

**E0074**

**Detectors and Storage Rings.** Andrew J Howard, Biology Div., BCPS Dept., Illinois Institute of Technology.

Three developments, all of which have matured since 1980, have transformed macromolecular crystallography from an arduous specialist's task into a productive analytical tool: synchrotron radiation, area detectors, and recombinant DNA technology. We can usefully examine the ways these developments play off of one another. Recombinant DNA enables the production of milligram quantities of a typical aqueous protein, generating demand for the other two advances. Area detectors and synchrotron radiation make life better for crystallographers independent of one another, so the combination ought to offer a benefit at least equal to their individual advantages. In fact the relationship between detectors and synchrotrons is more intimate: the promised benefit of a storage ring's awesome flux can only be realized if the detector can keep pace with the arrival of photons. The currently-prevalent fiber-optically coupled charge-coupled device detectors cannot keep up with an optimized third-generation insertion-device beamline, whereas the pixel-array detectors described in this session probably will. Such detectors will allow beamline designers to entrain the full fluence available from a third-generation insertion device onto a protein sample with a reasonable duty cycle. I will discuss how this transformation will alter the way protein crystallography operates.