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**Stephen D Smith\*** ([smiths@math.uic.edu](mailto:smiths@math.uic.edu)), Dept Math, U Illinois-Chicago (m/c 249), 851 S Morgan, Chicago, IL 60607-7045. *Combinatorial and geometric methods applied to group cohomology.*

The Tits building is the fundamental geometry for a group of Lie type; and analogous simplicial complexes for various other simple groups were introduced in the 1970s by Buekenhout, Ronan-Smith, and others. The underlying combinatorial methods were further studied by Stanley, Björner, and others; and from the viewpoint of algebraic topology, the methods were extended to arbitrary finite groups by Brown, Quillen, Webb, and others—often with application to decomposition the  $p$ -part of the cohomology of a group in terms of that of suitable  $p$ -local subgroups.

In particular for the prime  $p = 2$ , each sporadic simple group has a suitable “2-local geometry” which satisfies an analogue of the cohomology decomposition for a Lie type group over its building geometry. This result had long been conjectured; but it had to be proved separately for each sporadic group—and in some of the larger cases, the proof had to await the development of increasingly more sophisticated methods. The theorem along with much of this background is developed in the recent book *Classifying spaces of sporadic groups* by Benson and Smith.

A more elementary introduction to the methods is being developed in a forthcoming book *Subgroup complexes* by Smith. (Received July 27, 2010)