1100-74-353 **Ram Iyer*** (ram.iyer@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409. *On a thermodynamically consistent model for hysteresis in magnetostriction including hysteresis, viscoelasticity, and rate-dependent power losses.*

In this talk we will present an extension of the thermodynamically consistent model for hysteresis in smart materials (those that have more than input such as stress and magnetization), which was developed recently Krejci et al., to include viscoelastic dissipation, saturation, and rate-dependent power losses. These phenomena seriously hinder the use of smart actuators made of magnetostrictive materials in precision control applications. We will discuss new existence and uniqueness problems that arise in the area of differential equations coupled with hysteresis operators. (Received February 10, 2014)