Overview (by Ann Hochschild):
The subject of this session is transposable elements. Definitions vary somewhat, but the following description from Nancy Kleckner captures the essential criteria: "Prokaryotic transposable elements [or transposons] are defined genetic entities which are capable of inserting as discrete, non-permuted DNA segments at many different sites in prokaryotic genomes." In general, transposons encode one or more proteins that are required for element movement. These transposase proteins typically recognize the transposon ends and function as recombinases to mediate both cleavage of the ends and integration of the transposon into a nonhomologous target sequence. Various different families of transposable elements have been described, which differ in the type of transposase protein(s) they use and the mechanistic details of the transposition process. Transposition can be either a replicative process (in which the element is duplicated as it moves) or a non-replicative (cut-and-paste) process. Our first discussion paper (Bender & Kleckner) establishes that Tn10 transposes by a nonreplicative mechanism. This conclusion is based on extremely elegant genetic analysis, involving the use of "heteroduplex" DNA. (Recall that heteroduplex DNA is duplex DNA in which the genetic content of one strand differs at one or more positions from the genetic content of the other strand.) Bacteria have provided the most powerful systems for the dissection of transposition mechanism, but transposons are ubiquitous and transposition mechanisms are widely conserved.

The second discussion paper will highlight the use of the transposon sequencing (Tn-Seq) method to identify synthetic lethal genetic interactions.

Papers for discussion:
