Gap probabilities and applications to geometry and random topology

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What is the volume of the set of singular symmetric matrices of norm one? What is the probability that a random plane misses this set? What is the expected "topology" of the intersection of random quadric hypersurfaces? In this talk I will combine classical techniques form algebraic topology ("spectral sequences") with ideas from Random Matrix Theory and show how these problems can be solved using a local analysis of the "gap probability" at zero (the probability that a random matrix has a gap in its spectrum close to zero).

Joint work with Erik Lundberg (Florida Atlantic University).