

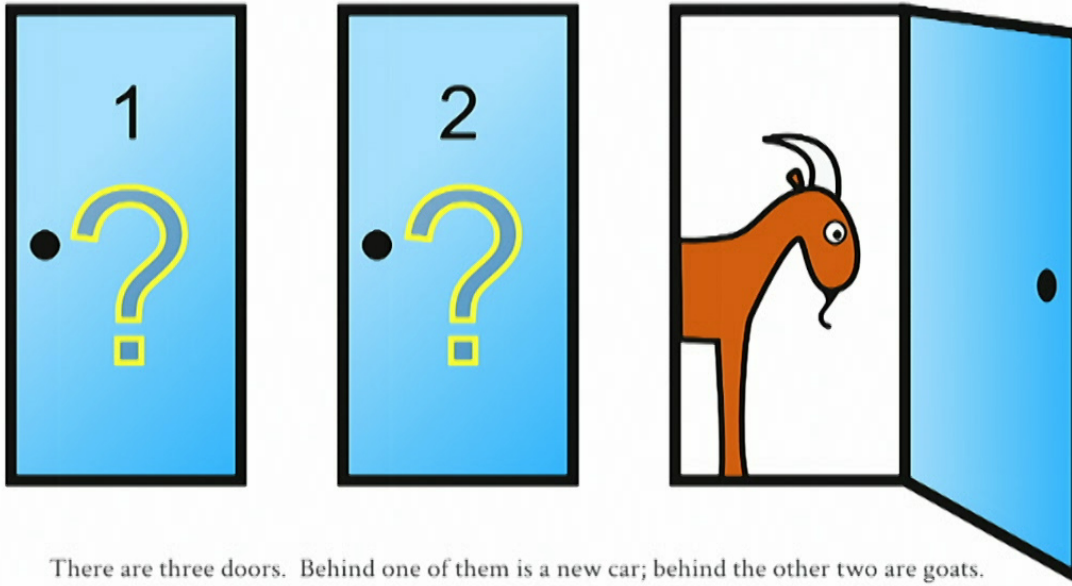
Title: James Weatherall: The Physics of Wall Street

Date: Feb 01, 2017 07:00 PM

URL: <http://pirsa.org/17020000>

Abstract: <p>Twenty-first century finance is built on complex mathematical tools developed by “quants,” a different breed of investor with expertise in fields such as physics, mathematics, and computer science. These models have been the basis for both new trading strategies and new financial products, leading to untold wealth. In some cases, however, these models have done more damage than good, making markets less stable and introducing new systemic risk. In this talk, Dr. James Weatherall will tell the story of how in the aftermath of World War II, some innovative physicists and mathematicians saw surprising connections between physics, gambling, and finance, and put those connections to use to become the first quants. Dr. Weatherall will introduce some of the ideas behind modern quantitative trading and show how the history of mathematical reasoning in finance reveals that these models can be extremely useful-but only if we understand their limitations.</p>

## The Monty Hall Problem

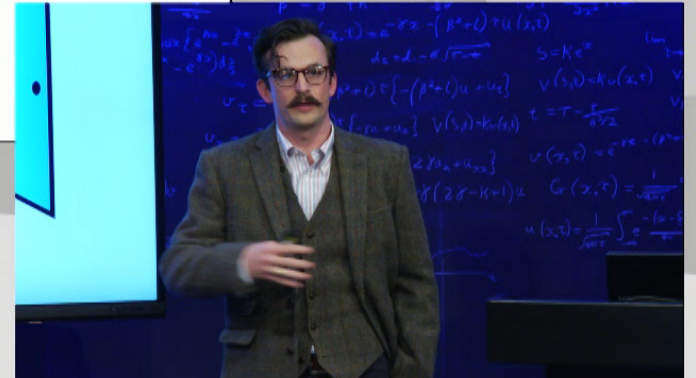


There are three doors. Behind one of them is a new car; behind the other two are goats.

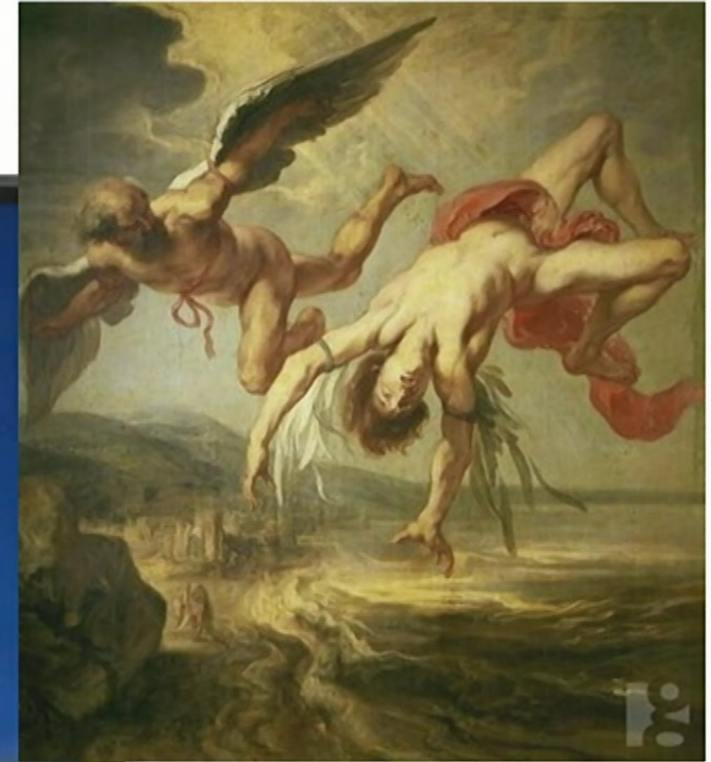
Step 1: The Player chooses a door.

Step 2: Monty Hall opens one of the remaining doors, (always) revealing a goat.

Step 3: The Player has the option to change doors. Should he?



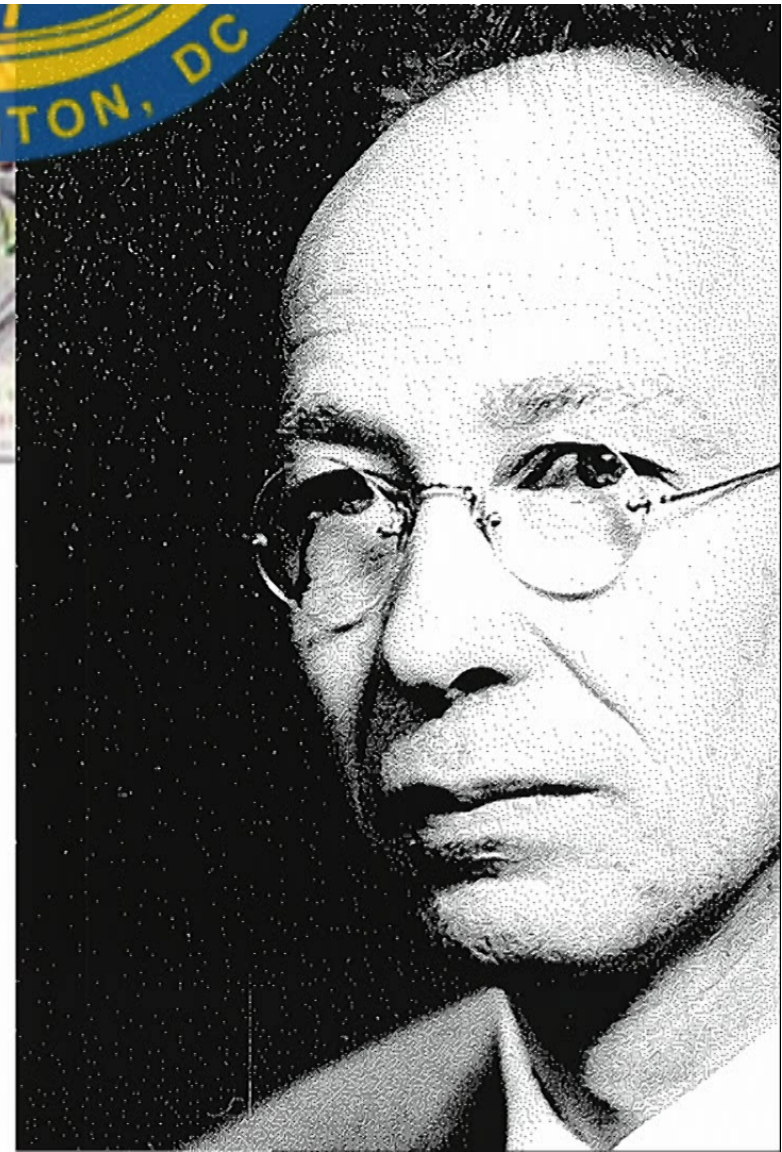
# Why Physics? Why Finance?



## Three questions:

- How did physicists come to make influential contributions to financial practice?
- Does physics provide novel insights into financial markets?
- How should we think about the mathematical models in finance introduced by physicists?

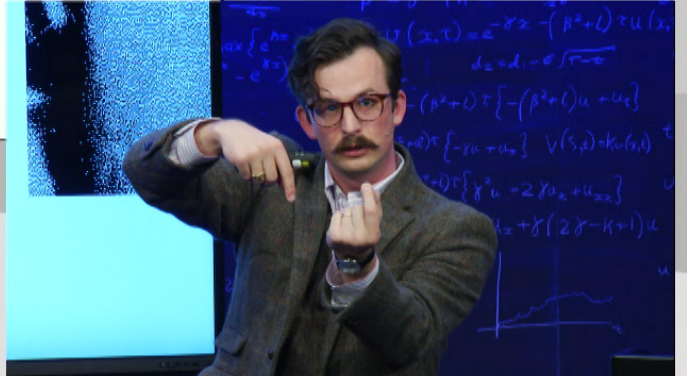
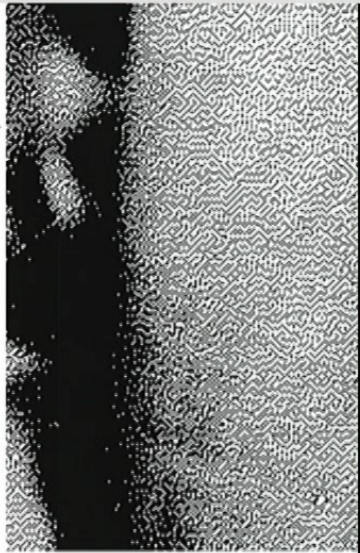
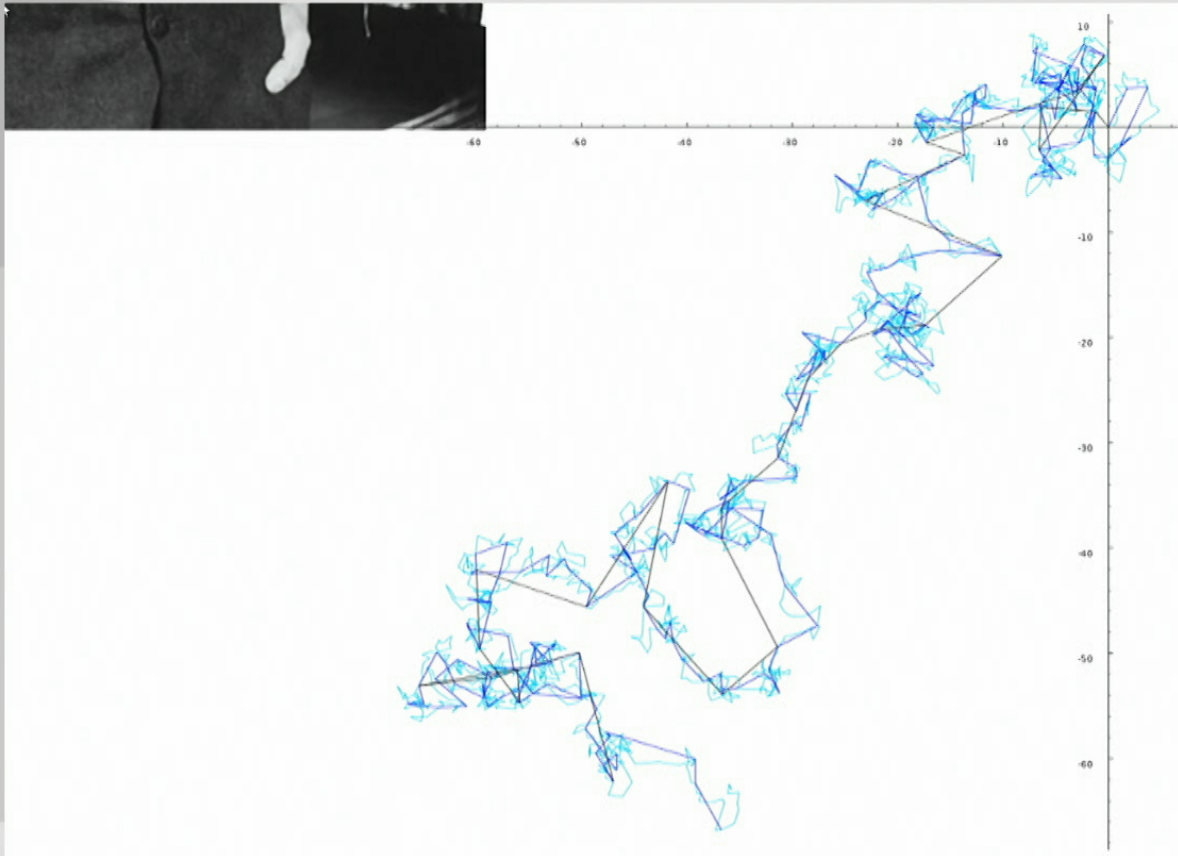




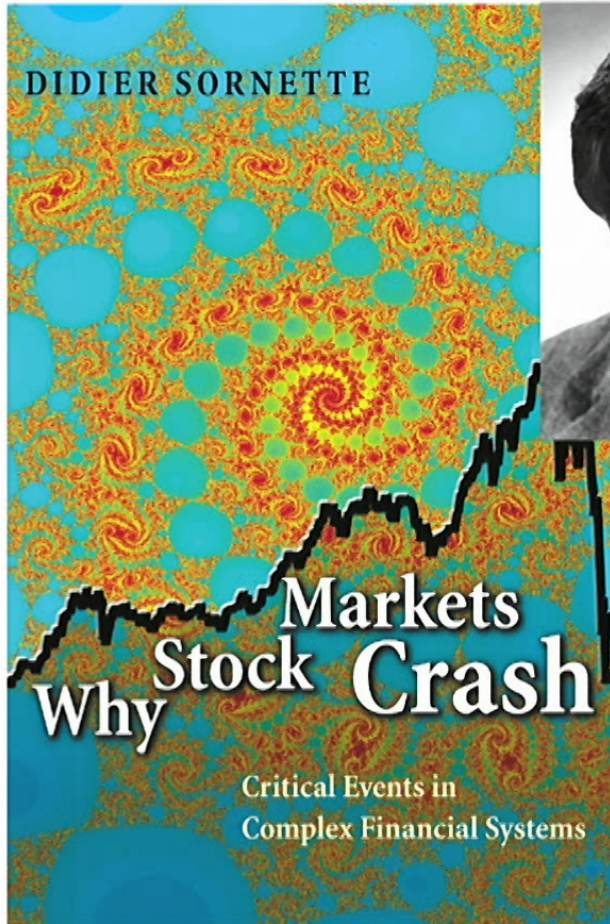
Let us imagine that a statistician, trained perhaps in astronomy and totally unfamiliar with finance, is handed a page of the Wall Street Journal containing the N.Y. Stock Exchange transaction for a given day...

Osborne (1959), "Brownian Motion in the Stock Market"





# New Directions...



## ...and Genuine Insights

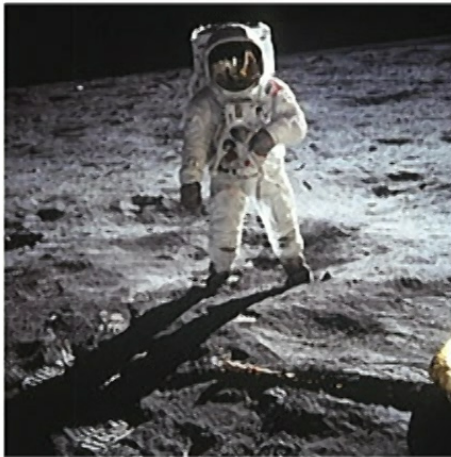


# Fisics, Phynance, & Phylosophy



"If physicists have been successful at improving our understanding of finance, it is because they have approached problems in a novel way, using methodological insights that are commonplace in physics (and engineering) and which are useful in studying virtually anything."

-from The Physics of Wall Street



Are Mathematical Models Reliable? Safe?

Yes... but only if we recognize their limitations.

Models are based on assumptions--and those assumptions can fail. Mathematical models are our best tools for understanding markets. But to use models safely, we must be ever vigilant to when their assumptions cease to apply.