# Reserch plan

A Hermitian manifold $(M, J, g)$ is a locally conformal Kähler manifold if there exists a closed 1-form $\omega$, called the Lee form, on $M$ satisfying $d\Omega = \omega \wedge \Omega$, where $\Omega$ denotes the fundamental 2-form associated with $(J, g)$.
I study differential geometry of locally conformal Kähler manifolds as a generalization of Kähler and symplectic manifolds. Concrete problems are following:

1. In [3] we give sufficient conditions of harmonic foliations on locally conformal Kähler manifolds is stable. One of the results is " A harmonic foliations on a compact locally conformal Kähler manifold with bundle-like metric foliated by complex submanifolds is stable". This is an analogoue of the theorem "a holomorphic map between two Kähler manifolds is stable as a harmonic map". This theorem is not request the assumption that the metric is bundle-like. I want to drop the assumption or give a weaker condition. For this I test harmonic foliations with non-bundle-like metrics (e.g. on Inoue surfaces and a solvemanifold).

2. A locally conformal almost Kähler manifold with parallel Lee form (with some assumptions) is called a $P$ manifold. This subclass contain a product $N \times S^1$ of a contact manifold $N$ and the unite circle $S^1$ as a typical example. We have a structure theorem for this manifolds under an assumption (e.g. $b_1 = 0$). I want to remove the assumptions. I also want to show the existence of a periodic orbit of the canonical vector field on compact $P$ manifolds.

3. I want to find a "good" subclass between $P$ manifolds and locally conformal symplectic manifolds.