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**Joshua Cooper** and **Danny Rorabaugh\*** (rorabaugh@mast.queensu.ca). *Homomorphism densities in free words.*

Word  $W$  is said to *encounter* word  $V$  provided there is a homomorphism  $\phi$  mapping letters to non-empty words so that  $\phi(V)$  is a substring of  $W$ . For example, taking  $\phi$  such that  $\phi(J) = Sea$  and  $\phi(M) = t$ , we see that “Seattle” encounters “JMM” since  $Seatt = \phi(JMM)$ . The density of  $V$  in  $W$ ,  $\delta(V, W)$ , is the proportion of substrings of  $W$  that are homomorphic images of  $V$ . So the density of “JMM” in “Seattle” is  $3/\binom{8}{2}$ .

This talk features several asymptotic results about the densities of words in random words, beginning with the following dichotomy. Let  $V$  be a word,  $\Sigma$  a finite alphabet with at least 2 letters, and  $W_n \in \Sigma^n$  chosen uniformly at random.  $\lim_{n \rightarrow \infty} \mathbb{E}(\delta(V, W_n)) = 0$  if and only if  $V$  is doubled (i.e., every letter in  $V$  appears at least twice). (Received September 22, 2015)