Emeritus spotlight

Dr. Bimal Bose

EECS Professor Emeritus Dr. Bimal Bose had a long and successful career in power electronics, in both industry and academia. He has won several awards and written many books and publications on power electronics. He even has an award named for him and has recently been elevated to one of the highest echelons in engineering.

Dr. Bimal Bose was born into a large family in Khalis Khali, a remote village in Bangladesh, at the time a part of India. He was an undergraduate student at Bengal Engineering College (BEC), now called the Indian Institute of Engineering Science and Technology, Shibpur.

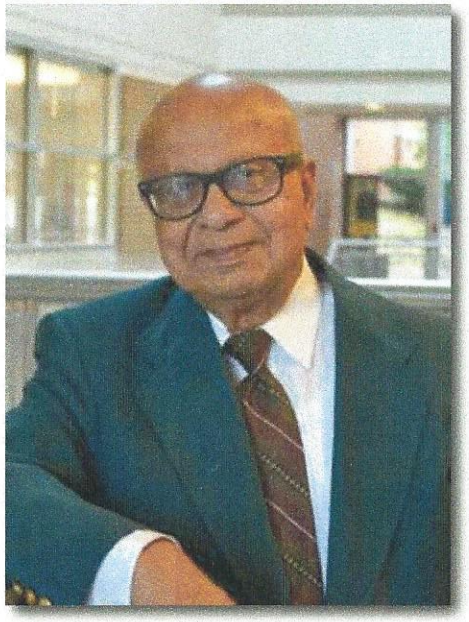
"Engineering education was not very developed after India established its independence in 1947. Students seeking higher engineering degrees normally studied in the universities of the United Kingdom. Gradually, after independence, the government of India established a number of Indian Institutes of Technologies (IITs) that grew to be world-class in educational quality and standard of research."

"After graduation, I started my career as a power engineer in India in the mid-1950s. I was an engineer in a hydroelectric power company in the early days, and then I started teaching power engineering courses (generation, transmission, distribution, and electric machines) at BEC. The so-called power electronics field was unknown in those days. Power electronics was termed "industrial electronics," because gas tubes were used mainly in industrial applications, whereas vacuum tubes were used in signal processing and communication."

Later, Dr. Bose came to America. "I pursued my master's degree at the University of Wisconsin, Madison, from 1958 to 1960. I was selected as a scholar for the USA-India Technical Cooperation Mission (TCM, which later became United States Agency for International Development [USAID]), and my expenses for the Wisconsin study were covered by TCM. Besides education, the TCM organized an excellent program for my all-round experience with the American educational system. Under the terms of this program, I was required to teach in an Indian university for a minimum period of three years."

"I conducted my M.S. research on the study of three-phase, diode-bridge rectifier harmonics and their effects on general utility systems using a distributed-parameter, LC-model transmission line."

"Coming from India to the USA, and Wisconsin in particular, was an exciting experience for me. It was a different world,



Dr. Bimal Bose

where people looked so lively and prosperous. With an Indian friend, I rented an apartment where I used to cook Indian food, but during the day, I ate American food in the university cafeteria. Winter weather in Wisconsin was extreme, and sometimes temperature used to fall to -16°F. The streets and the two lakes, Mandota and Manona, in Madison were completely frozen. I found it difficult to walk on the sidewalks and roads with a heavy coat and my briefcase in hand. I could hardly believe that men were ice-fishing on the lakes."

"After completing my studies at the University of Wisconsin, I returned to India and joined the faculty at BEC, where I introduced a new course in industrial electronics. I did my doctoral research at Calcutta University on Ramey magnetic amplifiers from 1960 to 1965."

From 1960 to 1971, Dr. Bose was in the faculty of BEC, where he researched magnetic amplifiers, supervising many MA-based research projects.

"The year 1971 was momentous for me, as I emigrated from India to the USA and started my academic career at Rensselaer Polytechnic Institute (RPI) as a visiting professor in modern power electronics."

"I applied for a faculty position at RPI, but getting an offer while I was in India was not easy. To test my knowledge, the department chairman asked me to submit four doctoral research topics and formulate a full senior/graduate course in power electronics. This was quite a challenge for me as an Indian whose strength was mainly in magnetic amplifiers. However, GE-CRD (General Electric Corporate Research and Development), which worked closely with RPI's EE Department, examined my submission and approved it. The official appointment letter from RPI helped me to get my emigration visa or "green card" easily from the American consulate."

Dr. Bose was at RPI for five years, until GE-CRD offered him a full-time job in 1976. "I could not refuse GE-CRD's attractive offer. Having spent sixteen years in university career, I always felt that I had a large gap in my education and expertise. As a graduate student, I did not have much experience getting my hands dirty in fabricating large power converters with complex electronic circuits, or solving

the real world EMI (electromagnetic interference) problems of large converters. My doctoral studies were rich with analytical work using complex waveforms, equations, etc., but not with real world applications."

"GE-CRD was then considered the ivory tower of power electronics worldwide, and power electronics specialists from all over the world used to visit its labs in Schenectady. All the conferences were then filled with the company's papers, and there were hardly any papers from universities. I thought it would be very unwise not to accept the GE offer."

Dr. Bose worked on several different types of projects at GE-CRD, including an electric vehicle called the ETV1, and control development of a linear inductor machine for railroad propulsion.

Due to various factors such as internal GE volatility into the 1980s and competition from Japanese companies, such as Hitachi, Toshiba and Mitsubishi, Dr. Bose decided to return to a university career in 1987, after spending eleven years in GE-CRD.

"I found that my expertise in power electronics had improved significantly due to the blending of practical experience with my theoretical knowledge. I also gained tremendous visibility in the world in the power electronics field because of my books and other publications. I thought it was the right time to migrate to the prestigious university job where I really belonged. One fine morning, I got a call from Prof. Jack Lawler of the University of Tennessee, Knoxville, with an invitation to visit the campus. There I was offered the endowed Condra Chair of Excellence in Power Electronics Applications." He was tasked with building up the then-fledgling power electronics program. For the next 15 years, he helped strengthen the program and paved the way for landing the National Science Foundation-backed Center for Ultra-Wide-Area Resilient Electric Energy Transmission Networks.

"In parallel, I also started working as Chief Scientist of the newly established Power Electronics Applications Center (PEAC) of the Electric Power Research Institute (EPRI). Part of my responsibility was to promote power electronics education and research in the United States. In addition to my regular graduate students, I managed to recruit a large number of visiting professors and research scholars from abroad to come and work in my laboratory, funded by their respective governments. All of them were brilliant scholars."

During his years at UT, Bose was honored seven times by the IEEE, including being named a Life Fellow, as well as receiving a lifetime achievement award, the IEEE Lamme Medal and the Millennium Medal for Outstanding Contributions in Power Electronics. He was also given an honorary D. Sc. degree from the President of India.

Dr. Bose retired from the University of Tennessee in 2002, but two of his greatest honors have come since his retirement from teaching.

Dr. Bimal Bose Energy Systems Award

In 2014, the IEEE Industrial Electronics Society (IES) established the Dr. Bimal Bose Energy Systems Award, to recognize an individual who is a young researcher with outstanding contributions to the field of Industrial Electronics applied to Power Electronics and Energy Systems. The candidate must be a member of IES who, on the date of nomination, is within his/her 25 years of professional experience from the date of his/her last academic degree. The award consists of an honorarium of $3,000, award certificate, and travel support to attend the award ceremony. To date, there have been three Bose Energy Systems Award recipients: Dr. Marco Liserre in 2014, Dr. Mariusz Malinowski in 2015 and Dr. Samir Kouro in 2016.

Member of the National Academy of Engineering

For its class of 2017, the prestigious National Academy of Engineering elected Dr. Bose to its ranks. Election to the NAE is considered to be among the highest recognitions in engineering fields, and it is a recognition of a lifetime's worth of accomplishments. "This honor has come to me very late in my career, but I am thrilled with the news," said Dr. Bose. "I would like to express my immense gratitude to UT, particularly to Tickle College of Engineering Dean Wayne Davis and the head of the department, Leon Tolbert, for giving me a favorable environment in pursuing my intellectual activities." Dr. Davis said, "Professor Bose has been instrumental in laying the groundwork for some of the successes that came after him. "His efforts have helped both our college and the world at large, so his election is well-deserved."[1]

Dr. Bose has experienced the satisfaction that comes with achieving many of the goals he has set for his life, and his hope is that the students of EECS will have the opportunity to do the same. "Coming from a remote village in Bangladesh, it was my dream to see the whole world with my own eyes and make important contributions to the world. I had to overcome mountainous hurdles, step by step, to fulfill the ambitious goals in life and reach where I am today. Although my goals are yet unfulfilled, I often feel that I am the happiest person on earth. Achieving the goals of life requires persistent ambition, courage, and hard work, but when you reach the top of the Himalayan Mountains, the mind remains filled with perennial pleasures. My advice to young engineers: have a dream in life and try to realize that dream with hard work. Have a long-term ambition and short-term career goals, with the fire always burning in your mind."

1. [Palensky, Peter. "National Academy of Engineering Adds Pioneering UT Professor as Member." IEEE Industrial Electronics Magazine June 2017.]