1139-37-175 **Steven J Miller*** (sjm1@williams.edu), Williams College, Williamstown, MA 01267. *Benford's Law and the 3x+1 Problem, or: Why the IRS cares about Discrete Dynamical Systems.*

Many systems exhibit a digit bias. For example, the first digit (base 10) of the Fibonacci numbers or of 2^n equals 1 about 30% of the time; the IRS uses this digit bias to detect fraudulent corporate tax returns. This phenomenon, known as Benford's Law, was first noticed by observing which pages of log tables were most worn from age – it's a good thing there were no calculators 100 years ago! The first digit of values of L-functions near the critical line also exhibit this bias, as do the first digit of iterates in the $3x + 1$ problem (provided the base B is not a power of two). After discussing the general theory and describing some applications of Benford's law to fraud detection, we discuss the proof for a large class of systems. For the $3x + 1$ problem the key ingredient is the rate of equidistribution of $n \log_B 2 \bmod 1$, which comes from the irrationality measure of $\log_B 2$. This work is joint with Alex Kontorovich. (Received February 08, 2018)