

Remembering Keith G. Balmain

George V. Eleftheriades

Keith G. Balmain, a leading scholar in electromagnetics, antennas, electromagnetic compatibility, and antennas in plasmas, passed away on 2 January 2019 at 85 years of age. Prof. Balmain had a sharp and clear mind, and he could simplify and explain complex concepts with ease. He was a scholar of extraordinary integrity and a great mentor. His intellect, integrity, humor, professionalism, and humanity will be greatly missed.

After Prof. Balmain received the B.A.Sc. degree in engineering physics from the University of Toronto, Ontario, Canada, in 1957, he received the M.S. and Ph.D. degrees in electrical engineering from the the University of Illinois at Urbana–Champaign, in 1959 and 1963, respectively, with theses on printed-circuit dipole antennas and spacecraft-borne dipole antennas in anisotropic plasma. He was an assistant professor of electrical engineering at the University of Illinois at Urbana–Champaign until 1966. He then joined what is now the Edward S. Rogers Sr. Department of Electrical and Computer Engineering, University of Toronto, where he was a professor and later a professor emeritus. From 1991 to 2001, he was the senior chairholder of the NSERC/Bell Canada/Nortel Industrial



Keith G. Balmain (1933–2019).

Research Chair in Electromagnetics. He chaired the Division of Engineering Science for two and a half years, until 1987, after which he chaired the University of Toronto's Research Board for three years. His research included antennas in plasma, broadband antennas, electromagnetic compatibility, human electrostatic discharge, radio wave scattering from power lines and buildings, space shuttle electrocompatibility prediction, electrostatic charging and discharging in spacecraft dielectrics, and microwave metamaterials.

With E.C. Jordan, he coauthored the second edition of *Electromagnetic Waves and Radiating Systems* (Prentice Hall, 1968), a highly regarded textbook about electromagnetics and antennas. He also coedited *Negative-Refraction Metamate-*

rials: Fundamental Principles and Applications (Wiley/IEEE Press, 2005) with G.V. Eleftheriades, which is one of the first books on metamaterials.

Prof. Balmain was a Life Fellow of the IEEE “for contributions to the understanding of log-periodic antennas and antennas in plasmas.” He was a corecipient of the IEEE Antennas and Propagation Society (AP-S) 1970 Best Paper Award and a 1992 NASA Group Achievement Award for an “exceptional engineering assessment of plasma effects from electrical grounding for the Space Station Freedom program.” His scientific papers exude the ingenuity, precision, and clarity that characterize the high-caliber researcher that he was. Prof. Balmain was a member of the AP-S Administrative Committee (1974–1977), an associate editor of *Radio Science* (1978–1980), chair of the technical program committee for the 1980 IEEE AP-S International Symposium, and chair of the local organizing committee for the 1999 General Assembly of the International Union of Radio Science.

AUTHOR INFORMATION

George V. Eleftheriades (gelefh@waves.utoronto.ca) is a professor of electromagnetics at the Edward S. Rogers Sr. Department of Electrical and Computer Engineering at the University of Toronto, Canada.

