Biographical Sketch:

Tsung Dao Lee (published under ***T.D. Lee***) is a Chinese-born American physicist well known for his work on parity violation, the *Lee Model*, the *Kinoshita-Lee-Nauenberg (*KLN*)* theorem, particle physics, relativistic heavy ion collider (RHIC) physics, and the field of non-topological solitons. In 1957, at the age of 31, Lee shared the Nobel Prize in Physics for violation of parity law in weak interactions “which has led to important discoveries of the elementary particles.”

Tsung Dao (T.D.) Lee was born in Shanghai on November 24, 1926. The Sino-Japanese War interrupted Lee’s high school education in Shanghai, thus he did not obtain his secondary diploma. Nevertheless, in 1943, Lee directly applied and was admitted by Zhejiang University. Very soon after, Lee’s talent in physics was discovered. Several physics professors, including Shu Xingbei and Wang Kan-Chang, mentored Lee as his interest in physics grew rapidly.

The following year in 1945, again disrupted by further Japanese invasion, Lee had to move to the National Southwestern Associated University in Kunming, where he studied under Professor Ta-You Wu. After his sophomore year, Professor Wu nominated Lee for a Chinese government fellowship for graduate study in the U.S. In 1946, Lee went to the University of Chicago and was selected by Professor Enrico Fermi to become his PhD student. Lee completed his PhD thesis under Fermi in 1950.

In 1953, Lee joined Columbia University, where he is a University Professor today. His first work at Columbia was on a solvable model of quantum field theory better known as the *Lee Model*. Soon, his focus turned to particle physics and the developing puzzle of K meson decays. Lee realized in early 1956 that the key to the puzzle was parity non-conservation. At Lee’s suggestion, the first experiment test was on hyperon decay by Steinberger’s group. At that time, the experiment result gave only an indication of a 2 standard deviation effect of possible parity violation. Encouraged by this feasibility study, Lee made a systematic study of possible P, T, C, and CP violations in weak interactions with other collaborators, including C.N. Yang. After the definitive experimental result by C.S. Wu and collaborators of parity non-conservation, Lee and Yang were awarded the 1957 Nobel Prize for Physics.

In the early 1960’s, Lee and collaborators at Columbia initiated the important field of high energy neutrino physics. This led to the famous Lederman-Schwartz-Steinberger experiment at Brookhaven National Laboratory (BNL) in 1962, which showed that there are two different neutrinos associated with the electron and the muon. In 1964, Lee and M. Nauenberg analyzed the divergences connected with particles of zero rest mass. They described a general method known as the Kinoshita-Lee-Nauenberg (KLN) theorem, which still plays an important role in contemporary work in QCD and remains a topic of key importance in particle physics. In 1974-

75, Lee published several papers on "*A New Form of Matter in High Density*," which led to the modern field of RHIC physics, now dominating the entire high energy nuclear physics field.

Besides particle physics, Lee has been active in statistical mechanics, astrophysics, hydrodynamics, many body system, solid state, and lattice QCD. In 1983, Lee wrote a paper entitled, "*Can Time Be a Discrete Dynamical Variable?*" This led to a series of publications by Lee and collaborators on the formulation of fundamental physics in terms of difference equations, but with exact invariance under continuous groups of translational and rotational transformations. Beginning in 1975, Lee and collaborators established the field of non-topological solitons, which led to his work on soliton stars and black holes throughout the 1980's and 1990's.

In 1997, Lee became the Director of the RIKEN-BNL Research Center, which together with the Columbia Group, completed a 10 teraflops QCDOC supercomputer in 2004. In theoretical research, Lee and R. Friedberg have developed a new method to solve the Schroedinger Equation, leading to convergent iterative solutions for the long-standing quantum degenerate double-wall potential and other instanton problems. More recently, they have developed a new theory named *Timeon*, which generates the difference between past and future.

Currently, Lee's research centers on the fact that constituents of all matter are made of 12 particles: six quarks and six leptons, divided into four families, each family of three particles of the same electric charge. Lee is focusing on understanding the phenomenon of transitions within the leptons and within the quarks, described by two 3 x 3 matrices, which he calls the cornerstones of particle physics.