what we will miss most is Mary the person. She was always optimistic

despite obstacles. She had boundless energy, and she was unsentimental but empathetic, critical but courteous, and respectful of others regardless of their social standing. In private, she loved to travel, enjoyed dinners with friends, and was very good with children. She especially loved watching the sun set over the ocean, hoping to see the green flash as it dropped below the horizon.

Mary's goal in life was nothing short of changing the world. We believe she succeeded. ■

Virginia Walbot
Jane Silverthorne
Machi Dilworth

References

- Brady, T., and Clutter, M. E. (1972). Cytochemical localization of ribosomal cistrons in plant polytene chromosomes. *Journal of Cell Biology* **53**: 827–832. <https://doi.org/10.1083/jcb.53.3.827>.
- Clutter, M. E. (1960). Hormonal induction of vascular tissue in tobacco pith in vitro. *Science* **132**: 548–549. <https://doi.org/10.1126/science.132.3426.548>.
- Clutter, M. E., and Walbot, V. (1972). AAAS meeting [letter]. *Science* **175**: 944–945. <http://www.jstor.org/stable/1732699>.