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Russell James Donnelly

Russell James Donnelly, a pioneer in the study of classical and quantum fluids, died from pneumonia on 13 June 2015 in Eugene, Oregon.

Born on 16 April 1930 in Hamilton, Ontario, Canada, Russ received bachelor's and master's degrees in physics from McMaster University. He earned his PhD, titled "On the hydrodynamics of liquid helium," in 1956 from Yale University. His advisers, C. T. Lane and Lars Onsager, would leave an indelible mark on his career. Lane's insistence that "each one teach one" instilled in Russ a lifelong ethic of cultivating young scientists. Among those he mentored was future Nobelist David Lee.

Recruited by the University of Chicago, Russ rose quickly to the rank of professor. But in 1966 he took a position with the University of Oregon because of Chicago's infamous antinepotism rule, which blocked his wife Marian, an art historian, from a faculty position. Russ twice chaired the physics department at Oregon and oversaw its impressive growth, while Marian did the same in art history. He maintained an active research program to his death.

Russ's remarkable impact on physics began at Chicago during that heady post–World War II period when US physics was ascendant. He worked closely with Subrahmanyan Chandrasekhar; with Dave Fultz, Russ provided experimental support for Chandrasekhar's seminal work on hydrodynamic and hydromagnetic instabilities. After his move to Oregon, Russ launched an intense period of research on superfluid flow and some of the exotic features of helium II, such as rotons and quantized vortex rings. During that time Russ, with William Glaberson and Peter Parks, published *Experimental Superfluidity* (University of Chicago Press, 1967), which is still a pocket-sized bible for experimentalists entering the field. During a sabbatical at the Niels Bohr Institute in Copenhagen, Russ and his student James S. Brooks compiled a list of the properties of liquid helium; that work culminated with their 1977 article "The calculated thermodynamic properties of superfluid helium-4," an exhaustive resource on helium properties.

Russell James Donnelly

Extending his work with Chandrasekhar into decades of experiments on classical fluids, Russ became an expert on Taylor–Couette flow; he referred to it, in his inimitable way, as "the hydrogen atom of fluid dynamics" because it was an excellent system for studying flow instabilities and turbulence. Russ and his students explored variations on the classical Couette cylindrical geometry, including applying a Coriolis force to break the axial symmetry, which confirmed an elegant prediction of the onset of Taylor vorticity and a novel set of instabilities leading to chaos. Those investigations and his broader interest in turbulent flows with high Reynolds and Rayleigh numbers fueled Russ's long-standing and close connections with Guenter Ahlers's group at the University of California, Santa Barbara, and with Harry Swinney's group at the University of Texas at Austin.

Russ's bold and optimistic leadership at the intersection of classical and quantum hydrodynamics led him to organize numerous conferences, including the 60th-anniversary Taylor Vortex Flow Workshop and the Conference on Quantized Vortex Dynamics and Superfluid Turbulence. He also coordinated nine Oregon Conferences on Low Temperature Physics and the 20th International Conference on Low Temperature Physics.

Russ had faith that almost any problem could be solved if put in the hands of a good experimentalist. Many of his ideas for addressing particularly vexing problems came during his frequent bicycle rides around the Eugene campus area and affectionately became known as "bike-path ideas." His life of service, however, left a legacy that goes well beyond his laboratory and his beloved Schwinn.

Upon arriving in Eugene, Russ founded the Pine Mountain Observatory, which continues to operate as a research and teaching telescope. He was also committed to the cultural life of Eugene. In the 1970s he helped broker an agreement among the county, the school district, the city, and the university to build Eugene's new science museum and planetarium, the Science Factory. Russ loved music and was a supporter and board member of the renowned Oregon Bach Festival and the Oregon Mozart Players. But perhaps his most generous gift is the one he and Marian, who died in 1999, gave to the American Physical Society (APS) to endow the Lars Onsager Prize. The capstone of Russ's career as a scientist and teacher was the PBS NOVA series *Absolute Zero*, which he relentlessly pushed into production while leading its science and education advisory committees.

Russ served on the editorial boards of *Physics of Fluids*, *Physical Review A*, *Physical Review E*, and the *Journal of Physical and Chemical Reference Data*. He contributed to the *AIP Physics Desk Reference* and was particularly proud that it elegantly unified physics. Russ gave decades of service to the APS division of fluid dynamics, including holding various positions on its executive committee from the mid 1960s to the late 1980s. Among the honors he received were the 1975 APS Otto Laporte Award, the 1996 Onsager Medal and Lectureship from the Norwegian University of Science and Technology, and the 2002 Fritz London Memorial Prize. Yet of all his achievements, he was most proud of the "family" of 25 PhDs he supervised.

Russ lived with gusto. He appreciated those around him and was known to offer guests his famous "Russell Martini," before dining at one of Eugene's fine restaurants. After rekindling his earlier friendship with Joyce Benjamin, with whom he had founded the Science Factory, they married in 2006. The two were inseparable in their travels, whether taking an exotic cruise or hosting the annual Onsager Prize dinner at the APS March Meeting. Russ had a vast overlapping network of family, friends, colleagues, and collaborators. We deeply miss his generosity and his friendship.

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John Leask Lumley

John Leask Lumley, the Willis H. Carrier Professor Emeritus of Mechanical and Aerospace Engineering at Cornell University who made seminal contributions to the physics and engineering of turbulent fluid flow, died from brain cancer on 30 May 2015 in Ithaca, New York.

John was born on 4 November 1930 in Detroit, Michigan. His lifelong appreciation of engineering design was encouraged by his father, an architectural engineer. John received his BA in engineering sciences and applied physics from Harvard University in 1952. He earned his master's in 1954 in mechanical engineering and his doctorate in aeronautical engineering, under Stanley Corrsin, in 1957, both from the Johns Hopkins University. In 1959 he joined the Pennsylvania State University, where he rapidly rose to be the Evan Pugh Professor of Aerospace Engineering in 1974 at age 44. He was the youngest to ever hold that prestigious title.

At Penn State, John developed his unique style as a theoretician, modeler, and experimentalist. In 1977 he accepted an offer from Cornell University. He, his wife, and their three children moved into a rambling old Victorian home with a pond. They renovated the kitchen and thus could pursue their love of cooking and food, which began during John's first sabbatical to Marseille, France, in 1966. Ithaca provided physical beauty, and Cornell offered John intellectual challenge and enduring friendships.

John Leask Lumley

It is difficult to think of a facet of turbulence, whether it is formal mathematical theory, fundamental physics, or engineering and environmental applications, to which John did not make seminal contributions. Although others may have probed as deeply, we can think of no other who has covered the whole gamut, from Hölder continuity to hotwire circuitry. In each sphere John's reach was broad. On the applied side, he wrote on drag reduction, buoyant plumes, gravity wave–turbulence interaction, turbulence in the presence of stable stratification, and the effects of electromagnetic fields on turbulence, among other things. He even wrote a paper on flow through a teat canal in a dairy cow.

John's fundamental contributions span mathematics, stochastic processes, spectral dynamics, and the dynamics and modeling of all the generic flows. He pioneered the proper orthogonal decomposition approach that unambiguously extracts structures from turbulent flows, which though random contain structures that occur repeatedly, and orders them according to their energy content. That approach provides a mathematically optimal description that can be used to construct low-dimensional models of the flows.

With his students, he made several experimental contributions to the understanding of atmospheric turbulence, particles in turbulence, and shear flows. In 1990 he received the Fluid Dynamics Prize from the American Physical Society.

John was also a great educator. Although not known as a colorful lecture-room expositor, he influenced generations of students through his six books, his papers, and his films. His path-breaking book *A First Course in Turbulence*, written with Hendrik Tennekes (MIT Press, 1972), was the first book to place dimensional analysis and scaling arguments as central to the subject. He had a lifelong passion for rebuilding old cars and wrote *Still Life with Cars: An Automotive Memoir* (McFarland & Co, 2005). He also provided editorial services to the *Annual Review of Fluid Mechanics* for 30 years, 19 of them as coeditor.

During the Cold War, Soviet scientists had developed turbulence theory and experiment significantly further than their counterparts in the West. John brought their advances to the attention of Western scientists by editing English translations of the two-volume treatise *Statistical Fluid Mechanics: Mechanics of Turbulence*, by Andrei Monin and Akiva Yaglom (MIT Press, 1971, 1975), and the *Izvestiya, Atmospheric and Oceanic Physics* journal series of the Soviet Academy of Sciences. After he caught the Soviets' attention with his 1964 book with Hans Panofsky, *Structure of Atmospheric Turbulence* (Wiley), John's work garnered much admiration in the USSR. He made several trips behind the Iron Curtain and met many prominent Soviet scientists.

John's writing style was, like the man, idiosyncratic and hard to pin down. It was both rigorous and intuitive. While the prose was elegant and often amusing, there was sometimes a sketchiness that reflected, no doubt, his impatience. He worked quickly and didn't look back. Some of his best papers were only one or two pages long. And his output was prodigious. Despite having strong views on the intellectual course of a subject, he was always ready to recognize innovative approaches and findings; he often used the word "cute" to describe something that particularly appealed to him. He was ready to drop pet theories if they did not measure up observationally.

However well one knew John, it was difficult to take him for granted; he was rarely spontaneous and was reticent in public. It was clear that he was intellectually special, never the one to toe the line of authority. Not only his long-standing colleagues but all of us in the field of turbulence will miss him greatly.

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Yoichiro Nambu

On 5 July 2015, at the age of 94, Yoichiro Nambu, one of the truly great theoretical physicists of our time, died in Osaka, Japan, due to an acute myocardial infarction.

Most of the important physics theo-