Princeton University

Honors Faculty Members
Receiving Emeritus Status

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The biographical sketches were written by
colleagues in the departments of those honored.

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Garry Leslie Brown

Garry Leslie Brown, the Robert Porter Patterson Professor of Mechanical and Aerospace Engineering, came to Princeton in 1990 as chair of the department, a position in which he served until 1998. Prior to his arrival at Princeton, he had been the director of Australia's Aeronautical Research Laboratory for the previous nine years. In addition to leading that laboratory and advising the Australian defense department, he had made significant research contributions to the understanding of vortex breakdown, a phenomenon that was causing early fatigue failure in twin-tailed F18 jets Australia had recently acquired. In the United States Garry was exceptionally well respected for the work he did in the early 1970s at the California Institute of Technology, where he and Anatol Roshko discovered the presence of large-scale organized structures in turbulent flow. This revelation had a profound effect on the understanding of turbulent flows. Their 1974 paper in the *Journal of Fluid Mechanics* remains among the top three most frequently cited papers in that journal. It is interesting to note that this very fundamental contribution to fluid mechanics arose from a very practical problem, which was to determine if a hydrogen leak at the bottom of the Apollo rocket would endanger the astronauts in their capsule at the top. Garry has maintained taking a practical view throughout his career, using his fundamental understanding of fluid dynamics and turbulence to make substantial contributions to the development of new concepts and solving critical problems for the aerospace industry. This deep understanding and practical enthusiasm always enlivened his teaching.

Garry was born in Australia and earned his undergraduate engineering degree from the University of Adelaide, before leaving Australia for the University of Oxford as a Rhodes Scholar in 1964. He remained at Oxford to complete his Ph.D. in 1967, after which he moved to Caltech as a research fellow and, soon after, as a senior research fellow, where he remained until 1971. It was during this time that he collaborated

with Roshko on their groundbreaking turbulence research. In 1971 he returned to accept a position as a lecturer in mechanical engineering at the University of Adelaide, and remained there as a senior lecturer and then as a reader until 1978 when he accepted a full professorship at Caltech. During these years at Adelaide, he continued to collaborate with colleagues at Caltech, conducting research on turbulence, including the control of the transition from laminar to turbulent flow, turbulent mixing, large-scale structures in turbulence, and combustion-related experiments in highly reactive gases. In 1981 he left Caltech to become the director of the Aeronautical Research Laboratory in Melbourne, Australia, a position he had until his arrival at Princeton. At Princeton he continued his research on turbulence and vorticity and in 1992 began work on a new concept for hypersonic wind tunnel technology based on high-power electron beam energy deposition. This project involved collaboration with his faculty colleagues as well as with Sandia National Laboratory, Lawrence Livermore National Laboratory, and MSE Technology Applications, Inc. in Montana, and has led to a promising new approach for testing hypersonic vehicles in ground facilities rather than in flight. His research also included collaborative efforts on the control of fluid dynamic drag with magnetic forces and innovative concepts on drug delivery. Throughout his career Garry has maintained an active interaction with leading aerospace engineering corporations and has made significant contributions to the development of advanced missile technologies. These contributions include determining the root cause of failure in the design of the solid rocket motor for the Titan IV, the cause of early failure in the development of the thrust-vectoring system for the AIN-9X, and the resolution of critical issues for the tactical Tomahawk.

As chair Garry oversaw the broadening of the Department of Mechanical and Aerospace Engineering to include a deeper commitment to materials science. This initiative was taken to recognize the central importance that high temperature and lightweight materials play in aerospace, while also taking into account the important role materials play in virtually all areas of mechanical engineering. He oversaw the expansion of the department into the new J wing of the engineering school, which included new combustion laboratory facilities and the

department's involvement in the New Jersey-sponsored photonics center. While nurturing new areas, he always maintained his commitment to the department's distinction in aerospace sciences, including propulsion, combustion, and dynamics and control. His deep understanding of fluid dynamics has been widely appreciated by the community, and his insights have led to numerous advances, both at Princeton and elsewhere. Garry has been honored for his service to the country in solving critical problems in missile technology. For his leadership and for his contributions in these areas he has been recognized as a fellow of the American Physical Society and as a fellow of the American Institute for Aeronautics and Astronautics, the citation for the latter which reads: "For path-breaking contributions to the science of turbulence and for leadership in aerospace education and research nationally and internationally." Garry continues his Caltech and Princeton collaborations, but from a base in Australia, to which he has returned to be with his family.