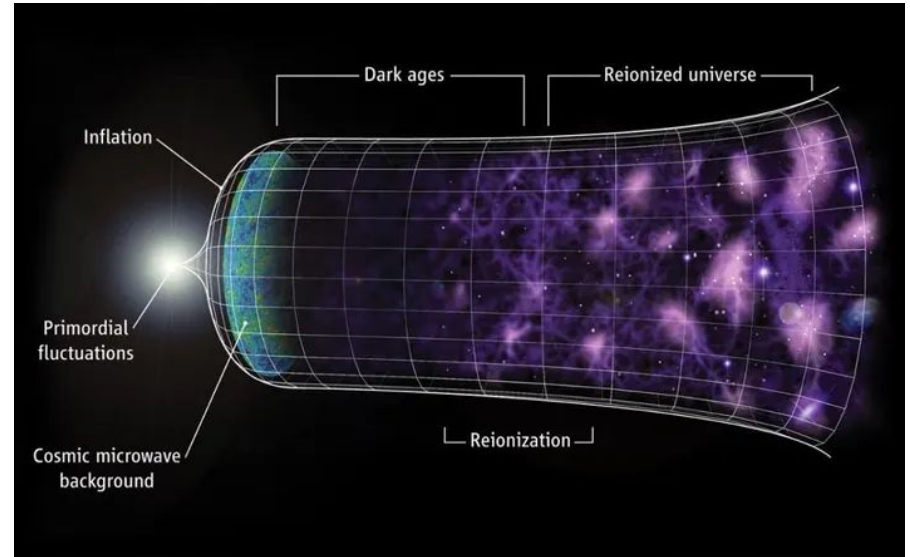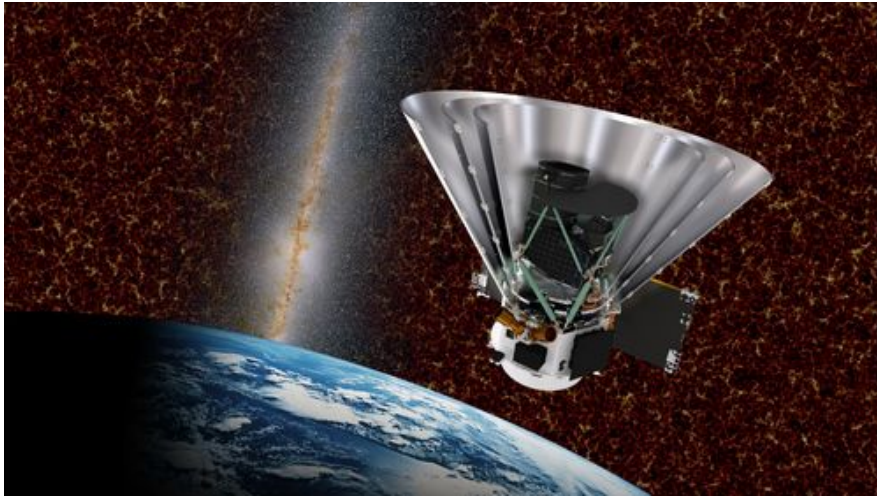# Neural Network Emulator for SPHEREx Observables

Grace Gibbins in collaboration with Dr. Tim Eifler and Annie Moore

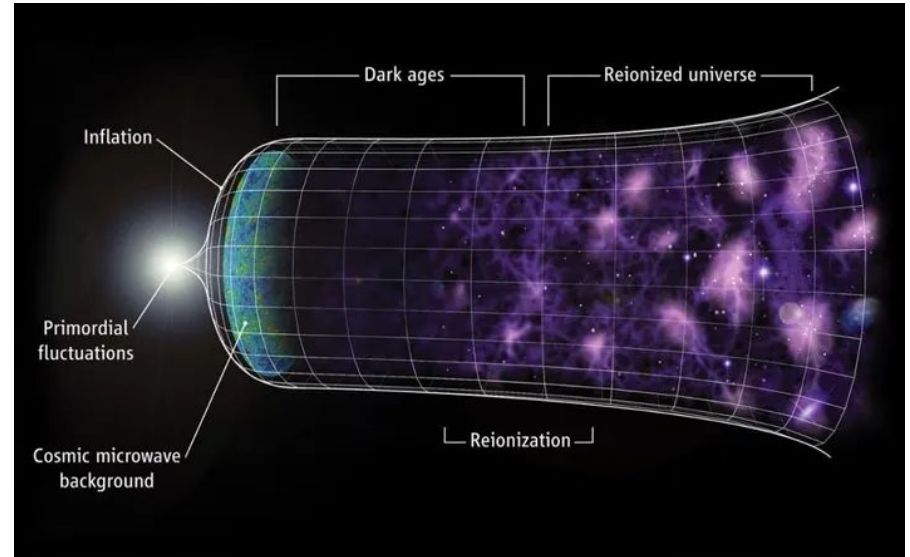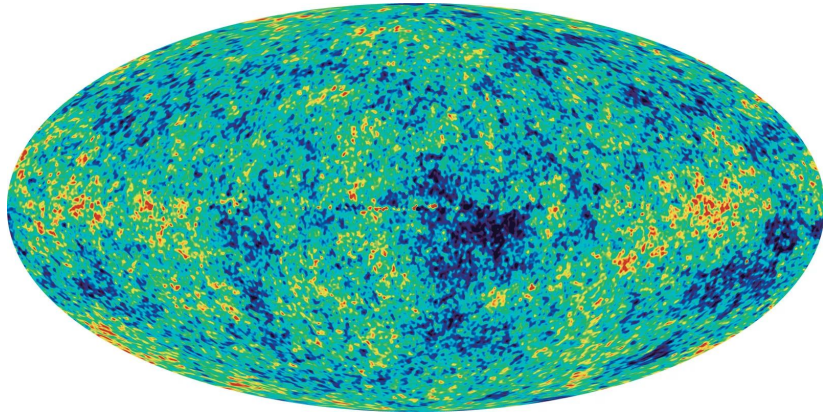# SPHEREx - Constraining Inflation Models

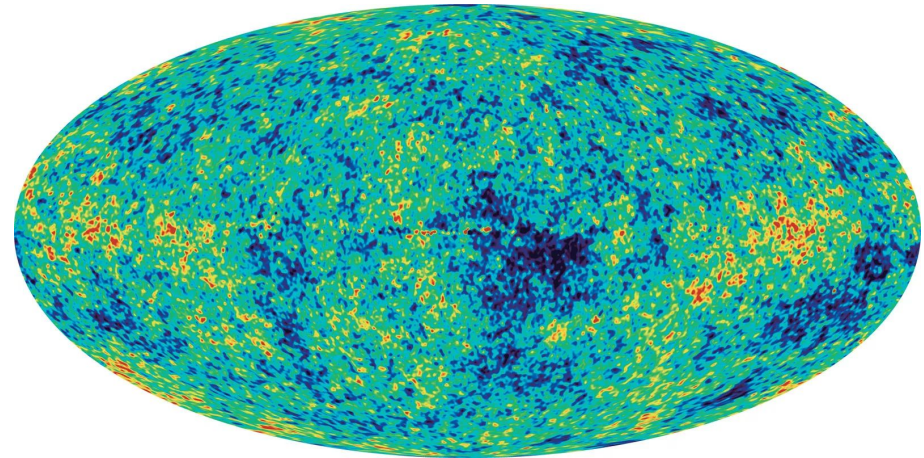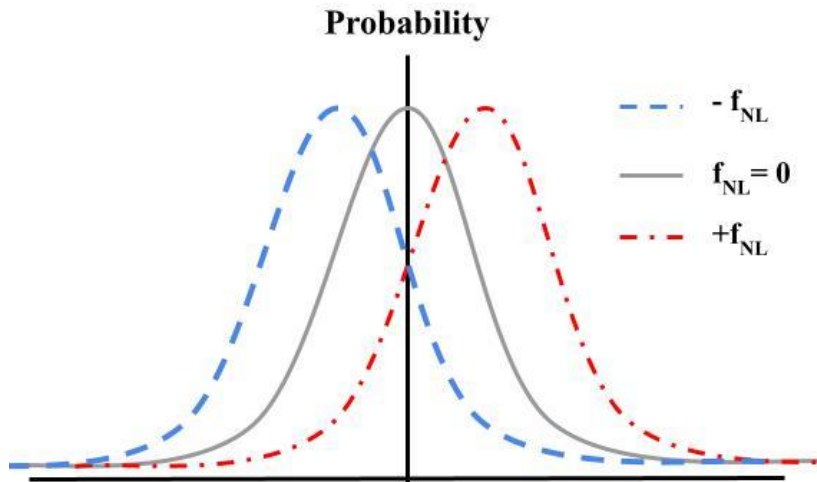# Matter Density Varies in Space

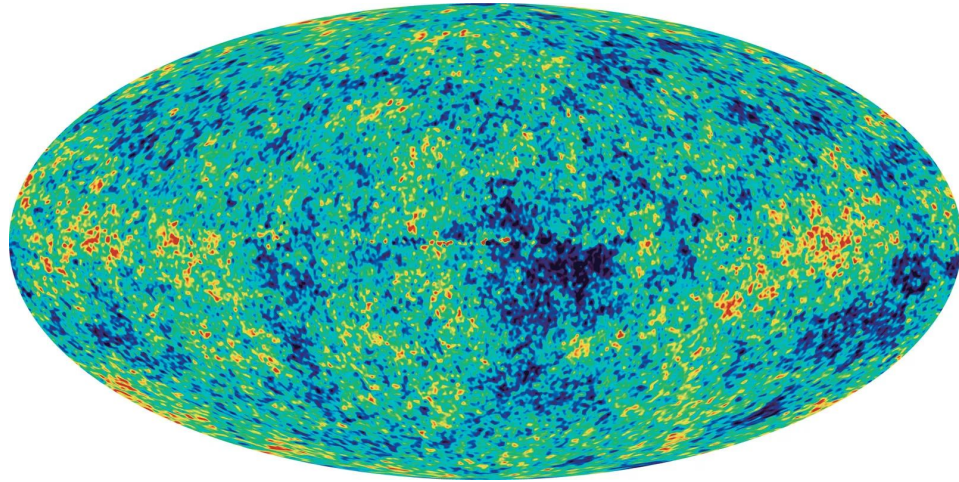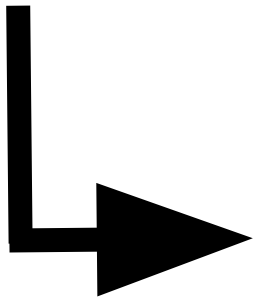# Primordial Non-Gaussianity: Density Distribution During Inflation



**Grace Gibbins**
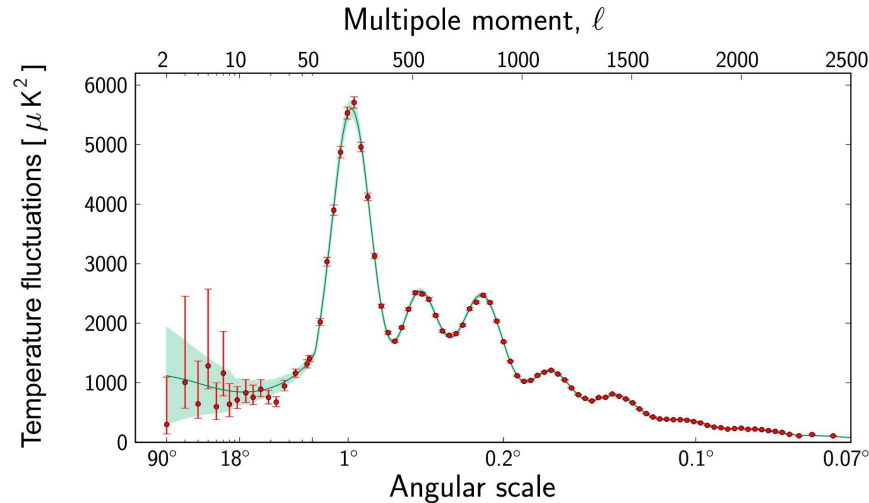
Planck

# Numbers can Describe our Universe

$$[H_0, \Omega_b, \Omega_m, \Omega_c, \Omega_\Lambda, \sigma_8, ..., f_{NL}, z, gb]$$



Grace Gibbins
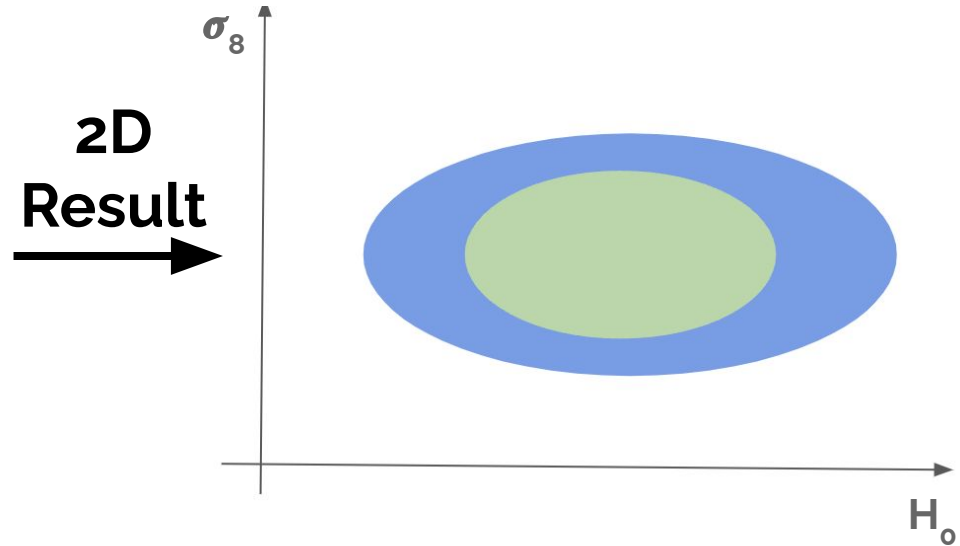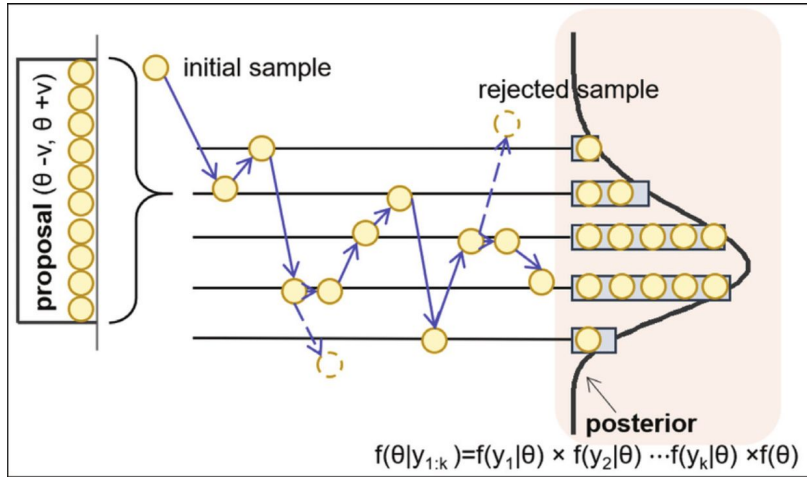
# Goal: Create a Galaxy Power Spectrum



P(k,z)

https://www.esa.int/ESA_Multimedia/Images/2013/03/Planck_Power_Spectrum

# MCMC - Accurate But Slow Machine Learning



2D Result →

Grace Gibbins

https://www.researchgate.net/figure/Markov-chain-Monte-Carlo-sampling-using-random-walk_fig1_331494053

# Neural Networks: Faster Supervised Machine Learning



**Grace Gibbins**