

October 2, 2026 - Friday

## Bochner-Riesz means on the Heisenberg groups

Andreas Seeger

University of Wisconsin-Madison, USA

We present an  $L^p$ -boundedness result for Bochner-Riesz means associated with the spectral decomposition of the sub-Laplacian  $L$  on the Heisenberg group  $\mathbb{H}_n$ . It is sharp up to endpoints for  $1 \leq p < p_n$  where  $\lim_{n \rightarrow \infty} p_n = 2$ . The Bochner-Riesz bound is a corollary of a more general spectral multiplier theorem for operators  $m(\sqrt{L})$ , with localized  $L^2$ -Sobolev assumptions on  $m$ . Our main auxiliary result is a corresponding  $L^{p'}$  estimate for a square function associated with the Heisenberg wave group  $\{e^{it\sqrt{L}}\}$ . Joint work with Detlef Müller, Lars Niedorf and Betsy Stovall.

## Diameter-free estimates and superorthogonality

Shukun Wu (吴澍坤)

Indiana University Bloomington, USA

I will discuss how order and orthogonality yield a near-optimal three-fold additive energy bound for points on convex curves and diameter-free decoupling for the parabola. A related geometric observation gives a short proof of the Guth–Wang–Zhang cone reverse square function estimate. I will then introduce an abstract ordered superorthogonality theorem and explain its applications to diameter-free and sharp reverse square function estimates for the cone. This is based on joint work with Adam Cushman and Ciprian Demeter. The work is AI-assisted.

## Maximal averages and non-transversality

Jinbong Lee

Seoul National University, South Korea

In this talk, the speaker presents  $L^p$  estimates for maximal averages along hypersurfaces in the context of the conjecture of Stein and Iosevich-Sawyer. In the literature, this problem has been mainly studied under the *transversality* assumption. One of main interests of this talk is what happens if the transversality assumption is violated. We give a definitive answer to this question, and reformulate the conjecture with regard to the role of non-transversal points.

## The endpoint eigenfunction bound for the Hermite operator in two dimensions

**Jaehyeon Ryu**

Ewha Womans University, South Korea

In this talk, we establish the optimal  $L(\mathbb{R}^2) \rightarrow L^{10/3}(\mathbb{R}^2)$  endpoint estimate for the spectral projection operator associated with the Hermite operator on  $\mathbb{R}^2$ . In higher dimensions  $d \geq 3$ , the corresponding endpoint estimates were recently established. Combined with earlier results, our result fully resolves the problem of optimal  $L^2 \rightarrow L^q$  eigenfunction bounds for the Hermite spectral projections in all dimensions. Although our approach builds on our previous method, we overcome its limitations through a multiscale decomposition in space and time relative to the degeneracy set, combined with an asymmetric refinement on the input side and almost orthogonality. This talk is based on joint work with Eunhee Jeong and Sanghyuk Lee.

## Damping oscillatory integrals of convex analytic functions

**Sewook Oh**

Gwangju Institute of Science and Technology, South Korea

The estimate for the Fourier transform of measure is a fundamental subject in Harmonic Analysis. When a measure is supported on a hypersurface whose Gaussian curvature is nonvanishing, the stationary phase method gives the optimal decay estimate. However, if hypersurfaces are degenerate, the Fourier decay worsens. For compensating this, Sogge-Stein introduced oscillatory integrals with suitable mitigating factors.

In this talk, we focus on oscillatory integrals with damping factor given by a power of the absolute value of the Gaussian curvature. Estimates for these integrals have several applications, including affine Fourier restriction estimates and maximal averages with damping factors. I will also present a sketch of the proof, which involves a modified version of stationary set method.

**October 3, 2026 - Saturday**

## **Layered Circle Method**

**Joonil Kim**

Yonsei University, South Korea

In this talk, we study exponential sums over lattice boxes with independently varying side lengths. To this end, we develop a layered circle method based on a major-arc rigidity phenomenon arising from the layered structure of the polynomial phase. As a first application, we prove uniform bounds for exponential sums with a product Hilbert kernel, extending the one-parameter theorem of Arkhipov and Oskolkov. We also establish the affirmative answers to multi-parameter versions of the Bellow–Furstenberg problem on pointwise ergodic theory.

This is joint work with Hejna, Łyżwa, Langowski, Mirek, Song, and Wright.

## **Maximal estimates for orthonormal systems of wave equations**

**Hyerim Ko**

Jeonbuk National University, South Korea

In this talk, I will discuss maximal estimates for wave equations with orthonormal initial data. I will present the sharp regularity result in three dimensions, as well as Schatten summability estimates in other dimensions. I will also discuss related problems and possible extensions to other dispersive settings. This talk is based on joint work with Sanghyuk Lee and Shobu Shiraki.

## **Eigenfunction estimates for Schrödinger operators with growth potentials**

**Peng Chen (陈鹏)**

Sun Yat-sen University, China

We study  $L^p$  estimates for eigenfunctions of Schrödinger operators  $-\Delta + |x|^\alpha$ ,  $\alpha > 0$ , acting on  $L^2(\mathbb{R}^n)$ . As an application, we show the  $L^p$  convergence of Bochner-Riesz summability for this class of Schrödinger operators.

## **Some progress for weak type (1, 1) bounds of rough operators**

**Xudong Lai (赖旭东)**

Harbin Institute of Technology, China

Rough operators are ubiquitous in harmonic analysis. In this talk, we present some recent progress on their weak-type (1,1) theory in both classical and noncommutative harmonic analysis. The

operators involved include maximal truncated singular integral operators with convolution or non-convolution kernels, noncommutative (operator-valued) singular integral operators, some operators on quantum tori, and Schur multiplier operators.

## Degenerate diffusion estimate

**Jingxuan Zhang (张景宣)**

Tsinghua University, China

We consider degenerate non-autonomous parabolic equations in  $L^p$  spaces for all  $1 \leq p \leq \infty$ , and prove integrated Gaussian space-time upper bounds on their solutions. Our bounds cover both linear and nonlinear equations on general Riemannian manifolds.

**October 4, 2026 - Sunday**

## **The solution to the $C_p$ conjecture**

**Sheldy javier Ombrosi**

Universidad Nacional del Sur, Argentina

We will show that the condition  $w \in C_p$  is sufficient to establish the estimate

$$\int |Tf|^p w \lesssim \int (Mf)^p w,$$

where  $T$  is a Calderón-Zygmund operator, thereby settling a conjecture of Muckenhoupt from 1980. The proof is based on a combination of sparse domination, Bellman function techniques, and random dyadic lattices.

This talk is based on joint work with A. Lerner and F. Nazarov.

## **Multilinear circle method and pointwise ergodic theorem**

**Renhui Wan ( 万仁辉 )**

Nanjing Normal University, China

This talk will introduce the multilinear circle method and its applications to the pointwise convergence of multilinear polynomial ergodic averages.

**October 5, 2026 - Monday**

## **Projection Theory and Makeya type problems**

**Chong-Wei Liang ( 梁崇璋 )**

Taiwan University, China

Projection theory has a deep connections with other fields. For instance, it relates closely to additive combinatorics, which reveal underlying structural phenomena, as well as to large sieve methods in analytic number theory. In this talk, I will survey several methods that have been developed in projection theory over finite fields. I will then discuss recent progress on the Peres-Schlag projection problem.

## **Mapping properties of the $\mathcal{S}$ -operator**

**Doowon Koh**

Chungbuk National University, South Korea

We study the  $\ell^p \rightarrow \ell^r$  estimates for the  $\mathcal{S}$ -operator arising in restriction problems for spheres over finite fields. We establish a necessary and sufficient condition for the boundedness of the  $\mathcal{S}$ -operator. Furthermore, we investigate this problem under certain restrictions on test functions. In particular, we address the sharp results when test functions are restricted to radial functions.

This is joint work with Hunseok Kang and Changhun Yang.

## **Representation of variable-coefficient partial differential operators as Fourier multipliers and applications**

**Arne Hendrickx ( 韩易伦 )**

Ghent University, Belgium

We discuss the representation of certain partial differential operators with variable coefficients as Fourier multipliers on Euclidean domains when expressed in a particular system of global nonlinear coordinates. The motivation for this study stems from work by V. E. Petrov in which he considered integro-differential equations on the interval  $(-1, 1)$  arising in mathematical physics, such as the Prandtl equation, the singular Tricomi equation, and the Lavrentjev-Bitsadze equation. We generalize this approach to arbitrary domains that are diffeomorphic to  $\mathbb{R}^n$ . We then discuss the existence of a fundamental solution for canonical partial differential operators with constant matrix coefficients. Finally, we give an outlook on ongoing work concerning microlocalization methods in this framework. This talk is based on joint work with D. Cardona, R. Duduchava, and M. Ruzhansky.

## Egorov's theorem on hyperbolic surfaces

Zhenhao Li ( 李桢昊 )

University of California, Berkeley, USA

Motivated by the analysis of scattering resonances on infinite-area hyperbolic surfaces, we establish a quantum-classical correspondence up to time  $\log \frac{1}{h}$ . The main tool is a global quantization procedure inspired by the Zelditch quantization and the anisotropic calculus of Dyatlov-Zahl. In particular, the Egorov's theorem allows us to propagate deep into the cusp regions where the injectivity radius degenerates. Such an Egorov's theorem allows us to rule out the escape of mass into the cusps of the manifold. This talk is based on joint work with Alex Cohen and Zhongkai Tao.

## Polynomial bounds for eigenfunctions and eigenvalues on random covers of hyperbolic surfaces

Elena Kim

Harvard University, USA

Let  $X$  be a compact connected orientable hyperbolic surface and let  $X_n$  be a degree  $n$  random cover. We show that, with high probability, the  $L^\infty$  norm of every Laplace eigenfunction on  $X_n$  with bounded eigenvalue decays polynomially in  $n$ . Using similar methods, we also show that, with high probability, the distribution of eigenvalues of the Laplacian on  $X_n$  converges to the spectral measure of the hyperbolic plane with polynomially decaying error. Our proof relies on the Selberg pre-trace formula and a variant of the polynomial method.

This is joint work with Zhongkai Tao.

**October 6, 2026 - Tuesday**

**$L^p$ -Estimates for maximal averages along mixed homogeneous hypersurfaces in  $\mathbb{R}^3$**

**Wenjuan Li ( 李文娟 )**

Northwestern Polytechnical University, China

In this paper, we study  $L^p$ -estimates for maximal averaging operators  $\mathcal{M}$  along hypersurfaces  $S$  in  $\mathbb{R}^3$  which are the graph of a mixed homogeneous function  $\Phi$  which is analytic away from the origin. The closure of such a surface will pass through the origin, so that the usual transversality condition that had been imposed in many previous works on maximal averages along hypersurfaces will not hold even when  $\Phi$  is analytic at the origin.

As our main result, under mild assumptions which are satisfied for instance for every mixed homogeneous polynomial  $\Phi$ , we determine the critical Lebesgue exponent  $p_c$  for which  $\mathcal{M}$  is  $L^p$ -bounded for every  $p > p_c$ , but unbounded for  $p < p_c$ , in terms of multiplicities of the real roots of the Hessian determinant of  $\Phi$ .

It turns out that the study of the contributions by neighborhoods of a certain type of roots is closely related to recent work by Buschenhenke, Dendrinos, Ikromov, and Müller on sharp estimates for a maximal averaging operator along a transversal hypersurface of an "exceptional" class, whose  $L^p$ -boundedness had been an open problem for a long time and which has recently been established by means of their new theory of FIO-cone multipliers.

This is joint work with Dr. Stefan Buschenhenke, Prof. Detlef Müller, and Dr. Huiju Wang.

**On a Pierce-Yung operator on the plane**

**David Beltran**

Universitat de València, Spain

Pierce and Yung introduced in 2015 a family of operators that is a hybrid between polynomial Carleson operators and Radon transforms: maximally modulated singular integrals along paraboloids. They established their  $L^p(\mathbb{R}^n)$ -boundedness for all  $1 < p < \infty$  and  $n \geq 3$ , assuming that the modulations are neither linear nor multiplies of  $|t|^2$ . In this talk, we will discuss the challenges of the planar case and present positive results for a model case: maximal cubic modulations of the Hilbert transform along the parabola. Our approach is inspired by techniques used in proving  $L^p$ -bounds for certain geometric maximal functions; in particular, it relies on local smoothing estimates for a class of oscillatory integral operators recently established by Chen, Gan, Guo, Hickman, Iliopoulou and Wright.

This is joint work with Shaoming Guo and Jonathan Hickman.