Granular Matter, Foams, and Beyond: Applications of the Granocentric Model KATHERINE NEWHALL, Courant Institute NYU — We present a local stochastic model that predicts the statistical fluctuations in jammed packings of monodisperse and polydisperse spheres revealed by confocal microscopy. Moreover, we find that this model can account for the properties of looser and denser random packings that result from depletion attraction between the particles or compression by an applied load, respectively. Finally, we extend the model to space-filling packings of cells in tissues and biliquid foams by testing analytic predictions for the dependence of the number of neighbors of a given cell on its volume. Interestingly, the model distinguishes between scenarios in which size or positional disorder in the packing dominate, in good agreement with experimental data. This versatile model can be put into the statistical mechanics framework proposed by Edwards in order to compute the entropy and compactivity of each packing.

Katherine Newhall
Courant Institute NYU