MANY CHEERFUL FACTS

presents

Feynman Diagrams and a Categorical Approach to Calculus

a talk by Theo Johnson-Freyd

2:10–3:00pm on Tuesday, October 21, in 1015 Evans.

To any sufficiently nice category of "linear maps" we associate a "formal category" of "formal power series maps". We explore the calculus of formal functions, developing a good notation (Feynman Diagrams) for formal functions and an interesting notion of integral (generalizing the Gaussian integral), and we prove that the calculus of formal functions behaves as it should. Taylor's theorem assures that in any situation with a notion of derivative we have a functor from the category of pointed smooth maps to the category of formal maps.

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/`