



## Parallel Computing with DNA

The discovery of the double helix model for DNA molecules (see Figure 1) is the foundation for our current understanding of microbiology. Applications have since been sought (and found), for example, in pharmaceuticals or in the custom design of bacteria for bioreactors.

Researchers also investigated how the ability to repeatedly recombine DNA strands can be used to construct “computational devices” that work massively parallel and are highly energy efficient. It is not obvious how such devices can be programmed to solve computational problems for which currently computer programs (Turing machines) are used. One may also ask how *fast* a solution can be found.

Nowadays, custom DNA strands are starting to become a household commodity (you can order them online!). Will we soon be able to solve otherwise computationally difficult problems using a DNA computing approach?

In this thesis we offer you the opportunity to learn about this research area and try out your own ideas.

### Goals

- Familiarize with DNA computing techniques.
- Come up with new ways to compute with DNA.
- Analyze and/or simulate its behavior.

### Requirements

- Ability to work independently on the topic.

**Note that a biology minor is NOT required to work on this topic ;-)**

### Interested? For more details please contact

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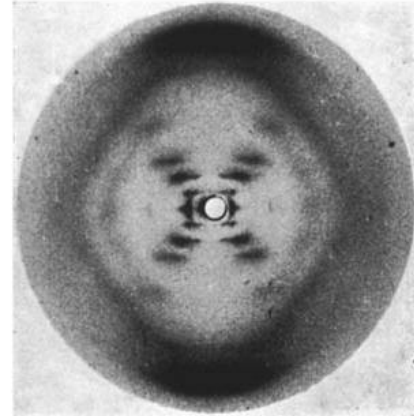


Figure 1: “Photo 51”, an X-ray image showing a tiny portion of a DNA molecule, is reported to have inspired the double helix model for DNA molecules as known today.

