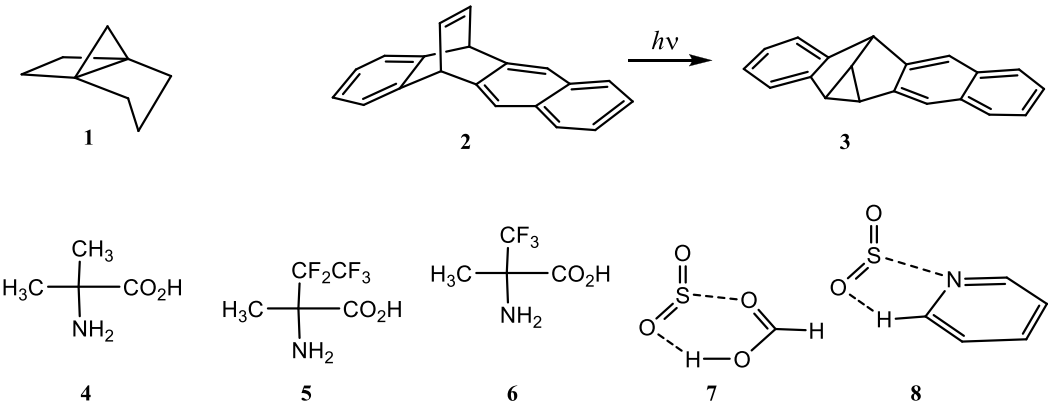
Biographical Sketch

John Keller was educated at the Ohio State University and the University of Wisconsin-Madison. As an undergraduate chemistry major at Ohio State, he worked with Paul Gassman to synthesize the unusual propellerane tricyclo[3.2.1.$0^{1,5}$]octane (**1**). He was elected to Phi Beta Kappa and graduated with a B.S. in 1968. At Wisconsin, Keller worked in the chemistry department with the photochemist Howard Zimmerman. While there, he synthesized naphthobenzobarrellene (**2**) and converted it to naphthobenzosemibullvalene (**3**), a signature Zimmerman reaction. He completed his Ph.D. in the laboratory of Charles Heidelberger of the McArdle Laboratory for Cancer Research, graduating in 1976. At McArdle he discovered and characterized the hydration reactions of several polycyclic arene oxides, 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 the dialkylglycine decarboxylase, an unusual vitamin B_6-dependent enzyme isolated from soil bacteria that metabolizes 2-methylalanine (**4**).



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 Marion O'Leary, as a boost to his nascent enzymology research career in Alaska. At UAF Keller continued work on the enzyme. In 1989 he and his students cloned and sequenced the gene for dialkylglycine decarboxylase (*dgdA*), which made possible the subsequent structural and functional studies. These were carried out in collaboration with Michael Toney of UC-Davis, the crystallographer Hans Jansonius of the Biozentrum of the University of Basel, and Klaus Schnackerz of the University of Wuerzburg. Early work on this enzyme was supported by a National Science Foundation Research in Undergraduate Institutions grant and an NIH AREA (R15) grant.

Keller's biochemical research then pursued biochemical characterization of LysR-type DNA binding proteins related to metabolism of dialkylglycine amino acids. This protein is encoded by the *dgdR* gene which is divergent from and just upstream of *dgdA*. The former work was recognized by two U.S. patents dealing 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 (**5**), and applications of computational chemistry in non-covalent complexes of sulfur dioxide (**7** and **8**).

As of 2016, John Keller has authored or co-authored 28 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, and *The Chemical Educator*, among others. The Alaska papers have been cited over 250 times in the scientific literature from 1985 to 2016. The 1986 paper in *Tetrahedron Letters* with JoNell Hamilton on the enzymatic resolution of the chiral amino acid 2-trifluoromethylalanine (**6**) has been cited 43 times, the latest in 2011. The 1991 paper in the *Journal of Biological Chemistry* on the isolation and sequence of *dgdA* has been cited 41 times, the latest in 2015. The latter 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.