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Manipulating bacteria with opto-electrokinetic methods STEVE WERELEY, JAE-SUNG KWON, SANDEEP RAVINDRANATH, JOSEPH IRUDAYARAJ, Purdue University — Recently we developed an opto-electrokinetic method for manipulating particles and cells called Rapid Electrokinetic Patterning (REP). REP is a very fast method for manipulating thousands of particles simultaneously and controllably owing to the creation of an electrothermal vortex that transports particles rapidly and in parallel to a site determined by the focal point of a laser beam. Whether particles are trapped at the center of the vortex or not is determined by their electrical properties (conductivity and permittivity). In this talk we demonstrate that REP can be used to manipulate the bacterium Shewanella oneidensis MR-1. The bacteria are assembled into large planar arrays of organisms. The dependence of this assembly process on voltage and frequency is quantified. REP can even be used to selectively manipulate and collect live or dead bacteria.

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