1056-94-1602 **Gianluca Vinti*** (mategian@unipg.it), Dipartimento di Matematica e Informatica, University of Perugia, Via Vanvitelli, 1-06123 PERUGIA, ITALY, 06123 Perugia,Italy, Italy. *Approximation Theory in Signal and Image Processing. Applications to Endovascular Surgery.*

In the last century, Whittaker, Kotelnikov and Shannon stated the celebrated WKS-sampling theorem:
let $f \in L^2(\mathbb{R})$ be a function with the support of its Fourier transform $\hat{f}$ contained in an interval $[-\pi w, \pi w]$, for $w > 0$,;then f can be completely reconstructed on the whole real time-axis from its samples values by means of the interpolation series:

$$f(t) = \sum_{k=-\infty}^{+\infty} f(\frac{k}{w}) sinc[\pi(wt-k)], \ t \in \mathbb{R}.$$

Several contributions have been given in order to weaken the band-limitation, but the most important contribution,based on an approximation theory's approach, has been given by P.L.Butzer and his school at Aachen considering a family of discrete operators, called "generalized sampling series" of the form

$$(S_w^{\varphi} f)(t) := \sum_{k=-\infty}^{\infty} f(\frac{k}{w})\ \varphi(wt-k), \quad t \in \mathbb{R}, \ k \in Z, \ w > 0$$

where φ is a continuous function with compact support on $\mathbb{R}$.
For the above operators, behind pointwise and uniform convergence results for continuous signals, we will discuss the approach in L^p-setting, which allow to treat signals not necessarily continuous nor of finite energy. In the last part of this talk, some applications to image analysis will be discussed. (Received September 22, 2009)