1116-11-144 **Alexi Block Gorman** (ablockgo@wellesley.edu), **Tyler Genao** (tgenao2013@fau.edu), **Heesu Hwang** (hshwang@princeton.edu), **Noam Kantor*** (noam.kantor@emory.edu), **Sarah Parsons** (parssy12@wfu.edu) and **Jeremy Rouse** (rouseja@wfu.edu). *The density of primes dividing a certain non-linear recurrence sequence.*

Define the sequence $\{b_n\}$ by $b_0 = 1, b_1 = 2, b_2 = 1, b_3 = -3$, and

$$b_n = \begin{cases} \frac{b_{n-1}b_{n-3} - b_{n-2}^2}{b_{n-4}} & \text{if } n \not\equiv 2 \pmod 3, \\ \frac{b_{n-1}b_{n-3} - 3b_{n-2}^2}{b_{n-4}} & \text{if } n \equiv 2 \pmod 3. \end{cases}$$

We relate this sequence $\{b_n\}$ to the coordinates of points on the elliptic curve $E : y^2 + y = x^3 - 3x + 4$. We use Galois representations attached to E to prove that the density of primes dividing a term in this sequence is equal to $\frac{179}{336}$. Furthermore, we describe an infinite family of elliptic curves whose Galois images match that of E. (Received August 06, 2015)