Differential cohomology theories of smooth manifolds geometrically refine classical cohomology theories by combining differential forms and integral cocycles to obtain local geometric and global topological information. Whereas the topological $K$-theory $K^0(M)$ is the ring of isomorphism classes of vector bundles, the differential $K$-theory $\hat{K}^0(M)$ consists of isomorphism classes of vector bundles with connection. When a smooth manifold $M$ carries a smooth action of the circle group $\mathbb{T}$, equivariant $K$-theory, the $K$-theory of $\mathbb{T}$-equivariant vector bundles, captures equivariant topological information. We recall the Freed-Lott construction of differential $K$-theory and present a construction of differential $\mathbb{T}$-equivariant $K$-theory which captures equivariant geometric and topological information at once. (Received September 25, 2012)