

Editorial

This Special Issue is devoted to the activities surrounding “Arrangements in Boston: A Conference on Hyperplane Arrangements,” which was held at Northeastern University, June 12–15, 1999. Participants included prominent researchers and young mathematicians, both from within the field of hyperplane arrangements, and from related areas. There were 28 invited talks, as well as a poster session, with some 10 posters. In all, there were close to 80 participants, including a foreign contingent of approximately 20, from France, Germany, Israel, Italy, Japan, Mexico, and Romania.

The study of arrangements is a relatively new branch of mathematics on the interface between topology, algebra, algebraic geometry, combinatorics, and the theory of hypergeometric functions. In the recent past, researchers in the field have enjoyed the benefits of approximately one international meeting per year devoted to arrangements. The objectives of the conference were to continue this tradition of providing an annual forum for the lively discussion of recent results in the field, and to promote dissemination of information and cross-fertilization, not only within arrangement theory, but also between this field and others.

The papers collected in this Special Issue represent a cross-section of some of the results and ideas that were discussed at the conference, with special emphasis on topological aspects of the theory of arrangements.

Origins of the topological study of arrangements may be found in seminal work of Fadell, Fox, and Neuwirth on configuration spaces and braid groups in the early 1960’s. The configuration space of n ordered points in the plane is an Eilenberg-MacLane space for Artin’s pure braid group on n strings, and may be realized as the complement of the reflection arrangement of type A_{n-1} . The cohomology of this configuration space was independently computed by Arnol’d and Cohen. Arnol’d’s calculation was generalized by Brieskorn to complements of arbitrary complex hyperplane arrangements. In turn, Orlik and Solomon interpreted the cohomology ring of the complement in terms of a purely combinatorial object: the intersection lattice of the arrangement.

The relationship between combinatorial and topological aspects of arrangements uncovered by this sequence of results remains to this day a central theme in the subject. Indeed, this relationship plays a significant role in a number of papers in this Issue. Connections to braid groups, Coxeter groups, configuration spaces, and their generalizations also remain a vital and fertile aspect of the topological theory of arrangements. These connections are in evidence in several papers appearing here. Other papers explore relations to areas of topology and geometry such as homotopy theory, knot theory and Vassiliev invariants, hyperbolic geometry, and singularity theory.

Local coefficient systems on complements of arrangements have been the subject of considerable attention in recent years. This attention is due in part to the role played by these structures in the Aomoto-Gelfand theory of multi-variable hypergeometric integrals, of interest in mathematical physics. Local systems also arise in the singularity theory of arrangements. There is a Milnor fibration associated to a central arrangement, the topology of which may be studied using a local system on the complement. A unified framework for such studies is provided by the characteristic and resonance varieties, jumping loci for local system cohomology and a related combinatorial cohomology theory, respectively. All of these ideas are pursued in papers appearing in this Issue.

The “Arrangements in Boston” conference benefitted from the financial support of the National Science Foundation and Northeastern University. We thank both institutions. Thanks are also due to David B. Massey, who organized the conference with us, and to Donna Marlowe, who took care of many practical aspects. We also thank Richard Sher and Jerry E. Vaughan, the managing editors of *Topology and its Applications*, for their support in putting together this volume. Finally, we thank the participants, authors, and referees for their roles in making the conference a success, and for bringing about this Special Issue.

Daniel C. Cohen and Alexander I. Suci, *Guest Editors*
Baton Rouge and Boston