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• **In Memoriam: Matatyahu Rubin.** Matatyahu (Mati) Rubin passed away on February 6, 2017, at the age of 70, after a struggle with lung cancer. He was a remarkable, devoted, mathematician and a unique person. He contributed to set theory and model theory, ordered algebraic structures, and general topology, but most significantly to the theory of Boolean algebras and to the study of reconstruction problems. His contributions to the study of the problem of reconstructing various structures from groups of their automorphisms have, by now, become a fundamental part of the theory and a standard tool in the study of the problem.

Born in Tel-Aviv, Israel in 1946, Mati received his education at the Hebrew University of Jerusalem. An extremely thorough and assiduous scholar, Mati decided that to truly understand first order logic, he had to study at depth a specific example. In his M.Sc. thesis under the supervision of Gaifman, he investigated the theory of linear orders. Despite being a well known example already studied by central figures in the field, Mati obtained significant new results. His first published paper *Theories of linear order*, based on this work, is still a standard reference in the subject, and a canonical example of classical model theoretic analysis (in the spirit of Tarski and Robinson) without good quantifier elimination.

Following Gaifman's advice, Mati started his Ph.D. as Shelah's first student, upon the latter's arrival at the Hebrew University. His dissertation *On Boolean Algebras and Their Automorphism Groups*, already touched upon the main themes that would occupy Mati throughout his career: Boolean algebras, automorphism groups and reconstruction problems. The problem of reconstructing a Boolean algebra from its group of automorphism was formulated by Monk in 1975, with rudimentary answers due to Monk and McKenzie (around 1977). Mati's work greatly extended the subject in several directions.

In view of McKenzie's (and independently Shelah's) proof that Boolean algebras, in general, cannot be reconstructed from their automorphism groups, Mati embarked on a long term project of finding the most general homogeneity conditions for which reconstruction theorems do exist. Realizing that in most cases the reconstruction results he obtained did not depend on the group G, he worked with the full group of automorphisms. Mati also started studying sufficient conditions for groups of automorphisms from which homogeneous enough Boolean algebras could be reconstructed. It is one of Mati's most striking results that the most important of those conditions is first order expressible in the language of groups (i.e., not even in the language of permutation groups). Mati's work on the subject continued during his 1977 assistant professorship in Boulder, Colorado, and upon his return in 1978 to Israel, as a lecturer at Ben Gurion University. This work, culminated in a fairly complete solution of Monk's problem in his 1989 paper, *On the reconstruction of Boolean algebras from their automorphism groups*, which appeared in the Handbook of Boolean algebras.

Rubin's contributions to the theory of Boolean algebras was not limited to reconstruction problems. One of his best works on the subject appeared as *A Boolean algebra with few subalgebras, interval Boolean algebras and retractiveness'*, where, using $\diamond$, Mati constructed a restrictive Boolean algebra B of cardinality $\aleph_1$ with only $\aleph_1$ sub-algebras, and such that B is not embeddable in an interval algebra, refuting conjectures of Monk, McKenzie and Rotman.

Mati's character as a meticulous, hard working and independent researcher manifested itself already as a student. During his Ph.D. he deliberately steered away from directions suggested to him by Shelah, in order to maintain his independence as a researcher and pave his own path in mathematics. When faced with tough problems which others would have set aside for a later time, Mati never gave up. He chain smoked his way through long days and nights of hard work, until the problem was solved.

After a decade or so of work around the reconstruction of Boolean algebras, Rubin realized its solution

could help in many other reconstruction problems. Expanding significantly the seminal work of Whittaker on the reconstruction of Euclidean manifolds, Mati introduced the notion of *local movement systems* and proved a reconstruction theorem for such systems. In his 1989 paper *On the reconstruction of topological spaces from their groups of homeomorphisms* Mati re-proved via his new method basically all known results in the area and obtained many spectacular new results concerning groups of differentiable and Lipschitz homeomorphisms of differentiable manifolds, groups of measure-preserving automorphisms of measure algebras, and groups of automorphisms of certain linear orderings and Boolean algebras.

Expanding the scope of his techniques Mati addressed reconstruction problems for trees in his 1993 monograph, *The reconstruction of trees from their automorphism groups*, and for $\aleph_0$-categorical structures, Banach spaces, and more in his 2005 research monograph, written in collaboration with Y. Yomdin, *Reconstruction of manifolds and subsets of normed spaces from subgroups of their homeomorphism groups*.

In 1988 Rubin was diagnosed with cancer for the first time. He fought the disease fiercely, never stopping to work (or to smoke), coming to his office even on the day he received chemotherapy treatments.

As the son of Hanan Rubin, a socialist leader who served in the Kneset (the Israeli parliament) for 13 years, Mati was a socially aware person, who never created any distance between himself and his students, as witnessed by the ever overflowing crowd of students attending his office hours. His graduate students became his friends and collaborators.

About a year after his retirement in 2015, Rubin was diagnosed with cancer for the second time. As in the first time, he fought the disease, he kept working, and remained optimistic. Unfortunately, the disease and the harsh treatments overcame him. He will be greatly missed by his colleagues at Ben Gurion University, his many co-authors, with whom he was always keen to cooperate and share his knowledge, and his friends.