

2014 American Crystallographic Association Patterson Award to John Helliwell¹

John R. Helliwell has been selected to receive the 2014 American Crystallographic Association (ACA) Patterson Award for his pioneering contributions to the development of the instrumentation, methods and applications of synchrotron radiation in macromolecular crystallography. A long time member of ACA and Professor of Structural Chemistry at the University of Manchester, UK, John received his undergraduate degree in physics from York University, where he was mentored by Michael Woolfson and Peter Main. He then pursued a PhD in protein crystallography at Oxford, under the supervision of Margaret Adams. He was mentored by Charlie Bugg and Guy Dodson in the laboratories of Dorothy Hodgkin and David Phillips and was involved in the first experiments that used synchrotron radiation for macromolecular structural studies.

Since then his career has been dedicated to exploring new applications of synchrotron radiation, and he has worked tirelessly to improve synchrotron and neutron facilities worldwide. Always driven by the desire to innovate and overcome existing limits, John expanded the use of anomalous dispersion techniques to explore new challenges in structural biology. He contributed to solving the phase problem by, among other things, introducing longer-wavelength radiation to expand anomalous scattering applications for phasing to a wider range of scatterers. He is also recognized for having pushed forward the development of Laue methods for time-resolved studies and other applications, in both X-ray and neutron crystallography.

The truly innovative nature of his work is demonstrated by the large number of 'firsts' encountered in a synopsis of his career. While working in Daresbury, UK, he led the design and realization of the first dedicated synchrotron radiation X-ray source (SRS) instrument for protein crystallography (1981) and of the first protein crystallography synchrotron radiation wiggler instrument (1984).

With US scientists as his collaborators at SRS, notable initiatives were in longer-wavelength anomalous dispersion (Howard Einspahr), weakly scattering crystals (Steve Ealick), microcrystal diffraction (Britt Hedman and Keith Hodgson), virus crystal diffraction (Michael Rossman) and Laue diffraction (Keith Moffat). His work at SRS Daresbury was highlighted in *Scientific American*. In the late 1980s and into the 1990s he led the European working group for macromolecular crystallography for the ESRF Foundation Phase

report and became Vice Chair and then Chair of the ESRF Science Advisory Committee.

From 1979 to 1999 he developed two-wavelength anomalous-dispersion phasing techniques using synchrotron radiation, particularly important for their applications in radiation-sensitive cases. In 1995 he first demonstrated sharpened crystal mosaicity in microgravity-grown protein crystals, and in 1998 he conducted one of the first time-resolved Laue protein crystallography studies harnessing fast-readout CCD detectors. In 2001–2002 he determined the first *de novo* structure of apocrustacyanin A1, solved with softer X-rays. In 2005 he initiated *ab initio* structure determination by MAD phasing of powder diffraction data and highlighted the potential for extending the method to structures of large molecules containing anomalous scatterers.

He is the author of a classic book on protein crystallography, *Macromolecular Crystallography with Synchrotron Radiation*, published by Cambridge University Press in 1992 (available in paperback since 2005). He is a founding editor of *Journal of Synchrotron Radiation* and was president of the European Crystallographic Association (2006–2009). He served as Editor in-Chief of the IUCr journals from 1996 to 2005, during which period *Acta Crystallographica Section E* and *Section F* were launched. In recent years he has continued to serve the IUCr, as a Co-editor of *Journal of Applied Crystallography* and as IUCr representative on the International Council for Scientific and Technical Information (ICSTI) and, more recently, the Committee on Data for Science and Technology (CODATA). In addition, he is

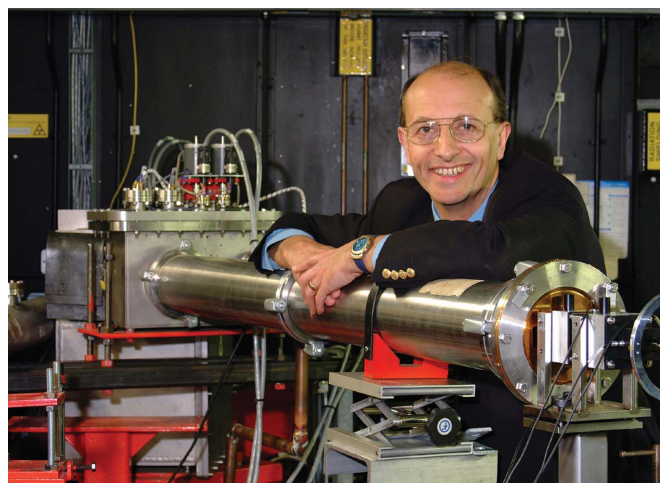


Figure 1
 John Helliwell.

¹ This notice is a slightly modified version of an article that originally appeared in the Summer 2013 issue of *ACA Reflexions*.

currently Chair of an IUCr Working Group evaluating the feasibility of routine deposition of raw diffraction data.

He has mentored some of the finest beamline scientists in the world, nurturing a community of researchers devoted to continuously advancing the technological and applicative aspects of synchrotron radiation. His University of Manchester PhD students have played a major role in his research studies. They include Dr Ashley Deacon, now at Stanford Synchrotron Radiation Laboratory, Dr Eddie Snell, now at the Hauptmann Woodward Medical Research Institute in Buffalo, Dr Titus Boggon, who is on the Pharmaceutical Sciences Faculty at Yale University, Dr Michele Cianci, instrument scientist at the EMBL PETRA III project in Hamburg, Dr Matthew Blakeley, the neutron Laue diffractometer instrument scientist at the Institut Laue–Langevin in Grenoble, and, most recently, Dr Stu Fisher, who is now an instrument scientist at Diamond Light Source. A shared PhD student

(with Dr Bill Hunter, now Professor at Dundee University) is James Naismith, now Professor at St Andrews University.

John has traveled widely to promote and support crystallography internationally and has made special efforts on behalf of crystallography in the US. He has fostered several synchrotron and neutron projects in the US and served on many advisory and board panels to review synchrotron projects, especially, in the past decade, at the Advanced Photon Source. His special relationship with American crystallography and the crucial contributions he has made to improve synchrotron radiation applications from the very dawn of the synchrotron era were key for his selection as the 2014 Patterson award recipient. John will receive the award at the 2014 ACA meeting at Albuquerque, New Mexico.

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