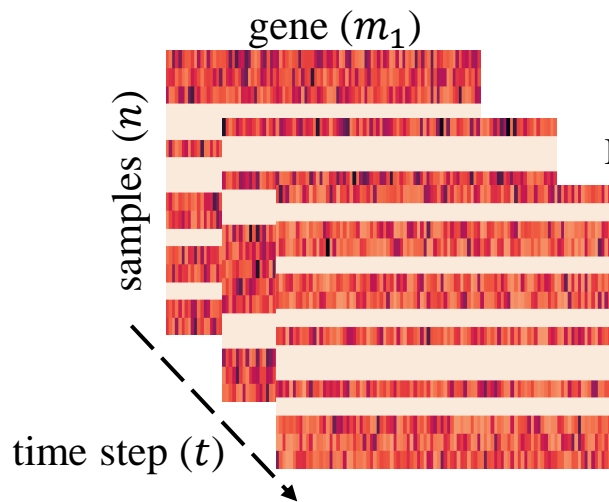
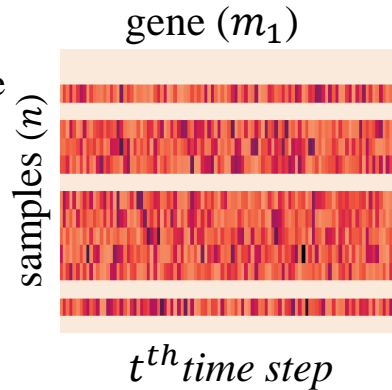


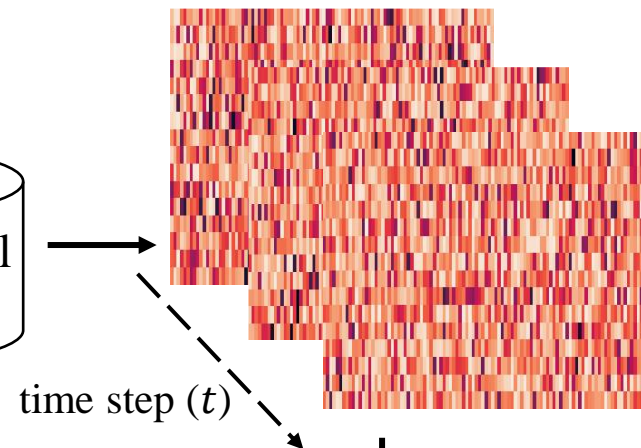
## Incomplete gene expression



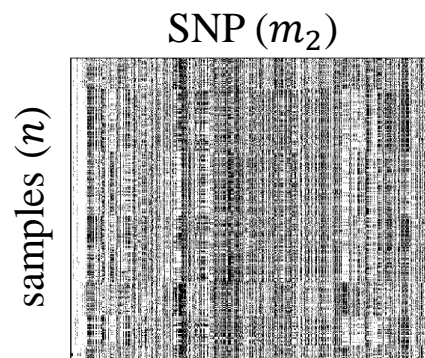
Imputation is done  
one time step at  
a time



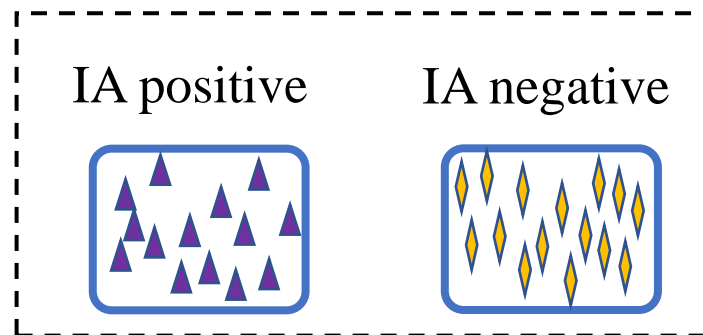
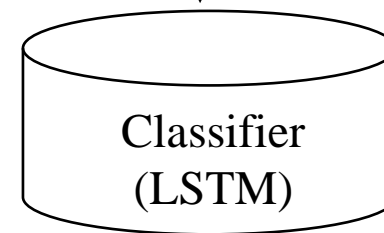
## Complete gene expression



## Mutation



PCA  
(# of component = 50)



Family  
history

samples ( $n$ )

samples ( $n$ )

HLA  
genotype