

Abstract Submitted
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A Stochastic Model of RNA Translation with Frameshifting BRE-
NAE BAILEY, University of Arizona — Many viruses can produce different proteins
from the same RNA sequence by encoding them in overlapping genes. One mech-
anism that causes the ribosomes of infected cells to decode both genes is called
programmed ribosomal frameshifting (PRF). Although PRF has been recognized
for 25 years, the mechanism is not well understood. We have developed a model
that treats RNA translation as a stochastic process in which the transition prob-
abilities are based on the free energies of local molecular interactions. The model
reproduces observed translation rates and frameshift efficiencies, and can be used
to predict the effects of mutations in the viral RNA sequence on both the mean
translation rate and the frameshift efficiency.

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