

**Introduction to Public Lecture by Dr. Nina Fedoroff**  
**Delivered at Oregon State University on November 15, 2005**  
**“Genetically modified foods: Myths and Realities”**  
**Introduction by Professor S.H. Strauss, Oregon State University**

Good evening. Please turn the ringers on your cell phones and other electronic devices off.

My name is Steve Strauss, I am a Professor in the Department of Forest Science and the Genetics Program at OSU, and Director of the OSU Program in Biotechnology Outreach. Along with Kirsten Carroll, Executive Director of our Outreach Program, it is our pleasure to introduce the second in a series of lectures called “Food for Thought.” The series explores the scientific and social responses to the new agricultural technologies variously called genetic engineering or genetic modification, frequently abbreviated as GE, GM, or GMO. The goal of this series is to help educate and promote dialogue about what the science and technology is about; what it has done, or could do, for agricultural sustainability and human health; and how societies are responding to them and why. In short, to explore their benefits and risks, including the risks of choosing to live without them. The lecture series is supported by the Wait and Lois Rising Lectureship Fund, the Center for Genome Research and Biocomputing, the Linus Pauling Institute, and the Colleges of Agricultural Sciences and Forestry.

Today’s public lecture will be followed by a reception with refreshments for those interested in meeting Dr. Fedoroff. Tomorrow she will deliver a lecture intended for a biological science audience entitled *Signaling and gene expression in the Arabidopsis oxidative stress response*. It will be held on the OSU campus in the Agriculture and Life Sciences building, or ALS, room 4001, from 3:00 to 4:00 pm.

The next public lecture in the series will be given here at 7 PM on November 29<sup>th</sup>. It will be given by Dr. LaReesa Wolfenbarger, who is an Associate Professor in the Department of Biology at the University of Nebraska. She conducts research on the effects of GM crops on grassland ecosystems, and has served on biotechnology committees convened by the Ecological Society of America, the US Environmental Protection Agency, and the US Department of Agriculture. She will speak on *Environmental impacts and social responses to genetically engineered crops*.

**PAUSE** / A critical consideration in deciding if and when to employ any new technology is that of context. The American Heritage® Dictionary of the English Language, Fourth Edition, published in 2000, defines context as: *1. The part of a text or statement that surrounds a particular word or passage and determines its meaning. 2. The circumstances in which an event occurs; a setting.* Both of these definitions are important to biotechnology. The language used to describe biotechnology has been highly influential to how it has been perceived: Frankenfoods anybody? The framework with which it has been presented also has had a very large influence on how it has been perceived. Should GE be viewed as the next step in a long evolution of genetic technologies used to modify organisms for human benefit? Because it modifies organisms at the level of single genes, is it not more precise, better studied, and thus safer than the methods that preceded it? Is it ever more important, both for humans and the environment, as the need to produce more food and fiber for a growing population, and from a shrinking land base, grows? Or, should GE be viewed as a radical departure from previous forms of breeding? Does its biological novelty in method, where genes can be designed by humans and moved between species, pose new dangers to people and ecosystems? Is its social novelty in the form of new kinds of intellectual property and regulations, causing disruption of important social institutions? Should it be viewed as a short-term “techno-fix” that postpones rather than solves problems, and is thus inimical to long-term sustainability?

These are not simple questions and there are no simple, ethically responsible answers. But there are plenty of “experts” around who will put one powerful spin or another on their view and claim it to be the truth revealed. The majority of the public, both in the USA and abroad, do not understand even the basics of genetics, let alone advanced biotechnologies. More than half think that only tomatoes produced via biotechnology have genes, and despite the significant press coverage give to biotechnology in recent years their level of knowledge has not changed significantly for more than a decade. It is therefore easy to influence them in one direction or the other, depending on how information is presented—that is, based on the *context* presented to them.

In her book “Mendel in the Kitchen” Dr. Nina Fedoroff in essence presents the *scientific context* surrounding GE. She can do this with remarkable accuracy, depth, and wit because she is an outstanding scientist, public servant, and humanitarian.

Dr. Fedoroff knows plant genes and genetics as well as anyone on this planet. She has published 128 peer review publications, many in the leading scientific journals. She has been a Member of the United States National Academy of Sciences, our most prestigious organization of top scientists from all fields, since 1990. She is currently a member of the National Science Board, appointed by President Clinton and approved by the Senate. It oversees the activities and policies of the National Science Foundation—the multi-billion dollar engine of basic science and engineering research for the USA. She has edited and served on boards of a number of major journals, grant programs, and scientific organizations, including AAAS, the leading science organization in the USA and the publisher of *Science* magazine. She has earned numerous awards, which I will not take the time to name but are readily available to all of you via Google, which will promptly get you to her web site as well as to the many organizations that have recognized her. If you surf around you will also find that she is one of the world’s foremost experts on transposable elements or *jumping genes* (you heard it right, I said *genes* not *beans*). They are the mobile forms of genes comprise the majority of the DNA in both corn and people. You will also find that she led in the writing of another book, this one about an outstanding women scientist who she admires that also studied jumping genes, Nobel Laureate Barbara McClintock.

Dr. Fedoroff knows the issues surrounding biotechnology well. The early years of her professional career spanned the period when GE methods for plants were first developed, and she was among the scientists leading the charge to evaluate and regulate them wisely. She served on the National Institutes of Health Advisory Committee on Recombinant DNA Research that produced the first scientist-led regulations, still in force today, for safe use of GE organisms of all forms. In the early 80’s she served on the first of several committees convened by the National Academy of Sciences, as well with the congressional Office of Technology Assessment, to evaluate the science and regulation of GE organisms. In more recent times, she has served on the Food and Drug Administration’s advisory committee on Genetically Modified Foods.

Among basic plant scientists, Dr. Fedoroff is unusual in her commitment to bringing the scientific advances of plant biotechnology forward to benefit humanity. Along with Joel Cohen of the International Food Policy Research Institute, she convened a National Academy Symposium in 1998 entitled “*Plants and population: Is there time?*” that looked at the urgent technical, population, and environmental issues surrounding crops and biotechnology in depth. She helped to organize an international symposium in 1999 titled “*Ensuring food security, protecting the environment, and reducing poverty in developing countries: Can biotechnology help?*” She has written many non-technical articles, and given numerous lectures and interviews, on the science issues surrounding biotechnology. Her article titles include “*Ethics for a small planet,*” “*Food for a hungry world,*” and “*Biotechnology and Agriculture: Promise and peril.*” And of course, her recent book *Mendel in the Kitchen*, shows her commitment to communicating science to the public so that advances in biotechnology are better understood, and thus used wisely.

Dr. Fedoroff earned her Bachelor’s degree from Syracuse University *summa cum laude* in 1966, and her PhD from Rockefeller University in New York City in 1972. She was on the faculty of UCLA for two years, then with the Carnegie Institute of Washington through 1978. She moved from Assistant through to Full Professor while at Johns Hopkins University from 1978 through 1995. Since then, she has been at Penn State University where she has directed their interdepartmental Life Science and Biotechnology Institutes, and has been named an Evan Pugh Professor, the highest distinction that Penn State bestows on a faculty member.

*We are honored that Dr. Fedoroff has traveled from the east coast to deliver this lecture. Please help me in welcoming her.*

**Introduction to science lecture by Dr. Nina Fedoroff at Oregon State University, November 16, 2005**  
***Signaling and gene expression in the Arabidopsis oxidative stress response.***  
**Introduction by Professor S.H. Strauss, Oregon State University**

Dr. Fedoroff is among the best known plant geneticists in the world. She has published 128 peer review publications, many in the leading scientific journals. She has been a Member of the United States National Academy of Sciences, our most prestigious organization of top scientists from all fields, since 1990. She is currently a member of the National Science Board, appointed by President Clinton and approved by the Senate. It oversees the activities and policies of the National Science Foundation—the multi-billion dollar engine of basic science and engineering research for the USA. She has edited and served on boards of a number of major journals, grant programs, and scientific organizations, including AAAS, the leading science organization in the USA and the publisher of *Science* magazine. She has earned numerous awards, which I will not take the time to name but are readily available to all of you via Google, which will promptly get you to her web site as well as to the many organizations that have recognized her.

Dr. Fedoroff is one of the world's foremost experts on transposable elements. From 1980 to 2000 she published nearly 100 articles in peer review journals on the factors influencing transposition in plants, with a focus in maize. She also published numerous critical reviews, with titles that include “transposable elements as an evolutionary force,” “transposons and genome evolution in plants,” “the discovery of transposable elements,” and “maize transposable elements and development.” She also led in the writing of a book about an outstanding women scientist whom she admired that is credited with the discovery of transposable elements, Nobel Laureate Barbara McClintock.

In recent years Dr. Fedoroff has become involved in a number of collaborative projects on quantitative analysis of microarray data, and even has several publications in bioinformatics journals. She is seeking to produce quantitative methods to help biologists to use arrays effectively in evaluating scientific hypotheses. She has also begun a number of studies on signaling pathways that plants employ when responding to stress, focusing on ozone as a stressor because it is of substantial environmental concern, and because of the direct production of reactive oxygen species it causes. This area is the topic of today's lecture. *Signaling and gene expression in the Arabidopsis oxidative stress response*. Please help me in welcoming Dr. Fedoroff.