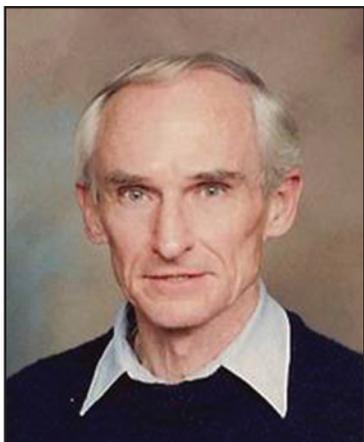


# In Memoriam: David Marshall Prescott (1926–2011)



David Marshall Prescott

We are sad to report the death of David Marshall Prescott on February 19, 2011. David's scientific career spanned six decades. During that time, he influenced multiple generations of students and investigators and contributed many scientific discoveries. He always worked on unicellular eukaryotes, with a recent focus on ciliates such as *Oxytricha nova*, but he employed a range of experimental systems that is seldom seen today. He approached science by identifying and pursuing interesting and often unique questions, frequently developing novel experimental approaches to answer them.

David received his early education from Crosby High School in Waterbury, CT, but his further education was interrupted by World War II, when he served as a radio operator in the Merchant Marine. Following his honorable discharge, he enrolled at Wesleyan University (CT), where he completed his BA degree in 1950. He earned a PhD degree in Zoology at the University of California, Berkeley, with Daniel Mazia, who initiated David's life-long interests in microscopy and the inner workings of cells. Postdoctoral studies were at the Carlsberg Laboratory in Copenhagen, Denmark, as an American Cancer Society Fellow.

In 1955 he returned to the U.S. as an assistant professor in the Department of Anatomy at the Medical School of the University of California, Los Angeles. In 1959 he moved to Oak Ridge National Laboratory in Tennessee, and then on to the University of Colorado Medical School, where he served as Professor and Chair of Anatomy from 1963 to 1966. He ultimately put down roots at the University of Colorado, Boulder, where he spent the remainder of his career, initially in the Institute of Developmental Biology, then as a founding member of a new Department of Molecular, Cellular, and Developmental Biology. He served as chair of that department from 1974–1975 and was

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named a Distinguished Professor in 1980.

During his career, David published more than 200 research and review articles, edited many volumes, and authored three books. David made so many significant observations that it is difficult to do justice to his many accomplishments. His early work provided insights into some fundamental aspects of cell biology that we now take for granted. One of these observations used a “Cartesian diver” to weigh a single amoeba throughout the cell cycle,<sup>1</sup> providing basic information on growth during the cell cycle and evidence that cell division was not triggered simply by reaching a critical cell size.

He also was one of the pioneers in the use of radioisotopes in combination with single cell micromanipulation and/or autoradiography.

He used such approaches to demonstrate that the nucleus was the primary site of RNA synthesis<sup>2</sup> and, in collaboration with Lester Goldstein, he identified the transport of proteins both into and out of the nucleus.<sup>3</sup> Also in conjunction with Goldstein, David carried out nuclear transplantation experiments that provided fundamental insights into nuclear-cytoplasmic interactions in the control of the cell cycle.<sup>4</sup> With Peter Kuempel he demonstrated in an elegant study that *Escherichia coli* DNA replication is bidirectional.<sup>5</sup>

In the early 1970s, David's laboratory made the astounding discovery that the macronuclear genome of stichotrichous ciliates consisted of thousands of small “gene-sized” DNA molecules,<sup>6</sup> more recently referred to as “nano-chromosomes.” This discovery formed the focus for the remainder of his career and led to a series of contributions on the organization of macronuclear DNA, as well as the structure of telomeres and DNA-interacting proteins. He also investigated how these macronuclear DNA molecules were derived from the more conventional chromosomes of the micronucleus during sexual reproduction/conjugation, leading to insights

into chromosome fragmentation, de novo telomere formation, and DNA splicing. His work extended into the area of evolution, and he contributed to the field of ciliate phylogeny and the evolution of DNA rearrangement processes.

Most recently, he uncovered the wholly unexpected phenomenon of DNA scrambling in the stichotrichs,<sup>7</sup> in which the segments of micronuclear DNA that will ultimately form a macronuclear DNA molecule are not only interrupted but also disordered, and sometimes inverted relative to each other. He focused on disentangling this DNA scrambling process through the end of his career, continuing with theoretical work even after retiring and closing his laboratory (e.g., reference 8).

David became a fellow in the American Academy of Arts and Sciences in 1970 and a member of the National Academy of Sciences in 1974. He received a Senior U.S. Scientist Prize from the Alexander von Humboldt Foundation (1979–1980) and was a fellow of the John Simon Guggenheim Memorial Foundation in 1990. He was active in numerous scientific societies, including serving as President of the American Society of Cell Biology (1965–1966) and the Society of Protozoologists (1996–1997). He was editor of *BioScience* (1966–1969) and *Experimental Cell Research* (1980–1989) and a member of the editorial boards of numerous journals throughout his career. David was the founding editor for the still influential series *Methods in Cell Biology* (originally *Methods in Cell Physiology*), which provided detailed descriptions of current protocols to generations of cell biologists, and he served as editor for the first 15 volumes in the series.

David was also a distinguished educator at multiple levels. He trained generations of graduate students and postdoctoral fellows, many of whom went on to establish their own successful research programs, and he hosted visiting scientists from around the world. For years David also taught one semester of freshman biology, and he designed a very well-received course entitled “Biology of the Cancer Cell.” Throughout his career, he hosted scores of undergraduate students in his laboratory. These teaching accomplishments were recognized by a number of formal awards, including his being named a University of Colorado President’s Teaching Scholar in 1993.

Some insights into David’s scientific philosophy come from his writings. In his 1999 commencement address at the University of Colorado (“On Learning, Wisdom, and the Game of Pinball”), David suggested his life had

been circuitous and meandering, resembling the erratic motion, stops, and starts of a pinball. He took the greatest delight in finding the unexpected in life and in the lab. He was most happy when he had an experimental result that went against the grain, something that forced a reevaluation of one’s preconceived notions. For example, he loved to tell the story of how his initial grant application to study the gene-sized DNA in *Oxytricha* was rejected over concerns that it was an experimental artifact. He subsequently submitted essentially the same grant to another study section and received its top score! David noted that “prejudice is not an adequate criterion for determining fact; it is well to keep an open mind . . .”<sup>9</sup>

Finally, it must be mentioned that in addition to science, David greatly enjoyed and was dedicated to his family. He is survived by his loving and devoted wife Gayle, his daughter Lavonne, his sons Jason and Ryan, and four grandchildren (Hayden, Henry, Alexandra, and Zack). The fields of cell biology and protistology, and science in general, has lost one of its heroes and he will be missed by many. Contributions in David’s memory may be made to the Prescott Scholarship for undergraduate Arts and Sciences students at the University of Colorado Foundation, 4740 Walnut St., Boulder, CO, 80301. Memories and condolences may be conveyed to the family at <http://david.prescott.muchloved.com>. ■

—Larry Klobutcher, University of Connecticut Health Center, and J. Richard McIntosh, University of Colorado, Boulder

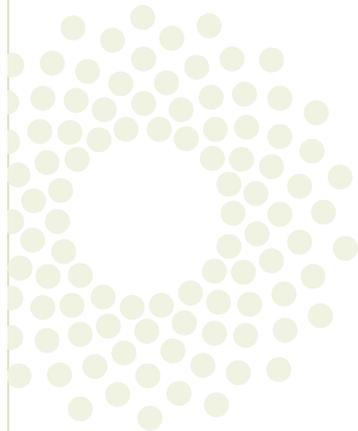
## Editor’s Note

The authors thank the many colleagues who provided information and their impressions of David, and apologize to the many individuals whose work has not been mentioned. Gayle Prescott, Carolyn Jahn, and Ann Cowan are gratefully acknowledged for their thoughtful comments on the manuscript. The photograph was provided by Gayle Prescott.

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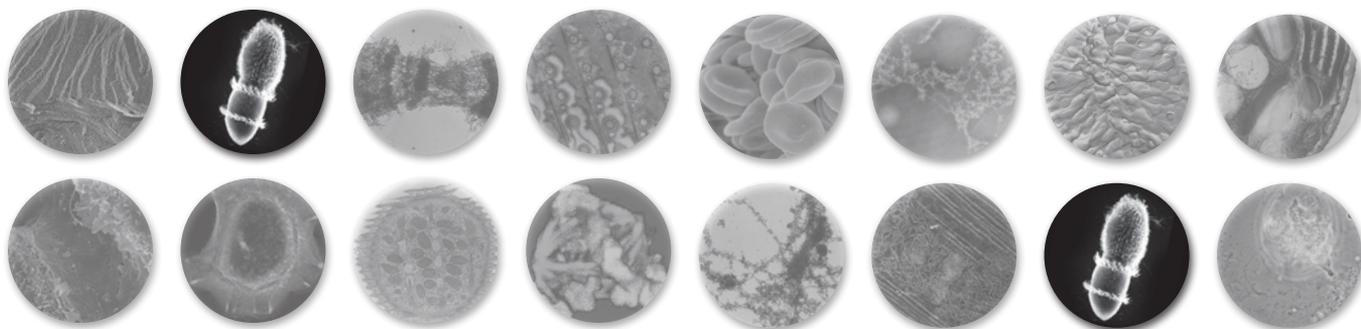
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