David F Walnut* (dwalnut@gmu.edu), Department of Mathematical Sciences, George Mason University, Mail Stop 3F2, Fairfax, VA 22030. Local reconstruction from averages.

In this abstract, we consider the problem of reconstructing a function locally from its averages over translations of a finite collection of compact sets. Such problems are a subclass of the class of local Pompeiu problems. We show that this problem can be reduced to a problem of the completeness of collections of functions in $L^2(E)$ where $E$ is compact. Such collections are closely related to the sampling theory of functions bandlimited to $E$. This analysis shows in particular that the recovery of functions from their local averages is mildly ill-posed. (Received September 30, 2002)