FOREWORD

Ron Graham finished his PhD in combinatorial number theory in 1962 under the direction of Derrick Lehmer and then immediately proceeded to work at Bell Labs. In the summer of 1963 a professor from Purdue reached out to Ron to encourage him to take an assistant professorship and told him, "You'll be dead mathematically in a couple years if you stick to industry." Ron did not take that advice and stayed at Bell Labs for another 36 years before retiring (also holding visiting positions at Stanford, UCLA, Princeton, Rutgers, and others during this time); after this first retirement he took a position at UC San Diego for another 20 years. Over the course of nearly six decades, Ron had one of the most amazing mathematical lives of the twentieth century. During his career he produced over 400 publications, held positions on numerous editorial boards and committee assignments, gave countless talks around the world, was awarded multiple honors and degrees, and helped to firmly bring discrete mathematics to the prominence it experiences today.

Ron's mathematical interests were not easy to pigeonhole. He started off working in combinatorial number theory, including Egyptian fraction problems (which is how he first connected with Paul Erdős). At Bell Labs he quickly expanded into a combination of the practical (which included scheduling, bin packing, vertex labelings, and Steiner tree problems), as well as the more esoteric[1] (including finite semigroups, geometrical packing problems, and Ramsey theory (which became a major focus of his work)). Many of his papers had a strong geometrical flavor including an efficient algorithm for finding a convex hull (the "Graham scan" which became one of his most cited works and helped to open up the field of computational geometry; though when Ron wrote the paper he considered it a "throw-away result"), the largest small hexagon (the hexagon of unit diameter with maximum area[2] — it is not the regular hexagon!), Apollonian circle packings, and many more. Ron also was able to mathematically explore "fun" topics that included card shuffling and magic[3], guessing games, and juggling.[4]

The contributions in this volume reflect some of the diverse range of mathematical interests of Ron; he would have delighted to leaf through these papers, see their results, and talk about them with friends and colleagues. These contributions also speak of Ron's ability to reach out and touch so many lives. Among mathematicians he had a nearly singular prowess in being able to connect with people, and then to

[1]The fact that AT&T enjoyed a monopoly resulted in giving the Bell Labs employees some flexibility in their research.

[2]Joel Spencer liked this result so much he built a sandbox using this shape for his children.

[3]This is exemplified most prominently in the book *Magical Mathematics* written by Persi Diaconis and Ron Graham

[4]Ron at one point served as president of the International Jugglers Association and was also instrumental in the development of the juggling pattern Mill's Mess.

help push them to be better, to connect them with problems and opportunities, and to delight and amaze them. His zest for playful, yet focused learning, whether it be of mathematics, Chinese, table tennis, trampolining or *Dance, Dance, Revolution*, was infectious.

We were fortunate to have been inspired by the work and life of Ron Graham, and by his example of how transformative a mathematician can be.

– *Steve Butler & Glenn Hurlbert*