Kronheimer and Mrowka defined the Instanton knot Floer homology $I^\natural(K)$ using connections singular along the link $K^3 = K \# H$, a connected sum of $K$ with the Hopf link $H$. They also constructed a spectral sequence converging from $Kh(K)$ to $I^\natural(K)$ which was instrumental in proving that the $Kh(K)$ is an unknot detector.

In our talk, we will approach $I^\natural(K)$ by passing to the double branched cover of $K^3$ and work with equivariant rather than singular connections. This approach results in explicit computations of the chain complex for $I^\natural(K)$ for several families of knots with simple double branched covers (such as two-bridge knots, torus knots, Montesinos knots.) (Received September 02, 2014)