

## **The Borel conjecture through controlled G-theory**

Boris Goldfarb (University at Albany, State University of New York)  
[bgoldfarb@albany.edu](mailto:bgoldfarb@albany.edu)

*Abstract:* I will describe the joint work with Gunnar Carlsson on the old conjecture of Armand Borel in topology. The conjecture states that if a closed aspherical manifold  $M$  is homotopy equivalent to another manifold then the two manifolds must be homeomorphic. The aspherical condition is equivalent to the universal cover of  $M$  being contractible, which is common in geometry. Our approach studies the K-theoretic assembly map associated to  $\pi_1(M)$  by factoring it through a controlled version of Grothendieck's G-theory of the group ring  $\mathbb{Z}[\pi_1(M)]$ . The G-theory turns out to be easier to compute and is equivalent to K-theory in very general geometric situations, for example when  $\pi_1(M)$  has finite decomposition complexity.