

PROFESSOR FAZIL ERDOGAN: A FOREMOST EXPERT IN FRACTURE MECHANICS AND MODEL MENTOR

Dr. Fazil Erdogan, G. Whitney Professor Emeritus of Mechanical Engineering at Lehigh University, died October 2, 2015 in Bethlehem, Pennsylvania. When I heard the news from one of his former students, I was in a state of sadness as if I had lost a close member of my family. He was my mentor during my doctoral studies at Lehigh University from 1974 to 1976. We continued to collaborate after my graduation as I worked as a post-doc at Lehigh during the summers of 1977 and 1978 and from 1979 to 1981. Even after I joined the faculty at Drexel University and later The City College of New York we published papers and wrote proposals together. As the years progressed my admiration and respect of Professor Erdogan grew even stronger.

Professor Erdogan was well known throughout the world because of his many accomplishments not only in Fracture Mechanics, but also in Applied Mathematics and in later years Inhomogeneous Materials, especially Functionally Graded Materials. Much already has been written about his scholarly accomplishments, which I also will describe briefly, but in addition I will concentrate on his mentoring and teaching activities since they have touched and influenced so many lives, including mine.

Dr. Erdogan was born in Kars, Turkey in 1925. After receiving the equivalent of a Master's degree from Istanbul Technical University, he pursued his doctoral studies at Lehigh University, in Bethlehem Pennsylvania receiving the PhD degree in 1955. Some of his classmates at Istanbul Technical University became famous politicians, even ascending to the posts of Prime Minister and President of Turkey. But Professor Erdogan aspired to be an academic and returning after his doctoral studies to Turkey he wanted to join the faculty of Lehigh University. In those days getting an immigrant visa to the US was very difficult. In later years he told me the story of his emigration to the US. While he was waiting to go to the US, one of the US senators from Pennsylvania had sponsored him in a bill passed by Congress. When he was called to the US Embassy in Ankara to obtain his visa, the consular officer asked him: "what is so special about you for Congress to issue a special visa?". When he returned to the US in 1957, the answer to the consular officer's question became clear as Professor Erdogan became one of the great contributors to the emerging field of Fracture Mechanics and put the name of Lehigh on the map with his colleagues George Irwin, Paul Paris, George Sih and Robert Wei.

Dr. Erdogan's scholarly achievements are many. He contributed greatly to the analysis of fracture problems by applying the singular integral equations technique to the solution of crack problems and to other mixed boundary value problems, such as contact problems. He formulated with Paul Paris the famous power law to predict the propagation of fatigue cracks. His work on the fracture of inhomogeneous materials starting with layered composites and later functionally graded materials opened fertile venues of research for others to follow through. The results of his research were published in over 200 scholarly articles. For all these accomplishments he was recognized by his peers and received numerous awards. He was the recipient of the German Alexander von Humboldt Foundation Senior Scientist Award twice and of the A.C. Eringen Medal of the Society of Engineering Science in 1993. He was a Fellow of the American Society of Mechanical Engineers (ASME) and in 1997 was elected as a member

to the Academy of Engineering, the highest honor an engineer can achieve in the USA. In 1998 he was honored at the International Symposium on Mechanics and Applied Mathematics held at Lehigh University. The symposium was attended by former students, colleagues and many scholars from around the world. This was a testament to his international recognition and the high regard and esteem he was held to by his peers and others.

Even though he was not much interested in administrative positions and preferred scholarly work, he served as Chair of the Mechanical Engineering and Mechanics Department at Lehigh at the insistence of his colleagues who made it known to the higher administration of Lehigh that Dr. Erdogan was their preferred candidate. He also served as Interim Dean for one year.

One side of Professor Erdogan that is less mentioned was his love for teaching and the excellent mentoring he provided to his graduate students. As a student who took several courses from him I can attest that he was an excellent teacher. He usually came to class without notes and derived complex formulas from scratch without ever consulting notes to the amazement of students. We later learned that he would spend a significant amount of time before class preparing for his lecture and he did it out of respect for his students. When it came to mentoring doctoral and master's students, he had an open door policy and one could walk into his office any time to discuss research results or seek advice. I remember that it was not unusual for me to go to his office several times a day to discuss my research.

Because of his accomplishments, Professor Erdogan was known all over the world and may I say that his reputation grew proportionately with the distance from Lehigh. One of my experiences at Lehigh will suffice to make this point. From July 1979 until August 1981, I worked as a post-doc at Lehigh under the tutelage of Professor Erdogan. I remember one day in the summer of 1980 I got a call from Professor Erdogan to immediately come to his office. When I entered the office he introduced me to two Asian men, an engineer and a vice president at a Japanese glass manufacturing company who had come all the way from Japan to seek his advice. They explained that they manufactured glass bottles for a beer company and some of the bottles cracked under internal pressure. They were asking advice whether we can provide them with a critical crack size that could be detected during their quality control process. Professor Erdogan asked me whether I can solve this problem. My response was that we could solve the problem as long as the crack was in the cylindrical part of the bottle and not in the neck area. After confirming that the crack was not in the neck area, Professor Erdogan agreed to take the job and we successfully solved the problem. The reason I told this anecdote is to show that Professor Erdogan was known all over the world and had developed such a reputation in Fracture Mechanics that they would come to him for advice from near and afar.

Professor Erdogan left us in October 2015. But he left a legacy that makes us all very proud. As his compatriot and student may I conclude with a Turkish saying: "Hocam, nur içinde yat!".

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