CEC AWARDS

SAMUEL C. COLLINS AWARD

In 1965 the Cryogenic Engineering Conference (CEC) established an award in honor of the late Samuel C. Collins, Professor of Mechanical Engineering at the Massachusetts Institute of Technology. One of Professor Collins' most notable works is his invention of the modern helium liquefier. The Collins Award is awarded to an individual who has made outstanding contributions to the identification and solution of cryogenic engineering problems and has additionally demonstrated a concern for the cryogenic community through service and leadership to this community.

The CEC Awards Committee reviewed the nominations and selected **Dr. William A. Little** as the recipient of the 2007 Samuel C. Collins Award. Dr. Little is a Professor Emeritus of Physics, Stanford University, and is the Chairman and Co-founder of both MMR Technologies, Inc., and of 3L&T, Inc.

Dr. Little's distinguished formative period includes a B.Sc. with Distinction in Physics and Applied Mathematics from the University of South Africa (1951), a B.Sc. with Honors in Physics from Rhodes University, South Africa (1952), a Ph.D. in Physics, also from Rhodes University (1955), and a Ph.D. in Natural Philosophy from Glasgow University, Scotland (1957). During this period he started a string of significant firsts. His Ph.D. Thesis at Rhodes University, "Photo-Fluorescence Decay Times of Organic Phosphors," included the invention and use of a radio-frequency technique for measuring fluorescence decay times that is still the foundation of most of today's fluorometers.

Dr. Little joined the faculty at Stanford University as an assistant professor (1958) and shortly there after received the Alfred P. Sloan Fellowship (1959-1963) that recognizes and supports highly-promising early-career scientists, often in their first appointments to university faculties. During this period, Dr. Little's research efforts included work on Kapitza resistance, magnetic cooling and refrigeration, and the study of thermophysical properties. Noteworthy are his prediction of the phonon coupling in liquid helium to the conduction electrons a metal, and the first demonstration of the effects of flux quantization on transport properties (the Little-Parks Effect), the fore-runner of the SQUID.

In 1964, Dr. Little published the seminal paper, "Possibility of Synthesizing an Organic Superconductor," that proposed the deliberate manipulation of a superconductor structure at the atomic level. It included the first recognition of the role of limited dimensionality in superconductors, and showed theoretically the possibility of obtaining superconductivity at high (room) temperatures through the use of electronically polarizable moieties in a properly configured molecular or crystal structure.

To this day Dr. Little continues his contributions in the theoretical and experimental study of superconductivity in organic, metal-organic, and high temperature ceramic superconductors, and the application of statistical mechanic techniques to neural networks. However, he is equally distinguished for his work in the development of palm-size coolers. These J-T coolers use a micro-miniature heat exchanger with cooling channels made from abrasively-etched glass plate. The coolers are now produced by the company he co-founded, and have achieved wide-spread use for biological specimen preparation, electronic characterization of materials, and temperature stabilization of sensitive electronic components. A distinctive feature of these open-cycle units are their rapid cool-down times (seconds to minutes).

Dr. Little has also made significant contributions in the miniaturization and commercialization of Kleemenko-cycle coolers – essentially J-T coolers using two-phase multi-component mixtures. These units have found practical application for the cooling of

X-Ray and Gamma ray detectors, in cryosurgery, dermatology and for liquefying oxygen for individuals requiring oxygen-assisted breathing.

Dr. Little has been recognized for his teaching capabilities, receiving the Dean's Award for Distinguished Teaching (1975-1976) and the Walter J. Gores Award for Excellence in Teaching (1979), both at Stanford University. He has authored or co-authored more than 160 publications on a variety of low-temperature topics, and has been granted 24 patents in the areas of cryogenic engineering, medical instrumentation and electrical propulsion. He is a fellow of the American Physical Society (1962), a member of the American Chemical Society, has served on the CEC Board (1991-1997) and was a CEC invited speaker in 1989 and 2007. Other significant acknowledgements of his contributions include a John Simon Guggenheim Fellowship (1964-1965), a NSF Senior Postdoctoral Award (1970-1971), an IR-100 Award (1981), a Department of Defense Award for Innovative Research (1991) and an R&D-100 Award (2006).

Dr. Little's career exemplifies the searching curiosity of a true scientist, but also the drive of the engineer to practically apply scientific phenomena for the use of mankind. His success in both these disciplines is rare, and uniquely recommended him to receive the 2007 Samuel C. Collins Award.

Dr. William A. Little (left) receiving the 2007 Samuel C. Collins Award from CEC Awards Chair Patrick Kelley.