

"Perhaps a proper understanding of the complex regulatory networks making up cellular systems like the cell cycle will require a shift from common sense thinking...to a more abstract world, more readily analyzable in terms of mathematics." (Paul Nurse, Cell, 7 January 2000)

# Irreversible Transitions, Bistability and Checkpoints in the Eukaryotic Cell Cycle

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The cell cycle is a striking example of the necessity of systems-level thinking in 21st century molecular cell biology. The resolute reductionism of the last century, albeit necessary for identifying the molecular components of cellular control systems and their interactions, has failed to provide a comprehensive, integrative understanding of the molecular basis of cell physiology. Putting the pieces back together requires new ways of thinking about and doing molecular biology—an approach now known as molecular systems biology. In this lecture I will show how systems-level thinking reveals deep and unexpected principles of cell cycle regulation.

