UCL Undergraduate Mathematics Colloquium

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Bounded Gaps Between Primes

28th October 2022

Abstract: In 2014, Yitang Zhang proved that there exists infinitely many pairs of consecutive primes with gap less than 7×10^7, an astonishing progress towards the twin prime conjecture. Few months later, this upper bound is sharpened to 600 by James Maynard, who received Fields medal in 2022 as a result of this achievement. Although Maynard's method is essentially independent from Zhang's, their works are built upon a sieve developed by Goldston, Pintz, and Yıldırım in 2009, whose ideas turn out be motivated by a 1947 research by Atle Selberg. In this colloquium, we will launch an ambitious adventure into the impressive works of these mathematicians. Pre-knowledge in analytic number theory is not required but would be helpful.

$$\liminf_{n\to\infty} (p_{n+1} - p_n) < 7 \times 10^7$$

$$S = \sum_{N<n\le N} \left(\sum_{1\le i\le k} \chi_p(n+h_i) - l \right) \left(\sum_{\substack{d \mid Q(n) \\ d \le R}} \lambda_d \right)^2$$

$$\chi_p(n) = \begin{cases} 1 & n \text{ is prime} \\ 0 & \text{otherwise} \end{cases} \qquad \lambda_d = \mu(d) \left(\frac{\log R/d}{\log R} \right)^{k+l}$$

Speaker: **Zihao (Travor) Liu**

Location: Gordon Street (25) Maths 500
Time: **4 pm - 6 pm**