1035-65-1488 **Bengt Fornberg** and **Cecile Piret*** (piret@colorado.edu), Dept. of Applied Mathematics, 526 UCB, Boulder, CO 80309. *The RBF-QR method on the surface of the sphere and two applications: stable interpolation and solution of a convective PDE with near-flat radial functions.*

The uncertainty principle was introduced by Schaback in 1995. It states that it is impossible to simultaneously have a well conditioned system and good accuracy when using the radial basis functions (RBF) method. In general, making the radial functions flatter has the effect of improving the accuracy of the interpolation, but also of raising dramatically the condition number of the collocation matrix. Thanks to the RBF-QR method introduced in 2007 by Fornberg and Piret, we are finally able to entirely eliminate the perceived ill-conditioning in the case of flat (or near-flat) basis functions, and thereby compute stably also in that regime. In this talk, I will introduce the RBF-QR method and explain the roles of the shape parameter and of the types of radial functions on the accuracy when interpolating and when solving a convective type equation on the surface of the sphere. (Received September 20, 2007)