CEC Awards

SAMUEL C. COLLINS AWARD 2025

Dr. Tomiyoshi Haruyama
Kavli Institute for the Physics and Mathematics of the Universe
Japan

Dr. Ralph C. Longsworth
Sumitomo (SHI) Cryogenics of America, Inc.
United States

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. The award is open to individuals regardless of national origin.

The CEC Awards Committee reviewed multiple nomination packages for highly qualified individuals and selected Dr. Tomiyoshi Haruyama and Dr. Ralph C. Longsworth as the recipient of the 2025 Samuel C. Collins Award.

TOMIYOSHI HARUYAMA

Tomiyoshi Haruyama received his Ph.D. at Keio University in 1989 in engineering. Since then, he has been a Research Associate, Physics Department, High Energy Physics Laboratory; Visiting Research Fellow of Southampton University (UK); Associate Professor, Physics Department, KEK, High Energy Physics Laboratory and Associate Professor (co-position), Graduate University for General Studies; Professor, Institute of Particle and Nuclear Studies, KEK, High Energy Accelerator Research Organization and Professor (co-position), Graduate University for General Studies; Deputy Director, Institute of Particle and Nuclear Studies, KEK, High Energy Accelerator Research Organization; Emeritus Professor, KEK, High Energy Accelerator Research Organization; Project Professor, Kavli IPMU, The University of Tokyo; and Deputy Director, Kavli IPMU, The University of Tokyo.

Dr. Haruyama is best known for developing a Pulse Tube Cryocooler for a liquid xenon particle detector and for studying heat transfer and fluid properties of liquid xenon. This work supported the search for rare muon decays that do not occur in the Standard Model of elementary particles. The success

of this experiment depended on the world's first large gamma-ray detector using low-temperature liquid xenon. To maintain liquid xenon throughout the experiment, the detector (120 liters of xenon) must be kept at a temperature of 165 K for a long and stable time. Thus, providing a more stable environment than using liquid nitrogen cooling. Tomiyoshi Haruyama's pulse tube refrigerator provided 70 W of cooling at 165 K. More recently a 200W version was developed in cooperation with Iwatani. These coolers are used in the search for dark matter in the universe, such as the XENON experiment, Panda-X experiment, PET detectors for medical diagnosis, and other applications worldwide. The pulse tube cryocooler developed was applied to a test experiment for the first dark matter search at Columbia University in the U.S. Tom also worked on purification systems for large scale argon systems, again in support of high energy physics detector applications, and helium two-phase flow studies for superconducting magnet cooling

Tomiyoshi published more than 100 papers in refereed journals and peer reviewed conference proceedings. He has received several awards:

Best Presentation Award (Cryogenic Association of Japan, Development of a cryogenic heat flux sensor using Peltier element),
Best Paper Award (Cryogenic Association of Japan, Vibration analysis of cryocooler),
Commendation for Science and Technology (Minister of Education, Culture, Sports, Science and Technology, Development of pulse tube cryocooler for the liquid xenon particle detectors),
Commendation for Research and Education Promotion Fund (Alumni Association of Keio University Faculty of Science and Technology, Development and application of pulse tube cryocooler for the liquid xenon particle detectors),
The Koshiba Prize (Japan's High Energy Accelerator Science Foundation).

and has been active in the community:

Editor of Cryogenics (International journal for low temperature physics and engineering)
Secretary of the International Cryogenic Engineering Committee (ICEC)
Executive Director of the Cryogenic Association of Japan
Chairman of the International Cryogenic Engineering Committee (ICEC)
Chairman of the Cryogenic Society of Japan.

RALPH C. LONGSWORTH

Ralph Longsworth received his Ph.D. in 1966 at Syracuse University for his work on Pulse Tube Refrigeration. Along with Bill Gifford, he invented the pulse tube refrigerator and was responsible for its early development and analysis. Ralph presented first paper on Pulse Tubes at the 1966 Cryogenic Engineering Conference which was published in Advances in Cryogenic Engineering, vol 12 in 1967. From 1966-1968 Dr Longsworth was General Manager of Cryomech. In 1968 He joined APD (Advanced Products Department of Air Products and Chemicals). In 1987 APD became IGC-APD Cryogenics and in 2002 became SHI-APD Cryogenics. Ralph retired in 2003 and remains a consultant in cryogenics.

Dr. Longsworth also contributed to the initial development of the Gifford-McMahon (GM) cryocooler and has continually made improvements to it over a span of more than 50 years. He served as the first manager of Cryomech to commercialize these cryocoolers. He was responsible for the introduction of the pneumatic drive for the displacer which led to reduced costs and improved reliability. Through his efforts, these GM cryocoolers have been the workhorse for cryopumps that are widely used in the semiconducting industry and for the zero boiloff of liquid helium in MRI systems. Over 40,000 of these coolers are in use today for MRI cooling.

Dr. Longsworth was also the pioneer of linear motor compressors for Stirling and later Stirling-type pulse tube coolers. In 1973 he designed and built the first dual-opposed linear motor compressor

for a split Stirling cryocooler. Also, he greatly advanced the use of fast cooldown Joule-Thomson (JT) cryocoolers with improved heat exchangers. In another application area for JT cooling, he pioneered much of the mixed refrigerant JT cooler technology, particularly for the medical industry in cryoablation. His work on optimizing the refrigerant composition greatly improved the efficiency of such coolers and allowed the use of commercial refrigeration compressors to drive them at low-pressure ratios producing refrigeration down to 70K, instead of using specialty compressors for very high-pressure ratios.

Ralph Longsworth has 81 patents, over 35 publications, and is still active today as a consultant. He has served on the boards for the CEC and the International Cryocooler Conference (ICC) to help promote cryogenics to a wide audience. He also has contributed to teaching at the Cryogenic Society of America (CSA) Foundations of Cryocoolers short course.

THE RUSSELL B. SCOTT MEMORIAL AWARDS

The Russell B. Scott Memorial Awards honor the first head of the Cryogenic Engineering Laboratory of the Boulder Laboratories of the National Bureau of Standards, now the National Institute of Standards and Technology. Mr. Scott was the founder of the Cryogenic Engineering Conference (CEC), the first of which was held in 1954 in Boulder, Colorado. He is the author of the book *Cryogenic Engineering,* published by the Princeton press in 1959. Mr. Scott retired in 1965 after 37 years at NBS and died in 1967.

The Scott Memorial Awards provide an incentive for the production and presentation of high-quality papers at the Cryogenic Engineering Conferences, and recognition of authors who, in the judgment of the CEC Board of Directors, presented the best papers at the proceeding conference. The papers are nominated by the reviewers and editors of the conference proceedings.

In 2025, two awards for the best papers delivered at the 2023 CEC Honolulu conference, and published in the *IOP Conference Series: Materials Science and Engineering, Vol. 1301, 2024*, were presented at the 2025 Reno conference as follows:

Best Paper for Cryogenic Engineering Research

J Adams and J G Brisson

for their paper
“Acoustic expanders for use in recuperative cryocoolers”
Article Number: 012134

Best Paper for Cryogenic Engineering Applications

L Ryali, W Stautner and D Mariappan

for their paper
“Impact of Internal Baffle Designs on Liquid Hydrogen Sloshing in Cryogenic Aircraft Fuel Tanks”
Article Number: 012068

KLAUS AND JEAN TIMMERHAUS SCHOLARSHIP AWARD

The Klaus and Jean Timmerhaus Scholarship Award was established by the CEC Board of Directors to develop and foster increased interest and participation in fields of cryogenic studies and to encourage future engineers and scientists in these areas. The award is named in honor of the late Dr. Klaus Timmerhaus, who has been a driving force behind the CEC since its inception and in memory of his late wife, Jean. Dr. Timmerhaus was a Professor of Chemical Engineering at the University of Colorado.

The 2025 CEC Klaus & Jean Timmerhaus Scholarship award was presentation to:

Matthew Shenton
Washington State University, Pullman, Washington, USA

DONNA JUNG SCHOLARSHIP AWARD

This graduate scholarship was created to "develop and foster increased interest and participation in fields of cryogenic studies and to encourage future engineers and scientists", particularly by supporting the development of future female leaders. The award honors the late Donna Jung, who was President and Owner of International Cryogenics, Inc. (ICI). International Cryogenics later became part of IC Biomedical following its acquisition by Milton Street Capital. Donna was a highly regarded leader in the cryogenic community, and International Cryogenics, Inc. was of a longtime Corporate Sustaining Member of the Cryogenic Society of America (CSA) and a stalwart supporter of the Society.

The 2025 Donna Jung Scholarship award was presented to:

Sydney Therien
University of Wisconsin-Madison, Madison, Wisconsin, USA