GTL P.I. Workshop, Washington, D.C.
Breakout Group: Imaging
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Main Points

- Good progress continues in developing physical methods for imaging to fill various niches in microbial studies.

- Better probes or labels, including biochemical probes and gene- and protein-specific probes, are urgently needed for identifying specific subcellular components.

- Quantum dots are particularly promising for applications in light, X-ray, and electron microscopy, but methods for targeting them and getting them into bacterial cells should be generalized.

- So far, few methods seem favorable for introducing these probes into bacteria.

- Engineering bacteria to produce their own electron-dense probes in a manner analogous to GFP may be possible. (This was not discussed extensively, but a number of approaches are being investigated that use, for example, ferritin or metallothionine gene fusions.)

- Higher resolution and interpretability of electron tomographic results need to be demonstrated.

- Better software is essential, at least in the context of visualization and interpretation of 3D volume data and searching for matches between experimental densities and known macromolecular structures.

- Genesis of photosynthetic membrane is a good model system for optical methods development because of the proteins' spectroscopic identities.

- Use of metalloproteins, which have distinctive spectroscopic signatures, might be of particular value both in GTL efforts involved with metabolism monitoring and as good models for technology development.