



Semester/Bachelor/Master Thesis:

## Anonymous Computation

Computing in anonymous networks, i.e., networks in which nodes are not distinguished by unique identifiers, has been studied for a long time. For example a by now well-known result from the 80s showed that electing a leader in anonymous networks is not possible, not even if the algorithm is allowed to use random bits.

Still, there are open questions that ask for answers. For example, recently the question was raised whether there is a complexity theory for anonymous distributed computation similar to the established theory of the classes P and N P. Current approaches to that question ask how much non-determinism needs to be allowed to allow certain computational models to verify a solution. What is the role randomization plays in this context? Randomization certainly helps solving, for example, the maximal independent set problem, which cannot be done with a deterministic anonymous algorithm. Another question that was investigated regards the means by which nodes decide on their output. Does this make a difference for randomized algorithms in comparison to deterministic ones?



### Goals

The goal of this thesis is to gain further insight in properties of anonymous distributed networks and computational models. Since there are many possible research directions for this thesis, let's meet and I will be happy to lay them out in more detail.

### Requirements

- Interest in theoretical aspects of distributed computing
- Creative thinking and problem solving
- The ability to work (and possibly come up with) formalized models for computation

### Contacts/Advisers

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