Obituaries

John Campbell Brown OBE (1947–2019)

Astronomer Royal for Scotland and inspirational solar physicist, by Lyndsay Fletcher, Nicolas Labrosse and Alec MacKinnon.

John Brown OBE was born in Dumbarton, a small town on the north side of the Clyde estuary in the west of Scotland. He began his astronomical career by making his own telescopes, starting an astronomy club at school and taking the ferry to astronomical society talks on the other side of the Clyde. Inspired by this he attended the University of Glasgow to study physics and astronomy as an undergraduate and was appointed to the teaching staff at Glasgow in 1970 while still working on his PhD. He was awarded his PhD in solar physics in 1973, followed by a DSc in 1984.

At the very beginning of his research career, his sequence of papers from 1971–75 introduced and gave a solid, quantitative foundation to ideas that remain central to the study of solar flares: the inversion of bremsstrahlung X-ray spectra to reveal the parent electron energy distribution; the energetic importance of flare particle acceleration; and the resulting "thick target" model, in which electrons accelerated in the corona heat the lower atmosphere and drive secondary flare phenomena. He would often comment that citations for his seminal paper "Brown 71" followed the 11-year solar cycle. A sabbatical year in Utrecht let him first apply these ideas to data from the hard X-ray spectrometer on the ESRO TD-1 spacecraft, and the launches in 1980 of NASA's Solar Maximum Mission and the RHESSI mission in 2002 allowed his ideas on the structure of flare hard X-ray sources, the physics of flare electron beams and the consequences of the thick-target model to be further interrogated, developed and confronted with observation. John was a major player in both the UK and US series of SMM Workshops that took place through the 1980s, and their RHESSI equivalents in the 2000s and beyond.

Inverse problems

His experience dealing with solar X-ray spectra led John to develop a second major research strand dealing with ill-posed astrophysical inverse problems, in which even small levels of data noise are amplified in the inversion process so that deductions about the source become noise-dominated. The title of the first of a series of publications on this with Ian Craig reflected John's iconoclasm: "Why measure astrophysical X-ray spectra?" (Craig & Brown 1976). Their work culminated in the 1986 monograph *Inverse Problems in Astronomy* and John was subsequently appointed to the editorial board of the journal *Inverse Problems*. He was also active in stellar physics, working on hot-star mass-loss with collaborators in Madison, Amsterdam and Potsdam. During his research career John held numerous visiting fellowships in Europe, the USA and Australia.

Undergraduates following John's lectures at the University of Glasgow, and the University of Aberdeen where he held an honorary position, will remember his unique style. Delivered in curly handwriting and peppered with impromptu order-of-magnitude calculations and other diversions, his lectures promoted astrophysics as a playground as well as a rigorously developed branch of physics. His PhD students benefited from his ability, possibly inspired by his own supervisor Peter Sweet, to reduce a complex problem to its physical basics, allowing analytic investigations. He was a master of such calculations. Outside of the lecture theatre, he was a strong supporter of student social activities, for example putting on magic shows for the astronomy society or delivering the "Toast to the Lassies" at the annual Burns' Supper. A generation of senior undergraduates and postgraduates will remember John and his wife Margaret's enormous hospitality, hosting regular parties in the days when the whole astronomy honours class and all the PhD students could fit in their house.

Retirement

In 2007, John stepped down from departmental teaching and university duties to focus on research and activities as Astronomer Royal for Scotland, a position which he had held since 1995. In 2012, he was awarded a Leverhulme Emeritus Fellowship to study the physics of sun-grazing and sun-plunging comets. That year he was also awarded the Gold Medal of the Royal Astronomical Society, an honour of which he was very proud. He continued to support the field as chair of the Robert Cormack Bequest Committee at the Royal Society of Edinburgh, and served on the Council of the RAS. Retirement also allowed John to explore the Isle of Skye, where he and Margaret had a second home in which they spent as much time as possible, and to tour villages up and down Scotland as Astronomer Royal for Scotland to communicate – including via magic and art – his passion for the cosmos. He also painted and was learning to play the saxophone (in exchange for astronomy lessons), and was devoted to his children Stuart and Lorna and his young grandchildren.

"He toured villages as Astronomer Royal for Scotland to communicate – including via magic and art – his passion for the cosmos"

In the past couple of years, John had been very busy writing *Oor Big Braw Cosmos* together with poet Rab Wilson. The book, launched in June 2019, presents a very Scottish take on the workings of our universe, accompanied by beautiful pictures, and poems in Lowlands Scots written by Rab. John was rightly proud of completing this project marrying science and poetry. On his very last day, he accomplished one of his dreams by flying over the Cuillin mountains on Skye in a two-seater plane, blessed by beautiful weather. He then gave an outreach talk in the evening in a small village in the south of Skye. As his son Stuart put it, "an average day for Prof. John Brown".

John was an inspirational scientist whose work and personality will continue to influence many colleagues. He left us far too soon, but his legacy is immense. ●

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