We discuss first the Ginibre ensemble, where complex-valued matrices with complex-Gaussian entries are considered. In the theory of random matrices, the eigenvalues are of fundamental interest. For the Ginibre ensemble, the eigenvalues are of course random and it is possible to explicitly give the joint probability density. It is a characteristic property of random matrices that the eigenvalues tend to repel each other. This property is connected with Slater determinants for fermionic interaction. In the same vein reproducing kernels of polynomial spaces are needed.

There is a more general model -- the random matrix model, where the matrices are required to be normal (so not as general as for the Ginibre case) but the associated potential is more general. This gives rise to a rich theory of reproducing kernels of polynomials of degree $<n$ with respect to exponentially varying weights. Until rather recently, it was understood how the kernel behaved in the interior of a certain compact subset called the droplet, but not well what happened at the droplet boundary.

Outside the droplet there are practically no eigenvalues so there is not much to talk about. Things changed with a recent breakthrough by Hedenmalm-Wennman (arXiv 2017, Acta Math., to appear), where orthogonal polynomials were shown to have an asymptotic expansion also in the planar case for exponentially varying weights. More recently it was understood that the orthogonal polynomials can be obtained by solving a certain "soft" Riemann-Hilbert problem.