1077-11-1833 **Lenny Jones*** (lkjone@ship.edu), Department of Mathematics, Shippensburg University, Shippensburg, PA 17257. *Polynomial Cunningham Chains.*

A sequence of prime numbers $p_1, p_2, p_3, \ldots$, such that $p_i = 2p_{i-1} + 1$ for all $i$, is called a *Cunningham chain.* If $k$ is the smallest positive integer such that $2p_k + 1$ is composite, then we say the chain has length $k$. It is conjectured that there are infinitely many Cunningham chains of length $k$ for every positive integer $k$. A sequence of polynomials $f_1(x), f_2(x), \ldots$ in $\mathbb{Z}[x]$, such that $f_1(x)$ has positive leading coefficient, each $f_i(x)$ is irreducible in $\mathbb{Q}[x]$, and $f_i(x) = xf_{i-1}(x) + 1$ for all $i$, is defined to be a *polynomial Cunningham chain.* If $k$ is the least positive integer such that $xf_k(x) + 1$ is reducible in $\mathbb{Q}[x]$, then we say the chain has length $k$. We prove that there are infinitely many polynomial Cunningham chains of length $k$ for every positive integer $k$, and that there are infinitely many polynomial Cunningham chains of infinite length. (Received September 21, 2011)