



IN MEMORIAM

Thomas C. Alber
Professor of Molecular and Cell Biology
Chancellor's Class of '43 Chair
UC Berkeley
1954 – 2014

Thomas C. Alber, an accomplished structural biologist known for his scientific integrity, mentorship, and collegial spirit, died in Berkeley on March 28, 2014. His impressive academic career in structural biology was cut short after a courageous five-year battle with amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease. He was professor of molecular and cell biology and Chancellor's Class of '43 chair at the University of California, Berkeley.

Alber was born in Tokyo, Japan, on January 5, 1954. He grew up in post-World War II Japan, which provided him the opportunity of a bilingual and bicultural education. He moved to the United States at the age of 10, and grew increasingly interested in science, an interest amplified by a teacher who taught college-level anthropology at his high school. He then honed his growing intellectual curiosity as an undergraduate at the University of California, Santa Cruz, where, as a chemistry major, he worked with the late Professor Anthony "Tony" Fink. This experience, which led to his first publication, "Crystal Structure of Elastase-Substrate Complex at -55° C," in the journal *Nature*, proved transformative for Alber and initiated his career of using protein crystallography to answer questions about proteins and their function.

As a graduate student at the Massachusetts Institute of Technology, Alber worked under the guidance of Professor Gregory A. Petsko as Petsko's first graduate student. While a graduate student, Alber elucidated the crystal structures of an elastase-substrate complex and a bacterial periplasmic galactose-binding protein, but it was his five papers on the atomic-resolution crystal structure of triose-phosphate isomerase and its catalytic mechanism that set a standard for the field and remain classics of the art. From

1981, he dedicated six years to postdoctoral studies with Brian W. Matthews at the University of Oregon. Under Matthews, Alber exploited the structure and site-directed mutagenesis of bacteriophage T4 lysozyme to analyze the features of secondary and tertiary structure that contribute to the stability of this protein, leading to results that are now also considered textbook classics. This work was featured in a major review he authored entitled, "Mutational Effects on Protein Stability," in the journal *Annual Review of Biochemistry*.

In 1988, Alber became an assistant professor at the University of Utah before moving to the Department of Molecular and Cell Biology at UC Berkeley in 1992. By the time he died, he had authored more than 120 scientific publications. Gifted in recognizing key biological problems, he created clever biochemical and structural studies to solve them. His dedication to his research became legendary, as he steadfastly continued his research even as his health deteriorated, using voice recognition technology.

As a recently hired faculty member, Alber was awarded the Pew Scholarship in 1998 for showing outstanding academic promise. At Berkeley, he worked on an array of problems with a string of innovative accomplishments focused on using structural biology to attack important problems in biology. He discovered a sophisticated system of protein communication within *Mycobacterium tuberculosis*, and identified proteins within this system that can be targeted with new drugs. He studied a large protein complex needed to express HIV genes, leading to the discovery of new potential targets for therapeutic intervention against HIV/AIDS. He developed new computational methods to examine X-ray data in order to reveal previously hidden alternative structures that have critical roles for protein function. In acknowledgment of his many important contributions, Alber received the Christian B. Anfinsen Award of the Protein Society in 2013 for his "foundational studies yielding an understanding of the structure/function relationship of proteins."

During the 2003-04 academic year, Alber took a one-year sabbatical, spending the first semester at Plexxikon in Berkeley, where he searched for inhibitors of the serine and threonine protein kinases in *Mycobacterium tuberculosis* in order to uncover the functions of these proteins. He then spent the second semester at the Institute for Molecular Bioscience in Queensland, Australia, where he developed new experimental methods for structural genomics and explored the basis for signaling and target specificity in the serine and threonine protein kinases.

During his time at UC Berkeley, Alber taught 10 different undergraduate courses in various aspects of molecular and cell biology, from the fundamentals of molecular biology to advanced biophysical chemistry. Alber was particularly proud of the large number of graduate students and postdoctoral fellows who trained with him and have gone on to make substantial contributions to our understanding of structural biology. Former mentees remember Alber as someone who cared deeply for his students and treated them as his colleagues – "from the moment they entered the lab and long after they left, [Alber] saw them as equals," said James Holton, a former student. Even with his disability, "he worked with and helped his postdocs do their own best work by

mentoring and coaching,” said Joan Alber, his sister-in-law. “He said it was the most powerful teaching he had ever done.”

Alber was known for his ability to span a wide range of scientific disciplines, to see connections between disparate fields and to extract fundamental insights from complex data sets. He had a collaborative spirit and was extremely dedicated to his department, campus, and professional societies. In 2008, he was named UC Berkeley Chancellor’s Class of ’43 Chair. Recognizing his uniquely inclusive and pioneering nature, he was also named as the founding director of the Henry Wheeler Center for Emerging and Neglected Diseases, and as head of the Stanley Donner Administrative Services Unit.

Alber’s enthusiasm and energy extended beyond academic pursuits. He loved his children and as they grew, he delighted in their moments of self-discovery where they developed their own interests and passions in life. Alber was also an ardent outdoor enthusiast – he enjoyed hiking, climbing, skiing, and was a dedicated long distance runner. Impressively, right up until just a few days before he died, although his body was failing, his spirit never dimmed. He was still meeting with friends and colleagues, writing papers, and enjoying the natural beauty of the Bay Area.

Alber is survived by his children, Josh, Emily, and Mackenzie. He is also survived by their mother Julie Nye and his brothers William, Chad, and Don Alber.

Susan Marqusee
David H. Raulet
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