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Maria Elena Schonbek*, U C California, Math Department, Santa Cruz, CA 95060. *Viscous conservation laws with slowly varying external forces.*

In this talk I will consider the existence and large time behavior of solutions to the convection-diffusion equation $u_t - \Delta u + b(x) \cdot \nabla(u|u|^{q-1}) = f(x, t)$ in $\mathbb{R}^n \times [0, \infty)$, where $f(x, t)$ is slowly decaying and $q \geq 1 + 1/n$. The initial condition u_0 is supposed to be in an appropriate L^p space. Uniform and nonuniform decay of the solutions will be established depending on the data and the forcing term.

The typical nonlinear term occurring in hydrodynamics in the one dimensional case has the form $uu_x = (u^2/2)_x$ (as in the case of the viscous Burgers equation). The most obvious generalization of this nonlinearity consists in replacing the square by a power u^q where q is a positive integer. (Received September 18, 2005)