



Norman M. Vrana

February 16, 1920 – November 9, 2013

Norman M. Vrana, Professor Emeritus of Electrical and Computer Engineering died peacefully at his home in Ithaca on November 9, 2013. He was born February 16, 1920 in Hudson Heights, NJ. As a teenager, Norman Vrana worked on construction of structures for the 1939 NY World's Fair site and worked as a messenger on Wall Street prior to finding his interest in Electrical Engineering. In 1947, he earned the BEE degree in Electrical Communications and Electronics at New York University while also working at ADT Company in the areas of detection devices and systems, logic design of central station signal systems, and power supplies. He served with the US Navy from 1944-45 in the Radio Material School. In 1946, he returned to ADT Company to continue in his previous areas of expertise and remained with the company until 1949.

In 1949, Norman moved his young family to Ithaca to pursue a Cornell Master's Degree in Electrical Engineering that he earned in 1951 with a specialization in Electrical Machinery and Control Systems. He was then hired into the School of Electrical Engineering as an Assistant Professor, thus

launching a very distinguished teaching and project supervision career at Cornell.

His particular area of specialization and interest remained laboratory courses especially those with a strong combination of theoretical material and hands-on practice. In fact, he once summarized his philosophy: "I have been motivated by the desire to develop new courses that were educationally relevant in combining theory, applications, innovation, and practical design – no (engineering) student is fully educated unless at some point his/her efforts result in the experience of using that knowledge and creativity to produce something tangible."

Professor Vrana's teaching and professional design interests varied and evolved over time. Initially he taught standard E.E. courses in measurement and circuits; direct current (DC) and alternating current (AC) machines, control theory, and electrical systems. He also began an interest in computing equipment in the 1950s and in this area, he found his true love of technology and saw its potential positive influences on society. This interest became more intense and by the 1960s, he had graduated several Master's students. His first sabbatical leave was spent designing analog computers for aircraft fire control. He returned to Cornell from that experience and developed an analog computation course that he taught for some years.

As digital logic hardware systems grew in importance via the enabling technologies of discrete semiconductor electronics devices such as the Bipolar Junction Transistor, Professor Vrana began developing a course in Hybrid Computation. About the same time the College of Engineering developed the one-year professional master's degree program to intentionally provide a higher level of education to those engineering students whose primary career goals was engineering design and development in industries throughout the US and around the world. Professor Vrana's best discovery at this time was to involve these Masters in Engineering students in the design of equipment for the various laboratory courses he instituted at Electrical Engineering. Of special note, in 1973 he decided to devote his efforts to digital hardware system design, which became a life-long interest. At this early stage the equipment needed to provide a substantial hands-on experience was either too expensive to adapt to a university setting or did not even yet exist in suitable form. Combining his excellent creative skills and management abilities, he

began using project students from the Masters of Engineering program within electrical engineering to devise and construct the hardware systems that would allow teaching the practical principles in this rapidly advancing field. Masters in Engineering students were required to complete a design project, and the synergy of engaging graduate students in the design and synthesis of specialized digital equipment ideally suited to educating students in this fledgling field, which has today become arguably the largest and most expansive field of engineering product development.

Within a very few years, students competed to be part of Professor Vrana's laboratory development program. By the middle 1970's, Professor Vrana was served by a very dedicated and highly creative group of Electrical Engineering students who affectionately named themselves VRA (Vrana Research Associates). Together with these students and their successors Professor Vrana was able to create and offer basic and advanced digital hardware courses. For example, he created the first large-scale microprocessor course available to undergraduates and graduate students alike in the late 70's. Much of the support for these courses came from very effective recruitment of support from industry leaders such as Hewlett Packard.

Given that the array of specialty electronics then were not available as they would become over the next decade. Professor Vrana and his students had to develop the various components needed for a modern processor. The vast number of individual chips required in that era of small-scale integration, and the hundreds of feet of wiring needed, required a container the size of a small suitcase. The department technicians created the necessary wooden boxes that were given the name: The CompuBox. Within a few years 40-75 of these boxes were commonly seen being carried around campus by his students – quickly the boxes were officially dubbed VranaBoxes by the students. Over his long and distinguished teaching career, Professor Vrana developed or taught some 15 different courses and assisted in many others as a recitation instructor. He also gave short courses at Cornell for staff and technicians and to local IBM locations in Owego and Endicott on analog and digital simulation. The later courses were offered using a video tape transmission system of continuing (distance) education. Of all his many accomplishments, his pioneering work with developing teaching equipment and methods for digital hardware systems was his greatest and most impactful contribution to the School of Electrical

Engineering and its students. His courses still live on today implemented with the latest of technology available.

Bruce Land who has inherited the honor of carrying on with this superb teaching effort has said, “Norm Vrana was already established as the embedded expert when I started teaching in Electrical Engineering in 1983. Norm was the go-to person for information regarding computing systems, especially on making microcontrollers work in a student laboratory setting. Chris Pottle took over the teaching effort in computer systems from 1991-1996. In 1997 I took over the microprocessor course he had pioneered in the 70’s using TTL discrete logic, then using commercial processors in the 1980s. By the 1990s, teaching utilized flash-based controllers costing a few dollars each and the computing chip became just another electrical design component, as Professor Norm Vrana had envisioned years earlier.”

His consulting and professional engineering design experiences spanned a wide range of interests from the 1940s through the 1980s. He contributed his expertise and problem solving abilities at North American Aviation, NY Telephone Company, Hewlett Packard Company, Foxboro Company, the US Army’s Frankford Arsenal, BRL, JP Hennessy Company, The Coates Company, and The Partlow Corporation. He also served as an External Faculty Member to the Sibley School of Mechanical Engineering from 1967-1971 advising on curriculum issues and helped further develop laboratory-based education in that program. He attained the rank of Full-Professor in 1974 and Professor Emeritus in 1990. Professor Vrana was also an avid and respected outdoorsman enjoying family camping and skiing trips to the Adirondacks, Maine, and Canada. He was active in the Ellis Hollow Community and helped develop the Ellis Hollow Ski Slope. He is best remembered by his students and colleagues alike as an innovative and creative engineering educator and an intensely dedicated member of the faculty of Cornell for over 40 years.

H.C. Torng, Bruce Land, John Belina