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Foreword

Special Issue In Memory of Jeff Remmel

Part 1 of the double issue

This is the first of two special issues of *Journal of Combinatorics* commemorating the life and legacy of Professor Jeffrey Brian Remmel (October 12, 1948–September 29, 2017). The breadth, depth, and sheer quantity of Jeff Remmel's cumulative mathematical output is truly astounding. Jeff produced over three hundred refereed journal articles in the fields of logic, combinatorics, computer science, and hybrid control theory. Even now, Jeff's total publication count continues to increase as his many coauthors finish ongoing joint research projects. In this very issue, you will find a new article coauthored by Jeff on pattern avoidance in ordered set partitions.

Before getting too enthralled by Jeff's elegant mathematical pursuits, we must pay our respects to the human impact of such a great mentor, teacher, and friend. Jeff Remmel trained 32 Ph.D. students, inspired hundreds of graduate students, and taught thousands of undergraduates during his 43 years of service in the Mathematics Department of the University of California at San Diego. He worked tirelessly and enthusiastically with over 100 collaborators throughout his long career as a research mathematician. He leaves behind many colleagues who admire him, friends who miss him, and a family who loves him dearly. His tragic and untimely passing in September 2017 saddened us all.

Though Jeff is no longer with us, we take comfort from the fact that his mathematical achievements and discoveries will last forever. To celebrate and memorialize Jeff's work, many of his students, coauthors, and colleagues have contributed original research articles on a variety of combinatorial topics. In "Line configurations and r-Stirling permutations," Brendon Rhoades and Andrew Wilson define coinversion codes on ordered set partitions that are related to graded rings realizable as the cohomology rings of certain varieties of line configurations. These codes lead to simpler proofs of more general results compared to the earlier work of Haglund, Rhoades, and Shimozono. The article "Patterns in words of ordered set partitions" by Dun Qiu and Jeff Remmel studies pattern avoidance properties of sets of ordered set partitions with a fixed number of blocks. The authors also analyze three new descent statistics on these set partitions.

The next three papers all have a graph-theoretic flavor. "On k-11-representable graphs" by Gi-Sang Cheon, Jinha Kim, Minki Kim, Sergey Kitaev, and Artem Pyatkin studies a generalization of word-representable graphs introduced by Jeff Remmel in 2017. These authors show that any graph is 2-11-representable by a concatenation of permutations, whereas the 1-11-representable graphs that can be represented by uniform words with two copies of each letter are precisely the interval graphs. "Hypergraphic polytopes: combinatorial properties and antipode" by Carolina Benedetti, Nantel Bergeron, and John Machacek defines a bijection between acyclic orientations of certain contracted hypergraphs and faces of a corresponding hypergraphic polytope. This bijection has interesting applications including a geometric interpretation of the antipode map of a Hopf algebra on hypergraphs. "Independence posets" by Hugh Thomas and Nathan Williams contains a novel construction of a partially ordered set from an acyclic directed graph. The order relation here (called a flip operation) is motivated by the representation theory of finite-dimensional algebras. The authors characterize the graphs for which the associated independence poset is a lattice, and they prove the poset must actually be a trim lattice in this case.

Approximately half of Jeff Remmel's research papers study mathematical logic, so we would be remiss not to include at least one article connecting combinatorics and logic. S. Gill Williamson has contributed a remarkable work on this topic, "Combinatorics in ZFC Limbo." Extending prior joint results with Remmel, this paper proves a combinatorial statement about subset sum problems that is conjectured to be independent of the usual (ZFC) axioms for set theory. The given proof relies upon Harvey Friedman's Jump Free Theorem, which is known to be independent of the ZFC axioms. Gill's work has the added interest of being the first time that theorems proven by large cardinal arguments have been linked to the P versus NP problem.

In closing, I would like to extend my heartfelt thanks and appreciation to all the authors, anonymous referees, editors, and other journal staff who made this special issue possible. I particularly acknowledge the efforts of principal *JOC* editors Fan Chung Graham and Jennifer Morse. I am certain that Jeff Remmel would be proud of all the work everyone has done to honor him. With humility and respect, I dedicate this issue to his memory.

Guest editor
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