

Reflections of David "Dave" Elton Thompson

I started my academic career teaching as a part-time instructor at what is now the University of Texas at Arlington in 1963. I continued as a full-time instructor during my doctoral studies at Purdue University. I found that teaching and research were my calling. After completing my doctorate at Purdue, I began my career in earnest as a new Assistant Professor at Louisiana State University in August of 1969. It was like a dream come true. I had wonderful colleagues, great students, and an almost instant collaboration with faculty in the Mechanical Engineering Department and with Dr. Paul Brand at Carville's United States Public Health Service Hospital. It was intense and exciting!

I was given the privilege of developing the department's instrumentation course, and at that time, I had students from many other departments taking the course. It was enormously rewarding. It was in that lab course that I first got NSF funding to apply a DEC PDP11 minicomputer (\$150,000) to laboratory measurements. I was able to hire Mr. Ric Haag as a system

manager and programmer. My good friend Ric remains one of the strengths of the computing infrastructure at LSU today. Later, that same PDP11 became the central computer in the Computer Graphics Research and Applications Laboratory co-founded by Dr. John Brewer and myself. To provide the academic infrastructure for the laboratory, Dr. Brewer and I taught a series of courses in computer graphics, math modeling, advanced CAD, and computer data acquisition and analysis. Other faculty, like A.J. McPhate, John Beard, and Warren Waggenpack shared our vision and joined in the activities of the lab.

I cannot begin to describe the breadth and depth of advances made through this multidisciplinary laboratory. Memories of the fun and challenges of building a state-of-the-art visualization facility still excites me and all the students and faculty that were associated with the lab. We started with almost nothing, but through hard work, improvisation and creativeness, we eventually put together several million dollars

of hardware and software and networking dedicated to research in real-time interactive modeling and visualization. This endeavor was difficult, but the results were mind-boggling.

Because of the work done at LSU, I have been a part of introducing math modeling and visualization into mechanical engineering, computer science, physics, biology, orthopaedic surgery, physical therapy, anatomy, and archeology. The visualization tools we developed have started revolutions in these fields that have flowered and borne fruit. As an example, we helped to change the way in which the medical profession, anatomists, and physiologists “look” at the human body or at nature. At LSU, we wrote 3D visualization software for this purpose that led to the viewing tools used in MRI and CT scans. We collaborated with students and Dr. Tohline in Physics that resulted in visual models of the growth of solar systems using fluid mechanics models. We introduced new approaches for tendon and muscle transfers to repair damaged arms and hands. We introduced a visual teaching model for understanding how complex joints function. Computer graphics has continued as a major component of my professional life, and my last MS student is completing his MSME degree looking at flexibility measure of a 70,000 year old Neandertal hand in comparison to modern humans.

The biomechanics laboratory has also continued to flourish, with one of my former students, David J. Giurintano, now as its director. This laboratory is on the forefront of major advancements in health care in orthopaedics, and physical and occupational therapy.

I would like to finish with a story about an undergraduate senior design project on which I served as major professor. A small team of five students came to me proposing a 35mpg

economy car as their senior project. I sensed that this was not what they wanted to do, and challenged them to confess their heart’s desire. One student finally blurted out that he wanted to design, build, and drive a dragster, but he knew that LSU would never allow that. I responded that if we did it right, they would. The team was given a one-week assignment to rewrite their full proposal, stating how they would raise the money (estimated at around \$20,000), how they would break the project into appropriate modules, how they would assure safety, and who would assume the responsibility for each of their sub-areas. One week later, they had around \$20,000 in committed money and hardware, a complete design plan, and enough enthusiasm for a team of 100. I required that they base their design selection for motors, transmission gear ratios, and tire sizes on a mathematical model simulation of a drag race. They did this, made their selections, and were able to predict a performance of 150mph in 8.85 seconds on the quarter-mile race track. The frame was made in Houston at an NHRA certified construction shop, and then assembled by the students in a local garage. The Final Exam was one Saturday night at the local drag strip, and they posted 149 mph in 8.89 seconds. It generally takes engineering graduates several years to come to grips with the quality of their engineering education, and how theory and practice are really well aligned. For those students, it happened in 8.89 seconds! The exhilaration we all experienced brought into focus just how special LSU’s Mechanical Engineering design program really was. This small team started with a clean sheet of paper and absolutely no experience in automobile dragster design or large scale math modeling. In just nine months they modeled, designed,

built, assembled, and tested a 150 mph race vehicle that did exactly what they intended.

Essentially, my entire 45 year professional life has been in education. It has been unbelievably rewarding. It has never been dull, frequently exciting, and always a challenge. I spent 24 years, over half of my working life, at Louisiana State University, and I was able to average half a million dollars in research expenditures annually. I could do that because LSU gave me the freedom to be a Carnegie Research I faculty member, and the expectations to do so. As a consequence, I used LSU as a role model during my time in leadership as a department chair or dean. The students, faculty, staff, and administration at Louisiana State University have every reason to be proud of their heritage and equally proud of where they are headed. This is an extraordinary place!