DNA Translator Continuous Discrete Variational Projection Viral Sequencing **Binary Format** Collection Date Padded Protein Sequence Autoencoder [0 1 0 0 ... 0 0 1 0] 2000-02-14 MEANAT...NNSTDAA Dim 2 2001-12-25 $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ MEANAT...NNSTDAA 2005-01-01 MEANAT...NNSTDA* $[0 \ 1 \ 0 \ 0 \dots 0 \ 0 \ 0 \ 1]$ [0 1 0 0 ... 0 0 0 1] 2008-09-01 MEANAT...NSTDAA* ■ 2011-07-04 $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ MEANAT...NNSTDAA 2016-07-01 $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1]$ MEAQAT...STDAA** $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ 2017-01-01 MEAQAT...NNSTDAA Dim 1 encode Synthesis Likelihood 0.459 MEAQAT...NNSTDAA $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ 0.331 MEAQAT...NNSTDAA $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ 0.120 MEAQAR...NSTDAA* [0 1 0 0 ... 0 0 0 1] 0.031 MEAQAT...STDAA** $[0 \ 1 \ 0 \ 0 \dots 0 \ 0 \ 0 \ 1]$ 0.029 MEAQAT...NNSTDAA $[0 \ 1 \ 0 \ 0 \ \dots \ 0 \ 0 \ 1 \ 0]$ Predicted Sequences decode **Gaussian Process**