

**Meeting:** 1002, Pittsburgh, Pennsylvania, SS 7A, Special Session on Knots and Macromolecules

1002-82-89            **Jayanth R Banavar\*** (jayanth@phys.psu.edu), Department of Physics, Penn State, 104 Davey Lab, University Park, PA 16802, and **Amos Maritan**, Via Marzolo 8, 35131 Padova, Italy.  
*Geometry and physics of proteins.*

We show that the notion of a tube of non-zero thickness allows one to bridge the conventional compact polymer phase with a novel phase employed by nature to house biomolecular structures. We build on the idea that a non-singular continuum description of a tube (or a sheet) of arbitrary thickness entails discarding pairwise interactions and using appropriately chosen many body interactions. We present a unified framework for understanding protein folding, amyloid formation, protein interactions and the mechanism for natural selection.

Collaborators: Marek Cieplak, Alessandro Flammini, Oscar Gonzalez, Trinh Hoang, John Maddocks, Davide Marenduzzo, Cristian Micheletti Flavio Seno and Antonio Trovato

Recent references:

Maritan, A. et al., (2000) Nature 406, 287; Banavar, J. R. et al., (2002) Proteins 47, 315; Banavar, J. R., Maritan A., and Seno, F., (2002) Proteins 49, 246; Banavar, J. R. et al., (2003) ComPlexUs 1, 4; Banavar, J. R. et al., (2003) J. Stat. Phys. 110, 35; Banavar, J. R. and Maritan, A., (2003) Rev. Mod. Phys. 75, 23; Banavar, J. R. and Maritan, A., (2003) J. Theor. Biol. 223, 263; Hoang T. X. et al., (2004) PNAS 101, 7960; Banavar, J. R. et al., (2004) Phys. Rev. E (in press). (Received September 03, 2004)