1036-20-2 **Ilya Kapovich***, University of Illinois at Urbana-Champaign, Department of Mathematics, 1409 W Green Street. *Algebraic rigidity and randomness in geometric group theory.*

Counting particular mathematical structures up to an isomorphism is an important basic mathematical problem. In many instances, e.g. for counting graphs and finite groups (with various restrictions), good precise or asymptotic counting results are known. However, until recently very little has been known about counting isomorphism types of finitely presented groups, with various restrictions on the size and the type of a group presentation. The reason is that, by a classic result of Novikov and Boone, the isomorphism problem for finitely presented groups is algorithmically undecidable. Even for those classes of groups where the isomorphism problem is decidable, the known algorithms are usually to complicated to help with counting problems.

In this talk we will survey recent progress in this direction, based on joint work with Paul Schupp. The key results, allowing for asymptotic counting of isomorphism types, involve establishing several kinds of algebraic rigidity properties for groups given by "generic" presentations. A representative result here is a Mostow-type isomorphism rigidity theorem for generic one-relator groups.

Studying group-theoretic rigidity is an important theme in Geometric Topology and Geometric Group Theory. However, most known results (such as Mostow Rigidity, Margulis Superrigidity, various kinds of quasi-isometric rigidity theorems) rely on exploiting some very particular structure, such as flats, parabolic subgroups, topological and analytic features of the boundary at infinity, and so in. In the case of generic finitely presented groups these special structures are not available and one needs to find new ways of extracting algebraic rigidity statements from the asymmetric nature of chaos itself. (Received June 18, 2007)