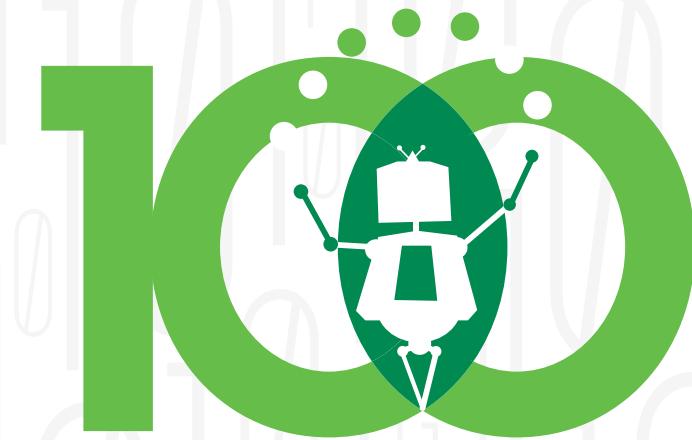


# WHAT IS INFORMATION?



claude shannon

1916 - 2016



The outcome of an unpredictable experiment.

## UBIQUITOUS EXAMPLES

Tossing a coin

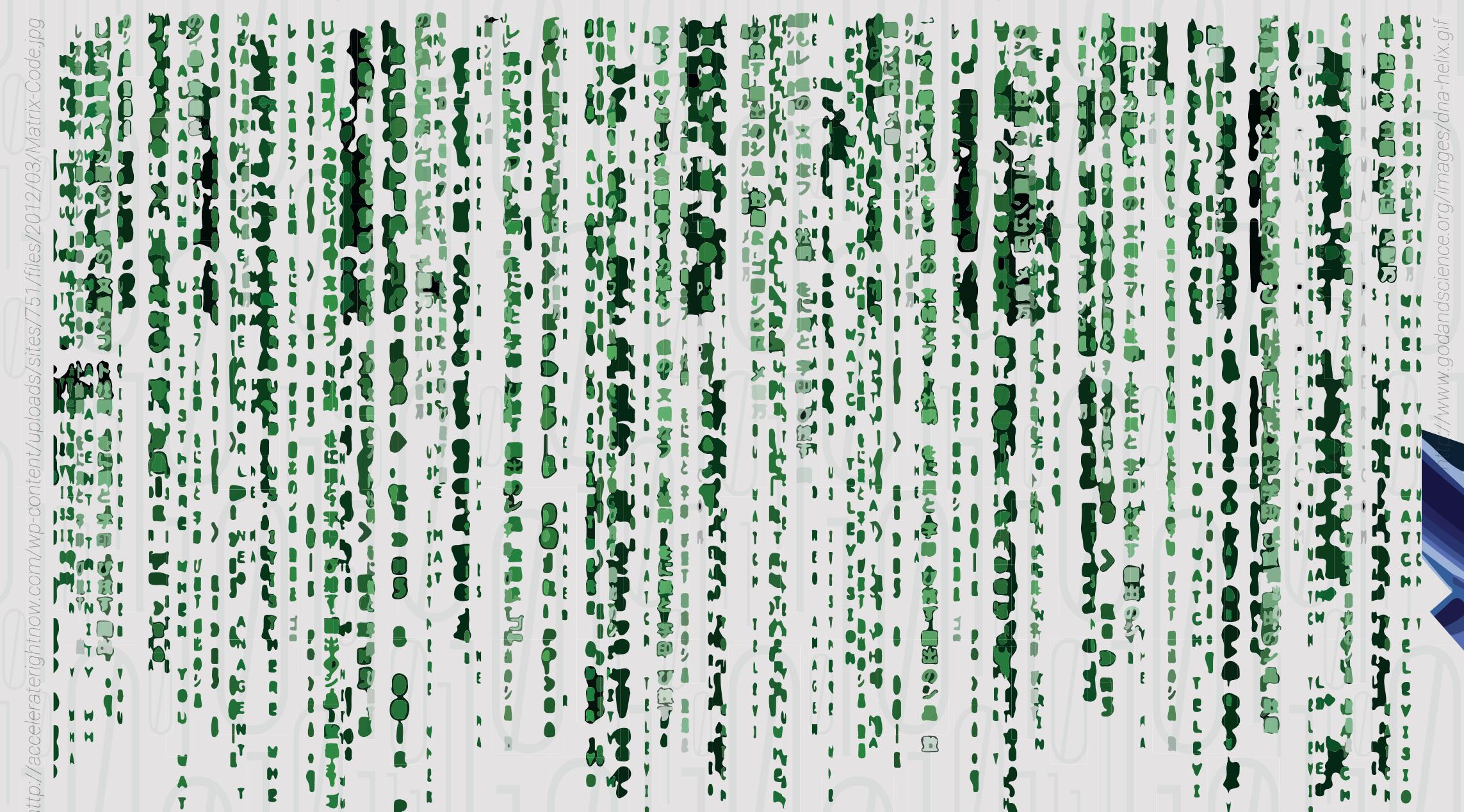


<http://newshour-tc.pbs.org/newshour/wp-content/uploads/2015/03/159615168-1024x768.jpg>

A google request

# Google

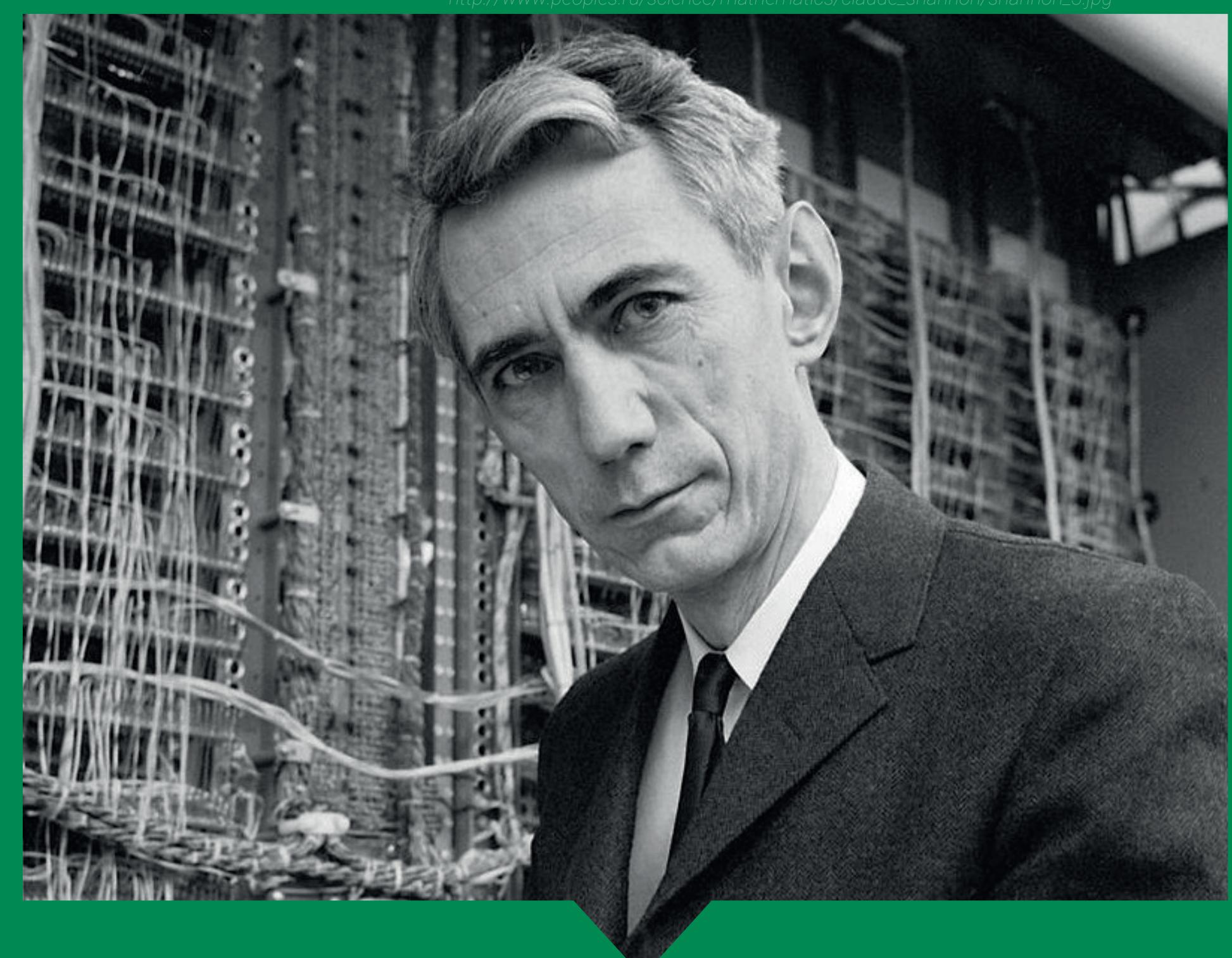
Code cracking



<http://acceleratingnow.com/wp-content/uploads/sites/75/files/2012/05/Mars-Code.jpg>

## ENTROPY

The less predictable (the more random) an experiment outcome is, the more informative it is.

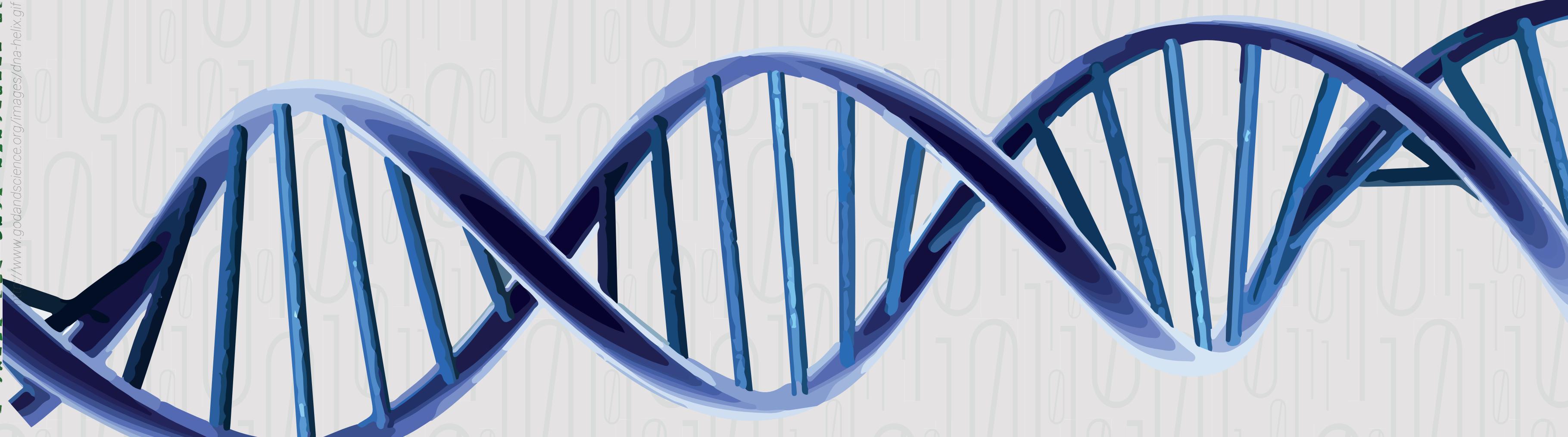


[http://www.peoples.ru/science/mathematics/clause\\_shannon/shannon\\_3.jpg](http://www.peoples.ru/science/mathematics/clause_shannon/shannon_3.jpg)

Information randomness is measured by **entropy**, a notion I borrowed from physicists. Moreover, information can be **compressed**, say for storage, and I proved that the limit to compression is entropy.

It can also be transmitted, say wirelessly, and I proved that the limit to transmission is **capacity**.

Assembling a DNA sequence from a new species



[https://upload.wikimedia.org/wikipedia/commons/a/a9/Mars\\_Science\\_Laboratory\\_Curiosity\\_rover.jpg](https://upload.wikimedia.org/wikipedia/commons/a/a9/Mars_Science_Laboratory_Curiosity_rover.jpg)

Collecting data from new horizons

