1046-05-1281 **Philip Matchett Wood*** (`matchett@math.rutgers.edu`), Department of Mathematics, Rutgers University, Hill Center for the Mathematical Sciences, 110 Frelinghuysen Rd., Piscataway, NJ 08854, and **Linh Tran** and **Van Vu**. *Structure and Randomness in Additive Combinatorics.*

In this talk, we will discuss the dichotomy between structure and randomness and the roll it plays in recent work on a few problems in additive combinatorics. Two problems that will be discussed are (1) demonstrating that the cardinality of $A\widehat{+}A := \{a+b : a,b \in A \text{ and } a \neq b\}$ is small only when A is close to an arithmetic progression (this is the inverse Erdős-Heilbronn problem) and (2) proving a conjecture due to Noga Alon that determines, for integers $n \leq m \leq n^2$, just how dense a subset $A \subset \{1,2,\ldots,n\}$ must be so that m can be represented as a sum of distinct elements of A. For both of these problems, we will discuss a sense in which either a common case occurs and the behavior is essentially random, or a rare case occurs and the behavior is highly structured. This common thread of separating the structured and random cases has lead to recent results for both problems. Joint work with Linh Tran and Van Vu. (Received September 15, 2008)