Meeting: 999, Nashville, Tennessee, SS 12A, Special Session on Biomathematics

999-92-214 **Tilmann Glimm*** (tglimm@emory.edu), Department of Physics, Emory University, 400 Dowman Drive, Atlanta, GA 30322. *Stability of n-Dimensional Patterns in a Generalized Turing System: Implications for Pattern Formation in Vertebrate Limb Development.*

The stability of Turing patterns in an n-dimensional cube $[0, \pi]^n$ is studied for $n \geq 2$. Generalizing a classical result of Ermentrout about spots and stripes in two dimensions [2], it is shown that under appropriate assumptions only sheet-like or nodule-like structures can be stable in an n-dimensional cube. Other patterns can also be stable in regions consisting of products of lower dimensional cubes and intervals of appropriate length.

The stability results are applied to a new model of skeletal pattern formation in the vertebrate limb [3].

This is joint work with H.G.E. Hentschel (Emory), M. Alber (Notre Dame), B. Kazmierczak (Warsaw) and S. Newman (NYMC).

References:

[1] M. Alber, T. Glimm, H.G.E. Hentschel, S.A. Newman, B. Kazmierczak (2004), *Stability of n-Dimensional Patterns in a Generalized Turing System*, preprint

[2] B. Ermentrout (1991) *Stripes or Spots? Nonlinear Effects in Bifurcation of Reaction-Diffusion Equations on the Square*, Proc. R. Soc. Lond. A **434**, 413-417

[3] H.G.E. Hentschel, T. Glimm, J.A. Glazier, S.A. Newman (2004), *Dynamical Mechanisms for Skeletal Pattern Formation in the Vertebrate Limb*, Proc. R. Soc. Lond. B **271**, 1713-1722 (Received August 23, 2004)