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**Irina Mitrea\*** ([imitrea@temple.edu](mailto:imitrea@temple.edu)), 1805 N. Broad St., Department of Mathematics, Temple University, Wachman Hall, Philadelphia, PA 19122. *Szegő Projections and Kerzman-Stein Formulas.*

Hardy spaces constitute a classical topic at the interface between Complex Analysis and Harmonic Analysis and progress in a deeper understanding of their geometric and functional analytic properties can have a fundamental impact on related issues. For example, the direct topological sum decomposition of  $L^2(\Sigma)$  into  $\mathcal{H}_\pm^2(\Sigma)$  (traces on  $\Sigma$  of holomorphic functions on either side of  $\Sigma$ ) in the case when  $\Sigma$  is a Lipschitz curve in the plane is equivalent to the boundedness of the principal value version of the Cauchy operator on  $L^2(\Sigma)$  (a famous result due to Calderón for small Lipschitz constants, and to Coifman, McIntosh and Meyer in full generality). In this talk I will address the question whether the orthogonal projection  $S$  of the Hilbert space  $L^2(\Sigma)$  onto the closed subspace  $\mathcal{H}_+(\Sigma)$  (or  $\mathcal{H}_-(\Sigma)$ ) has a bounded extension as an operator on  $L^p(\Sigma)$  with  $p \neq 2$ . This is a rather delicate issue, which interfaces tightly with the geometric character of  $\Sigma$ . The main tools are a new generation of commutator estimates and a far-reaching extension of the so-called Kerzman-Stein formula from Complex Analysis. This is joint work with M. Mitrea and M. Taylor. (Received August 13, 2013)