

# Group Representation Theory and Applications, Spring 2018

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## Summary

Group Theory is essentially the theory of symmetry for mathematical and physical systems, with major connections to diverse areas of mathematics, as well as physics, chemistry, and information science. Group Representation Theory is a central area of Group Theory. Born more than a century ago, it had first major success in the Classification of Finite Simple Groups. Since then, important and deep connections to areas as varied as topology, algebraic geometry, Lie theory, homological algebra, and mathematical physics, have been discovered and exploited. Still, the area abounds with basic problems and fundamental conjectures, some of which have been open for over five decades. Very recent breakthroughs have led to the hope that some of those can finally be settled. In turn, recent results in group representation theory have helped achieve substantial progress in a vast number of applications in Lie theory, number theory, algebraic geometry, combinatorics, to name a few.

All this wealth of new results and directions will be the main theme of the Spring 2018 semester program on “Group Representation Theory and Applications” at the MSRI. The goal of this program is to bring together the leading experts in group representation theory to further advance major progress in the area, with the aim of solving some of the famous open conjectures, to explore deep connections with Lie theory and other areas, and to obtain further applications of group representation theory to other branches of mathematics. This will also be a unique opportunity for young mathematicians to learn about these exciting developments and become directly involved in this fascinating area of research. Every effort will be made to include younger mathematicians, women and underrepresented groups. It is our hope that the program will strengthen existing and foster new collaborations, and facilitate significant progress along the lines of all the basic problems in the area as well as exciting applications and connections to other areas of mathematics.