

**Elaine Fuchs**

*456th Convocation Address: "Shapes of an Education at the University of Chicago,"*

January 6, 2000

**"Shapes of an Education at the University of Chicago"  
by Elaine Fuchs**

It is a particular honor for me to give this convocation address, because you will be receiving your degrees from the university at which I have been teaching for nearly twenty years and which is the university where my father, my aunt, my sister, and my husband all received their undergraduate degrees. Moreover, with the University of Chicago's tradition and reputation for teaching individuality, independent thinking, and questioning, and with the wisdom and foresight that you and your families have exerted in your decision to attend this university, this honor takes on all the more significance. Finally, it is a special treat for me, personally, to be able to give this particular convocation address, given the tremendous accomplishments of University of Chicago women this year, ranging from one of my faculty colleagues receiving the National Medal of Science to our undergraduate women receiving Rhodes, Marshall, and Truman scholarships.

The University of Chicago was founded over a hundred years ago. You are here today to join the ever-growing community of men and women who now can name these quadrangles their alma mater. You are among the privileged who will come before your family, friends, and loved ones to receive your diploma. But what does this diploma mean? What does it mean to have received a University of Chicago education, an education from one of the truly distinctive institutions that this nation has? Is it that you have successfully learned your thousand facts, read your hundred or more books, passed your hundred examinations? What does it mean to have achieved an education here? What I am going to say in response to these questions is not new any more than my questions are new. The things I want to say here are common knowledge in this gathering, and yet it's important, it seems to me, that these things be said today.

Your education has given you perspective, it has taught you how to think, not what to think. It has taught you how to think for yourself, to develop your own ideas, to be creative and imaginative in your thinking. You are leaving behind the world that was created for you, the confines of a life which, however admirable, was not a life created in your own image but one in which you existed. Your education has now given you the newfound ability to sculpt your own life. The foundation of this acquisition comes from many hours of classes, lectures, reading, conducting laboratory experiments, writing papers, listening to or playing music,

and lots of talking and listening, from which you have begun to orchestrate a symphony not heard before by your parents, friends, teachers, or professors. In your courses at the University of Chicago, your professors have introduced you to some great literature, philosophy, art, history, music, science, and mathematics. They have given you a taste of the nectar of scholarship and genius. They have unveiled the brilliance of René Descartes, Plato, Simone de Beauvoir, Gustav Mahler, Sandro Botticelli, Jan Brueghel, Emily Dickinson, Charles Darwin, Marie Curie, James Watson, and Francis Crick.

The common core you undertook in your initial years here has enabled you to appreciate that there are many avenues to the heavens of logic, scholarship, achievement, and discovery. But the great pioneers of their fields serve only as examples, if not exemplary ones, of what is possible in life and what is the epitome of the meaning of a career. From these examples, each of you has begun to develop your own interests and directions, your own image of your destiny. Perhaps the initial spark came from a special professor who conveyed to you his or her knowledge with unusual clarity and with a passion both for teaching and for the subject taught. For some of you, the common core may have sparked a new interest and changed your notions of what it means to learn and to commit yourself to a particular line of inquiry. For others, the core may have strengthened your convictions about a field in which you already had an interest. For all of you, your undergraduate studies here have broadened your horizons and enhanced your vision, whether this is something that you already appreciate or whether it is something that you will come to appreciate in future years.

For you have been embracing here the extraordinary opportunity to learn that learning has no boundaries and that it is always there for the taking. Now that you have been taught how to think for yourselves and have learned methods of inquiry, the world becomes more wondrous and new questions begin to turn to passions. Reflecting the vision of figures such as John Dewey and Robert Hutchins, the University of Chicago at its best emphasizes that what matters more than answers are questions and how they are formulated. If formulated well, the questions lead to answers. They make the hazy clear, the opaque translucent, the strange familiar (and often, of course, vice versa).

My own profession is not only teaching; I am also a biologist. For me, the world of questions and the chase after answers that are always put off until the next day is my passion. I study the human skin. I explore how it functions at a molecular level to keep microbes out, to keep our body fluids in so we don't dehydrate, and to protect us from the mechanical and physical stresses of our environment. Through elucidating the normal functions of the skin, my laboratory has been guided to the genetic bases of different types of

inherited and acquired disorders of the skin, ranging from severe blistering disorders to skin cancers. The research approach that my laboratory uses in understanding the genetic bases of human diseases is quite unconventional, something that the environment at the University of Chicago inspires. At this institution, it is not uncommon to march to different drummers, leading sometimes to discordance but also, happily, to melodious harmonies. For we are taught here to water and tend the seeds of imagination that rest within each of us. Indeed, some of the most exciting results that have come from my laboratory have stemmed from experiments devised by my students as a consequence of their questioning preexisting notions and received dogma. Such signs tell me as a professor that my students are moving beyond the boundaries of what I can teach them myself.

In my lifetime, I have had the wonderful opportunity not only to be a professor at this great university, but also to be a part of a veritable revolution in biology. This revolution has been replete with explosions, fireworks, and, at times, a pandemonium of discoveries. In his autobiography, *The Statue Within*, Nobel laureate Francois Jacob writes about a 1953 conference he attended at Cold Spring Harbor, where he had just heard another soon-to-be Nobel laureate, Jim Watson, present the structure of the double helix of DNA. Jacob remarks, "The principles, the two chains, the alignment of the bases, the complementarity of the two sequences, all this had the force of the necessary. All this could not be false. . . . One could not but admire a structure that responded so well to the requirement of genetics. One of the oldest problems posed since antiquity by the living world, heredity, had just been resolved in the properties of a molecular species. . . . By all indications, it was a turning point in the study of living things. It heralded an exciting period in biology."

Not quite fifty years later, Jacob's word "exciting" seems like an understatement to describe the period in biology that we entered. The structure of the double helix has led to an enduring revolution in our understanding of how cells function, in the bases of human diseases, and in improving human health through prevention and improved methods for disease diagnosis and treatment. It has led to dramatic advancements in agriculture and offers new potential for saving endangered species and for protecting our ecosystem.

With these advancements in biology and genetics come new and justifiable fears and concerns about the potential misuse of what is being learned. Again, one of the distinctive features of a University of Chicago education is that you do not adopt a blind or Whiggish view of scientific or any other kind of development. Rather, you are taught to question, to evaluate a situation against a larger horizon of human significance

and meaning. Your education here has taught you that scientific and many other kinds of results must always be subjected to philosophical and moral scrutiny.

The environment at this university has had a profound impact on my own development as a scientist. When I first began here, I immersed myself in the sheer joy of benchwork, often arriving at nine in the morning and working on experiments in the laboratory until midnight. Each new day, I couldn't wait to obtain the results of my experiment conducted the day before. With each new result, I could further chisel the model until it began to take the shape of a solid hypothesis. Struck by my own excitement and euphoria, my students did much the same. While my enthusiasm for science has not changed over the years, my conception of what it is to be a scientist has undergone a transformation. I now balance the joy of discovery with the necessity of taking seriously ethical and educational concerns at the nexus of science and society today. Indeed, for the world of science to be a successful one, it must be a science of the world. It must be a science that embodies concern for the world of the next millennium. Your education has taught you to be morally and ethically responsible, and to bring philosophical reflection into your chosen profession, your community, and your life as a whole.

Let me say a final word, in closing, on the impact that the University of Chicago and that you as University of Chicago students have had on my own life as a professor. When I arrived here in 1980, I possessed a different image of how a professor conducts him- or herself that was based upon what I was taught at the universities I had attended. The courses I now teach here and the laboratory group meetings I hold regularly have evolved over the years to be dominated by inquiry and discussion rather than by lectures and recitation of fact and technique. For me, the University of Chicago has come to stand not for talking at students, but rather for traveling with students down the unknown paths to which questions point. Working with University of Chicago students has taught me a better way of teaching and in so doing has given me a passion for teaching to accompany my passion for science. Thus, although I am not receiving a diploma today, I feel as though I too have received an education at the University of Chicago, thanks to students like you, who are graduating today. I extend to you, and to your proud families and loved ones, my most heartfelt congratulations.

*Elaine Fuchs is the Amgen Professor in the [Departments of Molecular Genetics & Cell Biology](#) and [Biochemistry & Molecular Biology](#), the [Committees on Genetics, Developmental Biology, and Cancer Biology](#), the [Cancer Research Center](#), and the [Howard Hughes Medical Institute](#).*