
Spring 2010 Seminar

MECHANICS RESEARCH COMMUNICATIONS

Elsevier Distinguished Lecture

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College Park, MD 20742

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11:30 a.m. – 1:00 p.m.

Guttenberg Information Technologies Center (GITC) – Room 3730

Simulating Fire Effects on Complex Building Structures

The purpose of this lecture is to assess the current state of our ability to simulate the consequences of a fire in a large building, and suggest some areas where improvement is needed. Attention is focused on the coupling of fire dynamics simulations and heat transfer analyses to each other and to structural analyses of the damaged building. The role that uncertainty plays in “input parameters” resulting from coupling a sequence of complex simulations is considered. The methodology used in the NIST investigation into the collapse of the World Trade Center Towers will be described from this perspective. The intent is *not* to summarize the results of the investigation, but rather to provide a specific context that illustrates the strengths and weaknesses of the methodologies employed. Research needs are emphasized by examination of some basic problems in fire-structure interactions.

Howard Baum grew up in The Bronx in New York City. He attended what is now the Polytechnic Institute of New York University, receiving an undergraduate degree in Aeronautical Engineering in 1957 and an M.S. in applied Mechanics in 1959. He obtained a Ph.D. in Applied Mathematics in 1964 from the Division of Engineering and Applied Physics at Harvard University. He held post-doctoral and junior faculty positions at Harvard (1964-1971) and worked at Aerodyne Research, Inc. in Billerica, MA, before joining the National Institute of Standards and Technology (NIST) in 1975.

His career at NIST was focused on mathematical modeling of phenomena arising in fire safety research and related combustion problems. These studies included the derivation and implementation of the basis for the widely used NIST Fire Dynamics Simulator, the development of the technical basis for the ventilation requirements for carrying flammable materials on container ships, and participation in the analysis of the collapse of the Twin Towers following the attack on the World Trade Center. He retired from NIST in 2006, having held the position of NIST Fellow since 1983. He is currently an Emeritus Scientist at NIST and Glenn L. Martin Professor in the Department of Fire Protection Engineering at the University of Maryland. Dr. Baum has received several honors and awards for his work in fire research, including two Gold Medals from the U.S. Department of Commerce and election to the National Academy of Engineering.

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