

**James R. Killian, Jr. Faculty Achievement Award 2011-12**  
**Citation for *Joanne Stubbe***

*The James R. Killian, Jr. Faculty Achievement Award was established in 1971 "to recognize extraordinary professional accomplishments by full-time members of the MIT faculty." It is the greatest honor the faculty can bestow upon one of its members. The recipient is chosen by a faculty committee from candidates nominated by their peers for outstanding contributions to their fields, to MIT and to society.*

The Killian Award Committee is pleased to announce that the recipient of this year's award is Dr. JoAnne Stubbe, Novartis Professor of Chemistry and Professor of Biology. Professor Stubbe is a superb scientist, internationally known for her research on the mechanisms and regulation of the enzymes ribonucleotide reductase, polyester synthase, and natural product DNA cleavers, for which she has garnered a number of important awards and prizes in her long career as a biochemist working in this area of chemistry. In the last few years, she has received the National Academy Prize in Chemistry, the National Medal of Science, the Franklin Institute Award in Chemistry, and the Welch Award in Chemistry.

Although trained in physical organic chemistry, Professor Stubbe has spent the last thirty years redefining the field of enzymology. Her creativity and rigor in tackling significant problems at the interface of chemistry and biology have become the standard by which others in the field are measured.

Professor Stubbe is perhaps the top mechanistic biochemist of her generation. More than any other scientist in the world today, she has pioneered our understanding of the role of radicals in biology. Using a number of novel biochemical and spectroscopic methods, she uncovered the basic principles by which radicals are generated, transported to active sites, and implemented to drive enzymatic function.

Among Professor Stubbe's most notable contributions is her important work with ribonucleotide reductase (RNR), a compelling demonstration of the power of chemical investigations to solve problems in biology. She explains with remarkable ingenuity and thoroughness the enzyme's impact on DNA repair processes, which are central to cancer research, as well as for producing environmentally friendly biodegradable polymers.

Some scientists have a tool and use it on many problems; other scientists have a problem and use many tools to unravel its secrets. Professor Stubbe is the latter. She has used biochemical reactions, nuclear magnetic resonance, laser spectroscopy, and other tools to elucidate the mechanism of RNR catalysis. When she began her work, it was believed that a radical mechanism was impossible because of the radical's chemical reactivity. Now, due to Professor Stubbe's work uncovering the intricate processes by which cells safely use free radicals, this is textbook material.

In addition to research, Professor Stubbe is an amazing teacher, responsible for much of the biological chemistry curriculum in the chemistry department. As a brief example of Professor Stubbe's dedication to teaching, when her cardiologist told her that she needed to have a surgical procedure done as soon as possible, she scheduled it for a Wednesday afternoon so that she could still teach on Wednesday morning, and then have a whole day to recover before teaching again on Friday. One of her nominators described her lectures as "inspirational." Her impact on MIT's graduate and undergraduate students and post-docs is profound. She raises the bar, and then gives students the tools to jump over.

Professor Stubbe is the quintessential MIT faculty member: in all aspects of her research and teaching, her approach is packed with energy, meticulous in the attention to detail, and displays uncompromising standards. Her *tour-de-force* discoveries are the result of elegant experimental design, deep chemical and biological insight, and a remarkable degree of focus, fueled by her scientific curiosity and desire to decipher nature's secrets.

It is with great pleasure that we recognize Professor JoAnne Stubbe with this award for her outstanding accomplishments as a scholar, teacher, mentor, communicator and leader.