

Dr. Erich Farber (1921-2017) – a personal eulogy

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Dr. Erich Farber – a U.S. based solar energy pioneer died on 9th April 2017. He was nearly 96 years' old and died of complications arising because of fall. He was an emeritus professor of Mechanical Engineering at University of Florida, Gainesville, U.S.A. I worked with him for 7 years from 1974-1981, first as his graduate student (got my Ph.D. under him) and then as his colleague in the [Training in Alternative Energy Technologies \(TAET\) Center, at UF](#). In 1981 I came back to India to run my own NGO.

Dr. Farber did pioneering work in many fields. He was the inventor of pool boiling curve which is the bedrock of two-phase flow in heat transfer. For this, he received ASME's major award – the Worcester Reed Warner Medal. He made major contributions to the design of Saturn 5 rocket which sent the man to the moon and in solar energy, he pioneered the development of solar refrigeration and air-conditioning and in design of solar powered Stirling engines. He was the charter member of Solar Hall of Fame and received many awards from various solar energy societies around the world.

He had a tremendous influence on my life, so this is a personal eulogy.

The last time I met him was in May 2014 when I had gone to UF to receive the [Distinguished Alumnus Award](#). He was invited to the Department of Mechanical Engineering and was sitting in Dr. David Hahn's Office when he was pleasantly surprised to see me. We spent lovely one hour talking about old times and attached is the photo of all three of us. Dr. David Hahn who is the chairman of mechanical engineering department at UF told me that Dr. Farber visited him once a month.

David Hahn, Anil Rajvanshi and Erich Farber. May 2014



Dr. Farber looked frail, little bent over (after all he was 93 years' old at that time), was very hard of hearing and yet sharp as ever and still drove his car ! He was quite insistent that he would leave me and my wife Nandini wherever we wanted to go, but I did not have the heart to tell him that I would not

like to be driven by a 93-year-old person who was carrying a physically challenged decal from the veterans' hospital on his car ! The high speed with which he backed his car from the parking lot showed that he was not completely in control of the vehicle.

Any time I returned to Gainesville after my departure in 1981, I always made it a point to see him and his lovely wife Ellen. They would always take me out for dinner, and we exchanged notes on our families. He was like my family in Gainesville. However, as he aged the way he drove was always a subject of discussion between him and Mrs. Farber. Dr. Farber would get angry and ask her "Are you driving, or am I ?"

I met Mrs. Farber for the first time sometime in 1975 during a Mechanical Engineering picnic. At that time I and [Nandini](#) were dating, and I had taken her for the picnic. Mrs. Farber got an immediate liking for her and next day Dr. Farber came to my office and told me that my choice is excellent ! Ellen was a very distinguished and beautiful lady, and I have never heard her say a single word against anybody. She was also a very soft-spoken person. Unfortunately [she passed away in 2020](#).

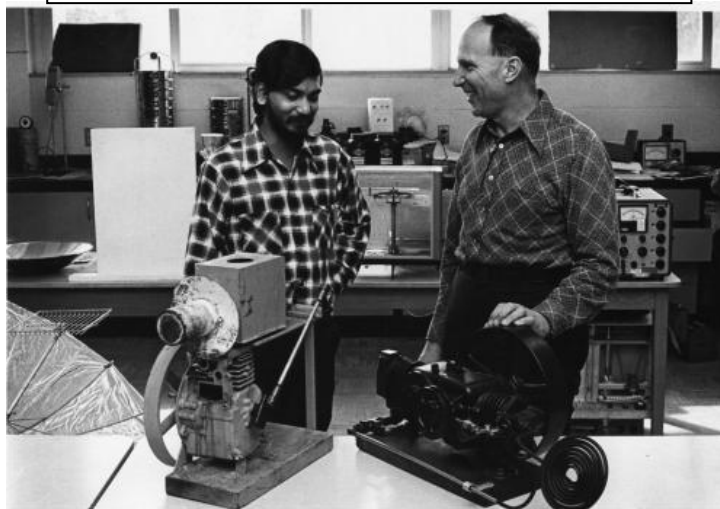
I came to work [under Dr. Farber in 1974](#). I had the prestigious Government of India (GOI) scholarship which paid for the air fare from India to U.S., all the course fees, money for books and gave US \$400/month as stipend. Most of the GOI scholars

went to prestigious universities like MIT, Caltech, UC Berkley, etc. I chose UF because of Farber and never regretted my decision.

He was at that time a leading light in US in solar energy utilization especially for solar thermal application in power generation and refrigeration and had pioneered many technologies in these areas.

He was an engineers' engineer with wonderful ability to work with his hands, go to the heart of a problem and apply basic engineering fundamentals to finding out the solution. They do not make such professors anymore!

Anil Rajvanshi with Erich Farber. MEB 1975

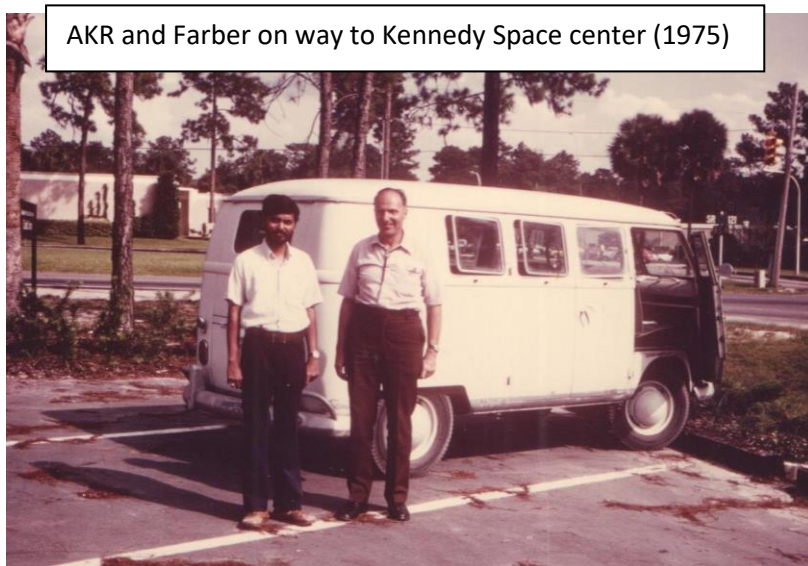


His mathematical knowledge was weak, but he more than made up for it by his practical approach. I remember very vividly how he helped me solve a tricky problem in internal reflections. For my Ph.D. research I was trying to develop transmittance profiles of different dye solutions. This was during the days when fancy spectrophotometers had not been developed. I was using WW II vintage Beckman Spectrophotometer, which was humongous, and to get the spectra of the dyes, I had to change the light source and detectors continuously.

During the course of my experiments I found out that the output beam from the dye cell for certain wavelengths was greater than the input signal. I did and redid my experiments dozens of time taking all precautions, but still the results were the same. The mechanical engineering professor in whose lab I was doing the experiment kept on telling me that there is something wrong in my experiments. So in desperation I went to Dr. Farber, and he immediately said that this is because of internal reflections inside the cell for those wavelengths. I did the theoretical calculations, and they matched my experimental results exactly !

Similarly he told me of another instance (it happened in late 1960s) where the volume of a complicated geometry of Saturn 5 rocket cone had to be found out. Quite a number of his colleagues at UF mechanical engineering department developed sophisticated computer models (and in those days getting a FORTRAN program to run in huge computers was a nightmare) and yet even after 3-4 months he did not get an answer. So he asked a master craftsman to make him a wooden model of the rocket engine, which he dipped in a bucket of water and from its displacement found the volume!

There were hundreds of such examples that I can narrate about his technical virtuosity. He was very much in the Lord Rutherford mould who believed in doing excellent experimental work rather than modeling or theoretical research. Rutherford and his Cavendish lab in University of Cambridge produced many Nobel Laureates based on their experimental work.



AKR and Farber on way to Kennedy Space center (1975)

I think I was probably his only student to whom he showed an 8 mm film (45 minutes duration) of his work in developing the critical mass concept for Saturn 5 rocket design. His design of mixing liquid oxygen and hydrogen was one of the

important contributions to the success of Saturn 5 rocket and the space program.

He showed through very sophisticated experimental work that only a “critical mass” of these fluids can be mixed safely. Above that amount, surface charge in the mixing liquids led to explosion of the fuel. With a child’s glee he explained to me how he analyzed reams of thermal data collected from the explosions to develop the critical mass concept. That lecture and the film for me was like sitting through the history of rocket design.

During my student days almost every week I would spend hours discussing with him some new discoveries that I read in a journal or saw on TV. These discussions are my most precious memories of him.

Through him, I also had the distinction of meeting [Dr. Wernher von Braun](#) – the father of U.S. space program. Dr. Farber and Von Braun were friends and Dr. von Braun had come to U.F. in 1975 for the launch of the rocket for US-USSR space docking from Cape Canaveral. Dr. Farber introduced me to him as his star pupil!

Dr. Farber was a difficult person to work with. He had a knack of rubbing people the wrong way. So he was accused of taking credit for others' ideas. However, I found him to be a charming and kind man who always helped me and from him I learnt a great deal about engineering and practical applications of solar energy. He gave excellent lectures about solar energy with insights on practical usage. It is a loss to solar energy community all over the world that he never converted those lecture notes into a book.

Dr. Farber was a teacher at heart and the [multimillion-dollar TAET center at UF](#) was a crowning achievement of his teaching ability. When my daughter [Noorie](#), in 2005, went to UF to do her Ph.D. in Mechanical Engineering, he would often come to meet her and would spend hours telling her about various issues in engineering. She fondly remembers those discussions.

Dr. Farber lived very frugally and sustainably. He mostly rode his bicycle to UF and drove a non-A.C. old VW Van. He lived in a house that had no air conditioning. Mrs. Farber would always complain to him about the heat in their house. Dr. Farber would tell her that Gainesville temperatures were not that hot and putting fans in the windows can pull in cool outside air! Many a times when we went to his house for a dinner the temperatures were comfortable, but the humidity was quite high.

In 1976 Dr. Farber came to India as the head of a U.S. delegation on Solar Energy. He met India's Minister of Energy [Mr. K. C. Pant](#) and apparently told him that his best student was an Indian ! Later on when I became close to Mr. Pant, he narrated to me the conversation he had with Dr. Farber. During this visit Dr. Farber was also

supposed to meet the Prime Minister Mrs. Indira Gandhi and the meeting was fixed around 8 p.m., but unfortunately for some reason it had to be postponed and the time given was very close to his U.S. return flight time. So Dr. Farber cancelled his meeting ! He was quite irreverent regarding these things.

It was credit to Dr. Farber's solar energy fame and credibility that UF got huge amounts of funding from both state and federal agencies and was known internationally for its solar energy work. In early 1970s, he set up at UF one of the largest solar energy program in any U.S. university. At the height of the program there were close to 25 graduate students and faculty working under his supervision in almost every area of solar thermal energy utilization.

He helped design the air conditioning system for Gainesville Airport and in 1980s, it became the largest building in the world to be air-conditioned by solar energy. No wonder the city of Gainesville was called, in those times, the solar capital of US.

His legacy continues through his innumerable students world over and his archives are housed in the Solar House situated in Energy Park on UF campus. This house which was the first solar house in US to be completely air-conditioned by solar energy was declared an [ASME landmark in 2003](#).

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