

Special Issue in honor of Fan Chung



This special issue of *Pure and Applied Mathematics Quarterly* is in honor of Professor Fan Chung. After finishing her undergraduate studies at National Taiwan University, Professor Chung earned her PhD in 1974 from the University of Pennsylvania under Herb Wilf. Her career saw two major arcs, first in industry at Bell Labs and Bellcore where she served as Division Manager of Mathematics. The second phase of her career saw her rejoining academia, first at the University of Pennsylvania and then at UCSD.

Professor Chung's research has been both broad and deep, touching on nearly every area of modern combinatorics ranging from Ramsey theory, to random graphs and probabilistic methods, to spectral graph theory and theoretical computer science.

Her celebrated work with Graham and Wilson developed the notion of quasirandom graphs, proving that a host of properties satisfied (with high probability) by random graphs are actually deterministically equivalent. This work, and later generalizations to hypergraphs and other discrete structures,

is a starting point to the modern study of graph limits and is central in extremal graph theory.

Her work on spectral graph theory, especially regarding the properties of the normalized Laplacian, has seen important theoretical and algorithmic applications. Especially striking are the analogies developed, some in joint work with S.-T. Yau, between the spectral theory of the normalized Laplacian and the Laplace-Beltrami operator on Riemannian manifolds. Her book on the topic, *Spectral Graph Theory*, has influenced myriad mathematicians and computer scientists.

Her later work on random graph models for complex networks and related work, helped put the mathematics of complex networks on a solid mathematical footing. Again, her book on the topic with Linyuan Lu, *Complex Graphs and Networks*, has become an important reference for researchers in the field.

We thank Prof. Chung for her leadership in research, her mentorship, and her friendship and are pleased to dedicate this issue in her honor.

Paul Horn, Yong Lin, and Linyuan Lu