1067-35-604 **Razvan C Fetecau*** (van@math.sfu.ca), 8888 University Drive, Burnaby, BC V5A 1S6, Canada, and **Raluca Eftimie**, Hamilton, ON L8S 4K1, Canada. *Nonlocal PDE models for self-organization of biological groups.*

We introduce and study two new PDE models for the formation and movement of animal aggregations. The models extend the one-dimensional hyperbolic model from Eftimie et al., Bull. Math. Biol. 69 (5) [2007]. Their main novel approach concerns the turning rates of individuals, which are assumed to depend in a nonlocal fashion on the population density. Our first model assumes in addition that the nonlocal interactions between individuals can also influence the speed of the group members. We investigate the local/global existence and uniqueness of solutions and we illustrate numerically the various patterns displayed by the model: dispersive aggregations, finite-size groups and blow-up patterns. The second model extends the approach from Eftimie et al. [2007] to two dimensions. We show that the resulting integro-differential kinetic equation with nonlocal terms has a unique classical solution, globally in time. We also present numerical results to illustrate various types of group formation that we obtained with the new model: (i) swarms (aggregation into a group, with no preferred direction of motion), and (ii) parallel/translational motion in a preferred direction with (a) uniform spatial density and (b) aggregation into groups. (Received September 10, 2010)