

*Discurso de investidura como Doctor "Honoris Causa" del
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CONFLUENCE OF CULTURES

Buenos días. Good morning.

Honorable Rector, His Excellency the Ambassador of Egypt, Excellencies, Distinguished Guests, Ladies and Gentlemen.

First of all, let me express my sincere gratitude to the Universidad Complutense de Madrid for conferring on me your highest honor, the Doctor Honoris Causa. From academic and historic perspectives, this event is indeed special. The honor comes from the top public university of Spain, and one of the oldest universities in the world on a par with Al-Azhar, Cambridge, Oxford, and Bologna—not Alexandria however! Personally, over the past two decades I have had a real bonding with Spain in general and this university in particular beginning in 1989 when Professor Angel González Ureña first invited me to a conference in El Escorial. The conference was the medium for meeting then graduate student Luis Bañares who joined my group at Caltech in 1990. But there is more. The university with its roots dating back to 1293 in Alcalá—an Arabic word—epitomizes a confluence of cultures, in this case between the rich Spanish culture and the culture I come from.

The success of this confluence in the past and its continuity at present is evident beyond the boundaries of the university. The Arabs and Muslims are proud of their history in Andalucía, and equally impressive today is Spain's pride in a civilization that you amalgamated brilliantly as a national heritage. You only have to travel to nearby Toledo—the city of three cultures—to see historic evidence of the harmonious coexistence of Jewish, Christian, and Muslim culture and scholarship, even in holy places. Unfortunately in today's world, politics and religion are being used to magnify differences, and hence conflicts, between cultures.

Fortunately, bonding in the invisible world of matter, which is fundamental to life and to our existence, is more manageable. This is because the understanding required is the rational approach of science and not the more mutable approach of politics. It is this understanding of matter's secrets of behavior that we have spent decades exploring and researching. Professor Luis Bañares of this university played a direct role in this exploration. As you heard from him today, the Nobel Prize of 1999 was awarded for making possible the observation of atoms in motion during the course of matter's transformation,

opening up new fields of femtosience. The time scale is perhaps unimaginable as one second has in it a million, billion femtoseconds!

In the years following the Nobel honor, we at Caltech have developed an entirely new field for visualization, exploring new frontiers especially at the interface of physics and biology which is termed Physical Biology. The ability to visualize materials and biological complexity in the four dimensions (4D) of space and time provides a microscopic view of natural phenomena as they occur (function) and promises a myriad of applications in physical and life sciences. Already the development of 4D microscopy and imaging have been reported, including applications in the studies of phase transitions, chemical reactions, and biological assemblies. But there are other dimensions in my own life.

As you heard from Professor Bañares, I have genuine interest in helping the developing world and the countries I belong to. I strongly believe in the fundamental role of education and liberty in world peace. Spain should be proud of the recent progress in education and innovation, and achievements in liberty and democracy. His Majesty King Juan Carlos I made possible a historic and successful transition from (Francisco Franco's) dictatorship to parliamentary democracy in less than two years after his coronation in November of 1975. One would have hoped that the authoritarian leaders of our world would have learned from his sage decision, but regrettably only a few followed the course.

In 1997, I had the honor of meeting His Majesty and share in an Honorary Degree event at Leuven University which recognized his achievement in democratic governance and mine in science. It was at this occasion that I also met Javier Solana, another notable graduate of this university.

His Majesty showed that It Is Possible! It is possible to transform society and enter with confidence the gates of the 21st century. The vision of It Is Possible to achieve as a nation resonates well with my own belief that it is possible to achieve as an individual. When I first arrived in the United States of America, seeking advanced education in the land of opportunity, I encountered real challenges. But I believed then, and still believe today, that armed with good education, dedication to work, and valued optimism it is possible to achieve, and to do so with pride in one's heritage and confidence in one's own ability.

As you just heard from our orator, in 1969 I left Egypt after graduating from the University of Alexandria. For centuries, beginning in 300 BC, Alexandria was a center of civilization. It had the world's most distinguished library and university. What I experienced in my childhood, however, was modern Egypt, a developing nation with people believing in the messages of faith and reason, in revealed and acquired knowledge.

At the university I had enlightened teachers and I experienced a peaceful family home. Muslims and Christian Copts were nationally bonded as

Egyptians' tolerance was a basic feature of the society. These were the pillars upon which I built my own foundation and that aided me when I crossed the ocean and the chasm of political, scientific, and cultural barriers.

Politically, the climate was gloomy. It was right after the 1967 war when I began living in the United States, and Egypt was defeated as were other Arab countries. The image of an Arab in the United States was not at all favorable. Although disturbed by such an image, I decided to be forward-looking in order to achieve my goals and learn as much as I could in the country which led the world in science and technology. I also was intrigued by the American value system and wanted to learn about the rich and new (to me) culture.

Scientifically, I needed a new orientation. Egypt provided me with a very good basic education and with family values which are necessary for living in a complex world, but I did not have access to the advanced science and technology of the West. I had never seen a laser or studied quantum mechanics, and I certainly did not aspire to or think of the Nobel Prize! We did not know of the Nobel Prizes and their significance as, at the time, no Arab had ever won one.

Culturally, the East meeting the West was a new experience, even socially. I will give you an example. In Egypt when we joke with a really good friend we often say, "I'll kill you!" And so one day, to one of my good American friends to whom I felt close, I said, "I'll kill you!" He looked at me with fear perhaps thinking that this fellow who came from the Middle East might just do it! So I stopped saying, "I'll kill you!" from then on.

With these obstacles and challenges, I had to make a choice either to feel disenfranchised and to think the world was against me, spending my time developing the reasons and theorizing about the conspiracies behind them, or to be forward-looking. In so doing I could appreciate what the new culture had to offer and do my best to achieve, hopefully at the highest level possible. I chose the latter. But, I maintained the bond to my original culture without being fearful of a clash or being insecure of my origins.

Sam Huntington of Harvard has claimed that conflict of civilizations between the West and East, in particular with the Muslim world, is inevitable. I do not see its basis even in my own case as my identity has been shaped by different cultures and ethnic and religious values. Should I experience conflicts of civilizations within myself? What about the melting pot of America? The real issues are economic, political, and educational in nature. It is not having and not knowing that are the two bases for clashes and wars. Barriers and chasms are crossed when people have the liberty to improve their economic situations and become educated about other cultures. When people of the globe, especially the 80% of the developing world, can live with dignity and be treated fairly, mutual benefits will bring them together without conflict of civilizations.

Ladies and Gentlemen, by receiving this special honor today and the induction to the Royal Academy tomorrow, we have fostered the strength of bonding to Spain in general and to the scientific and intellectual community in particular. And this bonding would not be possible without realizing the importance of confluence of cultures.

I wish to take this opportunity to thank all who have made it possible, especially the proposing department, the faculty (Cloister), the administration, the Honorable Rector and Vice Rector, and the Governing Board. As an institution you have given the world personalities with Nobel prizes in literature (Vicente Aleixandre, Camilo José Cela), Nobel prizes in medicine (Santiago Ramón y Cajal, Severo Ochoa), Oscar-winning filmmakers (Alejandro Amenábar), and political historic figures, most notably Javier Solana, the EU foreign policy chief, and of course HM the King. For the future, the real challenge is to continue to foster the excellence achieved thus far and to build the new knowledge society of the 21st century. I wish you continued success for a greater and brighter future.

Gracias. Thank you.