1086-11-2358 **Katharine Chamberlin** and **Emma Colbert***, ercolb13@g.holycross.edu, **Sharon Frechette**, sfrechet@mathcs.holycross.edu, and **Patrick Hefferman**, **Rafe Jones** and **Sarah Orchard**.
Newly Irreducible Iterates of Some Families of Quadratic Polynomials. Preliminary report.

Let K be a number field and for $f(x) \in K[x]$, let $f^n(x)$ denote the nth iterate of $f(x)$. Determining the factorization of $f^n(x)$ into irreducible polynomials has proven to be an important problem. In dynamics, it is a question about the inverse orbit $O^-(z) := \bigcup_{n\geq 1} f^{-n}(0)$ of zero, which has significance in various ways. (For instance, it accumulates at every point of the Julia set of f.) The field of arithmetic dynamics seeks to understand sets such as $O^-(z)$ from an algebraic perspective; finding factorizations of $f^n(x)$ fits into this scheme. A nontrivial factorization arises from an "unexpected" algebraic relation among elements of $O^-(z)$. In this talk, we discuss the two-parameter family of polynomials $g_{\gamma,m}(x) = (x-\gamma)^2 + m + \gamma$, for $\gamma, m \in K$, and give conditions under which the $(n+1)$st iterate of $g_{\gamma,m}(x)$ is reducible when the nth iterate is irreducible. (We refer to such $g^{n+1}_{\gamma,m}(x)$ as *newly reducible*.) In particular, for $n \geq 2$, we show that under certain conditions on γ, there are only finitely many m for which $g^{n+1}_{\gamma,m}(x)$ is newly reducible. (These results are the product of an undergraduate summer research project at College of the Holy Cross.) (Received September 25, 2012)