A rational homology n-sphere (RHS) is an n-dimensional manifold with deRham cohomology the same as that of an n-sphere. Rational homology spheres surprizingly appear in several places in the theory of Orlicz-Sobolev mappings between manifolds, starting from a result of Hajłasz, Iwaniec, Malý and Onninen sating that if the target manifold is not a RHS, then the topological degree of a map with $Df \in L^n \log^{-1} L$ (and similar Orlicz-Sobolev spaces) is well defined.

In my recent joint results with P. Hajłasz RHS reappear in conditions for integrability of Jacobians and continuity of finite distortion mappings between manifolds. I shall give a survey of these results and explain the role of rational homology spheres in our toolbox.