

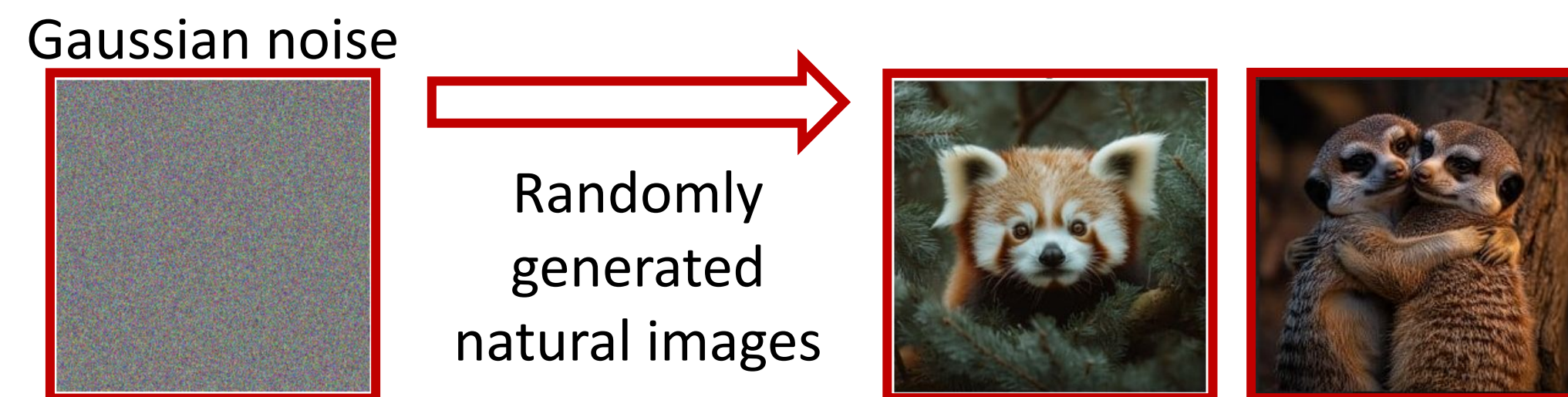
Computational Imaging and Diffusion Model Exploration

Ryan Hurley

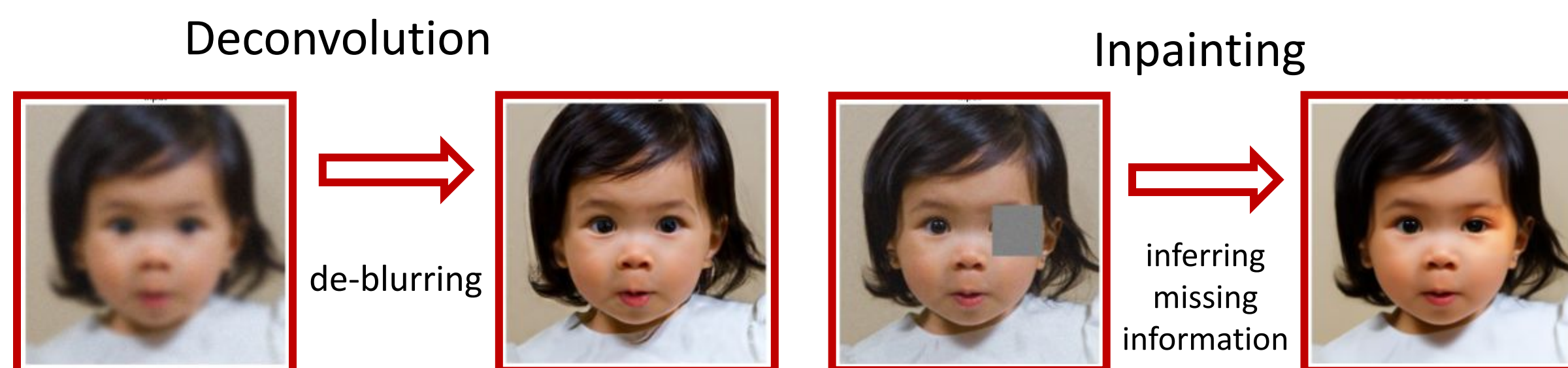
Affiliations, Stanford University

Motivation

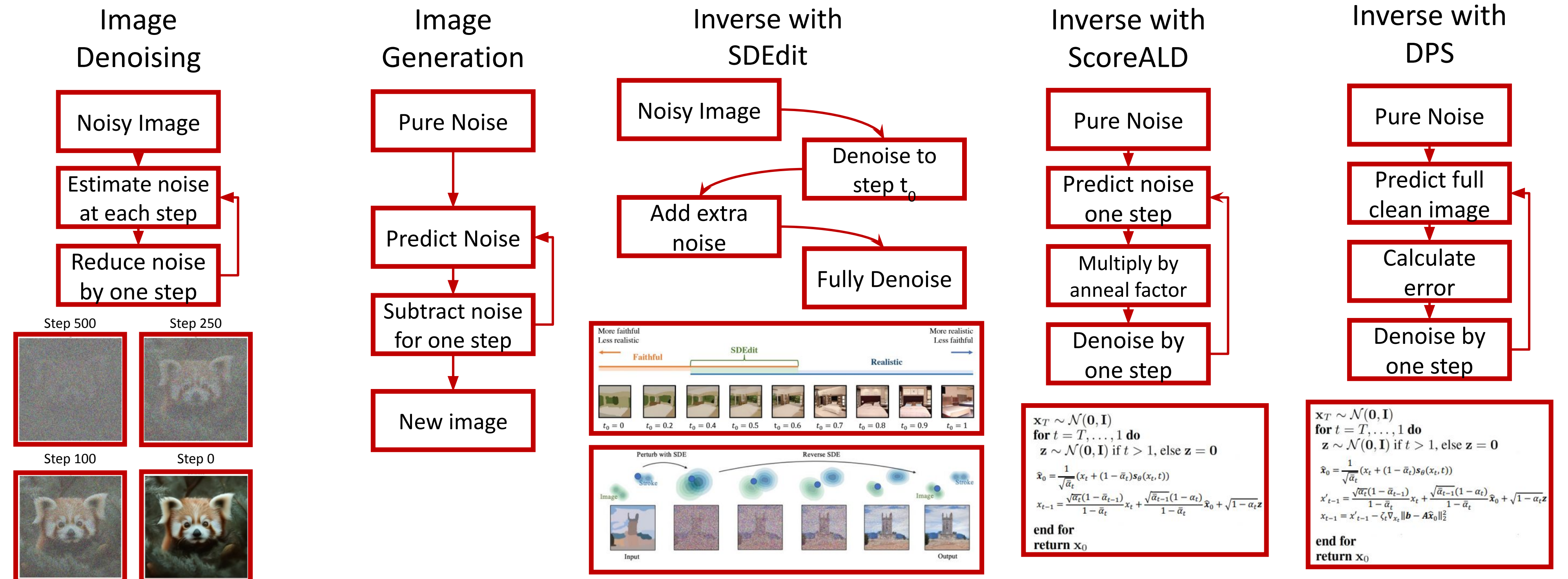
Generate natural images from Gaussian noise



Solving inverse problems with different methods



New Technique



Related Work

Image deconvolution with Adam, HQS and ADMM



Limitations

Adam is limited by the choice of regularizer in this case the TV norm. HQS and ADMM rely on the selected prior and which may not represent all natural images effectively.

References

- [1] Boyd, S., et al. (2011). Distributed Optimization and Statistical Learning via the Alternating Direction Method of Multipliers.
- [2] Chung, H., Kim, J., Mccann, M. T., Klasky, M. L., and Ye, J. C. (2023). Diffusion posterior sampling for general noisy inverse problems. In ICLR.
- [3] Ho, J., Jain, A., and Abbeel, P. (2020). Denoising diffusion probabilistic models. In NeurIPS.
- [4] Jalal, A., Arvintre, M., Daras, G., Price, E., Dimakis, A. G., and Tamir, J. (2021). Robust compressed sensing mri with deep generative priors.
- [5] Kingma, D. P., & Ba, J. (2014). Adam: A Method for Stochastic Optimization.
- [6] Meng, C., He, Y., Song, Y., Song, J., Wu, J., Zhu, J.-Y., and Ermon, S. (2022). Sdedit: Guided image synthesis and editing with stochastic differential equations.
- [7] Venkatakrisnan, S. V., et al. (2013). Introducing Plug-and-Play Priors for Model-Based Iterative Reconstruction.

Experimental Results

