1147-62-270 **Keenan J. Hawekotte*** (hawekott@usc.edu), 3620 S. Vermont Ave., KAP 262A, Los Angeles, CA 90089, and **Susan Luczak** and **I. Gary Rosen**. *Estimating Blood Alcohol Concentration from Biosensor Measured Transdermal Alcohol Level: A Distributed Parameter Model Based Bayesian Approach.*

We seek to estimate the posterior distribution (PD) of a random function describing blood/breath alcohol content (BAC/BrAC) in a distributed parameter, diffusion equation based model for the transdermal transport of ethanol. We also seek (sequentially or in parallel) the PD of the random parameters that appear in the governing PDE model. The underlying model yields transdermal alcohol concentration (TAC) expressed as the convolution of BrAC with a filter that depends on the individual subject, hardware itself, and environmental conditions (all random). We utilize a Bayesian approach to estimate the PD of the parameters and/or the deconvolved BrAC conditioned on an individual's measured TAC (and BrAC). Priors for the models are obtained from temporal population observations of BrAC and TAC via deterministic or statistical methods. Computations require finite dimensional approximation of the underlying state equation, which is achieved through standard finite element techniques. The posteriors yield credible regions, which remove the need to calibrate the model for every individual. We will present some of the results of our numerical studies and discuss the convergence of our finite-dimensional approximating PDs to the PD determined by the underlying infinite dimensional models. (Received January 15, 2019)