# Open Thesis (BA, SA)

**Mathematical modeling and analysis of apoptosis in cell populations**

## Field of Research:

Apoptosis is a mechanism of programmed cell death, important for instance in developmental processes of organisms. A promising alternative to the mechanisms of common therapies against cancer is the activation of death receptors with help of TRAIL. Experimental data are rather obtained from cell populations than from measurements of single cells. The modeling of cell populations is a challenging task because of a high heterogeneity within the population. Intrinsic and extrinsic noise of cells can be considered for example by use of stochastic modeling methods. An initial model that describes a three-dimensional tumor spheroid is available and can be extended, analyzed and adapted to experimental data. One longterm goal is to obtain a holistic multi-scale model of the effects of a therapy with TRAIL and to reveal the constraints for maximal therapy efficiency. A student thesis is possible in this field. The exact topic and goal can be determined in a personal discussion.

## Prerequisites:

- Basic knowledge in biochemistry and molecular biology
- Skills in *Matlab* or *Python*

## Supervisor:

**Dirke Imig**  
Room 2.204

## Area:

**Systems Biology**

## Properties:

- **Type:** BA, SA  
- 30% literature  
- 40% implementation  
- 30% simulation

## Beginning:

Now

Further information: [www.ist.uni-stuttgart.de/education/sada](http://www.ist.uni-stuttgart.de/education/sada)

Notice from 31. März 2015