



## Emergence: From Chaos To Order (Helix Books)

By John H. Holland

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**Emergence: From Chaos To Order (Helix Books)** By John H. Holland

In this important book, John H. Holland dramatically shows us that the “emergence” of order from disorder has much to teach us about life, mind and organizations. Creative activities in both the arts and the sciences depend upon an ability to model the world. The most creative of those models exhibits *emergent* properties, so that “what comes out is more than what goes in.” From the ingenious checkers-playing computer that started beating its creator in game after game, to the emotive creations of the poet, *Emergence* shows that Holland's theory successfully predicts many complex behaviors in art and science.

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### Editorial Review

#### Amazon.com Review

"Emergence" is the notion that the whole is more than the sum of its parts. John Holland, a MacArthur Fellow known as the "father of genetic algorithms," says this seemingly simple notion will be at the heart of the development of machines that can think for themselves. And while he claims that he'd rather do science than write about it, this is his second scientific philosophy book intended to increase public understanding of difficult concepts (his first was *Hidden Order: How Adaptation Builds Complexity*). One of the questions that Holland says emergence theory can help answer is: can we build systems from which more comes out than was put in? Think of the food replicators in the imaginary future of *Star Trek*--with some basic chemical building blocks and simple rules, those machines can produce everything from Klingon delicacies to Earl Grey tea. If scientists can understand and apply the knowledge they gather from studying emergent systems, we may soon witness the development of artificial intelligence, nanotech, biological machines, and other creations heretofore confined to science fiction. Using games, molecules, maps, and scientific theories as examples, Holland outlines how emergence works, emphasizing the interrelationships of simple rules and parts in generating a complex whole. Because of the theoretical depth, this book probably won't appeal to the casual reader of popular science, but those interested in delving a little deeper into the future of science and engineering will be fascinated. Holland's writing, while sometimes self-consciously precise, is clear, and he links his theoretical arguments to examples in the real world whenever possible. Emergence offers insight not just to scientific advancement, but across many areas of human endeavor--business, the arts, even the evolution of society and the generation of new ideas. --*Therese Littleton*

#### From Library Journal

Emergence, where simple systems generate complex ones, is a fundamental concept in many modern scientific theories. Phenomena as diverse as a game of checkers, neural networks, and even the origin of life are emergent. Holland, the developer of "genetic algorithms," demonstrates how mathematical models can represent the essential elements of emergent systems. Though the subject is arcane, Holland's emphasis on modeling appeals to readers' common sense, and he handles the mathematics very adeptly. Frequent recapitulation also helps. Most of the text focuses on the model-building process, with a few selected examples, and thus this book would be a good companion to others that are broader and more speculative, such as Murray Gell-Mann's *The Quark and the Jaguar* (LJ 4/15/94). For larger public and academic libraries. ?Gregg Sapp, Univ. of Miami Lib., Coral Gables, Fla.

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#### About the Author

**John H. Holland** holds joint appointments in the Electrical Engineering and Psychology Departments of the University of Michigan, Ann Arbor. He is known worldwide as the "father of genetic algorithms" and as one of the deans of "complexity studies" at the Santa Fe Institute. He is the author of the groundbreaking book *Hidden Order: How Adaptation Builds Complexity* (also from Perseus Books).

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**John Caldwell:**

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