C. Dwight Lahr Lecture

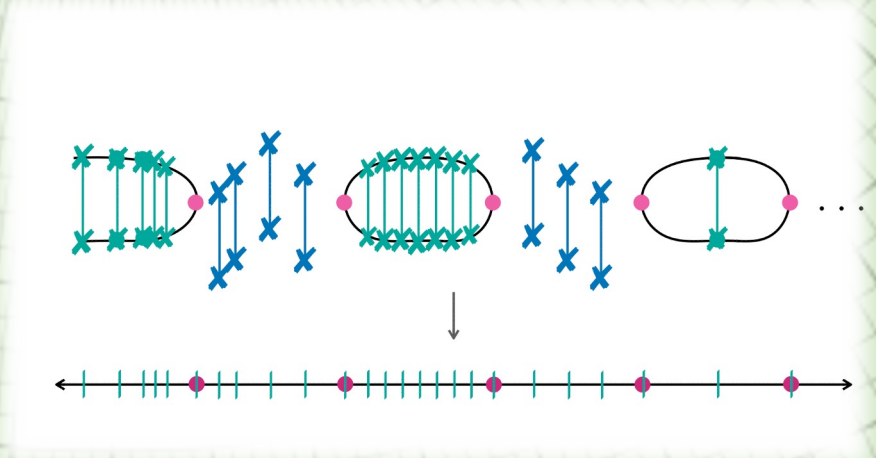
The Interplay of Geometry and Arithmetic

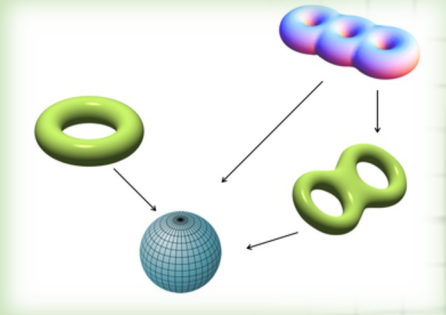
Bianca Viray, University of Washington

Tuesday, November 15 ∞ 6 pm

Haldeman 041

Bianca Viray is a Craig McKibben and Sarah Merner Professor of Mathematics at the University of Washington. Dr. Viray's research is in arithmetic geometry.





Abstract: Can you find a right triangle all of whose side lengths are whole numbers? Reaching back in your memory, you might recall from an algebra or geometry class that the side lengths have to satisfy the equation $a^2 + b^2 = c^2$, and that whole number solutions to these equations are called Pythagorean triples. So the answer is yes! And, in fact, there are infinitely many such triangles. However, there are many closely related equations that seem to have no (positive) whole number solutions. For example, there are no nonzero whole number solutions to the equation $a^n + b^n = c^n$ whenever n is at least 3, and we don't know of any whole number solutions to the so-called rational box problem: Does there exist a rectangular box where the distance between any two corners is a whole number? In this talk, I will explain our current guess as to why there is such a difference in the whole number solutions between the pythagorean triple equation and these other examples, describe some of the state-of-the-art results in this direction, and highlight some of the new frontiers in this research.

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