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## **Holomorphic disks and low-dimensional topology**

I will discuss recent work with Zoltan Szabo, in which we use techniques from symplectic geometry - holomorphic disks, and Lagrangian Floer homology - to construct topological invariants for three- and four-manifolds. These invariants yield many of the four-dimensional results which have been proved using their gauge-theoretic predecessors (Donaldson-Floer and Seiberg-Witten theory), though the new invariants are constructed using more topological and combinatorial input, rendering them easier to calculate. Moreover, they also have applications to three-dimensional topological questions which have not been addressed by gauge theory, including the problem of representing lens spaces as surgeries on knots in the three-sphere.