

## A foreword from the Editors-in-Chief

Graph theory is a fast-evolving subject in mathematics. Although its history is relatively short in comparison to other areas of mathematics, research in graph theory has been intense and tremendously exciting since the beginning of the 20th century. Many important results were proved, leading to firm establishments of several subbranches of graph theory. Some early instances include Menger's theorem (1927), which led to further studies of *connectivity in graphs*; König's theorem (1931) and Hall's theorem (1935), which resulted in further studies of *matchings in graphs*; and Túran's theorem (1941), which is one of the earliest results in *extremal graph theory*. In addition, the notion of the chromatic number dates back to the late 19th century, when the four colour conjecture was postulated, and then famously solved more than a century later by Appel and Haken (1976) with a computer aided proof. The theory of the chromatic number of graphs, along with Ramsey's theorem (1930), form two major cornerstones in the subbranch of *graph colourings*.

The subject of combinatorics is a natural counterpart to graph theory in the area of *discrete mathematics*, with the topic of *hypergraphs* playing a central role in bridging the two. In addition, connections between graph theory and several other areas of mathematics have been established throughout the 20th century. Notably, the relationship between graph theory and probability theory is remarkably strong, leading to the theory of *random graphs*, and the emergence of the *probabilistic method*. Also, any aspect of graph theory with an algebraic influence, such as the study of the eigenvalues of the adjacency matrix of a graph, graphic polynomials, and group-like structures such as Cayley graphs, can be classified in the subbranch of *algebraic graph theory*. Likewise, any aspect of graph theory with topological ideas, such as the notion of embedding graphs onto surfaces, belongs to the subbranch of *topological graph theory*.

Going another step further, connections of graph theory to several other areas of science were also developed. Naturally, there is the relationship with *network science*, which itself lends applications to other disciplines including particle physics, electrical engineering, biology, economics, and operational research. In recent years, there has been a lot of activity among graph theorists regarding the application of graph theory to statistical mechanics, computer science and social science, where research in *complex*

*networks* has generated a lot of interest. Another significant application is to chemistry, which resulted in the establishment of *chemical graph theory*. Here, a central object of interest is a chemical graph, which is a graphic representation of a molecule where atoms and bonds are represented by vertices and edges, respectively.

Graph theory, as we know it today, is living through a very exciting era. With great pleasure, we announce the launch of *International Journal of Graph Theory and its Applications* (IJGTA), a peer-reviewed journal that publishes original high-quality research articles as well as other contributions including survey papers, short papers (notes), open problems, and book reviews. The goal of IJGTA is primarily two-fold: to publish articles that (a) advance the research of any aspect of graph theory; and (b) explore the connection of graph theory with other areas of mathematics or other scientific subjects. This journal has been launched thanks to the joint efforts of its editorial board, contributors, and Mili Publications. Further information on IJGTA, including guidelines for submitting a manuscript, can be found at <http://www.mililink.com/index.php>, and on the inside front cover of every issue. We hope that IJGTA will become a leading international journal in the field of graph theory. The editorial board of IJGTA and the staff of Mili Publications are working very hard to guarantee timely, professional and thorough reviews of the manuscripts received.

It remains for us to wish that our readers will find the articles of IJGTA both enjoyable and fruitful.

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Editors-in-chief

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