Title: About Bateman-Horn Conjecture.

Abstract: Prime Number Theorem proven in 1896 independently by Hadamard and de la Vallée Poussin is a famous theorem about their density. However, is there any generalization of this theorem? As of yet, we don't know, but Paul Trevier Bateman and Roger Alan Horn proposed in 1962 their conjecture, which is far-reaching statement about primes distribution. In my talk, I will discuss what the Bateman-Horn conjecture states and emphasize its importance. I will sketch how to prove that the set $\{\frac{\sigma_1(p+1)}{\sigma_1(p)},\ p \in \mathbb{P}\}$ is dense in $[\frac{3}{2}, \infty)$ and I will try to generalize this result for $\frac{\sigma_k(p+a)}{\sigma_k(p)}$.

Talk should be based on:

[1] Soren Laing Aletheia-Zomlefer, Lenny Fukshansky, and Stephan Ramon Garcia. "The Bateman–Horn Conjecture: Heuristics, History, and Applications". In: *Elsevier* (2019).

[2] Stephan Ramon Garcia et al. "Primitive Root Bias for Twin Primes II: Schinzel-Type Theorems for Totient Quotients and the Sum-of-Divisors Function". In: *Elsevier* (2019).