1126-65-371   **Alina Chertock*** (`chertock@math.ncsu.edu`), Department of Mathematics, North Carolina State University, Campus Box 8205, Raleigh, NC 27695. *Numerical Methods for Chemotaxis and Related Models.*

Chemotaxis is a movement of micro-organisms or cells towards the areas of high concentration of a certain chemical, which attracts the cells and may be either produced or consumed by them. In its simplest form, the chemotaxis model is described by a system of nonlinear PDEs: a convection-diffusion equation for the cell density coupled with a reaction-diffusion equation for the chemoattractant concentration. It is well-known that solutions of such systems may develop spiky structures or even blow up in finite time provided the total number of cells exceeds a certain threshold. This makes development of numerical methods for chemotaxis systems extremely delicate and challenging task.

In this talk, I will present a family of high-order numerical methods for the Keller-Segel chemotaxis system and several related models. Applications of the proposed methods to to multi-scale and coupled chemotaxis–fluid system and will also be discussed. (Received January 17, 2017)