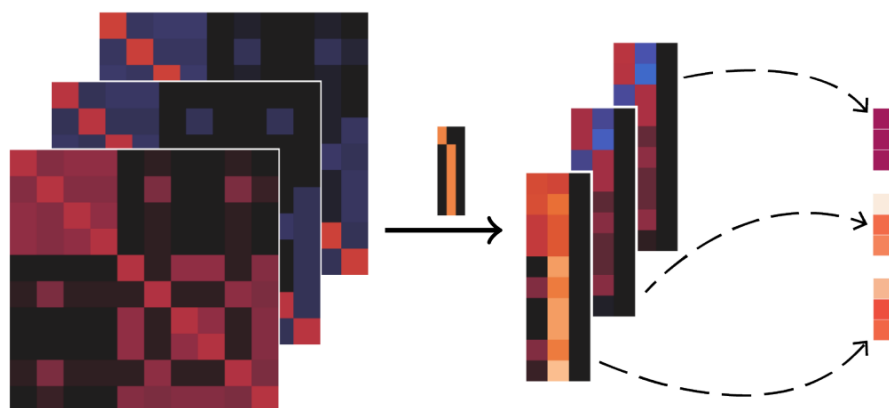


THE DEPARTMENT OF MATHEMATICAL SCIENCES PROUDLY PRESENTS

COLLOQUIUM

January-May, 2023

Fourier analysis methods in era of AI



Dr. Manos Papadakis
University of Houston

Mar-14-2023
10:30 am

Abstract- In this presentation we start with a premise: Initiating a learning process for a neural network from zero may not always be the best tactic. Human brains which are the best we know tools to analyze images evolved over a billion of years and this evolution perfected the visual processing and analysis of neuronal mechanisms. In this talk we want to propose a new, simple very customizable design method for the construction of multi-dimensional, wavelet-like families of affine frames, commonly referred to as framelets, with specific directional characteristics, small and compact support in space, and axial symmetries or anti-symmetries. The framelets we construct arise from readily available refinable functions. The filters defining these framelets have few non-zero coefficients, and custom-selected orientations. The filters can act as finite-difference operators. We also show how we have used a special family of framelet filters to register a top 10% score in a neural network competition sponsored by Google in 2019.

link: meet.google.com/urm-rhmx-dhw

