



Joshua Epstein

Pioneering Modeler of Human Behavior; Social Scientist, Johns Hopkins

TOPIC: Life Science

SUBTOPICS: Technology/Media

BIG IDEAS:

The Social Science Revolution

Social Science is undergoing a revolution. Nobel Prizes for behavioral economists and the best-selling success of *The Tipping Point*, *The Wisdom of Crowds*, and *Freakonomics* demonstrate that, suddenly, economists are on to something about the way individual choices lead to group behavior. And the tools they are developing can help organizations make more informed decisions about markets and management.

Over two decades, Josh Epstein's work has used the rigor and power of modeling to link individual behavior to organizational performance—whether the organization is a business, a hospital, or the Anasazi Indians in the Southwest.

Some of the subjects he discusses include:

- **Pandemic Flu:** How should the NIH contain an outbreak of a virulent strain of flu? Epstein's models of social network contagion help predict how the disease will spread and where to try to stop it.

- **Civil Conflict:** How does a small skirmish erupt into a country-wide conflict? What are the preconditions for such volatility, and how can it be damped down?
- **New Product Introduction:** How does a product become a runaway success? How can "word of mouth" and individual advocacy be measured and modeled to increase the probability of a major market event?
- **Organizational Optimization:** Faced with an uncertain workload, what incentives cause employees to continually reorganize themselves to do the best possible job?
- **Bioterror Attack:** Who should be inoculated in the event of a biological attack? Epstein's simulations show the patterns of contact within communities and have been used by the Department of Homeland Security to develop and test a range of contingency plans.

BIOGRAPHY

Josh Epstein models real world situations ranging from product launch campaigns to flu outbreaks, with surprising results and insights. His bottom-up social experiments are changing the way we look at business, health policy, warfare and history. Josh is Professor of Emergency Medicine at Johns Hopkins, with joint professorships in economics, biostatistics and public health, and the author of *Growing Artificial Societies: Social Science from the Bottom Up*. Prior to his appointment at Johns Hopkins, Josh was the Director of the Center on Social and Economic Dynamics and a senior fellow in economic studies at The Brookings Institution. A founding innovator in agent-based computational modeling (ABM), in which large-scale social dynamics are generated "from the bottom up" through the interactions of behaviorally realistic software individuals, Josh has used "artificial societies" in pioneering studies of contagious disease, violence and economic dynamics. He leads modeling efforts at the Johns Hopkins University Center for the Study of Preparedness and Catastrophic Event Response and the National Institutes of Health Models of Infectious Disease Agent Study. In 2008, the NIH honored Epstein with the Director's Pioneer Award.

Josh is a natural teacher and a great entertainer. Using computer-generated simulations, he lucidly explains why the bottom-up approach to explaining social phenomena gives better results and why these tools are so powerful and broadly applicable. It's as if Newton were explaining the power of his newly discovered Calculus to uncover the secrets of the physical world, but applied to societal systems like business organizations, cities, or political decision makers. Epstein illustrates this power with compelling discussions of a wide range of examples, chosen for relevance to the audience.

Princeton University Press recently published Josh's *Generative Social Science*, a volume bringing together work ranging from organizational behavior in business to the rise and fall of the ancient Anasazi in the Southwest.

Josh holds a bachelor of arts degree from Amherst and a Ph.D. from MIT and has taught at Princeton and lectured worldwide.