

# New Frontiers in Random Geometric Graphs

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Random geometric graph theory and continuum percolation are closely related topics that began over half a century ago in pioneering work of E.N. Gilbert. The objects of study are mathematical network models formed over some random set of points in a geometric space (the plane, say) according to some rule (join points within distance  $r$ , say). By their very definition, these models arise naturally in many contexts, for instance in stochastic optimisation, in machine learning, and in the analysis of real networks (like wireless ad-hoc or social networks). They are thus the focus of intensive study from many perspectives using tools from combinatorics and graph theory, probability and statistical physics, algorithms and optimisation, analysis and geometry, and more.

In this four-day workshop, we gathered together some of the most active and influential researchers in the field, with representation of all the above-mentioned areas and perspectives, and participants visiting from several parts of North America and Europe. There were six keynote lectures, by Aldous (Berkeley), Diaz (UPC Barcelona), Meester (VU Amsterdam), Penrose (Bath), Steele (UPenn), and Yukich (Lehigh), and 28 short research talks. The emphasis was on active exchange of new ideas and techniques and there was plenty of healthy discussion, and collaboration between researchers that had not previously met. This no doubt was facilitated by the relaxed and collegial atmosphere at the Lorentz Centre, by the keynote lectures which focused on open questions, and by Monday's problem session chaired by Devroye (McGill). One of the problems posed by Penrose was reportedly solved before the week was out, which underlines the level of interaction at the meeting. Based on other feedback we fully expect other new collaborations to stem from this meeting.

This workshop provided a useful platform to view future directions for research in the area. Given the even mix of younger and more established scientists, and of different fields, it was an excellent opportunity for many parties to gain new perspectives. An idea mentioned several times, which is new but gaining traction, is the study of models that begin to depart from traditional Euclidean geometric models. We eagerly anticipate further developments in this direction.

Fun (demographic) facts:

Out of the 50 registered participants, there was a roughly even division of affiliations into four regions: North American, British, Dutch and other European (France, Germany, Spain, Sweden). About a quarter were young researchers (doctoral or early postdoctoral) and a quarter full professors. Twenty nationalities were represented.

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