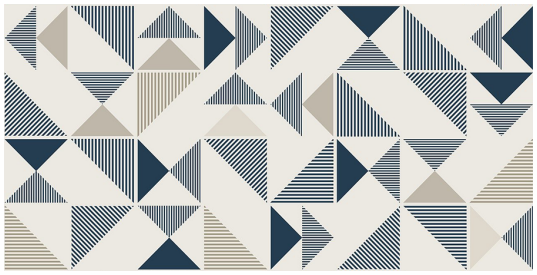

Contribution ID: **10** Type: **not specified**

Varopoulos extensions of BMO and L^p functions in domains with Ahlfors-regular boundaries and applications to Boundary Value problems for elliptic PDEs with L^∞ coefficients.

Thursday, 19 June 2025 14:30 (1h 30m)

This course presents a unified approach to extending boundary data from rough domains into the interior, with a focus on applications to boundary value problems for elliptic operators. We study recent advances in constructing \emph{smooth harmonic-type extensions} of BMO and \(L^p \) functions from the boundary \(\partial \Omega \) of a domain \(\Omega \subset \mathbb{R}^{n+1} \), where the geometry of \(\Omega \) may be highly irregular.

The domains under consideration include:
\begin{itemize}
\item \textbf{Corkscrew domains} when \(\partial \Omega \) is \(n \)-dimensional and Ahlfors regular,
\item and \textbf{complements of \(s \)-Ahlfors regular sets} when \(s < n \).
\end{itemize}

The core objectives of the course include:
\begin{itemize}
\item Constructing \emph{smooth interior extensions} of boundary functions with optimal control in terms of \emph{Carleson measures} and \emph{non-tangential maximal functions},
\item Establishing \emph{pointwise convergence} of these extensions back to the boundary data in a non-tangential sense,
\item Showing how \emph{Lipschitz boundary data} yields Lipschitz continuous extensions up to the closure of the domain.
\end{itemize}

A significant portion of the course will be dedicated to \textbf{applications in elliptic boundary value problems}, particularly for \emph{divergence-form elliptic systems with rough (e.g., merely bounded, complex-valued) coefficients}. We will explore:
\begin{itemize}
\item The role of these extensions in solving \emph{Dirichlet problems with \(L^p \) and BMO boundary data},
\item Connections between \emph{interior regularity in Carleson or tent spaces} and the \emph{solvability of Poisson problems},
\item How these tools fit into the modern framework of harmonic analysis on non-smooth domains.
\end{itemize}

The course is aimed at graduate students and researchers interested in \emph{elliptic PDEs, harmonic analysis, and geometric measure theory}. It will balance theoretical development with motivation from concrete problems in analysis and PDE.

Presenter: Prof. MOURGOGLOU, Mihalis (Universidad del País Vasco/Euskal Herriko Unibertsitatea)