1145-35-2833   **Stacey Levine*** (`levines@duq.edu`), Duquesne University, Department of Mathematics & Computer Science, 440 College Hall, Pittsburgh, PA 15282. *Learning Geometry for Image Decomposition.* Preliminary report.

In recent work we developed several frameworks for image denoising that attempt to recover an image from a smoothed version of some geometric feature of the image, e.g. level line curvature. These methods have successfully been used to improve upon denoising an image directly with variational and patch based approaches. The challenge in working with this data is that mathematically sound mechanisms developed for handling natural image data do not always readily carry over, and this data can be quite ill behaved. To mitigate this problem, in this work we use a structured convolutional neural network to learn both the geometric data from noisy observations and their corresponding regularizers. Our preliminary analyses and experiments indicate that the benefits of this approach can be significant, and that the learned regularizers can feed into mathematically sound variational approaches. (Received September 25, 2018)