1135-39-2360 **Steven J Miller*** (sjm1@williams.edu), **Yujin Kim**, **Shannon Sweitzer**, **Eric Winsor** and **Jianing Yang**. *Distributions in Generalized Zeckendorf Decompositions.*

Zeckendorf's Theorem states that every positive integer has a unique decomposition as a sum of nonadjacent Fibonacci numbers. This property can be used to define the Fibonacci numbers, and thus it's natural to study extensions to other recurrence sequences and decomposition laws. Previous work generalized to legal decomposition where we have infinitely many bins, all of length b, and one chooses at most 1 element from a bin and never elements from 2 consecutive bins (the Fibonaccis are the case $b = 1$). In addition to unique decomposition, these sequences led to Gaussian behavior in the distribution of number of summands in decompositions, and geometric decay in the probability of gap lengths. We extend these arguments to allow the bin sizes to vary. Previous combinatorial techniques are no longer applicable, and we use the Lyapunov Central Limit Theorem to prove Gaussian behavior for the number of summands in a decomposition. Gaussian behavior is also observed when we generalize Zeckendorf decompositions by extending the legal number of summands chosen from the n-th bin to a set A_n. We further generalize by examining cases where we place adjacency conditions on the bins, where we rely on a version of the CLT for dependent random variables to study the limiting behavior. (Received September 26, 2017)