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**Luan Hoang** ([luan.hoang@ttu.edu](mailto:luan.hoang@ttu.edu)), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409, **Truyen Nguyen** ([tnguyen@uakron.edu](mailto:tnguyen@uakron.edu)), Department of Mathematics, University of Akron, Akron, OH 44325, and **Tuoc Phan\*** ([phan@math.utk.edu](mailto:phan@math.utk.edu)), Department of Mathematics, University of Tennessee, Knoxville, TN 37936. *Gradient estimates and global existence of smooth solutions to a cross-diffusion system.*

We investigate the global time existence of smooth solutions for the Shigesada-Kawasaki-Teramoto system of cross-diffusion equations of two competing species in population dynamics. If there are self-diffusion in one species and no cross-diffusion in the other, we show that the system has a unique smooth solution for all time in bounded domains of any dimension. We obtain this result by deriving global  $W^{1,p}$ -estimates of Calderón-Zygmund type for a class of nonlinear reaction-diffusion equations with self-diffusion. These estimates are achieved by employing Caffarelli-Peral perturbation technique together with a new two-parameter scaling argument. (Received January 20, 2015)