This survey describes a wide range of recent developments in the theory of group actions. Various forms of rigidity feature prominently in the discussion. (For example, an action is said to be locally rigid if it is isomorphic to all of its nearby perturbations. In another sense, a class of actions may be said to be rigid if the measurable structure of each action determines its topological structure; more precisely, if there is a measurable isomorphism between any two of the actions, then there must be a continuous isomorphism between the two actions.) The emphasis is on aspects of the theory that are most distinct from classical ergodic theory, that is, from the theory for actions only of $\mathbb{R}$ and $\mathbb{Z}$.

The table of contents provides an overview of the coverage. 1. Introduction: dynamics of group actions in mathematics and applications; properties of groups relevant to dynamics; rigidity phenomena; rigid geometric structures; preliminaries on Lie groups and lattices. 2. Basic ergodic theory: measurable $G$-actions; ergodicity and recurrence; cocycles and related constructions; reductions of principal bundle extensions; amenable groups and amenable actions. 3. Group actions and unitary representations: spectral theory; amenability and property $T$; Howe-Moore ergodicity theorem. 4. Main classes of examples: homogeneous $G$-spaces; automorphisms of compact groups and related examples; isometric actions; Gaussian dynamical systems; examples of actions obtained by suspension; blowing up. 5. Smooth actions and geometric structures: local properties; actions preserving a geometric structure; smooth actions of semisimple Lie groups; dynamics, rigid structures, and the topology of $M$. 6. Actions of semisimple Lie groups and lattices of higher real-rank: preliminaries; the measurable theory; topological superrigidity; actions on low-dimensional manifolds; local differentiable rigidity of volume preserving actions; global differentiable rigidity with standard models; actions without invariant measure.

{For the collection containing this paper see MR1928517}