I am a third year Ph.D. student under the supervision of Prof. Daniel Lenz at University of Jena (Germany). My research interests lie in the intersection field of ergodic theory, spectral theory, and geometric group analysis. When I am not doing mathematics, with high odds I am spending time in my church, traveling, playing the piano or just doing sports.

Here is a tiny outline of my Ph.D. project.

The investigation of spectral properties of operators on discrete structures is an essential undertaking in the world of mathematical physics. Scientific findings in this field give - among other things - indications on the conductivity of materials subject to their molecular structure. Thus, it is a natural question to analyze connections between geometry and spectrum of graphs. One problem in this context is the approximation of the spectral distribution function (integrated density of states) by relative frequencies of matrix spectra. It turns out that uniform approximations can be proven by using convergence theorems for Banach space valued functions with certain additivity criteria. It is my goal to formulate and to prove assertions of this kind in general geometric situations. Similar results have been obtained before in the context of existence theorems for topological mean dimension of dynamical systems. The structures that I consider include Cayley graphs of amenable, finitely generated groups. Further, positive results can be obtained for graph sequences which converge in a locally statistical sense and which possess some amenability property (hyperfinite sequences).
It would be a dream to be able to leave the amenable world in order to prove uniform approximation results for non-amenable structures. I hope to get some inspiration in Ventotene...