1075-53-26 **Shihshu Walter Wei*** (wwei@ou.edu), Department of Mathematics, The University of Oklahoma, Norman, OK 73072. *Comparison Theorems, Geometric Flows, And Conservation Laws in p-Harmonic Geometry.*

Many fundamental tools in various branches of mathematics are examples of p-harmonic maps, and they are naturally fused and unified into p-harmonic geometry. In fact, we prove that p-harmonic maps $u : M \to N$ between Riemannian manifolds are generalizations of *geodesics* (when $\dim M = 1$ and u has constant speed), *minimal submanifolds* (when u is an isometric immersion), *logarithmic and exponential functions* (when $p = 1, N = \mathbb{R}, M = \mathbb{R}^+$ and $\mathbb{R}$ respectively), and *conformal maps* (when $p = \dim M = \dim N$), etc. Obviously, when $p = 2$, p-harmonic maps become ordinary harmonic maps. We recall a C^1 map u is said to be *p-harmonic* ($p \geq 1$), if it is a weak solution of the Euler-Lagrange Equation of p-energy functional $E_p(u) = \int_M |du|^p \, dv$, i.e. $div(|du|^{p-2}du) = 0$ on M.

We will study some geometric analytic and geometric measure theoretic aspects of p-harmonic geometry. Some applications and their link to curvature, new comparison theorems in singular differential equations, conservation laws, geometric flows, and monotonicity formula will be discussed. As Further applications, we obtain sharp geometric inequalities and rigidity theorems on Riemannian manifolds. (Received August 06, 2011)