Optimal Control of a Non-smooth Quasilinear Parabolic Equation

C. Clason[1], **<u>V. H. Nhu</u>**[1], and **A. Rösch**[1]

Abstract: This talk is concerned with an optimal control problem governed by a quasilinear parabolic equation of the form

$$\frac{\partial}{\partial t}H(u) - \Delta u = f,$$

where H is a maximal monotone graph and piecewise continuously differentiable. The state equation of this type occurs, for instance, in models of phase transitions in solid-liquid systems, where u stands for the temperature of the material and $H(u)$ is the enthalpy corresponding to temperature u.

The occurrence of H in the state equation leads to the associated control-to-state operator $f \mapsto H(u)$ to be non-smooth and thus standard techniques for derivation of qualified optimality conditions are inapplicable in this situation. To overcome this difficulty, we use a suitable regularization scheme to obtain the Karush-Kuhn-Tucker optimality conditions for a local minimizer of the non-smooth quasilinear parabolic optimal control problem.

[1] Faculty of Mathematics
University of Duisburg-Essen
Thea-Leymann-Strasse 9, 45127 Essen, Germany
{*christian.clason, huu.vu, arnd.roesch*}*@uni-due.de*