1023-11-456 **Edray Herber Goins*** (egoins@math.purdue.edu), Mathematical Sciences Building, 150 North University Street, West Lafayette, IN 47907-2067. *There exist infinitely many rational Diophantine 6-tuples – almost.* Preliminary report.

A set $\{m_1, m_2, \ldots, m_n\}$ of rational numbers is said to be a rational Diophantine n-tuple if $m_i\, m_j + 1$ is a perfect square for $i \neq j$. In the late 1700's, Euler showed that there exist infinitely many rational Diophantine 5-tuples. It is not known whether there exist infinitely many (nontrivial) rational Diophantine 6-tuples, although Gibbs found 45 examples in 1999.

In this talk, we use properties of the elliptic curve $E_k:\ y^2 = (1-x^2)\,(1-k^2\,x^2)$ to explain how to find an infinite family of nontrivial 6-tuples. We are motivated by Dujella's results from 2001 using properties of elliptic curves. In the process, we find families of elliptic curves having large rank for the torsion subgroup $Z_2 \times Z_4$. This is a work in progress. (Received September 13, 2006)