JUVITOP: PRE-TALBOT

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Contents

0.1. **Talk 1: Sander.** Overview of moduli spaces of manifolds.

0.2. **Talk 2: Lucy.** Definitions of moduli spaces of manifolds as in [3] and Miller-Mumford-Morita classes. Sections 2 of [2]. Statement of Mumford conjecture. Relation of Mumford conjecture to 2-dimensional case of theorems Sander mentioned

0.3. **Talk 3: Robin.** Group completion. This is like Talk 4 from the Talbot list, but only the first two paragraphs on their syllabus. Actually give a sketch/proof of the group completion theorem. If you have time, talk about relation of group completion to homological stability? See also Theorem 20.29 in [5] and [7] For the group completion theorem for topological categories, see Lemma 4.17 of [1].

0.4. **Talk 4: Dexter.** Barratt-Priddy-Quillen-Segal theorem. This should talk about delooping and the scanning map. Put things together with group completion to prove BPQS. Say we'll eventually see this as a 0-dimensional case of things. See Sander's class notes [5] Lecture 32.

0.5. **Talk 5.** Cobordism categories. Define cobordism categories like Talk 1 of Talbot. Explain how 0-dimensional relates to BPQS and how 2-dimensional relates to Mumford conjecture. What's 1-dimensional? Relate cobordism categories to moduli spaces of manifolds. Maybe state GMTW.

0.6. **Talk 6.** Group completion for cobordism categories. This is the rest of Cob. Cat. Talk 4 from Talbot. Focusing on 2-dimensions and the [6] reference.

0.7. **Talk 7.** Positive scalar curvature. Give the necessary background for homotopy theorist to understand what scalar curvature should feel like. Give lots of examples and pictures.

0.8. **Talbot Week.**

0.9. **Post Talbot.** Post-Talbot will be on [3].

References

[1] Galatius, S. *Stable homology of automorphism groups of free groups.*

[2] Galatius, S. and Randal-Williams, O. *Moduli spaces of manifolds: a user's guide.*

[3] Galatius, S. and Randal-Williams, O. *Monoids of moduli spaces of manifolds.*

[4] Galatius, S. and Randal-Williams, O. *Stable moduli spaces of high-dimensional manifolds.*

[5] Kupers, A. *Lectures on diffeomorphisms groups of manifolds.*

[6] Madsen, I. and Tillman, U. *The stable mapping class group and $Q(\mathbb{CP}^\infty_+)$.*

[7] Miller, Jeremy and Palmer, Martin. *A twisted homology fibration criterion and the twisted group-completion theorem.*