Speaker: Dr. Stephen Deterding  
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Zoom link: https://bit.ly/3qgbZNg

Title: Pell’s equation and the Chakravala method

Abstract: In 1657 Pierre de Fermat issued a challenge to European mathematicians to find a positive integer solution to the equation $61x^2 + 1 = y^2$. However, unknown to him, this problem had been solved over 500 years earlier by an Indian mathematician named Bhaskara II using the Chakravala method. Fermat’s challenge problem is an example of a type of equation known as Pell’s equation, which is an equation of the form $nx^2 + 1 = y^2$, where integer solutions are sought for $x$ and $y$. Pell’s equation has important applications in approximating square roots because if $x_1$ and $y_1$ are a solution pair for Pell’s equation then $\frac{y_1}{x_1}$ is a very accurate approximation to $\sqrt{n}$. The Chakravala method was developed by Bhaskara II and others as a way to solve Pell’s equation for all values of $n$. In this talk we will describe how the Chakravala method works and demonstrate its use in solving different forms of Pell’s equation.

Speaker’s webpage: https://westliberty.edu/physical-sciences-math/faculty-and-staff/stephen-deterding/
https://www.alleghenymtn.maa.org/colloquium