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The (un)reasonable (in)effectiveness of algebraic topology.

Among the great achievements of 20th century geometric topology are the classification of immersions, cobordism of manifolds the high dimensional Poincare conjecture, and surgery theory. They all involve "algebraicization" − the reduction of a geometric problem to one of algebraic topology, and then solving this. I will discuss the complexity of the solutions to these problems: how complicated are the objects that algebraic topology predicts? I hope to explain both lower bounds coming from logic and upper bounds that come from the geometric analysis of function spaces.

Based on joint work with Greg Chambers, Dominic Dotterer, Sasha Dranishnikov, Steve Ferry, Fedya Manin, and Alex Nabutovsky.