1086-42-556 **Jill Pipher*** (jpipher@math.brown.edu), Department of mathematics, Brown University, Providence, RI 02906. *Neumann and regularity problems for second order elliptic operators with non-smooth coefficients.*

I will describe recent progress in Neumann and regularity boundary value problems for second order divergence form elliptic operators, when the coefficients satisfy certain natural, minimal smoothness condition. Specifically, we consider operators $L = \operatorname{div}(A\nabla)$ such that $A(X) = (a_{ij}(X))$ is strongly elliptic in the sense that there exists a positive constant Λ such that

$$\Lambda|\xi|^2 \leq \sum_{i,j} a_{ij}(X)\xi_i\xi_j < \Lambda^{-1}|\xi|^2,$$

for all X and all $\vec{\xi} \in \mathbb{R}^n$. We do not assume symmetry of the matrix A. There are a variety of reasons for studying the non-symmetric situation. These include the connections with non-divergence form equations, and the broader issue of obtaining estimates on elliptic measure in the absence of special L^2 identities which relate tangential and normal derivatives. The results described are joint work with M. Dindos and D. Rule for operators satisfying a Carleson condition, and with S. Hofmann, C. Kenig and S. Mayboroda for operators with time-independent bounded measurable coefficients. (Received September 06, 2012)