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**Douglas Ulmer\*** ([ulmer@math.gatech.edu](mailto:ulmer@math.gatech.edu)), School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332. *Elliptic curves of high rank and explicit points over function fields.*

We consider elliptic curves over function fields such as  $K = \mathbf{F}_p(t)$ , the rational function field over the field of  $p$  elements. Using cohomological techniques, it can be shown that there are many elliptic curves  $E$  over  $K$  with analytic rank (order of vanishing of  $L(E, s)$  at  $s = 1$ ) arbitrarily large. In many cases (but far from all) it can also be shown that the Birch and Swinnerton-Dyer conjecture holds and so the rank of the Mordell-Weil group  $E(K)$  is also large. In a still smaller collection of cases, generators for Mordell-Weil can be made quite explicit. It turns out that in at least one simple but interesting case, explicit points can be written down which lead to an essentially technology-free proof of the existence of elliptic curves over  $K$  of high rank. The goal of this talk is to explain this example and suggest some applications. (Received August 28, 2009)