Colloquium

UNIVERSITY OF NOTRE DAME
Department of Mathematics

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Wednesday, February 15, 2012
4:15 pm
117 Hayes-Healy Hall

Title: Holomorphic Spaces and Strange Duality

Abstract:
L^p spaces are a standard playground for analysts. They have many beautiful functional analytic properties, but their constituent functions are generally extremely rough; depending on the measure, however, they contain large collections of very regular functions as well.

I will discuss *holomorphic L^p-spaces*: function spaces consisting of holomorphic functions in L^p. The most well known examples are the Hardy spaces H^p of holomorphic functions on the unit disk with boundary values in L^p. An important example in mathematical physics is the class of *Segal-Bargmann L^p* spaces: holomorphic functions on $\mathbb{C}$ (or more generally $\mathbb{C}^n$) that are in L^p of a Gaussian measure; the L^2 case is often called the *Fock space*.

Holomorphic function spaces often have strong "local" properties (for example, universal growth estimates), but more complicated "global" properties, like duality. The dual space (of continuous linear functionals) of a full L^p-space is well-known to be the corresponding $L^{p'}$ space (with $\frac{1}{p}+\frac{1}{p'}=1$). The dual space of holomorphic L^p, on the other hand, is not so easily identified. I will discuss the nature of the obstacles, and then present my recent work (joint with Will Gryc) identifying the dual spaces to the Segal-Bargmann spaces.