Bi-State Math Colloquium

Who: Mu-Ling Chang
When: Thursday, September 14, 4:00 pm
Where: Ottensman 122, UW-Platteville

Evaluation of π by Nested Radicals

Everyone who takes Calculus II knows that $e = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$. Have you ever wondered whether the irrational number π has an unexpected limit representation like e, which can be proved by using only undergraduate mathematical skills? In this talk, I will show you how to obtain the following result:

$$\pi = \lim_{k\to\infty}\left(2^{k+1}\sqrt{2-\sqrt{2+\sqrt{2+\cdots+\sqrt{2+\sqrt{2}}}}}\right)$$

which contains $k+1$ radicals. In fact, lately I found out that this formula has a long history and had been proved in 1842 by a French and Belgian mathematician Eugéne Catalan in his paper "Note sur le rapport de la circonférence au diameter." I will show you how to get the same result by a one-page proof. The contents of this talk can be found in my latest publication, in the December 2016 issue of *Mathematics Magazine*, which is a joint paper with Cristi Chang from Lakeland University.

Mu-Ling Chang joined the Mathematics Department at UW-Platteville in the fall of 2001. She is originally from Taiwan and received her Ph.D. from the University of Maryland at College Park. Her specialties are Algebraic Number Theory and Algebra. In her spare time she likes to do cooking, gardening, and "light" exercise.