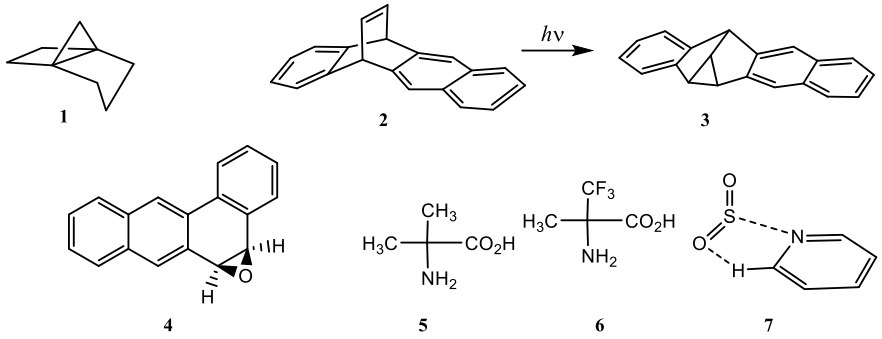
John W. Keller **Biographical Sketch**

John Keller was educated at the Ohio State University and the University of Wisconsin-Madison. As a chemistry major at Ohio State, he worked with Paul G. Gassman to synthesize the unusual propellerane tricyclo[3.2.1.01,5]octane (1). He was elected to Phi Beta Kappa and graduated with a B.S. in 1968. At Wisconsin, Keller worked with the photochemist Howard E. Zimmerman. In HEZ's lab he synthesized naphthobenzobarrellene (2), which was photolyzed to give naphthobenzosemibullvalene (3), a signature Zimmerman reaction. He completed his graduate studies in the laboratory of Charles Heidelberger of the McArdle Laboratory for Cancer Research, graduating with a Ph.D. in 1976. At McArdle he discovered and characterized the hydration reactions of several polycyclic arene oxides (4), which are the proximate carcinogenic metabolites of polycyclic aromatic hydrocarbons. Keller stayed at Wisconsin to complete post-doctoral training in enzymology in the laboratory of Marion H. O'Leary. It was there that he began mechanistic studies on dialkylglycine decarboxylase, an unusual vitamin B6-dependent enzyme isolated from soil bacteria that metabolize 2-methylalanine (5).



In 1979 Keller accepted a position as assistant professor in the University of Alaska Fairbanks Department of Chemistry. He and his wife Sue drove to Alaska carrying a vial of enzyme donated by Prof. O'Leary, as a boost for his nascent enzymology research. In 1989 he and his students cloned and sequenced the structural gene for dialkylglycine decarboxylase (*dgdA*), which made possible several structural and functional studies. These were carried out in collaboration with Michael Toney of UC-Davis, crystallographer Hans Jansonius of the Biozentrum of the University of Basel, and Klaus Schnackerz of the University of Würzburg. Early work on this enzyme was supported by a National Science Foundation Research in Undergraduate Institutions grant and an NIH Academic Research Enhancement Award (R15).

Keller's biochemical research then pursued biochemical characterization of a LysR-type DNA binding protein that controls metabolism of dialkylglycine amino acids. This protein, which is encoded by the *dgdR* gene, shuts off any downstream gene unless induced by 2-methylalanine. This work was recognized by two U.S. patents issued to the University of Alaska and J. Keller which deal with the control of gene expression by dialkylglycine-specific DNA binding proteins. Attempts to commercialize the patents have been unsuccessful. In chemistry research, he and his students have published papers on the synthesis of unusual amino acids, such as trifluoromethylalanine (6), and computational and spectroscopic studies of non-covalent complexes of sulfur dioxide (7).

As of 2020, John Keller has authored or co-authored 29 papers in the refereed literature. He and his students have published in the *Journal of Biological Chemistry*, *Journal of Molecular Biology*, *Biochemistry*, *Tetrahedron Letters*, *Journal of Physical Chemistry*, *Journal of Chemical Education*, *Royal Society of Chemistry Advances*, and *The Chemical Educator*, among others. The Alaska papers have been cited over 375 times in the scientific literature. A 1986 paper in *Tetrahedron Letters* with M.S. student JoNell Hamilton on the enzymatic resolution of the chiral amino acid 2-trifluoromethylalanine (6) has been cited 45 times, the latest in 2017. A 1991 paper in the *Journal of Biological Chemistry* on the cloning and sequence of *dgdA* and *dgdR* genes has been cited 41 times, the latest in 2019. That paper had seven University of Alaska student co-authors.

As a teacher of organic chemistry, he has been involved in bringing the modern tools of molecular modeling and computational chemistry into undergraduate chemistry education in Alaska. Keller was Principal Investigator on a grant from the National Science Foundation Division of Undergraduate Education in the year 2000 for installation of hardware and software for molecular modeling at four University of Alaska chemistry departments (Fairbanks, Anchorage, Juneau, and Matanuska-Susitna). Since then he has advocated for, and trained teachers in the use of, molecular modeling for chemistry teaching and research across Alaska.