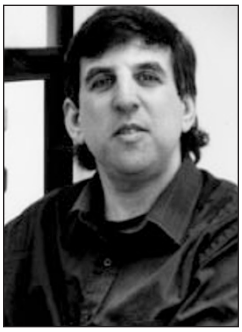
Prof. Michael R. Sussman, Ph.D.

Director
Biotechnology Center
University of Wisconsin
425 Henry Hall
Madison, WI 53706
United States



Michael R. Sussman, Ph.D., is a Professor and molecular biologist at the University of Wisconsin-Madison, with an academic appointment in the Department of Genetics and the Department of Horticulture within the College of Agricultural and Life Sciences. Since 1997, Prof. Sussman has served as Director of the UW Biotechnology Center. Professor Sussman first arrived in Madison in 1983, after a three-year postdoctoral stint with Professor Carolyn Slayman in the Department of Human Genetics at the Yale School of Medicine. For the past two decades, Prof. Sussman's research interests have focused on using the model higher plant, *Arabidopsis thaliana*, for understanding the role of plasma membrane proteins in signal transduction and solute transport. His laboratory was the first to report on unique calcium sensitive protein kinases found only in plants and protists. In *Arabidopsis,* there is a surprisingly large gene family, with perhaps as many as three dozen individual isoforms encoding this class of enzymes. To help understand the *in situ* role played by this protein kinase, as well as that for several other families of important plasma membrane proteins, in the past three years his laboratory has pioneered the development of genome-wide reverse genetics techniques. Specifically, they have utilized an insertional mutagenesis scheme to isolate "knockout" plants, starting with the sequence for any one of the 25,000 genes in *Arabidopsis.* For example, recent results from his lab demonstrate that the plant homologue for a brain potassium channel is performing a nutritional role in plants, i.e., the uptake of potassium from soil. In addition to basic knowledge in functional genomics with *Arabidopsis,* his research has provided some interesting applied agricultural "spin-offs", including the discovery of a transgene that creates an acid-resistant phenotype. Prof. Sussman is a co-developer of a new technique known as MAS (Maskless Array Synthesizer) for making "gene chips" that can analyze tens or even hundreds of thousands of genes at once. It promises to take the technology and put it in the laboratory of virtually any research biologist, since it eliminates the requirement for expensive masks used in traditional DNA chip technology. Prof. Sussman's research awards have included a Fulbright research fellowship (which supported a 1989 sabbatical in the laboratory of Prof. Andre Goffeau at the Catholic University of Louvain in Louvain-la-neuve, Belgium), a McKnight Foundation award and recently, a UW-Madison WARF Mid-Career Award. In 1996 Prof. Sussman was appointed Interim Director of the UW Biotechnology Center and in 1997, he was appointed as Director.

New Technologies for Mining the *Arabidopsis* Genome

More than three-fourths of the 120-megabase *Arabidopsis* genome sequence has been determined, and the remainder will be released in the public sector within the next 1-2 years. This presentation will focus on two new technologies developed at the University of Wisconsin to facilitate a more rapid and complete understanding of the *in situ* function for the 25,000 proteins that are predicted to be encoded by the genome. The first technology is a large collection of T-DNA insertionally mutagenized mutant plants, and a means of scanning them in order to isolate several knockout alleles for each gene. By analyzing the phenotype caused by the absence of only one of the 25,000 genes, this reverse genetic approach provides a definitive means of determining the in situ function of all plant genes represented in the *Arabidopsis* genome. The second technology is a "maskless" microarray synthesizer, which allows one to perform combinatorial chemistry on a glass surface using light-sensitive reactants.