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Poughkeepsie Chapter of the Association For Computing Machinery

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MEETING NOTICE

Free and open to the public

Topic: **The Hunt for ABC Triples**

Speaker: **Frank Rubin**

When: **Monday, January 28th, 2019, 7:30 pm**

Where: **Marist College, Hancock Center, Room 2023**

Directions: **Building 14 on the map at www.marist.edu/about/map**

Parking: Please park at black dot #10 on www.marist.edu/about/map (the lot North of the Hancock Center #14) or in the lot on the South-East corner of Route 9 & Fulton St. (S/E of the former Main Entrance).

About the Topic: A triple A, B, C of positive integers with no common divisor d > 1 is called an *ABC Triple* if A + B = C, and the product of the distinct prime factors of ABC is less than C. Two well-known examples are $2^2 + 11^2 = 5^3$ and $3 + 5^3 = 2^7$. The product of the distinct prime factors of an integer N is called the *radical* of N, denoted rad(N). So rad(6) = rad(12) = rad(18) = rad(144) = 6. Since ABC is the product of 3 integers, one of which is C itself, rad(ABC) cannot be smaller than C unless C has several repeated prime factors, and A and B either have repeated prime factors or they are much smaller than C.

There is a direct connection between ABC Triples and Fermat's Last Theorem, because if $A^n + B^n = C^n$ with n > 2, then A^n, B^n, C^n would be an ABC Triple. The theorem states that no such triple exists. Let R = rad(ABC). The *quality* Q of the triple is defined as Q = ln(C)/ln(R). When Q > 1.4 the triple is called *good*. Good triples up to 30 digits are known. The ABC Conjecture is that for any quality Q' > 1 there are only finitely many ABC Triples with Q > Q'.

The *merit* M of a triple is defined in terms of the quality as $M = (Q - 1)^2 \ln(R) \ln(\ln(R))$. Triples with merit up to 38.67 are known. It is believed that merit can never exceed 48. Triples with M > 24 are called *high merit*. High merit triples up to 253 digits are known. A triple D + E = F is said to *beat* a triple A + B = C if F > C and D, E, F has higher quality than A, B, C. If there is no triple that beats A, B, C, then A,B,C is called *unbeaten*. Unbeaten triples up to 13,331 digits are known.

This talk will describe computer algorithms for finding high quality, high merit and unbeaten triples.

About the Speaker: Frank Rubin has an M.S. in Mathematics and a Ph.D. in Computer Science. He has been hunting for ABC Triples since 2007, finding most of the good triples over 25 digits, more high merit triples than the next 2 searchers combined, and all of the unbeaten triples over 3000 digits.

Cost: **Our meeting is Free and open to the public**

Dinner: **6:00 pm, Palace Diner, 845.473.1576**
Map and menu: www.thepalacediner.com
All are welcome to join us for dinner.

We thank Marist College for hosting the chapter's meetings.

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