

## **PLENARY LECTURE P2**

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### **Visualization of DNA motor proteins and nucleoprotein filaments at the single-molecule level**

Stephen Kowalczykowski

*Department of Microbiology, University of California, Davis, USA*

A variety of DNA binding proteins are involved in maintaining the integrity of DNA via recombinational repair. We can now visualize the action of some of these proteins at the single-molecule level. Detection involves optical trapping of an individual DNA molecule that is attached to a polystyrene bead, and extension of the DNA by fluid flow forces. Protein, or protein action, is detected by either displacement of a fluorescent dye from the DNA, or by attachment of an extrinsic fluorophore directly to the protein. The subsequent visualization of the molecule of interest by either epifluorescence microscopy or by total internal reflected fluorescence microscopy. Using these approaches, we have been imaging the translocation of DNA motor proteins, such as the DNA helicase, RecBCD enzyme; the DNA translocases and chromatin-remodeling proteins, Rad54 and Tid1 proteins; and also the self-assembly of the DNA strand exchange proteins, RecA and Rad51 proteins. Recent progress will be presented, and the biophysical and mechanistic implications of our findings will be discussed.