

Speech of Prof.

Ahmed Zewail

at the ceremony of awarding him the Prize

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Your Royal Highness, Prince Abd Allah Ibn Abd Al-Aziz,
The Crown Prince,
Your Highnesses, the Princes,
Your Eminencies and Excellencies,
Distinguished guests,
Ladies and gentlemen,

I am honored tonight to receive one of the world's most prestigious prizes in science, the King Faisal International Prize. I am honored for the recognition of the science, and for being the first Arab to win this prize. I have been fortunate to obtain other international recognitions and honors, but the King Faisal Prize is special.

The fact that Saudi Arabia has chosen to recognize international achievements that help mankind is something that history will vividly record and we all should be proud of. Nations are always judged historically by their civility and by their recognition of the importance of Science. Such recognition of Science is not new to this area, which provided the world with many advancements and became a center of civilization. In astronomy, in geography, in medicine, in mathematics, in physics, and in chemistry major advances have shined from here, from the days of ancient Egypt to the days of the Arab civilization.

My title at Caltech is professor of chemical physics. In both areas (chemistry and physics), original contributions have been associated with Arabia. The field of chemistry was named here through the work of Jabir Ibn Hayyan—alchemy! To the field of physics, Alhazen (Hassan Ibn Al--Haytham) contributed the early fundamentals of optics which made laser research, the subject of the prize, possible. Colin Ronan, a distinguished writer, speaking about the past, said: “Indeed, Arabia produced some original scientific minds; it nurtured them and encouraged them to make their own individual contributions. So when we think of the West’s indebtedness to Arabic culture, it is important to appreciate both aspects, the original work as well as the transmitted ideas of an earlier age”.

Our own little contribution in laser research at Caltech, cited in the Prize, was to unravel some of the mystery that is involved in the “art and magic” of alchemy on the molecular level, perhaps just what Ibn-Hayyan wanted to do, but there were no lasers at the time! Molecules are in our body, in our air, in our food, etc. --they are the foundation of all life, of all matter. How is it that molecule A can react and interact with molecule B to form a new molecule C. In other words, what are the fundamental laws that govern the process of “marriage” between molecules which lead to the birth of new molecules! This birth, unlike the birth of a real baby (usually taking hours to be born) occurs in a less than a millionth of a millionth of a second. To be able to see in real-time the birth of molecules, we used advanced laser techniques that allowed us to “photograph” their motion in a millionth of a billionth of a second -- a femtosecond! To appreciate this, in one second, light travels roughly the distance from earth to the moon. In a femtosecond it takes light to travel one-one-hundredth of the width of a human hair. Put in another way, one femtosecond to a second is what a second is to 32 million years - that is we can now film 32 millions of years but see every second of this movie! This work enables scientists for the first time to record the instant of a

molecule's creation and has been compared to astronomers observing the "big bang" of the micro universe.

The Prize for this work was given in my name, but truthfully there are many people who contributed to my life and to this achievement:

1. Above all, my parents. Their love for me and confidence in me since childhood has had a major influence on my life. I hope that tonight both of them are seeing the fruits of their love and hard work. To them and to my daughters, Maha and Amani, I dedicate the Prize.
2. Egypt has "planted" me and to Egypt I owe what I know and what I achieve.
3. The good fortune of being in a first-class university, Caltech; being in the right place at the right time and with the right people. Over the years I have had 78 students, postdoctoral research fellows, and visitors in my group. All of them have contributed to this research the excitement at the time of research is what it is all about! Nothing can replace one's sincere love of his work, and the possible contribution it may make to humanity. I am indebted to all my students and colleagues for helping to make this possible.

There is not enough time to cite the names of all persons in my life who helped me grow, learn, and achieve. They, however, should know that they will never be forgotten, and from my heart I wish them all the best. I particularly want to thank my friends and colleagues Professor Richard Bernstein and Rudy Marcus for the great collaboration we have had over the years, and my secretary, Ms. Christina Wood, for being beside me throughout the entire development.

I am grateful to all of you here tonight, and I repeat my sincere appreciation and best wishes to Saudi Arabia and to the King Faisal

Foundation.

Thank you Your Royal Highness, Distinguished members of the King Faisal Foundation, Ladies and Gentlemen.