

## Steve Wilkins (1946–2013)



The passing of Steve Wilkins, an enduring and endearing figure in the crystallographic community, was met with shock and disbelief. He died while doing what he loved best, teaching a new generation of students at Monash University the science of X-rays.

We met as PhD students in the early '70s, at one of the bush crystallography meetings in Adelaide. He carried out his PhD under Professor J. M. Cowley, working in the area of diffuse scattering from alloys and the role of long-range interactions. His PhD thesis was entitled *Correlations and Interactions in Binary Alloys*. From 1970 to 1971, during his PhD, he worked as a graduate research assistant in the Department of Physics, Arizona State University. He joined CSIRO, Division of Chemical Physics, in 1975 as a Research Scientist and was promoted to Chief Research Scientist in 1998. At CSIRO he worked on a range of theoretical problems in X-ray crystallography, including quantum effects in the theory of atomic vibrations, the role of asymmetry in the problem of multiple scattering (also called 'extinction') in structure determination from crystals, and also new approaches to the determination of the atomic structure of molecules from structure-factor magnitudes (also called the 'phase problem'). I collaborated with him on the latter, work which rested on a powerful and very general branch of statistical inference known as 'information theory', which has the maximum-entropy method as a cornerstone. The work helped to advance this methodology into the mainstream of crystallography where, when combined with Bayesian methods, it has now become a very powerful technique for the structure determination of macromolecules, particularly in combination with multiple-wavelength anomalous scattering (MAD) data.

As a result of a serendipitous encounter at the International Union of Crystallography Congress in Hamburg in 1984 with Professor Jimpei Harada, his former lecturer from his Melbourne University days (by then at Nagoya University), Steve Wilkins was invited to visit Japan the following year to explore possibilities for Australian collaboration with the newly established synchrotron in Japan known as the Photon Factory. The resulting visit (which took place in November 1985 and was funded by the Japanese Society for Promotion of Science) led to a formal invitation for Australia to build and operate a beamline at the Photon Factory. Following much lobbying of the government and the local scientific community, a multi-purpose powder diffractometer (called 'BigDiff'), conceived by Steve Wilkins, was built at CSIRO in Clayton under his guidance. It was installed at the Photon Factory and started operation in 1992 as the Australian National Beamline Facility (ANBF). It has only just been decommissioned and is currently being shipped to the Australian Synchrotron, to go on display. During the construction of BigDiff, I worked with Steve on adapting the instrument to protein crystallography and modification of the X-ray optics at the ANBF. We also worked closely on the Australian

Synchrotron proposal, lobbying both federal and state governments and professional societies, he concentrating on the physics applications and I on the biological applications. Later we worked together on the National Scientific Advisory Committee and chaired some of the Beamline Advisory Panels that were responsible for the development of the Australian Synchrotron and the beamlines. He championed the Medical Imaging Beamline and was one of the driving forces behind its development.

Steve and his co-workers also worked on hard X-ray phase-contrast imaging, where they made seminal and pioneering contributions including the development of related practical methods and instruments that can use conventional ('polychromatic') X-ray sources. This opened the way for the widespread implementation of hard X-ray phase-contrast imaging in research, and increasingly in industry and medicine. When the CSIRO P-Health Flagship was initiated, Steve was the Leader in X-ray imaging and one of his projects to use synchrotron X-ray methods for determining the number of plaques in the brains of Alzheimer's sufferers is still being pursued.

Steve was a tireless worker for SCANZ, our crystallographer's association, and the Australian Academy's National Committee for Crystallography. In his quietly efficient way, he organized many meetings for the community, and while he was President of SCANZ he lobbied for SCANZ to organize the Bragg Centennial in December 2012. This meeting was coordinated to be held in conjunction with the SCANZ and the Asian Crystallography Association meetings and was an immensely successful event. He organized the Bragg Centennial Symposium, inviting several notable crystallographers who were connected to Lawrence Bragg, as well as members of the Bragg family.

Steve exemplified the quiet achiever and was able to overcome considerable hurdles in seeking the goals he set his eyes on, by a quiet confidence, a sharp intellect and persuasive arguments. He was a scholar and a gentleman, and the crystallographic community shall miss him.

#### **Jose Varghese**

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