G E O P H Y S I C I S T S

John Beavan (1950–2012)

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John Beavan passed away peacefully in Lower Hutt, New Zealand, on 19 November 2012 after having been diagnosed with cancer one year earlier. John's contributions to crustal deformation science, geodesy, and New Zealand's active tectonics were immense and form a legacy that will last many years. He is survived by his wife, Catherine (Cashy); his daughter Rhiannon; two step-daughters, Elli and Rosa; and his sister Sue. John also leaves a huge network of friends and colleagues around the world, all of whom will miss him greatly.

John began life in Hereford on the English-Welsh border and eventually went on to study at St Johns College, University of Cambridge, where he received a 1st Class Honours degree in theoretical physics. He did his Ph.D. studies in geodesy and geophysics at Cambridge, where he worked on Earth tides and ocean tidal loading in the North Sea. John continued his post-Ph.D. career at Lamont-Doherty Geological Observatory (1976–1994), where he made major contributions to the field of crustal deformation measurement using precise leveling, tiltmeters, strainmeters, tide-gauges, and eventually GPS when it was a method that few had encountered. Throughout his career, John conducted research in Alaska, California, and New York in the United States; the Philippines; the Marianas Islands; Micronesia; Tonga; Samoa; and, most notably, New Zealand.

In his early geodetic career, he introduced rigorous field procedures and automated processing methods to ensure data quality, and was the first to use satellite telemetry to retrieve tide gauge data from Alaska in real time. One ingenious water level sensor that he devised required intricate bit-level coding of a linear array of optical sensors exposed to laser light reflected both from a water surface and from the glass lid of a reservoir, thereby determining water level to sub-micron precision over a range of several centimeters. His skills and his insight into difficult technical and mathematical subjects, especially in time-series analysis, were recognized at Lamont, where he became a senior research scientist and taught geophysical theory courses.

In 1994, John moved to GNS Science, New Zealand's national geoscience research institute. John's arrival at GNS forever changed the face of geodetic and crustal deformation work in New Zealand. John immediately dedicated himself to building up a world-class campaign GPS network throughout the New Zealand plate boundary zone. As a consequence of John's efforts, New Zealand is the site of what is arguably one of the most comprehensive crustal deformation networks of any plate boundary on Earth. John also played a key role in the integration of the New Zealand GPS velocity field into a dynamic datum to account for the effect of the ongoing tectonic contortions on the New Zealand national surveying datum. New Zealand was therefore one of the first countries in the world to develop a dynamic surveying datum. John was a strong advocate for the inclusion of continuous GPS (cGPS) in the New Zealand national monitoring network, GeoNet. GeoNet cGPS has enabled the discovery of a diverse array of slow-slip events at the Hikurangi subduction zone, and John was actively involved in the investigation of these interesting phenomena for the last decade.

John's scientific accomplishments in New Zealand include the first measurements of the vertical uplift rate of the southern Alps, development of the first national velocity and strain field in New Zealand from GPS, and the first GPS estimates of deformation and interseismic coupling across the Alpine Fault system. More recently, John discovered from GPS measurements in northern Tonga that the 2009 M_w ~8.0 outer rise earthquake (and devastating tsunami) in Samoa was accompanied by a near-simultaneous M_w ~8.0 rupture of the subduction interface at the Tonga Trench. John's work on this was published in the journal *Nature*, and has fundamental implications for understanding of tsunami hazards at subduction margins.

In the past few years, John dedicated extraordinary time and energy to using GPS and Interferometric synthetic aperture radar (InSAR) to understand the unusually complex source mechanisms and postseismic deformations in the devastating sequence of earthquakes that have struck Christchurch, New Zealand, in the past few years. His work on the Christchurch earthquakes underpins ongoing efforts to forecast what might be expected to occur in future earthquakes in that area as the Christchurch sequence evolves. His identification of areas of subsidence in the Christchurch area has contributed to highly significant societal and commercial decisions about areas that are not suitable for renewed suburban development.

John served AGU (which he joined in 1976), and the broader community, in many ways, including: Geodesy Section Fall Meeting program chairman, 1987–1988; *Eos* geodesy editor, 1990–1992; local organizing committee chair for the 2002 Western Pacific Geophysics Meeting held in Wellington, New Zealand; associate editor for *Geochemistry, Geophysics, Geosystems*, 2002–2005; and member of the Perlman Award selection panel, 2006–2010. He received AGU's award for excellence in reviewing in 1988. He was an editor of *Geophysical Journal International* from 2004 to 2010, a task undertaken with great dedication. John's sound judgment and likability led to his participation in many other committees in UNAVCO, that organization's Plate Boundary Observatory, the Southern California Earthquake Center, and elsewhere.

Courtesy of GNS Science

John Beavan

John's colleagues will remember him as an incredibly rigorous, generous, humble, and insightful collaborator. At scientific meetings he was often sought for his opinions on analytical matters and tectonic processes. He was also a stellar field companion, with an unshakable ability to stay cheerful even in the worst field work conditions. His students recall his optimism and good spirits on being marooned on the Shumagin islands for 2 weeks with food for only 3 days. Others recall his ability to sing British and American folk songs with gusto and to accompany them on an accordion or a guitar. He was actively involved in European folk dancing (his mathematical mind could remember all the correct moves, an attribute much admired by those who forgot), and for several years performed in an Eastern European dance troupe donning traditional dress in public performances.

John's untimely passing leaves a gaping hole in the field of geodesy both in New Zealand and globally. He will be missed by many.

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