

## Math 996; Spring 2008: Topics in 3-dimensional Topology

This will be a selection of topics from classical and modern three-dimensional topology with particular emphasis in knot theory. Topics will be chosen from: Covering spaces and abelian invariants; Toroidal decompositions and geometric structures of knot complements; Polynomial invariants, Quantum group invariants and relations with geometric structures; Vassiliev invariants and the Kontsevich integral; Khovanov Homology.

If you have any questions or you want more details on the contents please contact e-mail me or stop by my office. In the mean time here are some references that can give you an idea of the flavor of the topics to be discussed (we will NOT cover ALL these references in the class).

### Some references:

- [1]. D. Rolfsen: KNOTS AND LINKS. publish or perish, 1978.
- [2]. J. Hempel: 3-MANIFOLDS. Annals Math Stud # 86, PUP
- [3]. V. Prasolov and A. Sossinsky: KNOTS, LINKS, BRAID AND 3-MANIFOLDS. An introduction to the new invariants in low-dimensional topology. Transl. of Math. Monographs, AMS.
- [4]. P. Scott: THE GEOMETRIES OF 3-MANIFOLDS. Bull. London Math. Soc. 15 (1983), 401-487
- [5]. D. Bar-Natan: ON THE VASSILIEV KNOT INVARIANTS. Topology 34 (1995) 423-472.
- [6]. D. Bar-Natan: ON KHOVANOV'S CATEGORIFICATION OF THE JONES POLYNOMIAL. Algebraic & Geometric Topology 2 (2002) 337-370.
- [7]. E. Kalfagianni and X.-S. Lin: THE HOMFLY POLYNOMIAL FOR LINKS IN RATIONAL HOMOLOGY SPHERES. Topology Vol 38 (1), 95-115 (1999).
- [8]. O. Dasbach, D. Futer, Kalfagianni, X.-S. Lin and N. Stoltzfus: THE JONES POLYNOMIAL AND GRAPHS ON SURFACES. arXiv:math/0605571
- [9]. Futer, Kalfagianni, Purcell: DEHN FILLING, VOLUME AND THE JONES POLYNOMIAL. arXiv:math/0612138v2.
- [10]. D. Thurston: HYPERBOLIC VOLUME AND JONES POLYNOMIAL. <http://www.math.columbia.edu/~dpt/speaking/index.html>.