1038-92-125 **James A. Glazier*** (glazier@indiana.edu), Dept. of Physics and Biocomplexity Institute, Indiana University, 727 E 3rd St., Swain Hall West 159, Bloomington, IN 47405-7105. *Multi-Cell Modeling of Biological Development using the GGH Model and CompuCell3D: Applications, Technology and Open Problems.*

While bioinformatics tools for the analysis of DNA sequences, the reaction kinetics of biomolecular networks and the dynamics of biomolecules, are widely used, multi-cell modeling of developmental processes is relatively undeveloped. A key reason for this neglect has been the lack of widely-accepted approaches for building such models. Now, a growing community has settled on the GGH Model, derived from the Potts model of statistical mechanics, as a convenient methodology to create multi-cell simulations of tissue development. The GGH's use of an Effective Energy and constraints to describe cell behaviors simplifies integration of multiple biological mechanisms, while open-source tools for building GGH models make developing, validating and sharing simulations easier. I will introduce the GGH and the modeling environment CompuCell3D (http://www.compucell3d.org/), then apply the GGH to modeling somitogenesis in vivo, illustrating some of the questions this type of modeling can address (e.g. error correction mechanisms in development) and discussing its application to other developmental-biology problems including tumor growth, gastrulation, and biofilms. I will also discuss some of the key mathematical and computational issues which GGH models still need to address. (Received February 04, 2008)