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Irena Lasiecka* (lasiecka@memphis.edu), Department of Mathematical Sciences, University of Memphis, Memphis, TN 38152-3370. *Boundary Feedback Control with Applications to High Intensity Focused Ultrasound (HIFU)*.

This talk will discuss boundary feedback control associated with PDE models arising in HIFU models -which are PDE's of third order in time. This leads to a notion of non-standard Riccati equations which provide suitable gain operators for the feedback control. Singularity of the control action compromises the usual regularity of the associated Riccati operators-making the analysis challenging particularly in the case of boundary controls. In this latter case, the loss of regularity is "double" - due to singularity caused by the appearance of time derivatives in control function and also due to the intrinsic loss associated with unbounded and un-closable trace operators. In order to construct viable theory one needs to develop suitable regularity theory within the framework of non-smooth optimization. It will be shown how the propagation of hidden trace regularity in hyperbolic dynamics allows to build suitable concepts. (Received January 28, 2018)