In a series of papers which began in 2009, Kamran, Milson and Gómez-Ullate posed the following Bochner-type problem: to find all sequences of polynomials \( \{p_n\}_{n=1}^{\infty} \), with \( \deg(p_n) = n \), which are solutions of a second order differential equation of the form
\[
\ell[y](x) = a_2(x)y''(x) + a_1(x)y'(x) + a_0(x)y(x);
\]
are orthogonal with respect to a positive weight function \( w(x) \) on a real interval; and all have moments \( \{\mu_n\} \) of \( w(x) \) exist and are finite.

Up to a complex change of variables, their classification result shows that the only two such sequences are the “exceptional” polynomial sequences, \( X_1 \)-Laguerre and the \( X_1 \)-Jacobi. In this lecture, which is joint work with Dr. Lance Littlejohn (Baylor), we review this classification result and specifically discuss the spectral theory and related results, for the \( X_1 \)-Laguerre polynomials. (Received September 25, 2012)