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	Sommario/riassunto	These notes, based on lectures delivered in Saint Flour, provide an easy introduction to the authors' 2007 Springer monograph "Random Fields and Geometry." While not as exhaustive as the full monograph, they are also less exhausting, while still covering the basic material, typically at a more intuitive and less technical level. They also cover some more recent material relating to random algebraic topology and statistical applications. The notes include an introduction to the general theory of Gaussian random fields, treating classical topics such as continuity and boundedness. This is followed by a quick review of geometry, both integral and Riemannian, with an emphasis on tube formulae, to provide the reader with the material needed to understand and use the Gaussian kinematic formula, the main result of the notes. This is followed by chapters on topological inference and random algebraic topology, both of which provide applications of the main results.