MIT System Design & Management Program

Systems Thinking Comes of Age

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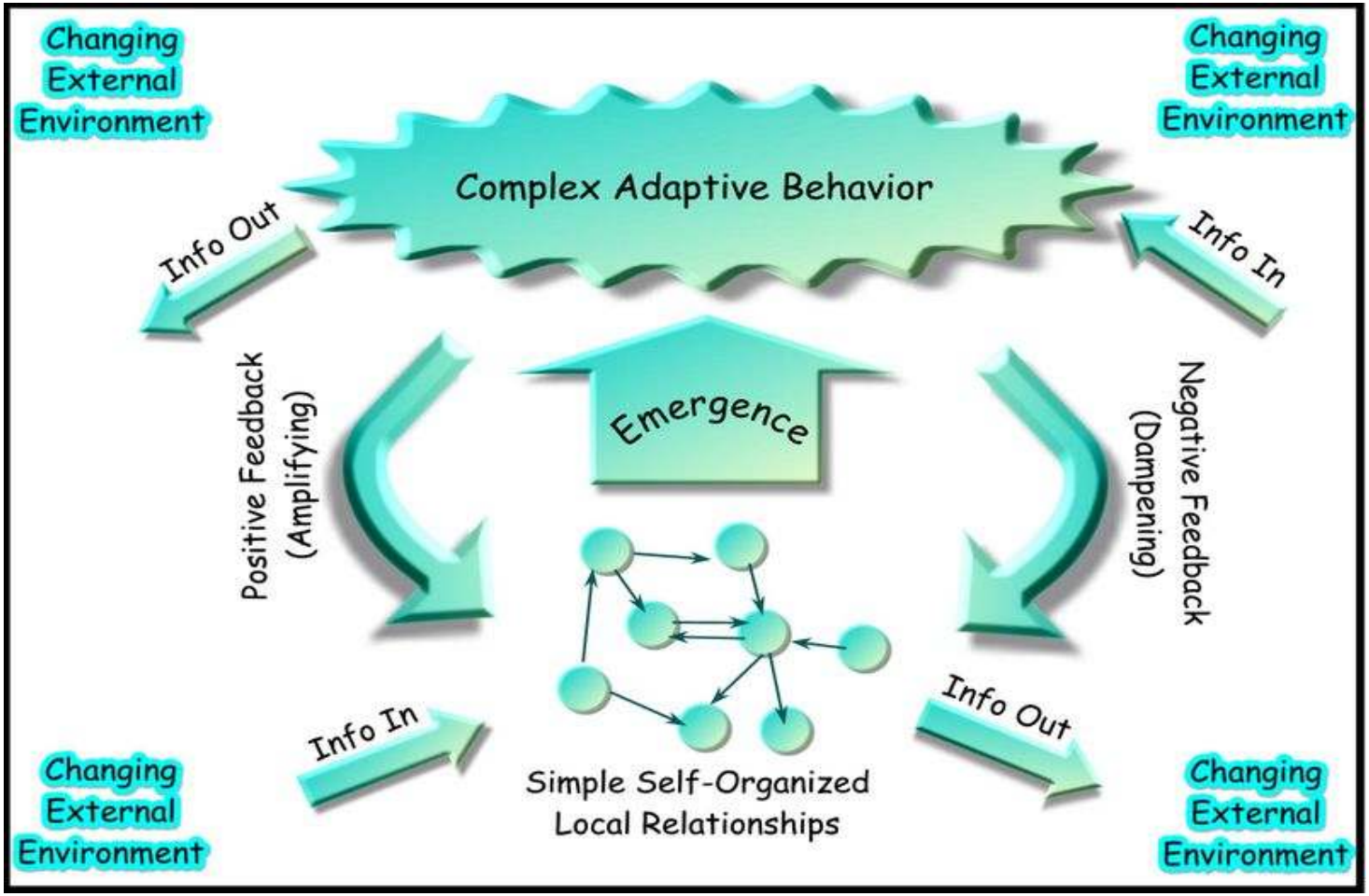
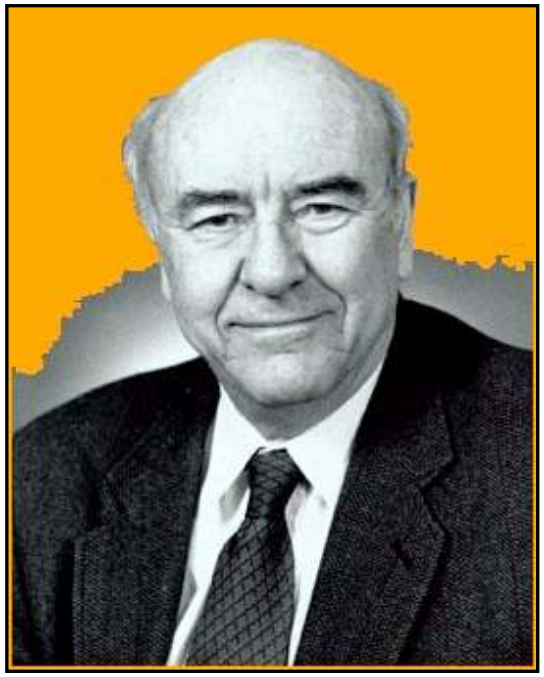
What Is Systems Thinking?

- Traditional analysis is centered in decomposition and study of the components of a system
- Systems Thinking is centered in context, interfaces and emergent behaviors—the *interstitial* elements around and within the system; the 'whole' rather than the decomposed elements
  - Systems Thinking recognizes that systems often exhibit behaviors not related to their individual elements in any linear, reductionist combination
  - Modeling relationships and behaviors is a key to understanding a complex-adaptive system

Complex-Adaptive Systems



John Warfield (George Mason U.)

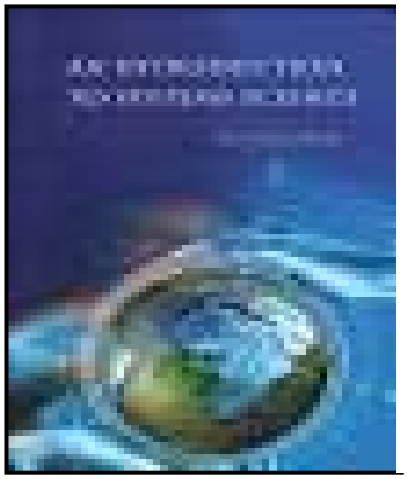


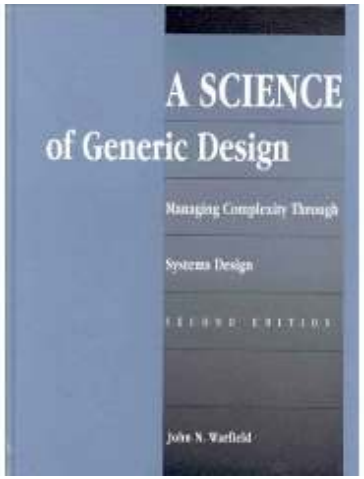
"Father of Systems Science"

- Extensive background in electrical and control systems engineering; 40 years faculty at multiple institutions

"… my motivation was to develop a systems science: a science that extended all the way from its foundations to a sufficient number of applications to provide empirical evidence that the science was properly constructed and was very functional; a science that could withstand the most aggressive challenge"

Discovering Systems Science, Int'l Journal of General Systems. 2003





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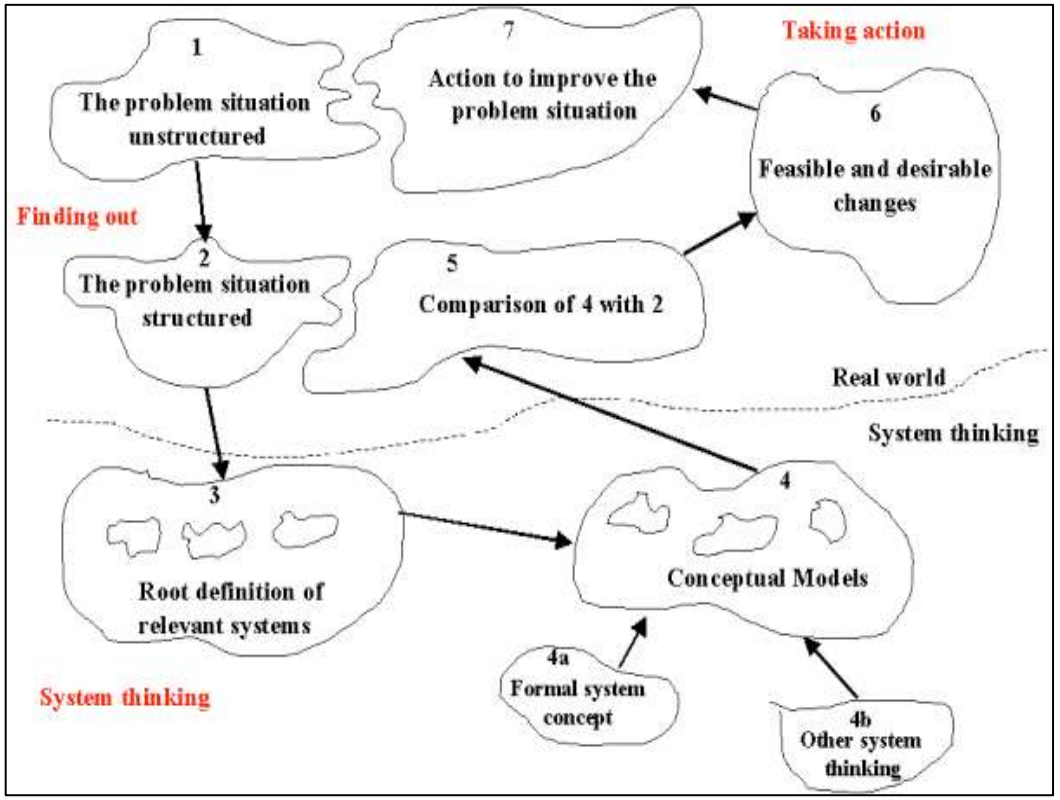
Peter Checkland (Lancaster Univ.)

Cognition and the human element in complex systems…

- Leader in methodological work in the study of 'Soft Systems'



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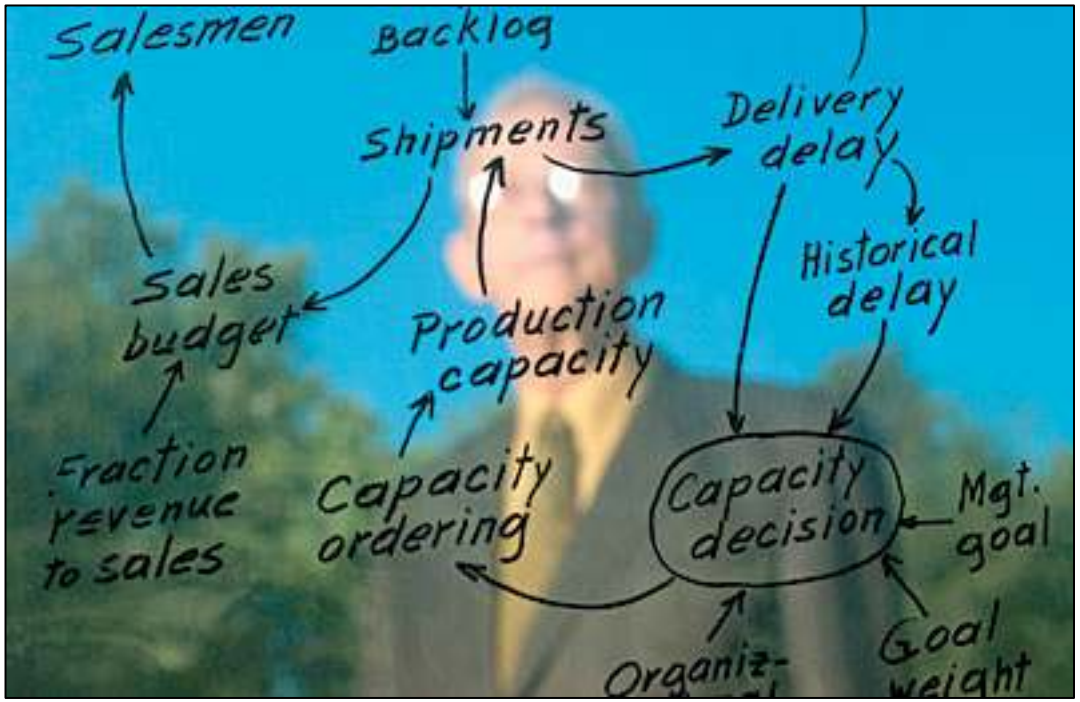
Jay Forrester (MIT)



Father of System Dynamics

"Jay Forrester's computer models show the nonlinear roots of calamity and reveal the leverage that can help us avoid it."

Lawrence M. Fisher,
ww.strategy-business.com

Coping With Complexity

- Today's complex-adaptive systems require new methodologies to accurately model interactions and behaviors, including convergent and divergent behaviors
- Almost all of current societal challenges—sustainable energy strategies, climate change, the economy, healthcare delivery—are clearly challenges that require systems thinking
- A large spectrum of disciplines, from all engineering specialties, management and social sciences, are needed to develop feasible, durable solutions

Your Personal Conference Agenda

- Learn to apply systems thinking in your own life
- Challenge poor or muddled thinking on systems issues
- Work in your community to encourage science, math and engineering excitement among our youth (K-12)
- Seize every opportunity to weave systems thinking examples into you work, your teaching and your behavior—infect your environment!
- Become a 'systems thinking provocateur'

Enjoy the Conference!