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The chemistry of life, such as genetics and metabolism, relies on complicated networks of interacting chemical reactions. The networks are naturally modelled as *hypergraphs*, which generalize the notion of graph connectivity to include edges that join more than two nodes. This extension is helpful because many interesting chemical reactions involve multiple reactants and products, and are often catalyzed. Getting a better grasp on the nature of these interactions could inform the study of how early life formed. To this end, we seek to apply non-equilibrium thermodynamics to chemical reaction networks. Recent work on large-deviations theory and its application to non-equilibrium statistical mechanics provides a framework by which to do so. Large deviations theory studies the behavior of “tail” events occurring in a stochastic process, such as rare transitions between equilibrium states. The specific questions to answer are numerous. For example, we wish to determine how the topology of a reaction network affects the number of equilibrium states possible on it. Other research questions are likely to arise through the course of the summer, as this is not yet well-charted territory. Later, this study of chemical reaction networks can perhaps be abstracted to include other kinds of species and reactions, such as ecological interactions between populations of organisms.