Abstract: For an arbitrary analytic Jordan curve $L$ in the complex plane whose interior domain is denoted by $G$, we shall look at the sequence of polynomials $p_n(z)$, $n = 0, 1, 2, \ldots$ ($p_n$ of exact degree $n$) that are orthonormal over $G$ with respect to area measure, that is,

$$\int_G p_n(z)\overline{p_m(z)}dA(z) = \begin{cases} 0, & m \neq n, \\ 1, & m = n, \end{cases}$$

where $dA$ is the two-dimensional Lebesgue (area) measure.

Specifically, we want to understand how these polynomials and their zeros behave as the degree $n \to \infty$. We shall give a quite complete and satisfactory answer to the question, which required us to gain a good understanding of the meromorphic continuation properties of the interior and exterior canonical conformal maps associated with the analytic curve $L$. The results will be illustrated with some concrete (far from trivial) examples and numerical computations. Results have been obtained in collaboration with Dr. P. Dragnev of Indiana-Purdue University Fort Wayne.