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Hanna M Kristensen* (hanna.kristensen@pepperdine.edu) and **Erika Ordog**. *Applications and mathematical challenges of digital image mosaicking.*

We have created an automatic algorithm that creates a mosaic of user-supplied digital images to reproduce a user-supplied single larger digital image. In creating the mosaic of smaller images to reproduce the larger image, the simplest approach in selecting which image to place in each larger image pixel location is simply to select the one image of all smaller images whose overall color or grayscale levels best matches that of the larger image at that pixel location. However, for a higher quality result, other additional considerations and issues arise, including: reshading of the smaller images to better match the color or grayscale value at each large image pixel location; how to best reproduce essentially solid (constant-valued) areas in the larger image; creating more smoothness between smaller images in the mosaic for a more visually pleasing large image; ensuring that all of the smaller user-supplied supplied images are used at least once in reproducing the larger image, or possibly using all of the smaller images essentially an equal number of times; and numerical issues such as image and integer types in working in Matlab. Our work thus far has focused primarily on grayscale images and is the foundation of our ongoing work with color image mosaicking. (Received September 16, 2014)