Representation of random variables by integrals with respect to fBm

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Dudley showed that any functional ξ of a standard Wiener process $W = \{W_t, t \in [0,1]\}$ can be represented as an Itô stochastic integral $\int_0^1 \psi_t dW_t$, where ψ is adapted to the natural filtration of W and $\int_0^1 \psi_t^2 dt < \infty$ a.s. On the other hand, under an additional assumption $\int_0^1 E\psi_t^2 dt < \infty$, only centered random variables with finite variances can be represented in this form and moreover ψ is unique in this representation. In my talk I will discuss similar questions for fractional Brownian motion. In particular, I will give both necessary and sufficient conditions for a random variable to be a stochastic integral with respect to fractional Brownian motion. I will also discuss several financial implications of these results.