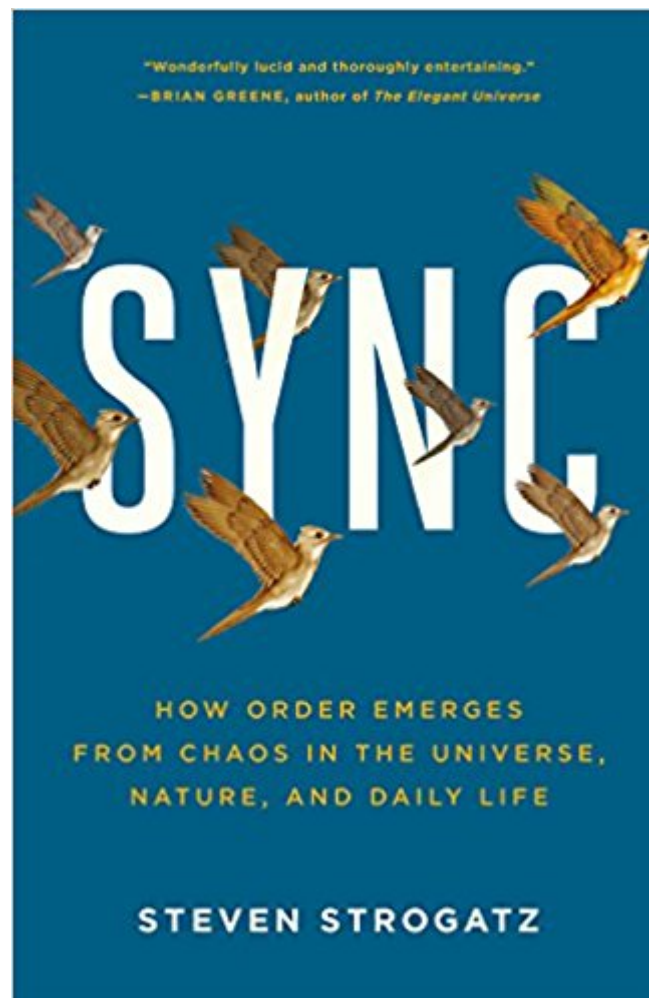




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Sync: How Order Emerges From Chaos In The Universe, Nature, And Daily Life



Synopsis

The tendency to synchronize may be the most mysterious and pervasive drive in all of nature. It has intrigued some of the most brilliant minds of the 20th century, including Albert Einstein, Richard Feynman, Norbert Wiener, Brian Josephson, and Arthur Winfree. At once elegant and riveting, *Sync* tells the story of the dawn of a new science. Steven Strogatz, a leading mathematician in the fields of chaos and complexity theory, explains how enormous systems can synchronize themselves, from the electrons in a superconductor to the pacemaker cells in our hearts. He shows that although these phenomena might seem unrelated on the surface, at a deeper level there is a connection, forged by the unifying power of mathematics.

Book Information

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Customer Reviews

When you have a flight to catch early in the morning, you'd like to sleep early in the evening. You go to bed but you stay awake until your usual bedtime. When you stay up for a late party, you'd like to sleep in until noon. But you wake up tired and can't fall back asleep. Why can't you sleep for as long as you need to? Why can't you fall asleep when you want to? The culprit is a small cluster of neurons right at the bottom of your brain. These cells have the amazing power to synchronize their activity to each other and to the cycle of day and night. Their combined effect is to regulate your bodily functions along a fixed 24-hour cycle. Your body temperature, hormone secretions, and a myriad other functions are regulated by this internal clock. And so is your sleep-wake cycle. Your day contains two "forbidden zones," for most people around 10 am and 10 pm, when your brain dictates that you can hardly fall asleep. Slightly after lunch your brain says it's a good time for a nap,

as so many cultures discovered on their own. Between 3:00 and 6:00 am, it's so hard to stay awake that shift workers call this time the "zombie zone". Most catastrophic accidents that depend on human error, like Three Miles Island and Chernobyl, occur at this time. For all of their importance in helping people sleep well and avoid accidents, understanding the neural clock is among the most difficult problems facing science today. It requires understanding how thousands of cells, connected together in complicated ways, manage to coordinate their behavior. New mathematical concepts have been developed over the last few decades to tackle this kind of problem. Synchronization is exhibited by stock markets, brains, and many other things we'd love to understand better.

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