

**Abstract of present research**  
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I'm presently working on three projects:

1.  $L^2$ -Betti numbers for type I unimodular locally compact groups, and relation with the Plancherel measure (joint with H. Petersen);
2. irreducible affine isometric actions on Hilbert spaces: characterizations, existence, link with the first  $L^2$ -Betti number (joint with T. Pillon);
3. 1-cohomology for groups acting on trees: characterizing those representations with vanishing 1-cohomology or reduced 1-cohomology (joint with T. Fernos).