



CLAREMONT CENTER
for MATHEMATICAL SCIENCES

CCMS COLLOQUIUM

EXTREMIZERS FOR THE RADON TRANSFORM:
A SYMMETRIC STORY

by

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Abstract: The Radon transform R takes a function whose domain is \mathbb{R}^d for some $d \geq 2$, and forms its integrals over all hyperplanes. R and its inverse are widely used in medical imaging.

R satisfies certain inequalities in terms of L^p norms; such inequalities express power law type bounds for $R(f)$ in terms of f , with exponents dictated by the dimension d . This talk will discuss the *extremizers* for the most fundamental of these inequalities. An extremizer is a function f which maximizes the ratio of the norm of $R(f)$ to the norm of f . It turns out that the Radon transform enjoys a remarkably large group of symmetries, which can be used to determine the extremizers in closed form. The proof, in which symmetries arise in three distinct ways, will be outlined.

Inequalities in L^p norms are among the most fundamental weapons in any analyst's arsenal. Proofs often involve decomposition, synthesis, application of the triangle inequality, and combinations of simpler inequalities which are optimal individually but not in combination. Such proofs rarely yield optimal constants or reveal the identity of extremizing functions. The talk will briefly review some classical inequalities from this perspective.

About the speaker: Michael Christ earned a BA from Harvey Mudd College in 1977 and a PhD from the University of Chicago in 1982, and subsequently served on the faculties of Princeton University, UCLA, and UC Berkeley. He was an invited speaker at the International Congresses of Mathematicians in 1990 and 1998. He has been a Sloan fellow and a Presidential Young Investigator, was awarded the Stefan Bergman Prize in 1997 and the UC Berkeley Distinguished Teaching Award in 2004, and was elected to the American Academy of Arts and Sciences in 2007. Among his research interests are real, complex, and harmonic analysis, and partial differential equations.

Wednesday, October 5, 2011, at 4:15pm

Millikan Auditorium, Pomona College

Refreshments at 3:45 p.m. in Millikan Auditorium & wine and cheese after the talk in Harry's Room
(Millikan 209)

*The dinner will be hosted by Prof. Stephan Garcia.
Please contact Prof. Garcia if you are interested in attending the dinner*