In his 1983 research announcement "Some results in harmonic analysis in \( \mathbb{R}^n \)
for \( n \to \infty \)" (Bulletin of the AMS), E.M. Stein announced new results for several classical operators in harmonic analysis with operator norms that do not depend on the dimension \( n \)
and raised the following question: "Can one find an appropriate infinite-dimensional formulation of (that part of) harmonic analysis in \( \mathbb{R}^n \)
which displays in a natural way the above uniformity in \( n \)?" This talk describes the representation of some classical Calderón-Zygmund operators as conditional expectations of stochastic integrals. From this representation, probability gives bounds on their norms that are not only universal in terms of the geometry of the space where they are defined but in several instances are also sharp. To illustrate the techniques, we describe an application to a long-standing open problem concerning the norm of the discrete Hilbert transform. The latter is joint work with Mateusz Kwasnicki of Wrocław University of Science and Technology, Poland.
Blackwell-Tapia Prize at a conference held at IPAM. His research is at the interface of probability, harmonic analysis, partial differential equations and spectral theory. He has authored or co-authored over 100 research articles, one book, and several lecture notes in probability and analysis. He has lectured widely on these topics worldwide. He has served on many editorial boards and scientific committees, including the United States National Committee for Mathematics, MSRI's Scientific Advisory Council, and IPAM’s Board of Trustees.

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