
Tulk²a Konstanz (July 21st, 2026, in P 603)

Program

11:45–12:30	Lukas Fußangel	<i>On manifold-constrained variational functionals of linear growth</i>
12:30–13:45	Lunch break	
13:45–14:30	Fabian Merz	<i>Nonlocal Fisher information: lifting, local limit, and the Blachman–Stam inequality</i>
14:45–15:30	Yonas Mesfun	<i>Well-posedness and global Strichartz estimates for a class of rough wave equations</i>
15:30–16:15	Coffee break	
16:15–17:00	Jonathan Mui	<i>Symmetry, spectrum, and positivity</i>
18:00–	Dinner	Restaurant Deli, Lago Konstanz

Abstracts

Lukas Fußangel (Konstanz):

On manifold-constrained variational functionals of linear growth

We examine variational functionals of linear growth with an additional manifold constraint in terms of existence and regularity of minimizers. The difficulties arising from these functionals are twofold. Firstly, they constitute a limit case of the corresponding theory for p -growth functionals with $p > 1$ and make use of different methods, for example working with BV functions. Secondly, the non-linear manifold constraint poses additional challenges.

After a general introduction, we define and show existence of generalized minimizers to the Dirichlet problem for quasiconvex functionals posed on Dirichlet classes in $W^{1,1}$. In doing so we obtain an integral representation formula for the lower semicontinuous extension of the functional.

We also discuss current work on the regularity theory for generalized minimizers.

This is joint work with Franz Gmeineder (Konstanz).

Fabian Merz (Ulm):

Nonlocal Fisher information: lifting, local limit, and the Blachman–Stam inequality

We show that the nonlocal Fisher information—defined as the entropy dissipation of the Boltzmann entropy for nonlocal heat equations—admits a natural lifting in the sense of Guillen and Silvestre. Important examples include the discrete Fisher information arising in Markov chains and the fractional Fisher information i_s associated with the fractional Laplacian $(-\Delta)^s$ on $\mathbb{R}^d$, $s \in (0, 1)$. We further establish a Blachman–Stam inequality (BSI) for the fractional Fisher information i_s and prove that, for a large class of functions, i_s converges to the classical Fisher information as $s \rightarrow 1$. Through this nonlocal-to-local limit we recover the classical Blachman–Stam inequality.

Yonas Mesfun (Karlsruhe):

Well-posedness and global Strichartz estimates for a class of rough wave equations

In this talk, we consider variable-coefficient wave equations in spacetime $\mathbb{R}_t \times \mathbb{R}_x^d$ with Lipschitz coefficients satisfying a structural assumption. Under this structural assumption, we are able to construct parametrices (i.e., approximate solution operators) for these wave equations by means of the Phillips functional calculus. We then use these parametrices to establish well-posedness in H^1 . In particular, we obtain a representation of the solution in terms of these parametrices that is explicit enough to prove global-in-time Strichartz estimates without loss of derivatives. In earlier works, Smith, Tataru and Metcalfe–Tataru established Strichartz estimates without loss of derivatives under a C^2 assumption on the coefficients. Thus, for the class of wave equations considered in this talk, our result lowers the regularity assumption from C^2 to Lipschitz.

This talk is based on joint work with Dorothee Frey.

Jonathan Mui (Wuppertal):

Symmetry, spectrum, and positivity

In this talk, we give a functional analytic perspective on a classic topic in PDE theory: how symmetry properties of the domain and differential operator affect the solutions. Using properties of group actions on Sobolev spaces combined with some simple variational tools, we investigate elliptic operators on symmetric domains with a generalised, possibly non-local, Robin boundary. Our methods yield some surprising insights into positivity of the leading eigenfunction and the asymptotic behaviour of the associated heat equation.

Joint work with Jochen Glück (Wuppertal).