5005-B1-34 **Karlheinz Grochenig*** (karlheinz.groechenig@univie.ac.at), Faculty of Mathematics, Nordbergstrasse 15, A-1090, A-1090 Wien (Vienna), Austria, and **Richard Bass** (bass@math.uconn.edu), Department of Mathematics U-3009, University of Connecticut, Storrs, CT 06269. *Random Sampling of Bandlimited Functions.*

We consider the problem of random sampling for band-limited functions. How can a band-limited function f be recovered from randomly chosen samples $f(x_j), j \in \mathbb{N}$?

The goal is to estimate the probability for a sampling inequality of the form

$$A\|f\|_2^2 \leq \sum_{j\in\mathbb{N}} |f(x_j)|^2 \leq B\|f\|_2^2 \tag{1}$$

to hold, valid for all functions $f \in L^2(\mathbb{R}^d)$ with supp $\hat{f} \subseteq [-1/2, 1/2]^d$.

In contrast to the space of trigonometric polynomials of a given band-width or sparsity, the space of band-limited functions is infinite-dimensional and the functions "live" on $\mathbb{R}^d$. These facts raise new problems. We prove both negative and positive results.

(a) The sampling inequality fails, with probability one, for any reasonable definition of a random set on $\mathbb{R}^d$, e.g., for spatial Poisson processes or uniform distribution over disjoint large cubes.

(b) The sampling inequality (1) holds "with overwhelming probability" for certain compact subsets of the space of band-limited functions. (Received May 29, 2007)