1155-11-175 **Lawrence C Washington*** (lcw@umd.edu), Department of Mathematics, University of Maryland, College Park, MD 20742. *Odd colossally abundant numbers and the Robin-Lagarias criterion for the Riemann Hypothesis.*

In the talk, I'll begin with abundant numbers, superabundant numbers, and colossally abundant numbers, and then discuss applications of this last sequence and variations. Colossally abundant numbers were introduced by Ramanujan in 1915. Robin used them in 1984 to show the Riemann Hypothesis is equivalent to the statement $\sigma(n) < e^{\gamma} n \log\log n$ for all $n \geq 5041$, where $\sigma(n)$ is the sum of divisors of n and γ is the Euler constant. We consider an odd number version of this result and prove that the Riemann hypothesis is equivalent to the statement $\sigma(n) < \frac{e^{\gamma}}{2} n \log\log n$ for all odd numbers $n \geq 3^4 \cdot 5^3 \cdot 7^2 \cdot 11 \cdots 67$. Lagarias modified Robin's criterion and proved the Riemann hypothesis is equivalent to $\sigma(n) < H_n + \exp H_n \log H_n$ for all $n \geq 1$, where H_n is the nth harmonic number. We establish an odd number analogue of Lagarias's criterion for the Riemann hypothesis by creating a modified harmonic series $H'_n = 2H_n - H_{2n}$ and demonstrating that the Riemann hypothesis is equivalent to $\sigma(n) \leq \frac{3n}{\log n} + \exp H'_n \log H'_n$ for all odd $n \geq 3$. (This is joint work with Montgomery Blair High School student Ambrose Yang.) (Received January 11, 2020)