Symplectic Geometry

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My research interests lie in symplectic geometry and related problems in geometric analysis and dynamical systems. Symplectic geometry is a field that studies spaces equipped with a symplectic structure, which are known as symplectic manifolds. Historically, this field originated from the Hamiltonian formulation of analytical mechanics. Symplectic manifolds are mathematical generalizations of the phase space in analytical mechanics. For this reason, symplectic geometry has developed as a field with deep connections to both pure mathematics and mathematical physics. Since symplectic structures are closely related to almost complex structures, symplectic geometry also has strong connections to complex geometry and algebraic geometry. In 1985, Gromov founded the theory of pseudoholomorphic curves using almost complex structures on symplectic manifolds. In the late 1980s, Floer applied Gromov's ideas to create Floer theory. These powerful theories have allowed symplectic geometry to grow into a very active field of research. I use these global and geometric analytical theories to study symplectic invariants and Hamiltonian dynamics.

Keywords : symplectic manifold, contact manifold, Floer homology, Hamiltonian dynamics