One of the great intellectual achievements of the twentieth century was the theory of quantum mechanics, according to which observational results can only be predicted probabilistically rather than with certainty. Yet, after decades in which the theory has been successfully used on an everyday basis, most physicists would agree that we still don't truly understand what it means. I will talk about the source of this puzzlement, and explain why an increasing number of physicists are led to an apparently astonishing conclusion: that the world we experience is constantly branching into different versions, representing the different possible outcome of quantum measurements. This could have important consequences for quantum gravity and the emergence of spacetime.

Sean Carroll is a Research Professor of theoretical physics at the California Institute of Technology. He received his Ph.D. in 1993 from Harvard University. His research focuses on fundamental physics and cosmology, quantum gravity and spacetime, and the evolution of entropy and complexity. His most recent book is Something Deeply Hidden: Quantum Worlds and the Emergence of Spacetime. Other books include The Big Picture; The Particle at the End of the Universe; From Eternity to Here; and the textbook Spacetime and Geometry. He has been awarded prizes and fellowships by the National Science Foundation, NASA, the Sloan Foundation, the Packard Foundation, the American Physical Society, the American Institute of Physics, the Freedom From Religion Foundation, the Royal Society of London, and the Guggenheim Foundation. He frequently consults for film and television, and has been featured on shows such as The Colbert Report, PBS's NOVA, and Through the Wormhole with Morgan Freeman. He is the host of the weekly Mindscape podcast.

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