1137-92-153 **Tilmann Glimm*** (glimmt@wwu.edu). *Modeling pattern formation mechanisms in the vertebrate limb: What can we learn from tetrapod evolution?*

The limbs or fins of vertebrates contain an endoskeleton made up of nodules, bars or plates of bone or cartilage. The generation of these elements occurs by processes involving production and diffusion of morphogens, adhesion, and receptor dynamics. Several potential self-organizing mechanisms have been described and modeled.

One such mechanism in the chick acts through the adhesive activity of galectin-1 together with galectin-8. Galectin-1 has homologs in all jawed vertebrates. Using a mathematical model of this network based on a system of nonlocal reaction-advection-diffusion equations (Glimm, Bhat, Newman, 2014), we present evidence that in the tetrapods, a putative galectin-8 control module was acquired that enabled proximodistal increase in the number of pre-cartilage elements.

We also address other self-organizing networks that convert pre-cartilage protocondensations into skeletal tissues. These are the basis for other models, e.g. the BSW model by Raspopovic et al. (2014). We present ideas about a unified interpretation of the functioning of these networks and how their progressive appearance may refine the identities of the resulting arrays of elements.

This talk is based on joint work with S. A. Newman (NY Medical College) and R. Bhat (IIS, Bangalore). (Received February 01, 2018)