1014-92-808   **Martin Golubitsky*** (`mg@uh.edu`), Department of Mathematics, University of Houston, Houston, TX 77204-3008. *Symmetry in Neuroscience.* Preliminary report.

The neuronal system has evolved to complete many tasks and this system is highly structured. Much research is aimed at understanding this organization; and being involved in uncovering the brain's secrets is an exciting opportunity. Mathematics and mathematicians will be part of this endeavor.

Symmetry may at first appear to be an unlikely part of the structure of the nervous system. However, I will describe three rather different areas where symmetry has a role to play: animal gaits, the vestibular system, and the visual cortex.

Collins and Stewart point out that the standard gaits of quadrupeds (walk, trot, pace, etc.) are highly stylized symmetric motions. Understanding these gaits leads to interesting mathematics concerning the spatiotemporal symmetries of periodic solutions of ODEs. McCollum and Boyle show that the connections between the semicircular canals in the inner ear and the ring of muscles surrounding the neck have octahedral symmetry. Finally, Cowan and Bressloff exploit symmetries in the connectivity of the primary visual cortex to create models for this system.

It remains to be seen how important symmetry is in enabling these systems to carry out their tasks. At the very least, these are curious and interesting observations. (Received September 24, 2005)