Encoding and Decoding in the Auditory System

One of the most important problems in auditory neuroscience is to understand the relation between stimulus and neuronal responses. This relation can be studied from two opposite points of view:

i) **Neural encoding** refers to the map from stimulus to response. This is the classical approach where one computes the neuron’s spectro-temporal receptive field (STRF). This provides a model of the neuron and allows us to predict the neuron’s response to new stimuli.

ii) **Neural decoding** refers to the inverse map, from response to stimulus. In this approach, the goal is to use the neuronal responses to reconstruct the stimulus.

In this project, we will learn how to compute encoding and decoding filters for real auditory neurons. We’ll compare the two approaches and identify the reasons why encoding and decoding filters would look different from each other.