Industry takes great interest in verification techniques to improve the reliability of process designs. In application domains like spectrum auctions, the issue is extremely valuable. Spectrum auction revenue has been an important source of governmental income. The goal of spectrum auction designers is to prevent undesirable executions and maximize certain outcome measures like revenue. Despite much testing of various formats of spectrum auctions with human subjects, auctions with embarrassing outputs have happened in the past. E.g., about fifty percent of the items remained unsold or in the Dutch UMTS Auction in 20000, the low revenue caused a fiasco in public policy.

By verification techniques, one can find undesirable system behavior before getting into execution. For example, one can find the lowest revenue in a spectrum auction. To this end, data values such as bidder's budget, price of products, etc., in the process model must be modeled. However, the domains of data values in spectrum auctions are big. For example, the price of products could take a domain of one hundred to millions of values. These big data domains make a huge obstacle for verification of processes by model checking.

We aim to overcome this issue by transforming processes with large data domains into smaller Petri Nets. To implement and evaluate our approaches, we are looking for a student who is interested to implement the transformation of process models into Petri Nets. In further work we plan to evaluate the verification approaches together with auction experts.

As a research assistant, you will contribute to open-source research software. The following abilities are required:

- Programming skills. You should have experience with Java
- Communication skills. You should be able to clearly communicate and present your results
- Scientific skills. You should be able to read and understand current research papers and to implement algorithms on your own.

In this job, you will get practical knowledge of modeling data-value-aware workflows. You will learn how to transform a workflow model to Petri Nets and how to verify properties in Computational Tree Logic (CTL). Having background knowledge in workflows and Petri Nets is beneficial but not mandatory if you are eager to learn.

Furthermore, as a student research assistant, you will enjoy the following benefits:

- Access to the chair’s computing infrastructure for research purposes.
- Scientific discoveries and the opportunity to contribute to the state of the art.
- Flexible working time, from 20 to 40 hours per month.