



COLLOQUIUM

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Mathematics of Digital Image Interpolation

Friday March 12th at 3pm on Zoom

<https://csuohio.zoom.us/j/91945126460>

Bio: Prof. Kim's research is in image processing, data processing, sustainability research, and mathematical psychology/philosophy. He received his PhD from Purdue University in 1995. He held postdoctoral positions at Rice University and was a Research Scientist at Shell E & P Technology Co. in Houston. He is now a Full Professor at Mississippi University.

Abstract: Digital zooming is a method of magnifying the size of digital photographic or video images. It is usually accomplished employing interpolation methods, with no adjustment of the camera's optics. However, the resulting images hardly gain optical resolution and may involve interpolation artifacts such as ringing (aliasing), blurring, and image halo. Various interpolation methods have been proposed in order to minimize interpolation artifacts, particularly by avoiding the interpolation evaluation across the edges. This talk will begin with basic principles in interpolation. Then we will consider mathematical image interpolation methods such as the curvature interpolation methods (CIMs) and the sharp edge-enhancing diffeomorphism (SEED), which outperform state-of-the-art interpolation methods. These mathematical image interpolation methods minimize interpolation artifacts and enhances the optical resolution (super-resolution) as well, by avoiding the interpolation evaluation across the edges and trying to sharpen the image in the normal direction of the edges. Various numerical examples will be shown to verify the claim.