

Biomedical Computation Review

Stanford University

318 Campus Drive

Clark Center Room S170

Stanford, CA 94305-5444

seeing science

SeeingScience

BY KATHARINE MILLER, MANAGING EDITOR

Decoding the Decoder

Inside a cell, the ribosome deciphers genetic codes to produce proteins at unfathomable speeds. Now, researchers at Los Alamos National Laboratory (LANL) have simulated this complex nano-machine in action. With 2.6 million atoms moving at once, it's the largest molecular simulation ever attempted by a factor of six. The work by **Kevin Sanbonmatsu, PhD**, a computational structural biologist, and his colleagues at LANL revealed some new details about the essential translating molecule, transfer RNA: it must be flexible in two places for decoding to occur. The simulation also identified a new structural gate, which may act as a control mechanism for selecting the proper transfer RNA.

The ribosome (large subunit in white and small subunit in cyan) uses the transfer RNA molecules (incoming in red; outgoing in yellow) to read the genetic information from the messenger RNA (green) to produce protein. For visualization purposes, the top portion of the ribosome is cut away. Courtesy of LANL.

See a Quicktime movie showing transfer RNA at: <http://www.lanl.gov/news/images/sanbonmatsu.mov>

