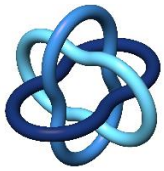

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Short citation:

James Maynard is awarded the Fields Medal 2022 for contributions to analytic number theory, which have led to major advances in the understanding of the structure of prime numbers and in Diophantine approximation.

Long citation:

James Maynard made spectacular contributions in analytic number theory. His work is highly ingenious, often leading to surprising breakthroughs on important problems that seemed to be inaccessible by current techniques.

Some of the most famous questions in number theory regard the distribution of prime numbers. While the large-scale distribution of prime numbers is governed by the Prime Number Theorem (and more precisely, but conjecturally, by the Riemann Hypothesis), many natural problems deal with short (or sparse) scales. Maynard has obtained many remarkable results in this direction. For instance, while the sequence of prime numbers generally becomes increasingly sparse, he showed that there are infinitely many "prime clusters", of any fixed size m, each contained in a bounded interval (the bound necessarily depending on m). This is a marked improvement on the famous result of Zhang, which established the case $m = 2$, which had been obtained a few months before. Maynard's method, at once elegant and powerful, pushed the boundaries of sieve theory in a particularly surprising way. In a seemingly opposite direction, Maynard went on to show that sometimes primes are much more sparse than average, a well-known Erdős problem on which no qualitative progress had been made for decades.

Maynard has also produced fundamental work in Diophantine approximation, having solved the Duffin–Schaeffer conjecture with Koukoulopoulos. This conjecture, posed in 1941, can be thought of as the ultimate generalization of Khintchine's Theorem, describing how well a typical real number can be approximated by rational ones.