1056-05-2014 **Teresa Haynes**, 312 Gilbreath Hall, PO Box 70663, Johnson City, TN 37614, **Debra Knisley**, 312 Gilbreath Hall, PO Box 70663, Johnson City, TN 37614, and **Denise Koessler*** (Denise.Koessler@gmail.com), 312 Gilbreath Hall, PO Box 70663, Johnson City, TN 37614.
Bonding Tree Models of RNA Structures. Preliminary report.

Understanding the formation of RNA structures from base pairings is an open problem in biological research. We apply graph theory to study this problem. Through a project supported by the National Science Foundation, the New York University RNA team provides an online database of trees representing possible secondary RNA structures. Considering these graphical models, we ascertain the frequency of occurrence of a tree by determining all possible ways two smaller trees could bond together to form it. In graph theory, two vertices are said to be identified if they are combined into a single vertex whose neighborhood is their neighborhood union. We use this process to model the bonding of base pairs of RNA tree structures to form a single tree. This novel approach could give insight into the likelihood of the tree existing in nature as an RNA structure. (Received September 22, 2009)