

My Research Interests

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About Me



About Me

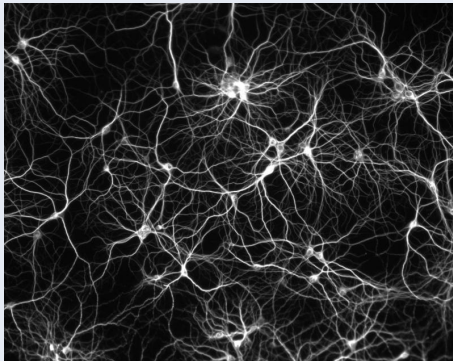
How I got into Mathematics

- Curiosity
- I've always asked a lot of questions
- Sometimes the answers are unknown

What I aim to do as a Mathematician

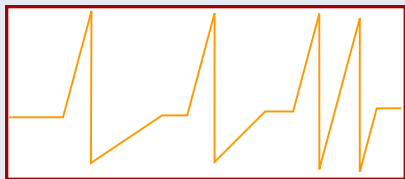
- Computational techniques to give insight into mathematical problems
- Examples include:
 - Collective rhythm of firefly flashes
 - Formation of magnetism from interactions on the scale of atoms
 - Networks of neurons, the building blocks of the nervous system

Networks of Neurons

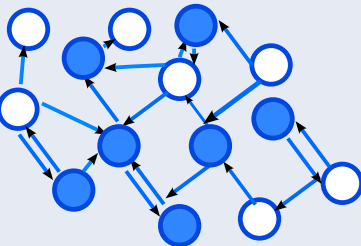


- The nervous system is composed of cells called neurons
- They are connected in complex networks
- They use electrical impulses to communicate

Input Signal



Neurons



- The electrical impulses from other neurons can cause a neuron to fire
- Can simulate on a computer how a network responds to an input signal
- Some networks will respond differently every time, even when the signal is the same!

Sensory Input

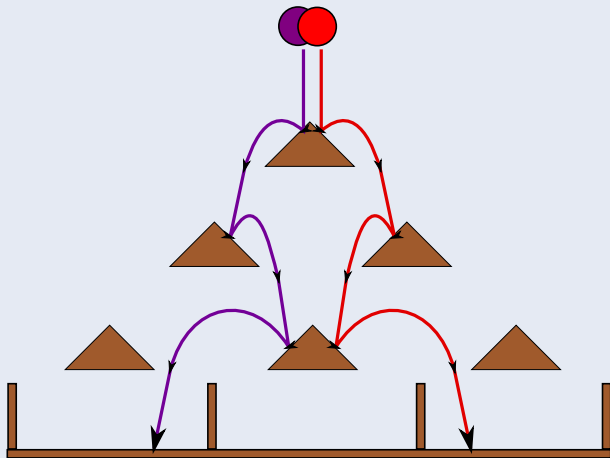


Input Signal



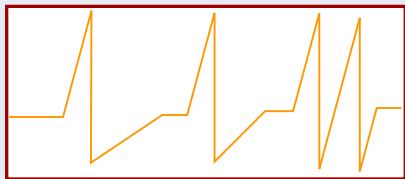
- The input signal may be sensory input or another group of neurons
- Networks of neurons close to the sensory input usually respond consistently
- Networks of neurons further away from the sensory input may respond inconsistently

Chaos

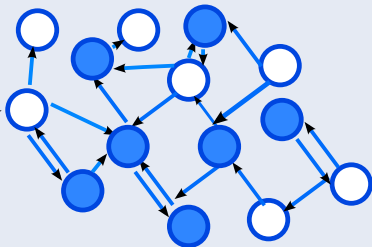


- Chaos: Small changes grow over time

Input Signal



Neurons



- Varying network response is a result of chaos!
- My goal:
 - Biological: Understand characteristics of chaotic networks of neurons
 - Mathematical: Develop tools and theory in a more general setting

Thank you!