1063-68-272 **Yalin Wang*** (ylwang@math.ucla.edu), Department of Mathematics, 520 Portola Plaza, Math Sciences Building 6363, Los Angeles, CA 90095. *Human Brain Mapping with Conformal Geometry and Multivariate Tensor-based Morphometry.*

Historically, biology and medicine have been primarily descriptive science. The rapid advance of information and medical technology will accelerate the trend towards more quantitative science and help achieve an integrated understanding of anatomy, genetics and illness prevention and treatment. For human brain mapping research, we aim to apply computational methods to track the emergence of disease in the living brain, and understand clinical and genetic correlates of changes in brain scans. In this talk, I will introduce how to apply conformal geometry and multivariate tensor-based morphometry (MTBM) to analyze brain structures effectively. With harmonic energy minimization, holomorphic 1-form and discrete curvature flow (Ricci/Yamabe flow) methods, we can parameterize brain surfaces onto various canonical domains such as sphere, Euclidean plane, and the Poincaré disk. The resulting surface subdivision and the parameterizations of the components are intrinsic and stable. It provides a rigorous framework for representing, matching and measuring brain structure surfaces. The obtained conformal grids are beneficial for PDE are stable shape indices for statistical analysis. (Received August 17, 2010)