259A Fall 2017: "Algebras of Operators in Hilbert Space"

Instructor: Sorin Popa
Meetings: MWF 3-3:50 in MS5138.

This course (and its continuation 259B in Winter quarter) aims at presenting several topics of interest in II_1 factors, as follows:

1. Iterative procedures for constructing abelian subalgebras and hyperfinite subfactors of a given II_1 factor that satisfy some prescribed properties (ergodicity, control of normalizers, etc, see e.g. the paper "Constructing MASAs with prescribed properties http://lanl.arxiv.org/abs/1610.08945)

2. Intertwining by bimodule techniques (allowing to decide when two subalgebras of a II_1 factor can be unitary conjugate, see e.g. Section 1.3 in the above paper and the references therein)

3. Incremental patching techniques (see https://www.imj-prg.fr/ao/IMG/pdf/coursorsaypopa2017.pdf for a Summary and for appropriate references).

4. Paving over MASAs in von Neumann algebras, i.e. generalized Kadison-Singer problems (see https://www.imj-prg.fr/ao/IMG/pdf/kyotolectures.pdf)

5. Deformation-Rigidity techniques and their usage in classifying various classes of II_1 factors (arising from groups, group actions and amalgamated free products) and for obtaining W*-superrigidity results.

But during the first two weeks (so until mid-October) I will review the basics of II_1 factors theory, a fast paced revision of the first few chapters of the book http://www.math.ucla.edu/ popa/Books/IIun-v13.pdf, but without proofs (or giving only sketches of proofs). If any of you does not know some of that material, he can just go through the corresponding parts of the book, and see me outside class hours for clarifications.

All people attending the class will get an A, but will have to make at least one presentation in our Operator Algebra Participating Seminar 290I, Mondays 4-5:30pm in MS5137.