On some path-dependent stochastic differential equations with distributional drifts

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In this talk, I will discuss existence and uniqueness of martingale problems for some one-dimensional path-dependent stochastic differential equations of the form

$$dX_t = \sigma(X_t)dW_t + b'(X_t)dt + \Gamma(t, X)dt,$$

where $b, \sigma : \mathbb{R} \to \mathbb{R}$ are functions, Γ is a non-anticipative functional and W is a Brownian motion. The drift b' is a distribution in the sense of Schwartz. We treat essentially two cases: the first one concerns the case when the drift b' is the derivative of a continuous function, the second one when b' is the derivative of a logarithmic function. Applications to possibly non-Markovian Bessel processes in the most singular case, i.e., dimension $0 \leq \delta \leq 1$ will be presented. This is a joint work with Francesco Russo and Alan Teixeira.