Alex Amenta
Delft University of Technology
Constructing Riemannian manifolds with L^p-unbounded Riesz transform for $p > 2$

We construct a large class of Riemannian manifolds of arbitrary dimension with Riesz transform unbounded on L^p for all $p > 2$. These manifolds are constructed in terms of infinite graphs with a 'spinal' structure. This extends recent results for Vicsek manifolds, and in particular shows that fractal structure is not necessary for this property.

Odysseas Bakas
Stockholm University
A multiplier inclusion theorem

It follows from some classical results of Paley, Zygmund, and Rudin that if a set $\Lambda \subset \mathbb{Z}$ satisfies the following Paley-type inequality

$$\big(\sum_{n\in\Lambda} |\widehat{f}(n)|^2 \big)^{1/2} \leq A_\Lambda \|f\|_{H^1(\mathbb{T})}$$

then Λ also satisfies Zygmund's inequality,

$$\big(\sum_{n\in\Lambda} |\widehat{f}(n)|^2 \big)^{1/2} \leq B_\Lambda \|f\|_{L\log^{1/2} L(\mathbb{T})}.$$

We extend this fact to weighted settings and to higher dimensions showing that the class of all multipliers from the d-parameter real Hardy space $H^1(\mathbb{T}^d)$ to $L^2(\mathbb{T}^d)$ is properly contained in the class of multipliers from $L\log^{d/2} L(\mathbb{T}^d)$ to $L^2(\mathbb{T}^d)$. Variants in the euclidean setting will also be discussed.

Gianmarco Brocchi
University of Birmingham
Sharp Strichartz inequalities for fractional and higher order Schrödinger equations

Strichartz estimates are a fundamental tool in understanding how solutions of dispersive PDEs evolve. The search for extremizers in the corresponding inequalities is an active area of research, and is intimately related with the study of the Fourier extension operator from certain hypersurfaces.

In this poster, we present a class of sharp Fourier extension inequalities on the planar curves $s = |y|^p$, $p > 1$. A careful analysis of the convolution measure on these curves reveals that, in the range $1 < p \leq 5$, extremizers for the corresponding inequalities do exist.

This is based on a joint work with Diogo Oliveira e Silva and René Quilodrán (arxiv:1804.11291).

Jayson Cunanan
Saitama University

Smoothing estimates for the kinetic transport equation at critical regularity

We prove smoothing estimates for velocity averages of the kinetic transport equation in hyperbolic Sobolev spaces at the critical regularity, leading to a complete characterisation of the allowable regularity exponents. Such estimates will be deduced from some mixed-norm estimates for the cone multiplier operator at a certain critical index. Our argument is not particular to the geometry of the cone and we illustrate this by establishing analogous estimates for the paraboloid. This is a joint work with Neal Bez and Sanghyuk Lee.

Fausto Di Biase
Università degli Studi G. d'Annunzio Chieti–Pescara

On the sharpness of the Stolz approach

In a joint work with Alexander Stokolos, Olof Svensson and Tomasz Weiss, we study the sharpness of the Stolz approach for the a.e. convergence of functions in the Hardy spaces in the unit disc, first settled in the rotation invariant case by J. E. Littlewood in 1927 and later examined, under less stringent, quantitative hypothesis, by H. Aikawa in 1991. We introduce a new regularity condition, of a qualitative type, under which we prove a version of Littlewood's theorem for tangential approach whose shape may vary from point to point. Our regularity condition can be extended in those contexts where no group is involved, such as NTA domains in Euclidean spaces. We show exactly in what sense our regularity condition is sharp, thus answering a question that appears in Littlewood (1927), Rudin (1979), and Rudin (1988).

Xiumin Du
Institute of Advanced Study, Princeton

Schrödinger maximal estimates and refined Strichartz type estimates

We consider Carleson's pointwise convergence problem of Schrödinger solutions. It is shown that the solution to the free Schrödinger equation converges to its initial data almost everywhere, provided that the initial data is in the Sobolev space $H^s(\mathbb{R}^n)$ with $s > \frac{n}{2(n+1)}$ (joint with Larry Guth and Xiaochun Li in the case $n = 2$, and joint with Ruixiang Zhang in the case $n \geq 3$). This is sharp up to the endpoint, due to a counterexample by Bourgain. This pointwise convergence problem can be approached by estimates of Schrödinger maximal functions, which have some similar flavor as the Fourier restriction estimates. The key ingredients are refined Strichartz type inequalities derived from Bourgain–Demeter decoupling theorem and induction on scales. Roughly speaking, refined Strichartz type estimates give finer information compared to classical restriction type estimates when Schrödinger solutions are spread-out in physical space.

Shohei Nakamura
Tokyo Metropolitan University

The orthonormal Strichartz inequality on torus

In this poster, motivated by recent important works due to Frank–Lewin–Lieb–Seiringer and Frank–Sabin, we study the Strichartz inequality on torus with the orthonormal system input and obtain sharp estimates in certain sense. An application of the inequality shows the well-posedness to the periodic Hartree equation describing the infinitely many quantum particles interacting with the power type potential.

David Rottensteiner
Universität Wien

New Aspects of Time-Frequency Analysis via Nilpotent Lie Groups – ONB's, Frames, Coorbit Spaces

The use of nilpotent Lie groups which possess square-integrable unitary irreducible representations (SI/Z unirreps) offers a meaningful generalization of time-frequency analysis and the theory of coorbit spaces. The 3-step nilpotent Dynin–Folland group, for example, gives rise to spaces which are akin to modulation spaces and Besov spaces but in fact different from both classes. A conclusive characterization and comparison can be given in terms of decomposition space theory and recent results by Felix Voigtlaender.

The SI/Z unirreps of nilpotent Lie groups can also be used to generate new kinds of orthonormal bases (ONB's) and frames of $L^2(\mathbb{R}^d)$, much in the same way a dense enough lattice in $\mathbb{R}^{2d}$ can be used to generate an ONB or a frame via time-frequency shifts.

The presented results summarize collaborations with Véronique Fischer, Karlheinz Gröchenig and Michael Ruzhansky.

Wolfgang Woess
Technische Universität Graz

Boundary representations of λ-harmonic and polyharmonic functions on trees

This is joint work with Massimo Picardello.