# Journal Week 7

### Generative Adversarial Networks (GANs)

* Can produce “generated” images
* Interesting example where a computer may generate best guess of the distribution based on the regression line – but any human would be able to tell that this was not drawn randomly from the input distribution
* Needs to add randomness to your generated data to fool someone classifying real/fake images
* Train a network to focus on taking advantage of (or fooling) the classifying systems weakness
* Focus the training on the area where the “student” is failing
* Discriminator Network:
  + A classifier
  + Give it an image & output the class of the image
* Generator Network
  + Usually a CNN
  + Give it random noise & it will generate an image from that noise (example)
* The discriminator wants its error rate to be low while the generator wants the error rate of the discriminator to be high
* Generator gets insight into how to trick the discriminator by knowing information about the discriminator’s gradient descent while training
* At the end you throw away the discriminator & you are left with a generator you can feed random noise to and it will generate whatever you trained it to do
* Moving around in the latent space in different directions can correspond to real features the network has learned about the training data