

# TEMPLE UNIVERSITY

Department of Mathematics

## Analysis Seminar

Room 617 Wachman Hall

Monday, October 3, 2022, 2:30 p.m.

*Fatou theorems for elliptic systems in uniformly  
rectifiable domains*

by Marius Mitrea

Baylor University

Abstract: The trademark blueprint of a Fatou-type theorem is that size/integrability properties of the nontangential maximal operator for a null-solution of an elliptic equation in a certain domain implies the a.e. existence of the pointwise nontangential boundary trace of the said function. It is natural to call such a theorem quantitative if the boundary trace does not just simply exist but encodes significant information regarding the size of the original function.

In this talk, which is based on joint work with Dorina Mitrea (Baylor) and Irina Mitrea (Temple), I will be presenting a quantitative Fatou-type theorem for null-solutions of an injectively elliptic first-order (homogeneous, constant complex coefficient) system of differential operators in an arbitrary uniformly rectifiable domain in the  $n$ -dimensional Euclidean space, assuming that the nontangential maximal operator is  $p$ -th power integrable (with respect to the Hausdorff measure) for some integrability exponent larger than  $(n - 1)/n$ . Such a result has a wide range of applications, including the theory of Hardy spaces associated with injectively elliptic first-order systems in uniformly rectifiable domains.