

## **'Dynamics of FtsZ clusters in the Z-ring of *E. coli*'**

**Prof. Mario Feingold, Ben-Gurion University**

### ***Abstract***

During bacterial cell division, the FtsZ protein polymerizes on the cytoplasmic face of the inner cell membrane to form a ring-like structure, the Z-ring, at mid-cell. The current perception of the Z-ring is that of a rotating structure resulting from the treadmilling of its FtsZ filaments. However, it remains an open question as to how this dynamic Z-ring is associated with septum formation and how it leads to the emergence of symmetric constriction. We address this question by tracking FtsZ clusters of live *E. coli* cells using image analysis.

We find that the motion of the FtsZ clusters is significantly more complex than a simple rotation including tracks that are localized, others that display rapid changes in the direction of motion and also tracks that are apparently random in nature. Using Mean-Square Displacement (MSD) analysis we find that the motion of the FtsZ clusters is mainly diffusive rather than directed. Specifically, trajectories are well approximated by a piecewise linear function, and the extent of the linear sections grows with temperature. We expect that in the limit where the FtsZ protein is uniformly distributed along the Z-ring the motion will become purely rotational.