MANY CHEERFUL FACTS

presents

The Mahler Conjecture and Gauss Linking Integrals

a talk by Daniel Pomerleano

2:10–3:00pm on Tuesday, October 7, in 1015 Evans.

The Mahler Conjecture is a question in convex geometry and was recently one of Terence Taos "Open Problem of the Week." The conjecture asks about which centrally symmetric convex bodies minimize a very natural, affine invariant, "Mahler volume." Apparently, most of the work on these problems uses high-powered analytical methods (flows and the like). This does not sound at all "cheerful." Nevertheless, I will try to explain the latest word on this problem, which is very fun and "geometric" due to Greg Kuperberg. The key shot makes use of a "Gauss type linking integral"—an isometry-invariant integral formula which computes the linking number of two submanifolds of an ambient space (in this case some Minkowski space). I actually don't know anything about convex geometry (I happened upon this paper by chance and thought it would be fit for the MCF talk I had promised to give). So, of course, "no" knowledge will be assumed of anyone else.

I am the very model of a modern Major General,
I've information vegetable, animal, and mineral,
I know the kings of England, and I quote the fights historical
From Marathon to Waterloo, in order categorical;
I'm very well acquainted, too, with matters mathematical,
I understand equations, both the simple and quadratical,
About binomial theorem I'm teeming with a lot o' news,
With many cheerful facts about the square of the hypotenuse!

— Gilbert & Sullivan, $P \circ P$

The website for Many Cheerful Facts is
`http://math.berkeley.edu/~mcf/`