1092-35-61 **Robert Pertsch Gilbert*** (gilbert@math.udel.edu), Robert Pertsch Gilbert, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, **Alex Panchenko** (anpanchenko@gmail.com), Department of Mathematical Sciences, Washington State University, Pullman, WA 99164, and **Ana Vasilic** (vasilic@uaeu.ac.ae), Department of Mathematical Sciences, UAE University, Al Ain, United Arab Emirates. *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 to the limit $\varepsilon \to 0$ in the governing equations. The effective model describes a biphasic viscoelastic material with long time history dependence. Homogenized system describes macroscopically anisotropic media and is more general than the Biot system. (Received July 24, 2013)