

**MATH CLUB**  
**Friday, March 6, 2009**  
**2:30 – 3:30 p.m.**  
**SCI 242**

**Lecturer: Li Guo**  
**Department of Mathematics**  
**Rutgers University at Newark**

**From integration by parts to quantum field theory and beyond**

**Abstract:**

**The Rota-Baxter operator is naturally an abstraction of the integration operator that satisfies the integration by parts formula even though it was first introduced from a probability study by Glenn Baxter in 1960. Cartier and Rota noticed its combinatorial significance and continued its study in the next twenty years. Then in the 1980s the operator was studied independently as the operator form of the classical Yang-Baxter equation, named after the well-known physicists. Since the 1990s, further applications of Rota-Baxter operators were found in several areas of mathematics and mathematical physics, most notably in the seminal work of Connes and Kreimer on renormalization of quantum field theory. We will discuss some of these developments in this talk.**