Different Strategies for Aggregation in Social Amoeba Colonies
CARL FRANCK, RYAN MONAGHAN, ALBERT BAE, DUANE LOH, Cornell University, EBERHARD BODENSCHATZ, Cornell University and MPI Dynamics and Self-Organization, Goettingen, Germany — When confronted by starvation, collections of the amoeba Dictyostelium discoideum seek to aggregate in order to form genome-preserving stalk and spore structures. We have been interested in the means by which individual cells unite for this purpose. It has long been recognized that communication by means of diffusion of small molecules affords one such strategy: periodic chemical wave signaling can direct individual cells to an aggregation site. By employing thin layer substrates that presumably alter the propagation characteristics of such waves, we have shifted the colonial aggregation strategies to modes that rely on adhesive interactions for initial stages of multicellular assembly. Besides relentless aggregation of individual cells into large scale streams, these substrates reveal remarkable structures composed of only a few cells which we call “squads” that search for each other in order to achieve sufficient aggregation mass in sparse populations.