Preface

Dennis Sullivan was born in Port Huron, Michigan, on February 12, 1941. Since he grew up in Houston, Texas, he has always considered himself a Texan. He is now the Einstein chair at CUNY Graduate Center and a Distinguished Professor at SUNY Stony Brook.

Sullivan is internationally renowned for his work in topology and in dynamical systems. He was awarded the Oswald Veblen Prize in Geometry in 1971, the Prix Élie Cartan of the French Academy of Sciences in 1981, the King Faisal International Prize for Science in 1994, the US National Medal of Science in 2004, the AMS Steele Prize for Lifetime Achievement in 2006 and the Wolf Prize in Mathematics in 2010. The citation of the Wolf prize gives a good summary of his work:

"Dennis Sullivan has made fundamental contributions in many areas, especially in algebraic topology and dynamical systems. His early work helped lay the foundations for the surgery theory approach to the classification of higher dimensional manifolds, most particularly, providing a complete classification of simply connected manifolds within a given homotopy type. He developed the notions of localization and completion in homotopy theory, and used this theory to prove the Adams Conjecture (also proved independently by Quillen). Profs. Sullivan and Quillen introduced the rational homotopy type of space. Sullivan showed that it can be computed using a minimal model of an associated differential graded algebra. Sullivan's ideas have had far-reaching influence and applications in algebraic topology.

"One of Sullivan's most important contributions was to forge the new mathematical techniques needed to rigorously establish the predictions of Feigenbaum's renormalization, as an explanation of the phenomenon of universality in dynamical systems. Sullivan's 'no wandering domains theorem' settled the classification of dynamics for iterated rational maps of the Riemann sphere, solving a 60 year-old conjecture by Fatou and Julia. His work generated a surge of activity, by introducing quasiconformal methods to the field and establishing an inspiring dictionary between rational maps and Kleinian groups of continuing interest. His rigidity theorem for Kleinian groups has important applications in Teichmuller theory and for Thurstons geometrization program for 3-manifolds. His recent work on topological field theories and the formalism of string theory can be viewed as a byproduct of his quest for an ultimate understanding of the nature of space, and how it can be encoded in strange algebraic structures.

"Sullivan's work has been consistently innovative and inspirational. Beyond the solution of difficult outstanding problems, his work has generated important and active areas of research, pursued by many mathematicians."

The citation of the 2004 National Medal of Science for Professor Sullivan also emphasized the depth and originality of his work:

"For his achievements in mathematics, including solving some of the most difficult problems and creating entirely new areas of activity, and for uncovering striking, unexpected connections between seemingly unrelated fields."

On the occasion of the seventieth birthday of Professor Sullivan, the editors of PAMQ decided to publish two special issues in his honor. We hope these special issues convey a sense of the great impact of his work, as well as the deep admiration and respect of his fellow mathematicians towards him.

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