CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES
COLLOQUIUM

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3:00 – 4:00 PM
Maria Sanford, Room 101

SOME MATHEMATICS
OF PYTHAGOREAN TRIPLES

ROGER BILISOLY
CENTRAL CONNECTICUT STATE UNIVERSITY

Abstract: A Pythagorean triple are three integers, (a, b, c), that satisfy $a^2 + b^2 = c^2$. For example, $3^2 + 4^2 = 9 + 16 = 25 = 5^2$. If a, b, c are relatively prime, the triple is called *primitive*. This talk discusses some properties of primitive triples featuring the following. First, proving that they all have the form $(r^2 - s^2, 2rs, r^2 + s^2)$ for integers, r, s. Second, radially projecting triples onto a unit circle produces a bijection with the rational points on it. Third, representing these rational points in the form $e^{i\theta}$, there is a group isomorphism between triples and complex multiplication of rational, unit complex numbers. Last, showing the connection between primes of the form $p = a^2 + b^2$ and finding a triple where $c = p$. A computational example is done for $p = 1,000,000,021$ using Python. If you love integers, this talk is for you.

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