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*Improved constants for Serre's open image theorem*

For an elliptic curve  $E$  over a number field without complex multiplication, Serre proved the mod  $p$  representation of  $E$  is surjective except for finitely many primes  $p$ . Assuming GRH, Mayle-Wang have recently given bounds on such primes  $p$  which are logarithmic in the conductor of  $E$  and have explicit constants. In joint work with Joshua Swidinsky, we will describe improvements to these constants using deviation groups of 2-adic representations. Other results of independent interest are improved effective isogeny theorems for certain elliptic curves over the rationals.