

Oberwolfach Workshop 1733: Proof Complexity and Beyond

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Proof complexity is a multi-disciplinary intellectual endeavor that addresses questions of the general form “how difficult is it to prove certain mathematical facts?” Having started as an enterprise in mathematical logic, it soon outgrew these boundaries. Researchers realized that the concepts of “fact” and “proof” significantly transcend their original meaning, and at the same time they can be studied, in the best traditions of mathematical logic, within one unifying mathematical framework. An exciting development of recent years is the observation that the analysis of an appropriately tailored concept of “proof” underlies many of the arguments in algorithms, geometry or combinatorics research that make the core of modern theoretical computer science. These include the analysis of approximation algorithms, or the size of linear or semidefinite programming formulations of combinatorial optimization problems, to name just two important examples. Our aim for this workshop is to bring together the leading experts of proof complexity and these related areas of theoretical computer science to strengthen the connections and stimulate further collaboration.