-Supplementary materials-
Ki-GAN: Knowledge Infusion Generative Adversarial Network for Photoacoustic Image Reconstruction *in vivo*

Hengrong Lan[1], Kang Zhou[1,2], Changchun Yang[1], Jun Cheng[2], Jiang Liu[3,2], Shenghua Gao[1] and Fei Gao[1]

[1] School of Information Science and Technology, ShanghaiTech University, Shanghai 201210, China
[2] Cixi Institute of Biomedical Engineering, Chinese Academy of Sciences, Ningbo 315201, China
[3] Department of Computer Science and Engineering, Southern University of Science and Technology, Guangdong 518055, China
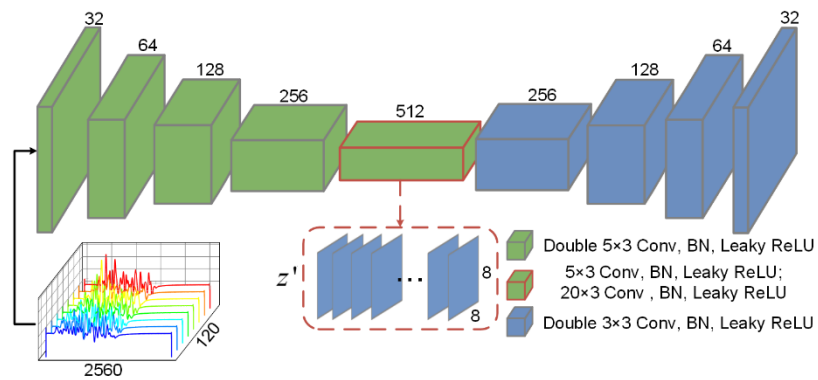
Fig. S1. Adapted Auto-Encoder for Signal Processing Knowledge. Dotted area z' is the input of the convolutional layer, and the convolutional layer converts z' to the latent feature $\hat{z}$; green blocks indicate the signal's features; blue blocks indicate the image's features.
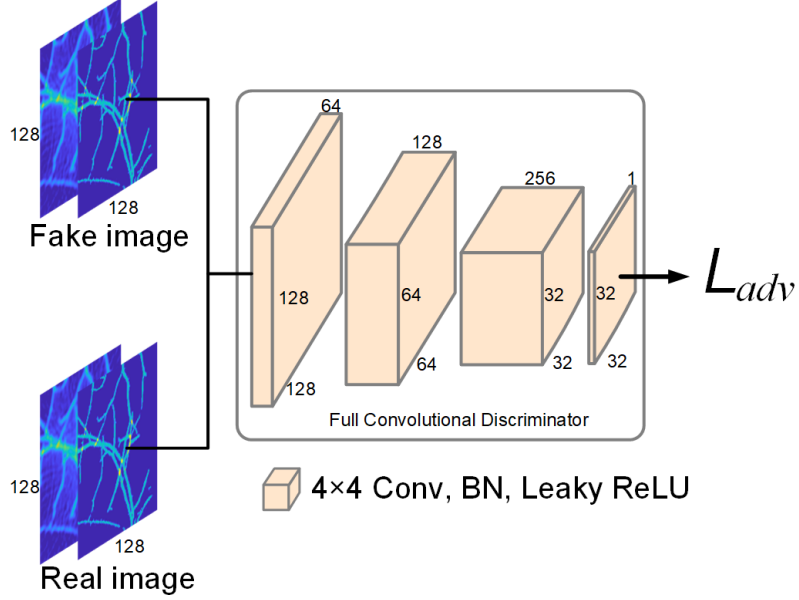
Fig. S2. Overview of our Discriminator. Note that we use convolutional kernel with 4×4 size, the receptive fields of output can still cover the entire input image.
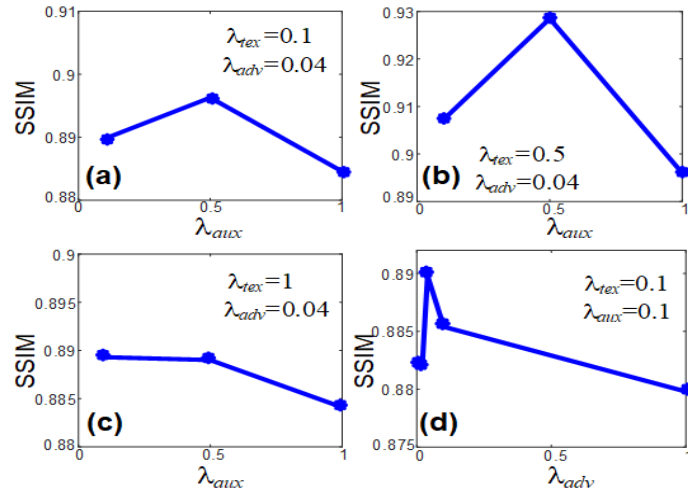

Fig. S3. The performances of different hyper-parameters values. For all results, the $\lambda_{pix}=1$.
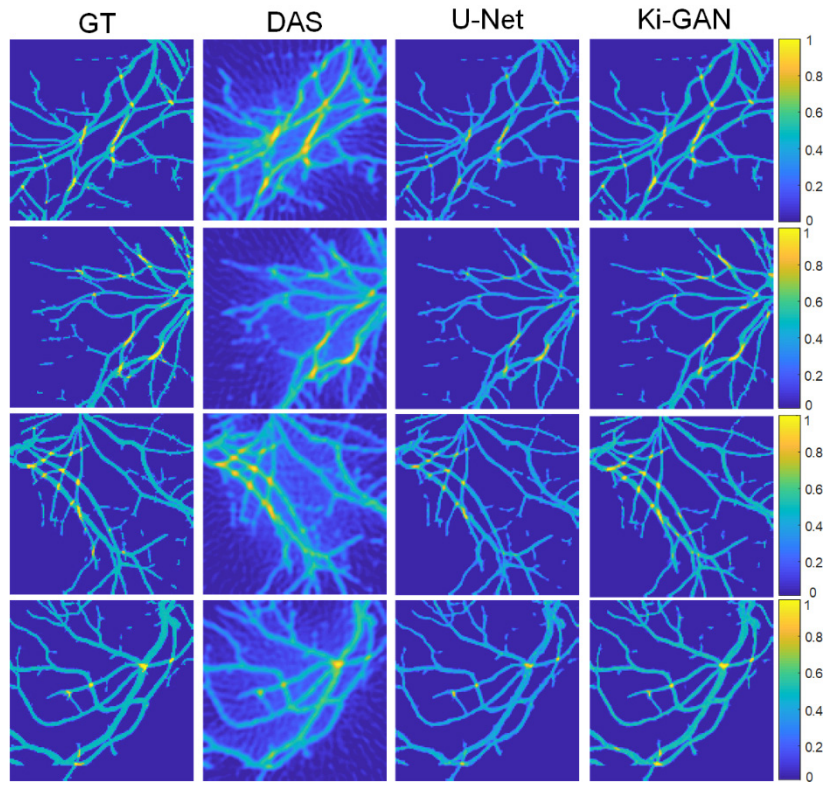
Fig. S4. More examples of quantitative comparison using full-sampled data. Different row indicates different sample; from left to right: ground-truth, delay-and-sum, U-Net and Ki-GAN.
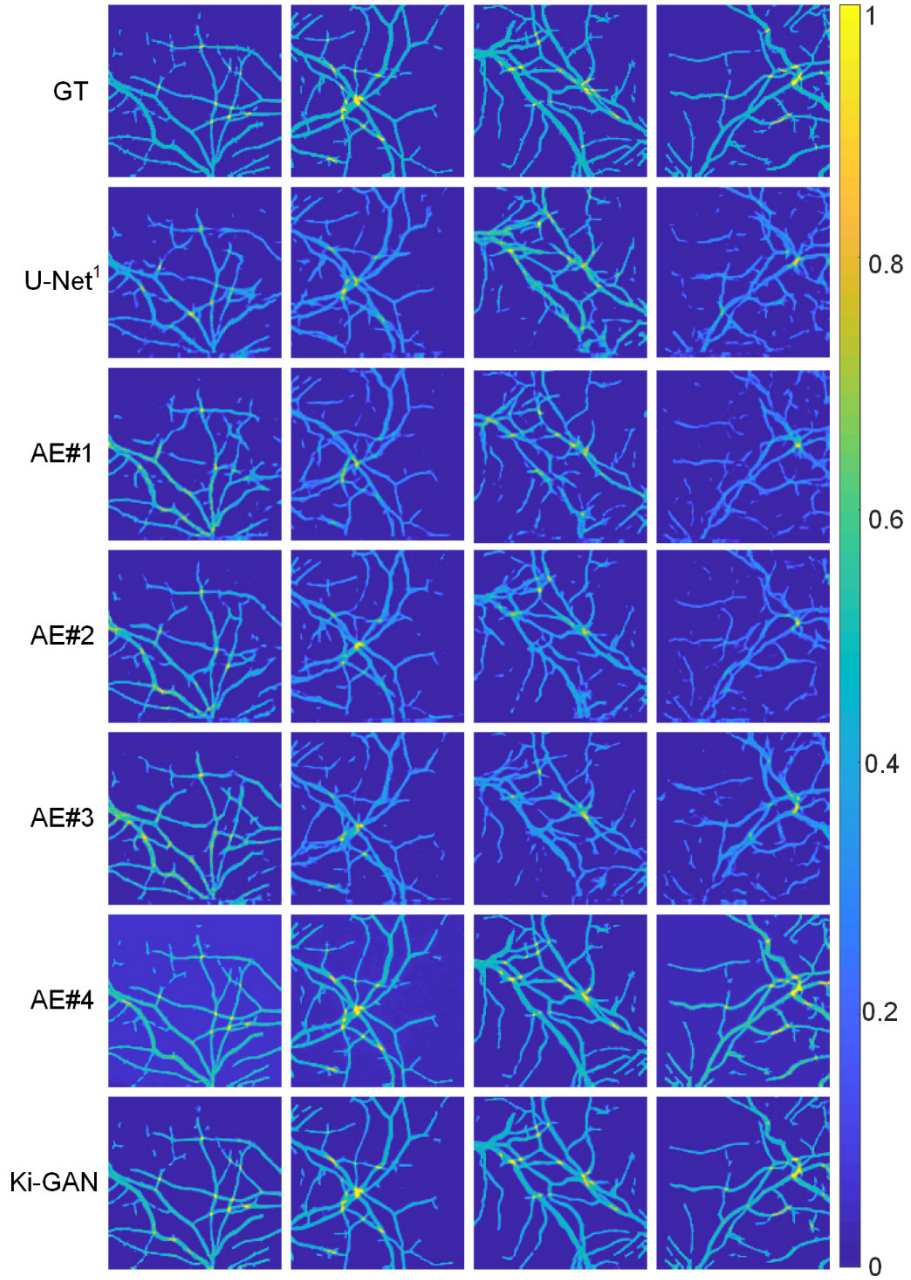
Fig. S5. Examples of ablation studies. Different column indicates different sample; from top to bottom: ground-truth, U-Net[1]: input the signals and resize to concatenation, AE#1: Auto-Encoder, AE#2: AE#1 with PSSIK, AE#3:AE#2 with Image Feature Supervision, AE#4: AE#3 with Embedded Certified Knowledge, Ki-GAN.
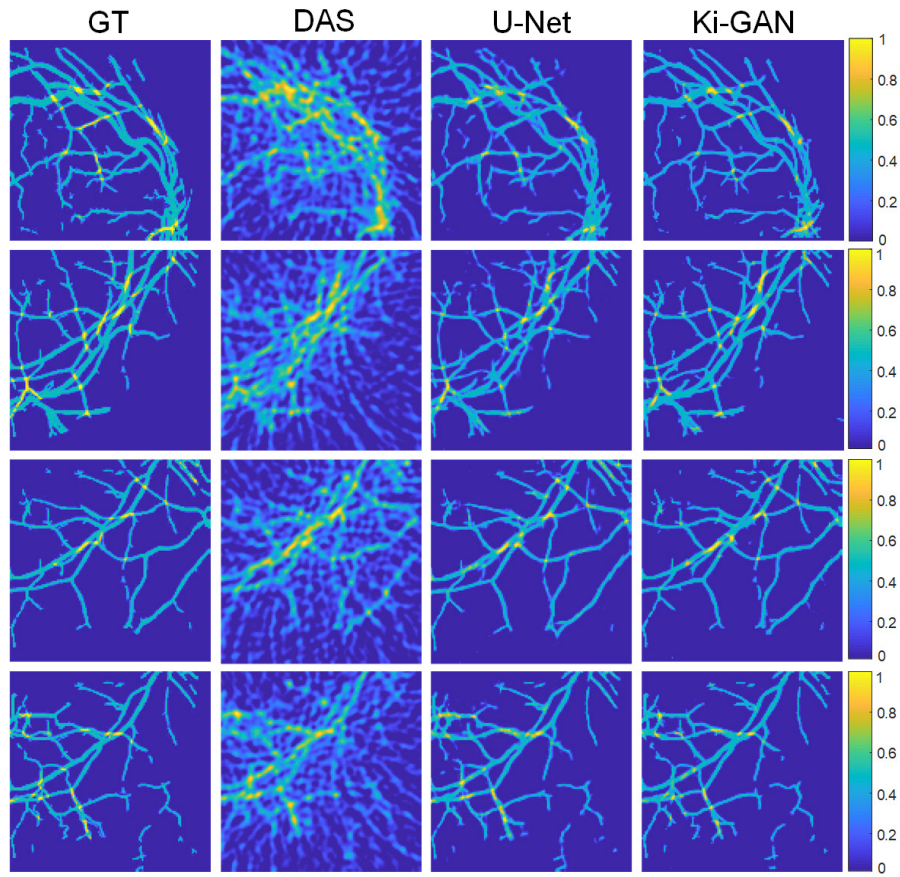
Fig. S6. More examples of quantitative comparison using sparse-sampled data. Different row indicates different sample; from left to right: ground-truth, delay-and-sum, U-Net and Ki-GAN.