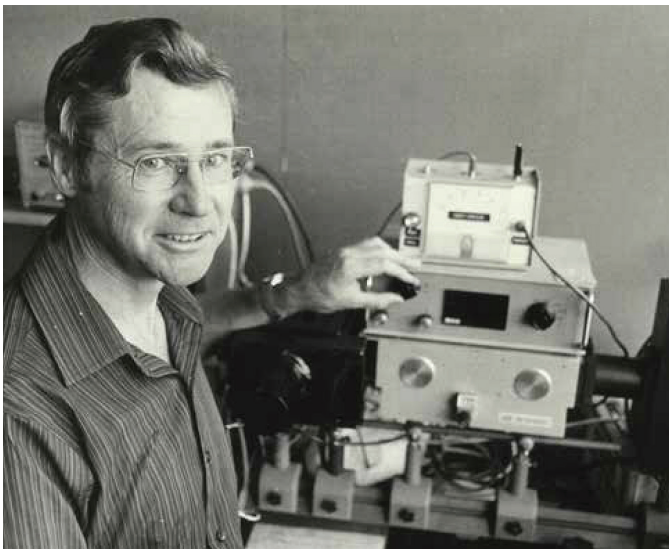
In Memoriam

William Hugh Sawyer 1940–2023

William (Bill) Hugh Sawyer was a pioneering researcher in applications of fluorescence techniques to biomembrane biology. He was a former President and Honorary Member of the Australian Society for Biochemistry and Molecular Biology (ASBMB).



Bill with state-of-the-art fluorescence anisotropy equipment at the University of Melbourne.

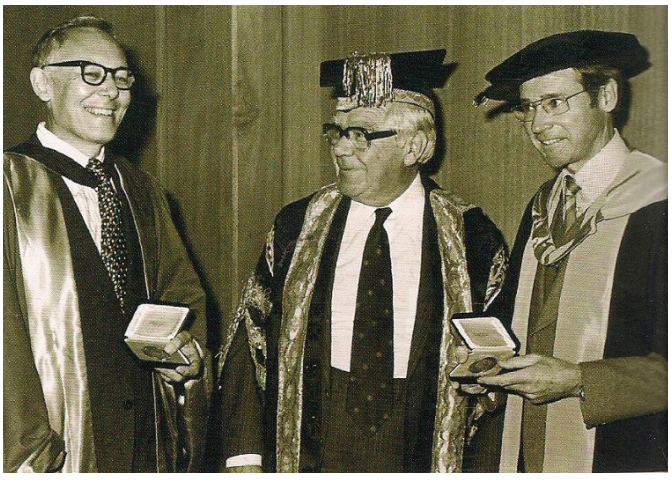
Bill was born in 1940 in Melbourne. His father, Harry, and mother, Hilda, operated the Box Hill Dairy, which instilled in Bill an interest in dairy technology and the science of milk proteins. He undertook an Agricultural Science (BAgrSc) degree at the University of Melbourne, graduating in 1961. As an undergraduate, he secured a scholarship in Dairy Research at CSIRO, where he worked on controlling the viscosity of casein solutions.

Following his interests, Bill travelled to the University of Minnesota for an MSc, where he worked with renowned dairy researcher, Robert Jenness. There, he investigated the formation of disulphide bonds between milk proteins and their role in milk gelling (1), graduating in 1962. He returned to Australia and undertook a PhD in Canberra with Hugh McKenzie at the Australian National University. Here, Bill honed his skills in protein biochemistry and biophysics, continuing his work on milk protein, including a paper in *Nature* on the effect of pH on β-lactoglobulins (2), and expanding to studies of the plant lectin, concanavalin A and bacterial proteins. In Canberra, Bill also met the charming and vivacious Diana Camm, whom he married in 1966. Bill then undertook postdoctoral studies at the Lister Institute of Preventative Medicine in London, working with Michael Creeth.

During these formative years, Bill discovered a deep interest in the structure and dynamics of proteins. He was passionate about applying new physical chemistry theory and biophysical techniques to probe molecular interactions and to understand the biophysical underpinning of protein behaviour and function. He initiated collaborations with Laurie Nichol and Don Winzor, and became convinced of the importance of analysing complex systems from first principles. Bill and Don later co-authored the definitive *Quantitative Characterization of Ligand Binding* (3), about which one reviewer wrote, “The book fills the void between rigorous theoretical discussions of ligand binding … and experimental recipes.”

When Bill was appointed Lecturer at the University of Melbourne in 1968, he took the opportunity to build on his research vision of applying fast reaction photophysics to important biological problems. He acquired, borrowed, or built the most advanced fluorescence and phosphorescence instrumentation available. Further, he developed a series of fluorescent excited state probes. These light-absorbing and emitting chemical envoys were designed to attach to lipids and proteins in membranes to report on the molecular microenvironment and membrane dynamics. Bill was particularly excited about fluorescence anisotropy. When polarised light hits a group of randomly oriented fluorophores, those with dipoles oriented in the same direction are preferentially excited, providing a powerful tool for monitoring the dynamics of biomolecules. In these excited state adventures, the thing that really set Bill apart from other colleagues was his rigorously quantitative approach.

Bill made a remarkable and sustained contribution to our understanding of biological membranes, and the techniques he pioneered have been used by many researchers to interrogate different disease states. His contributions were recognised by the award of the prestigious David Syme Research Prize in 1980.

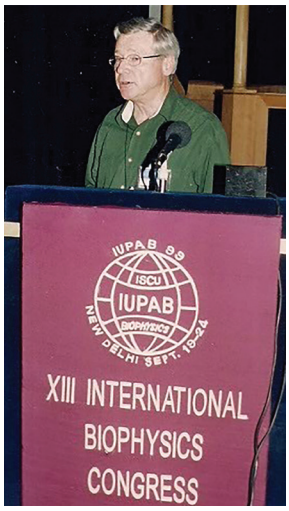


Bill (right) receives the David Syme Research Prize in 1980. Le Roy Henderson (left), Department of Mechanical Engineering, University of Sydney, jointly receives this prize.

In Memoriam

I had the great privilege of working with Bill on the development of fatty acid probes for the assessment of the fluidity gradient of lipid bilayers (4) and the application of phosphorescence anisotropy to studies of lipoprotein receptors (5). His passion for all things fluorescent was contagious and shaped my research vision.

Bill was also innovative in his approach to the teaching of biochemistry, being the first to introduce computer-based exercises at the University of Melbourne. I well remember his third year Biophysical Biochemistry lectures delivered at the uncivilised hour of 8am. It's a good thing he made biophysics so interesting! We students affectionately referred to Bill as Dr Soya (Sawyer)-Bean. I don't think he ever knew, but I am sure he wouldn't have minded. His love of academic life is captured in this quote from Bill, "As research and teaching academics, we are exposed to great minds, and become members of the most exclusive club in the world. Add these intangible assets to the intellectual satisfactions, and you have, I believe, an exceedingly attractive career." Bill's academic contributions were recognised by his promotion to a Personal Professorial Chair in Biochemistry in 1991, and by the award of the title Professor Emeritus from the University of Melbourne in 2001.



Bill presents his work at the 13th International Biophysics Congress, New Delhi, India, 1999.

Later in his academic career, Bill became interested in the translation of biochemistry research outcomes, and completed a Graduate Diploma in Intellectual Property Law. He then served as a member of the university's Patents and Intellectual Property Committees and was appointed a non-executive Director of Rothschild Bioscience Managers Limited, a venture capital trust for the promotion of innovation in science and technology (6).

Bill was an untiring supporter of the scientific community in Australia. He was President of the Australian Society for Biophysics from 1986 to 1988. He served with distinction as President of the ASBMB. During his Presidency (1990–1992), Bill established

Bill (front, third from right) at 16th FAOBMB Symposium, Taipei, Taiwan, 2002.

the Special Interest Groups (SIGs) to organise local meetings on specialist topics and to have input into the programs for the annual Society meetings. In 1990, he and outgoing President, Bruce Stone, presided over the change of name of the Society from the Australian Biochemistry Society to the Australian Society for Biochemistry and Molecular Biology. I remember Bill and Bruce chartering a small private plane in the middle of the pilots' strike to take dedicated colleagues to the ComBio1990 meeting on the Gold Coast. The pilot was kept waiting on the return trip as one of the longest and most fiercely fought Society meetings played out until they wore down everyone, and the name change was accepted. In recognition of his impactful contributions, Bill was awarded Honorary membership of the Society in 1999.

Bill also served as President (1999–2001) of the Federation of Asian and Oceanian Biochemists and Biologists (FAOBMB), which currently has twenty Constituent Members, representing more than 20,000 active scientists (7). Bill was passionate about promoting the science of Biochemistry in the region (8). He fought

Bill (front, far right) with ABS/ASBMB Presidents at the Society's Golden Jubilee celebration at ComBio2005.

hard to try to save the FAOBMB journal, *Journal of Biochemistry, Molecular Biology and Biophysics*, which he saw as instrumental in helping young scientists from the less affluent countries. He also arranged for the ASBMB community to donate biochemistry textbooks to be distributed to other member countries.

In 2001 and 2002, Bill took on a position as an Executive Director of the Australian Research Council (ARC). The Government had recently doubled the funding for the ARC, and Bill had responsibility for overseeing the assessment of all grant applications in Biological Science and Biotechnology, as well as helping to improve the assessment system and institute new programs such as Federation Fellowships and Centres of Excellence.

Bill's time at the ARC made him acutely aware of the difficulties faced by Early Career Researchers (ECRs). From 2004 to 2014, he co-convened workshops to up-skill ECRs. In 2013, with Bill's support, the Department of Biochemistry and Molecular Biology at the University of Melbourne established Bill Sawyer Awards for excellence in the PhD program.

From left: Bill, 2018 Bill Sawyer Award recipient, Jess Bridgford, and Leann Tilley.

Upon his retirement, Bill pursued other passions: carpentry, viticulture and winemaking. He was a keen sailor and rower and hand-built a very beautiful rowing scull. His winery, Wyuna Park, on Victoria's Bellarine Peninsula, specialised in pinot noir and pinot gris wines, including an innovative and award-winning fortified pinot noir. Bill's life was a true partnership with his wife Diana, and he was the very loving and proud father of their two sons, Christopher and Philip.

I benefited directly from Bill's wise guidance, his endless patience and his deep knowledge of scientific principles. I witnessed first-hand the pioneering technologies and scientific rigour that led to his being widely recognised as a world leader in fluorescence-based studies of proteins and membranes. But what particularly impressed me, and many other colleagues, was his gentle nature and the bubbling 'excited state' of ideas that underpinned his quiet determination. It is a great privilege to have had Bill as a mentor and as a friend. Not only was he an innovative and creative scientist, but also one of life's true gentlemen.

References

1. Sawyer WH, Coulter ST, Jenness R. *J Dairy Sci* 1963;46:564-565.
2. McKenzie HA, Sawyer WH. *Nature* 1967;214:1101–1104.
3. Winzor DJ, Sawyer WH. *Quantitative Characterization of Ligand Binding*. 1995, Wiley.
4. Tilley L, Thulborn KR, Sawyer WH. *J Biol Chem* 1979;254:2592–2594.
5. Tilley L, Sawyer WH, Morrison JR, Fidge NH. *J Biol Chem* 1988;263:17541–17547.
6. Flesch J. *Transforming Biology: A History of the Department of Biochemistry and Molecular Biology at the University of Melbourne.* 2015, Melbourne University Publishing.
7. Nagley P, Svasti J, Kikuchi A. *IUBMB Life* 2022; 74:1126–1168.
8. Svasti J, Sawyer WH. *IUBMB Life* 2008;58:280–282.

Leann Tilley
Department of Biochemistry and Pharmacology
University of Melbourne

Bill loved the water and was a keen sailor. In retirement, he hand-crafted his own boat – a rowing skull.