1096-35-1428 **Robert Pertsch Gilbert*** (gilbert@math.udel.edu), 112 Briar Lane, Newark, DE 19711, and **Alexander Panchenko** and **Ana Vasilic**. *Biphasic Acoustic Behavior of a Non-periodic Porous Medium.*

We study the problem of derivation of an effective model of acoustic wave propagation in a two-phase, non-periodic medium modeling a fine mixture of linear elastic solid and a viscous Newtonian fluid. Bone tissue is an important example of a composite material that can be modeled in this fashion. We extend known homogenization results for periodic geometries to the case of a stationary random, scale-separated microstructure. The ratio ε between a typical size of microstructural inhomogeneity and the macroscopic length scale is a small parameter of the problem. We employ stochastic two-scale convergence in the mean to pass in the limit to the governing equations. The effective model describes a biphasic viscoelastic material with long time history dependence. Homogenized system describes macroscopically anisotropic media and appears to be more general than the Biot system; however, numerical realizations show that the *non-Biot* coefficients are much smaller than the usual Biot coefficients. Hence, we obtain a numerical scheme for accurately determining the Biot coefficients. (Received September 15, 2013)