Neutron reactions are responsible for the formation of the elements heavier than iron. The corresponding scenarios relate to the He- and C-burning phases of stellar evolution ($s$ process) and to supernova explosions ($r$ and $p$ processes). The $s$ process, which is characterized by low neutron densities, operates in or near the valley of $\beta$-stability and has produced about half of the elemental abundances between Fe and Bi in the solar system. Because the $s$ abundances are essentially determined by the $(n, \gamma)$ cross sections along the reaction path, accurate neutron data constitute the key input for $s$ process studies. Important constraints for the physical conditions at the stellar sites can be inferred by comparison of the abundance patterns from current $s$-process models with solar system material or presolar grains.

The experimental methods for the determination of stellar $(n, \gamma)$ rates are outlined at the example of recent cross section measurements and remaining quests will be discussed for existing laboratory neutron sources and future developments. 