1023-53-341   **R Inanc Baykur*** (`baykur@msu.edu`), Department of Mathematics, MSU, East Lansing, MI
                     48824. *Generalizations of symplectic structures and Lefschetz fibrations on smooth 4-manifolds.*

Motivated by various celebrated results obtained in the study of symplectic 4-manifolds in the past 15 years, we would like to apply similar ideas to larger families of closed smooth 4-manifolds. There are two types of symplecticish forms one can employ for this purpose: *Near symplectic forms*, which live precisely on smooth 4-manifolds with $b^+ > 0$, and folded symplectic ones, which are known to exist on all closed smooth oriented 4-manifolds. The latter contain a distinguished subfamily of forms, called *folded Kähler structures*, which still span the entire family of closed smooth oriented 4-manifolds. Both near symplectic and folded Kähler forms have appropriate generalizations of Lefschetz fibrations as their topological counterparts; namely *singular Lefschetz fibrations* and *folded Lefschetz fibrations*, respectively. In this talk, we will discuss recent results regarding these topics, with an emphasis given to smooth 4-manifold invariants. (Received September 07, 2006)