1135-05-2233 **Omar A. AbuGhneim**, **Dylan Peifer*** (djp282@cornell.edu) and **Ken W. Smith**. *All (96, 20, 4) Difference Sets.*

A $\langle v, k, \lambda \rangle$ difference set is a nonempty proper subset D of a finite group G such that $|G| = v$, $|D| = k$, and each nonidentity element of G can be written as $d_i d_j^{-1}$ for $d_i, d_j \in D$ in exactly λ different ways. In 1978, Robert Kibler at the National Security Agency in Fort Meade, Maryland published a description of all noncyclic difference sets with $k < 20$. Kibler's decision to stop his extensive computer search for difference sets at block size 19 was motivated partly by the difficult barrier at $k = 20$, the difference sets with parameters (96, 20, 4). In this talk, we announce the completion of the search for all (96, 20, 4) difference sets in the 231 groups of order 96, relying on the computer software GAP and the work of numerous authors over the last few decades. We also introduce a GAP package that implements a general algorithm for exhaustively enumerating all difference sets in any group, and discuss its strengths and limitations. (Received September 25, 2017)