

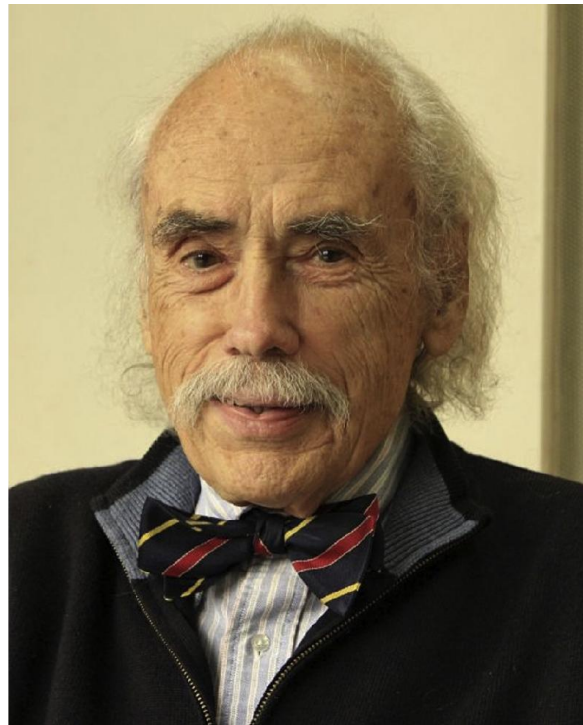
In memoriam: Lawrence Daniel Longo (1926-2016)

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The path to excellence in developmental biology is long and arduous and requires an enormous amount of passion, focus, and love for the excitement of both challenges and opportunities. One of the most influential figures in the fields of prenatal and perinatal biology, maternal-fetal and neonatal physiology, and basic sciences research, the founder and chairman emeritus of the National Institutes of Health (NIH) Center for Perinatal Biology at Loma Linda University, died on January 5, 2016, aged 89 years.

Dr Longo, a distinguished professor of physiology and obstetrics and gynecology, was internationally recognized as a pioneer investigator, mentor, teacher, missionary, innovator, medical historian, and ambassador of academic scholarship, and his research has been funded by the NIH and other agencies for more than 4 decades. Among his many significant accomplishments, he authored more than 350 scientific papers, and edited or authored 20 books. His passion for discovery, and for training the next generation of scientists responsible for shaping the future of medicine, continued to be the driving force sustaining him in his long and productive career until his end.

In referring to Sir William Osler, the embodiment of such a humanistic approach, he was convinced that “Ideally the contemporary physician, in addition to scientific knowledge, must have a wide appreciation for the history of the profession, a grasp of literature both ancient and modern, and a dedication to the patient and the importance of clinical care”¹—and he personally lived up to this ideal as role model and leader.



Longo was born October 11, 1926, in Los Angeles, CA, to Frank Albert Longo and Florine Azalea Longo as their third child. As a young researcher, he majored in chemistry and mathematics at Pacific Union College in Angwin, CA, where he met his wife, Betty Jeanne. The couple married on September 9, 1948.

After graduating from Pacific Union College, Dr Longo applied to the College of Medical Evangelists, now Loma Linda University. In 1954, after graduating from the College of Medical Evangelists, Dr Longo went on to a residency in obstetrics and gynecology at the University of Southern California Los Angeles County Hospital. During that time he took an interest in brain damage in children, and noted, “It was a time in history when

obstetricians were being sued if anything related to the child’s performance or development was amiss (as they are to the present day).”² He then went into neuroscience and trained at the University of Pennsylvania with Robert Elder Forster II.

In 1968, Dr Longo was offered a position as founder of a perinatal research center at Loma Linda University, at that time consisting of 4 investigators.

During the past 5 decades he compiled an impressive record in research and academic leadership. He established the Center for Perinatal Biology at Loma Linda University as one of the world’s leading research groups in the field of developmental physiology, and served as its founding director from 1973 through 2012. His research has been continuously funded by the NIH and other agencies since 1964. Dr Longo was president of both the Society for Gynecologic Investigation (now the Society for Reproductive Investigation) (1982 through 1983) and the American Osler Society (2002 through 2003).

In 1988, Dr Longo was awarded a NIH Program Project Grant to explore the cellular and molecular mechanisms by which the body acclimatizes to high-altitude, long-term hypoxia (eg, oxygen deficiency). These studies involve acclimatization responses in the fetus in utero, the newborn infant, and the adult. Today the Center for Perinatal Biology is home to 13 core faculty members, all of whom are national and international leaders in maternal and fetal physiology,

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endocrinology, and neuroscience, experts in their individual disciplines. Over the past 4 decades the faculty of the center have accumulated \$135 million worth in research grants and published 1448 scientific reports—55 of those articles being published just this past year.²

“Much of our work relates to epigenetics—not only how prenatal influences affect the size and weight of the baby, but how they affect long-term sequelae for health and disease,” he stated in a recent interview.² “We are attempting to move beyond phenomenology—which is saying...you give hypoxia, protein deprivation, or other stress and the child develops hypertension, heart disease, metabolic syndrome, and other diseases—and instead trying to understand the mechanisms these genes regulate. What is going wrong with the epigenetic regulated transcription, elongation factors, or the telomeres?” He continued to say that “the mechanisms are so complex, but that is precisely what makes it so exciting. That’s why I am still working. It’s a great life.”²

Beyond doubt, his legacy for the community of developmental biologists is his opus magnum, his last monograph, *The Rise of Fetal and Neonatal Physiology: Basic Science to Clinical Care*, published in 2013 and dedicated to his father and to his mentor Robert Elder Forster II, in which he presented a scientific genealogy, from William Harvey, Paulus

Zweifel, Arthur St George Hugget, and Sir Joseph Barcroft to the pharmacologist-physiologist Geoffrey Sharman Dawes who was appointed Director of the Nuffield Institute for Medical Research at Oxford University in 1948. In Longo’s view of the antecedents of this field of fetal and neonatal physiology, Dawes was chosen as focus for evolution of the discipline, “as a pioneer who donned the mantle of his predecessors, by his indefatigable labors...Dawes not only personally advanced science, but did so through the influence of the scholars who worked with him, many of whom went on to distinguished careers throughout the world.”¹

To honor Dr Longo’s memory and his contribution to Loma Linda University and the scientific community, flags on the Loma Linda University Health Campus were flown at half-staff throughout the week following his passing. Personally, I will miss Dr Longo as a truly gracious and humble human being, unique scholar, mentor, and friend. ■

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