

**Massive C\*-algebras W20 projects.** Each student who is taking the course is required to give a 25-minute presentation on a topic of their choice at the end of the semester. Each talk should have an introduction and conclusion and contain a complete proof. (See Halmos, Paul R.: "How to talk mathematics." Notices Amer. Math. Soc. 21.3 (1974): 155-158 and Kra, Bryna: "Giving a Talk." Notices of the Amer. Math. Soc. 60.2 (2013), for some useful advice.)

Here is a quick list of possible topics. The list is not exhaustive and I am open to suggestions. Some of the topics are very broad (and apparently impossible to give any justice in a 30-minute presentation; but then you can try to be creative) and some are very specific.

- (1) Multipliers of C\*-algebras via Hilbert modules.
- (2) SAW\*-algebras are tensorially indecomposable.
- (3) An amenable operator algebra that is not isomorphic to a C\*-algebra.
- (4) Reduced powers, Feferman–Vaught-style theorems.
- (5) Asymptotic sequence algebras are countably saturated (using Feferman–Vaught-style theorem).
- (6) Failures of countable saturation in the Calkin algebra.
- (7) Gaps (in coronas and/or in  $\mathcal{P}(\mathbb{N})/\text{Fin}$ ).
- (8) Embedding into ultrapowers:
  - (a) Connes Embedding Problem
  - (b) Kirchberg’s Embedding Problem.
  - (c) MF algebras and QD algebras.
- (9) Voiculescu’s theorem.
- (10) Weyl–von Neumann–Berg–Sikonia Theorem.
- (11) Basics of BDF theory.
- (12) Basis of KK-theory.
- (13) The  $2 \times 2$  matrix trick.
- (14) C\*-algebras with approximately inner flip and their ultrapowers
- (15) Any application to classification.