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About

Functional Analysis in the Pacific Northwest. University of Oregon, Eugene, OR, Nov 8-11, 2025

Over the years, the remarkable progress of Functional Analysis led to the unfortunate consequence of loss of contact between different branches of that discipline. The aim of this conference is to bring together researchers working on different topics, and to facilitate their interactions. We would also like to use this opportunity to celebrate the 80-th birthday of Bill Johnson, who is the force behind many advances in the field.

Organizing committee

Marcin Bownik	IMPAN and University of Oregon
Daniel Freeman	Saint Louis University
Timur Oikhberg	University of Illinois
Nirina Randrianarivony	Saint Louis University
Darrin Speegle	Saint Louis University

Location

- Saturday, Sunday, Tuesday (Nov 8, 9, 11): talks at Fenton 110, coffee at Fenton 219.
- Monday Nov 10: talks and coffee in EMU 231-232 (Cedar and Spruce).

Conference dinner

Sunday Nov 9, 5:30-9:30, in Gerlinger Hall. Drinks available at 5:30, food served starting at 6.

Conference website

https://speegled.github.io/functional_analysis_pnw/index.html

Timetable

Saturday, Nov 8

All talks will be held in Fenton 110, coffee in Fenton 219.

8:30–8:45	Registration (Fenton 219)	
8:45–9:00	Welcome remarks (Fenton 110)	
9:00–9:50	Thomas Schlumprecht Texas A&M University	On Asymptotic Properties of Banach spaces
10:00–10:30	Coffee (Fenton 219)	
10:30–11:20	Christian Rosendal University of Maryland	Mean operators for (skew) amenable groups
11:30–11:50	Narcisse Randrianantoanina Miami University	Interpolations of martingale Hardy spaces
12:00–1:30	Lunch	
1:30–2:20	Mark Rudelson University of Michigan	When a system of real quadratic equations has a solution
2:30–2:50	Paul Simanjuntak Texas A&M University	Stochastic dominance for products of random matrices
3:00–3:30	Coffee (Fenton 219)	
3:30–3:50	Dorsa Ghoreishi Saint Louis University	Discretizing the L_p norm and frame theory
4:00–4:20	Pu-Ting Yu University of Oregon	Operations that are incompatible with frames of translates
4:30–4:50	Alejandro Chavez-Dominguez University of Oklahoma	Dynamical sampling in Banach spaces

Sunday, Nov 9

All talks will be held in Fenton 110, coffee in Fenton 219.

8:45–9:00	Registration (Fenton 219)	
9:00–9:50	Chris Philips University of Oregon	Incompressibility and Calkin algebras
10:00–10:30	Coffee (Fenton 219)	
10:30–10:50	Anna Pelczar-Barwacz Jagiellonian University	2^c closed operator ideals on Banach spaces
11:00–11:20	Kevin Beanland Washington and Lee University	Some new properties of Schreier sets and Tsirelson spaces
11:30–11:50	Bentuo Zheng University of Memphis	Ball Covering Property for classical Banach spaces
12:00–12:15	Conference picture	
12:15–1:30	Lunch	
1:30–2:20	Stephen Dilworth University of South Carolina	Transportation cost spaces and invariant projections
2:30–2:50	Chris Gartland UNC Charlotte	L_1 -distortion of transportation cost Banach spaces over graphs
3:00–3:30	Coffee (Fenton 219)	
3:30–3:50	Bruno Braga IMPA	On homeomorphisms between the spheres of ℓ_∞^k and ℓ_1^k
4:00–4:20	Tomasz Kania Czech Academy of Sciences	The π -property along a filter
4:30–5:30	Problem session (Fenton 110)	
5:30–9:30	Conference dinner (Gerlinger Hall); Drinks available at 5:30, food served starting at 6	

Monday, Nov 10

All talks will be held in EMU 231-232 (Cedar and Spruce); same location for coffee.

9:00–9:50	Marianna Csörnyei University of Chicago	Embeddings into Euclidean spaces without shrinking
10:00–10:30	Coffee (EMU 231-232)	
10:30–10:50	Seung-Yeon Ryoo California Institute of Technology	A conjectural low-dimensional embedding of doubling metric spaces
11:00–11:20	Beata Randrianantoanina Miami University	Bi-Lipschitz properties of lamplighter graphs on weighted trees
11:30–11:50	Florent Baudier Texas A&M University	On asymptotic B-convexity and infratype
12:00–12:15	Conference picture	
12:15–1:30	Lunch	
1:30–1:50	Mitchell Taylor ETH Zurich	Basic sequences in Banach lattices
2:00–2:20	Vladimir Troitsky University of Alberta	Free Banach lattices
2:30–2:50	Mary Angelica Tursi Independent researcher	Universal Lattice Homomorphisms
3:00–3:30	Coffee (EMU 231-232)	
3:30–3:50	Beatrice-Helen Vratiou University of Alberta	Regular ellipsoids for non-symmetric convex bodies
4:00–4:20	Artem Zvavitch Kent State University	Weighted Brunn–Minkowski Theory

Tuesday, Nov 11

All talks will be held in Fenton 110, coffee in Fenton 219.

9:00–9:50	Denka Kutzarova University of Illinois	2R renormings of combinatorial nonseparable Banach spaces
10:00–10:15	Coffee (Fenton 219)	
10:15–10:35	Bunyamin Sari University of North Texas	Banach-Mazur distances between $C(\alpha)$ spaces
10:45–11:05	Pavlos Motakis York University	Operators on Bourgain–Rosenthal–Schechtman spaces
11:15–11:30	Concluding remarks (Fenton 110)	

List of Abstracts – Talks

Florent Baudier, Texas A&M University

On asymptotic B-convexity and infratype (20 minutes)

In this talk, we introduce the notions of asymptotic B-convexity and asymptotic infratype. The introduction and study of these notions are partially motivated by our desire to understand the similarities and discrepancies between the Ribe program and the Kalton program. We will discuss asymptotic analogs of a series of results due to Giesy and Pisier from the late 1960s and early 1970s. In particular, we will discuss an alternative proof of an asymptotic version of Pisier's trivial type theorem, originally proven by Causey, Draga, and Kochanek in 2019. If time permits, we will also briefly discuss the notion of asymptotic stable type. This is a joint work with Audrey Fovelle (Texas A&M University).

Kevin Beanland, Washington and Lee University

Some new properties of Schreier sets and Tsirelson spaces (20 minutes)

In this talk, I will preview recent results on the characterization of isometries in Schreier and Tsirelson-type spaces. I will also discuss new results on the computation time for vectors in Tsirelson space, which resolved a problem in Casazza–Shura's book on Tsirelson space. Along the way, I will highlight some open problems and suggest new directions for research on these spaces.

Bruno Braga, IMPA, Brasil

On homeomorphisms between the spheres of ℓ_∞^k and ℓ_1^k (20 minutes)

Bill Johnson asked in a MathOverFlow post in 2011 whether one can find a sequence of homeomorphisms $(f_k)_k$ between the unit spheres of the finite dimensional Banach spaces ℓ_∞^k and ℓ_2^k such that the Lipschitz constant of the f_k 's are uniformly bounded. In this talk, I will discuss some recent developments on this question which provide a negative answer to Bill's question under some extra assumptions on the homeomorphisms $(f_k)_k$. The talk is based on ongoing work together with Gartland, Lancien, Motakis, Pernecká, and Schlumprecht.

Alejandro Chavez-Dominguez, University of Oklahoma

Dynamical sampling in Banach spaces (20 minutes)

Dynamical sampling is a paradigm in signal processing based on the following desirable spatio-temporal trade-off: instead of recovering a signal by measuring it at many different locations at the same time (requiring multiple sensors), we would like to be able to recover it by measuring it only at one location but at many different times (requiring only one sensor).

In the Hilbert space setting, frames (a generalization of orthonormal bases) are a well-established method of doing signal recovery. The dynamical sampling question can then be shown to translate to: for which bounded linear operators on a Hilbert space does there exist an orbit which is a frame? This question has by now been fully answered, together with other closely related ones.

Using the notion of Schauder frames for Banach spaces, we explore several versions of dynamical sampling questions in this context and prove various results reminiscent of the classical ones. While some of these results are less explicit, they are easier to understand conceptually. This is joint work in progress with Daniel Carando (U. of Buenos Aires).

Marianna Csörnyei, University of Chicago

Embeddings into Euclidean spaces without shrinking (50 minutes)

We study the problem which spaces (X, ρ) can be embedded into \mathbb{R}^d without decreasing any of the distances. That is, we ask the question whether there is an $f : X \rightarrow \mathbb{R}^d$ such that $\|x - y\| \geq \rho(x, y)$ for every $x, y \in X$. Our aim is to find necessary and sufficient conditions under which such a mapping exists, and to show how this can be used to generalize/disprove some classical results in real analysis.

Stephen Dilworth, University of South Carolina

Transportation Cost Spaces and Invariant Projections (50 minutes)

This is a report on an ongoing project with D. Kutzarova and M. Ostrovskii. We investigate the transportation cost space associated to a finite metric space (an unweighted graph with the shortest path metric in the examples we consider). The transportation cost space is a finite-dimensional normed space whose dual is the space of Lipschitz functions on the vertex set. We are particularly interested in estimating the Banach-Mazur distance to an ℓ_1^n space. Analysis of the ‘invariant’ projections from the edge space onto the space of Lipschitz functions (which embeds naturally into the edge space) that commute with a group of isometries can yield useful lower bounds, e.g. for the families of diamond and Laakso graphs [1, 2]. Ad hoc arguments sometimes yield matching upper bounds, but whether there are good upper bounds in general is an open problem. More recently, we considered the case of Hamming graphs and discrete tori [3]. For example, we show that the projection constant of the space of Lipschitz functions on the n -dimensional Hamming cube is $(n + 1)/2$.

References:

- [1] S. J. Dilworth, Mikhail Ostrovskii, and Denka Kutzarova, Lipschitz free spaces on finite metric spaces, *Canad. J. Math.* 72 (2020), no. 3, 774–804.
- [2] S. J. Dilworth, Mikhail Ostrovskii, and Denka Kutzarova, Analysis on Laakso graphs with application to the structure of transportation cost spaces, *Positivity* 25 (2021), no. 4, 1403–1435.
- [3] S. J. Dilworth, Mikhail Ostrovskii, and Denka Kutzarova, Cycle Spaces: Invariant Projections and Applications to Transportation Cost, *Geometry of Banach Spaces and Related Fields, Proceedings of Symposia in Pure Mathematics*, vol. 106, American Mathematical Society, 97–131, 2024.

Chris Gartland, UNC Charlotte

L_1 -Distortion of Transportation Cost Banach Spaces over Graphs (20 minutes)

We study the problem of how well the transportation cost space over a finite graph can embed into L_1 . In this talk, we will present Sobolev-type inequalities certain graphs, such as the Laakso graphs and the 2-dimensional Euclidean grids $\{0, \dots, n\}^2$, and describe how these inequalities may be used to derive new lower bounds on the L_1 -distortion of the corresponding transport cost spaces. Based on joint work with Mikhail Ostrovskii.

Dorsa Ghoreishi, Saint Louis University

Discretizing the L_p norm and frame theory (20 minutes)

In applied mathematics, physics, and engineering, many problems are expressed in terms of continuous objects but can only be solved efficiently once they are discretized. For instance, one might approximate an integral over a measure space using numerical integration, or compute efficiently with the aid of the fast Fourier transform. Given an N -dimensional subspace X of $L_p([0, 1])$, we consider the problem of choosing M -sampling points which may be used to discretely approximate the L_p norm on the subspace. We are particularly interested in knowing when the number of sampling points M can be chosen on the order of the dimension N . For the case $p = 2$ it is known that M may always be chosen on the order of N as long as the subspace X satisfies a natural L_∞ bound, and for the case $p = \infty$ there are examples where M may not be chosen on the order of N . We show for all $1 \leq p < 2$ that there exist classes of subspaces of $L_p([0, 1])$ which satisfy the L_∞ bound, but where the number of sampling points M cannot be chosen on the order of N . We show as well that the problem of discretizing the L_p norm of subspaces is directly connected with frame theory. This is a joint work with Daniel Freeman.

Tomasz Kania, Institute of Mathematics of the Czech Academy of Sciences

The π -property along a filter (20 minutes)

We investigate the descriptive set-theoretic complexity of the class of separable Banach spaces possessing the π -property, formulated in terms of convergence along a filter. Our main result shows that this class is Σ_3^1 whenever the underlying filter is analytic (viewed as a subset of the Cantor set Δ). In addition, we prove that if the filter is countably generated, then the class of such spaces is already Σ_2^1 with respect to any admissible Polish topology on the family of closed subspaces of $C(\Delta)$. Joint work with J. Swaczyna.

Denka Kutzarova, University of Illinois

2R renormings of combinatorial nonseparable Banach spaces (50 minutes)

The notion of a 2-rotund (2R) norm was introduced by Milman. Every 2R space is reflexive, so Milman asked whether the existence of an equivalent 2R norm characterizes reflexivity for separable Banach spaces. Odell and Schlumprecht gave a positive answer to Milman's question. The problem for nonseparable reflexive spaces is still open. We prove that several classes of combinatorial Banach spaces admit an equivalent 2R norm. In some cases the equivalent norm depends on the complexity of the combinatorial structure. We also give a sufficient condition for the existence of an equivalent 1-symmetric 2R norm when a separable reflexive space has a symmetric basis. The talk is based on joint work with S. J. Dilworth and P. Motakis.

Pavlos Motakis, York University

Operators on Bourgain–Rosenthal–Schechtman spaces (20 minutes)

For $1 < p < \infty$, the Bourgain–Rosenthal–Schechtman spaces R_α^p form a transfinite hierarchy giving rise to uncountably many pairwise non-isomorphic complemented subspaces of L_p . Their construction, though ingenious, rests on elementary probabilistic language, and they remain largely understudied. We develop a theory of their canonical coordinate systems, namely martingale difference sequences and their distributional representations. We define explicit blockings (FDDs) of these bases with strong reproducing properties, and employ them to show that any bounded linear operator T on such a space is an approximate “orthogonal” factor of a diagonal operator S with respect to the aforementioned FDD. The diagonal entries of S are averages of the diagonal entries of T , while the term “orthogonal” reflects that the operators A, B with $ATB \approx S$ are given by a distributional embedding and its formal adjoint.

This is joint work with Konstantinos Konstantos.

Anna Pelczar-Barwacz, Jagiellonian University, Poland

2^c closed operator ideals on Banach spaces (20 minutes)

We present a criterion based on the asymptotic behavior of basic sequences and Johnson–Schechtman technique, which guarantees large cardinality of the lattice of closed operator ideals in the algebra of bounded operators on a Banach space, related to Freeman-Schlumprecht-Zsák criterion. The method yields 2^c closed operator ideals on some class of Lorentz sequence spaces, combinatorial spaces and their p -convex versions as well as Baernstein spaces (extending the results of R. M. Causey – APB, N. J. Laustsen – J. Smith, A. Manoussakis – APB). An ongoing project with Niels J. Laustsen.

Chris Philips, University of Oregon

Incompressibility and Calkin algebras (50 minutes)

This is joint work with Bill Johnson.

We call a Banach algebra *isometrically incompressible* if whenever B is another Banach algebra and $\varphi: A \rightarrow B$ is a contractive injective homomorphism, then φ is isometric. We say that A is *incompressible* if whenever φ as above is bounded and injective, then φ is bounded below. There are also a uniform version and a strengthening involving quotients.

The terminology is new, but the first results go back to about 1950: every C^* -algebra is incompressible and isometrically incompressible, and whenever E is a Banach space and $A \subset L(E)$ contains all finite rank operators, then A is incompressible and isometrically incompressible. On the other hand, the algebra of 2×2 upper triangular matrices is not isometrically incompressible, and the disk algebra and the convolution algebra $l^1(\mathbb{Z})$ are not incompressible. Motivation for the current work is new results on incompressibility for Calkin algebras $L(E)/K(E)$, and the idea that isometric incompressibility of a Banach algebra is an indication that it is somehow “ C^* like”.

In this talk, I will state the definitions carefully, give basic illustrative examples and nonexamples, and give some history. Then I will give some new results and open problems, including new examples of incompressible Calkin algebras, a previously unknown relation between isometric and uniform incompressibility, and some new information on relations between selfadjointness and versions of incompressibility for a Hilbert space operator algebra.

This material is based upon work partially supported by the Simons Foundation Collaboration Grant for Mathematicians #587103 and by the US National Science Foundation under Grant DMS-2055771.

Beata Randrianantoanina, Miami University

Bi-Lipschitz properties of lamplighter graphs on weighted trees (20 minutes)

In 2021 Baudier, Motakis, Schlumprecht, and Zsák proved that if a sequence of graphs $(G_k)_{k \in \mathbb{N}}$ contains the sequence of complete graphs with uniform distortion, then the sequence of lamplighter graphs on G_k 's will contain Hamming cubes with uniform distortion and asked whether the converse holds.

They suggested that a sequence of “moderately” weighted trees may be a counterexample. We prove that indeed this is the case.

Further, we prove that diamond graphs do not embed with uniform distortion into the lamplighter graphs on “sufficiently heavily weighted” trees.

Joint work with Charlotte Melby.

Narcisse Randrianantoanina, Miami University

Interpolations of martingale Hardy spaces (20 minutes)

We will discuss recent progress and open problems for interpolations of couples of martingale Hardy spaces for both classical and noncommutative cases. More precisely, we consider the following general question: If E and F are Banach Köthe function spaces on a probability space $(\Omega, \mathcal{F}, \mathbb{P})$ equipped with a filtration $(\mathcal{F}_n)_{n \geq 1}$ such that the real interpolation $(E, L_\infty)_{\theta, q} = F$, does it automatically lift to the corresponding couple of martingale Hardy spaces? We will show that under a natural assumption on E , the couple of martingale Hardy spaces $(H_E^S(\Omega), H_\infty^S(\Omega))$ is K -closed in the couple of Köthe-Bochner spaces $(E(\Omega; \ell_2), L_\infty(\Omega; \ell_2))$. Here, $H_E^S(\Omega)$ denotes the Hardy space obtain by using square functions.

Christian Rosendal, University of Maryland

Mean operators for (skew) amenable groups (50 minutes)

For every mean m on a topological group G and linear isometric action on a Banach space, $G \overset{\pi}{\curvearrowright} X$, there is an associated mean operator $X \xrightarrow{M} X^{**}$. We detail some of the properties of this operator for appropriate means on amenable and skew amenable groups. We apply these results to problems regarding the integration of unbounded Lipschitz functions on the phase spaces of isometric G -actions, Reiter-Følner criteria for amenability, and cohomology of Banach G -modules.

Mark Rudelson, University of Michigan

When a system of real quadratic equations has a solution (50 minutes)

The existence and the number of solutions of a system of polynomial equations in n variables over an algebraically closed field is a classical topic in algebraic geometry. Much less is known about the existence of solutions of a system of polynomial equations over reals. Any such problem can be reduced to a system of quadratic equations by introducing auxiliary variables. Due to the generality of the problem, a computationally efficient algorithm for determining whether a real solution of a system of quadratic equations exists is believed to be impossible. We will discuss a simple and efficient sufficient condition for the existence of a solution. While the problem and the condition are of algebraic nature, the proof relies on Fourier analysis and concentration of measure.

Joint work with Alexander Barvinok.

Seung-Yeon Ryoo, California Institute of Technology

A conjectural low-dimensional embedding of doubling metric spaces (20 minutes)

Assouad's embedding theorem states that a doubling metric space embeds bi-Hölderly into a Euclidean space. We are interested in obtaining such an embedding that is optimal both in the distortion and the target dimension. We present a conjectural structural statement that would imply the existence of such an embedding, and verify this statement in the case of groups of polynomial growth.

Bunyamin Sari, University of North Texas

Banach-Mazur distances between $C(\alpha)$ spaces (20 minutes)

In 1968, Pełczyński posed a conjecture that the Banach–Mazur distances between isomorphic $C(\alpha)$ spaces are always integers. This conjecture was recently disproved: Piasecki and Gergont showed that $3 < d(C(\omega), C(\omega \cdot 3)) < 4$, and Malec and Piasecki later proved that $d(C(\omega), C(\omega^2)) = 2 + \sqrt{5}$, and more generally,

$$d(C(\omega), C(\omega^n)) = n + \sqrt{(n-1)(n+3)}, \quad n \geq 2.$$

In this talk, we will discuss the computations underlying these intriguing values, as well as ongoing work concerning the remaining cases.

Paul Simanjuntak, Texas A&M University

Stochastic Dominance for Products of Random Matrices (20 minutes)

While the study of behavior of singular values of random matrices has seen tremendous progress in recent decades, much less is known about those for products of random matrices. At the same time, product structures can be found in many places, such as in problems from data science. We establish comparison inequalities for some norms of products of independent random matrices with corresponding products of Gaussian matrices. Our results are non-asymptotic and apply for a wide class of random matrices, making them applicable in many settings. We use classical symmetrization techniques, both sharp and approximate, to produce near extremizers for distributional inequalities for such products. Joint work with X. Hu, G. Paouris, and P. Pivovarov.

Thomas Schlumprecht, Texas A&M University

On Asymptotic Properties of Banach spaces (50 minutes)

An asymptotic property of a Banach space X is a property which is defined by “asymptotic games” in which one player chooses cofinite-dimensional subspaces of X and the second player chooses a vector in the sphere of that cofinite-dimensional subspace. This is repeated a finite or infinite number of times. The outcome is then a finite or infinite sequence (x_n) in the sphere of X . An asymptotic property of X is then defined by the property that the first player has or does not have a strategy to force the outcome (x_n) to have a specific property, for example, to be isomorphic to the ℓ_p -unit vector basis. We will apply this concept to several problems concerning embeddings, universality problems, and problems concerning the coarse geometry of Banach spaces.

Mitchell Taylor, ETH Zurich

Basic sequences in Banach lattices (20 minutes)

Given a basis (f_n) of $L_p(\mu)$, whether one has almost everywhere convergence of the series expansions $f = \sum_{n=1}^{\infty} a_n f_n$ is a fundamental question. To establish almost everywhere convergence, the standard approach is to prove uniform bounds for the associated maximal function. We will discuss the necessity of this approach using techniques from Banach lattice theory, harmonic analysis and descriptive set theory.

Vladimir Troitsky, University of Alberta

Free Banach lattices (20 minutes)

Given a Banach space E , the free Banach lattice over E is, in some sense, the least Banach lattice that contains E as a generating subspace; it is denoted $\text{FBL}[E]$. The last few years have seen active studies of free Banach lattices. Free Banach lattices are instrumental in studying Banach spaces that are isomorphic to subspaces of Banach lattices. In the talk, we will discuss ways of constructing $\text{FBL}[E]$, properties of $\text{FBL}[E]$, and several related free objects.

Mary Angelica Tursi, Independent researcher

Universal Lattice Homomorphisms (20 minutes)

Let \mathcal{K} be a class of lattices, and let $\vec{\mathcal{K}}$ be the class of homomorphisms S between lattices in \mathcal{K} with $\|S\| \leq 1$. Then $T : X \rightarrow Y$ is universal for \mathcal{K} if for all $S : X' \rightarrow Y' \in \vec{\mathcal{K}}$, there exist lattice embeddings $i : X' \rightarrow X$ and $j : Y' \rightarrow Y$ such that $j \circ S = T \circ i$. In this talk, we present examples of contractive lattice homomorphisms that are universal for the classes of p -convex separable Banach lattices with $1 \leq p \leq \infty$, as well as the classes of L_p lattices for $1 \leq p < \infty$ using multiple techniques. In particular, we use the amalgamate pushout properties of Banach lattice homomorphisms and the preservation of homomorphism structure under convexification to derive universal homomorphisms for the p -convex lattices. However, it turns out the classes of L_p lattices do not admit pushouts, so a constructive method over finite dimensional lattices is used instead. Finally, we show certain special properties of these homomorphisms.

Beatrice-Helen Vratiou, University of Alberta

Regular ellipsoids for non-symmetric convex bodies (20 minutes)

We will discuss how to extend a celebrated result by Pisier for symmetric convex bodies to the non-symmetric case: Pisier's theorem refines V. Milman's concept of an M-ellipsoid, and establishes the simultaneous 'regularity' of entropy numbers of the identity operator both when considered from some finite-dimensional normed space to a space of the same dimension with an appropriate Euclidean structure, and vice versa. This is equivalent to showing a regular rate of decrease for the covering numbers of K , the unit ball of the norm, by larger and larger dilates of the appropriately chosen ellipsoid E , as well as of the covering numbers of E by larger and larger dilates of K . In this form the question makes sense even if one no longer requires that K be a symmetric convex body, but such an extension remained elusive until recently.

One of the key ingredients to obtaining similar (albeit quantitatively weaker for now) estimates on these covering numbers is a Blaschke-Santaló-type inequality for the projections of a convex body with Santaló point at the origin (or equivalently, for the sections of a convex body with barycentre at the origin).

Pu-Ting Yu, University of Oregon

Operations That Are Incompatible with Frames of Translates (20 minutes)

Let $\Lambda = \{\lambda_n\}_{n \in \mathbb{N}} \subseteq \mathbb{R}$ be an arbitrary subset and let $g \in L^2(\mathbb{R})$. Olson and Zalik conjectured that no sequence of translates $\{g(x - \lambda_n)\}_{n \in \mathbb{N}}$ can be a Schauder basis for $L^2(\mathbb{R})$. Although this conjecture remains open as of the time of writing, some partial results are known to be true. For example, Christensen, Deng and Heil proved that no sequence of translates can be a frame for $L^2(\mathbb{R})$. In this talk, we aim to identify universal properties such that any closed subspace of $L^2(\mathbb{R})$ satisfying them fails to admit a frame of translates. For example, we will show that any closed subspace of $L^2(\mathbb{R})$ that is closed under modulation and contains a function with "good" time-frequency concentration cannot admit a frame of translates. Some other related result will be presented as well if we have time.

Bentuo Zheng, University of Memphis

Ball Covering Property for Classical Banach Spaces (20 minutes)

A Banach space is said to have the Ball Covering Property (BCP) if the unit sphere can be covered by countably many open balls off the origin. The BCP is a geometric property closely related to the weak* property of the dual space. In this talk, we will first give a brief overview of historical literature in the study of BCP. Then we will present some recent advances on this topic.

Artem Zvavitch, Kent State University

Weighted Brunn–Minkowski Theory (20 minutes)

The Brunn–Minkowski theory studies the behavior of convex bodies in n -dimensional Euclidean space, namely compact convex n -dimensional sets with non-empty interior, by examining properties such as volume, surface area, projections, and Minkowski sums. We present a generalization of this theory to a measure-theoretic setting, where volume is replaced by a Borel measure with density. In particular, we define mixed measures of three convex bodies and provide an integral formula for these mixed measures. We establish inequalities for this quantity, including Minkowski's first and second inequalities, as well as Fenchel's inequality. As applications, we investigate the log-submodularity and supermodularity of the measure of Minkowski sums of symmetric convex bodies, motivated by recent work on these properties in the context of volume. This research is part of a joint project with Matthieu Fradelizi, Dylan Langharst, and Mokshay Madiman.

List of Participants

Florent Baudier	Texas A&M University, USA
Kevin Beanland	Washington&Lee University, USA
Eugene Bilokopytov	University of Alberta, Canada
Marcin Bownik	University of Oregon, USA & IMPAN, Poland
Julian Buck	Okanagan College, Canada
Javier Alejandro Chavez-Dominguez	University of Oklahoma, USA
Marianna Csornyei	University of Chicago, USA
Bruno de Mendonca Braga	IMPA, Brazil
Stephen Dilworth	University of South Carolina, USA
Daniel Freeman	Saint Louis university, USA
Chris Gartland	UNC Charlotte, USA
Dorsa Ghoreishi	Saint Louis university, USA
Anastasiia Ianina	University of Illinois, USA
Tomasz Kania	Jagiellonian University, Poland
Konstantinos Konstantos	York University, Canada
Denka Kutzarova	University of Illinois at Urbana-Champaign, USA
Pavlos Motakis	York University, Canada
Timur Oikhberg	University of Illinois, USA
Anna Pelczar-Barwacz	Jagiellonian University, Poland
N. Christopher Phillips	University of Oregon, USA
Beata Randrianantoanina	Miami University - Ohio, USA
Narcisse Randrianantoanina	Miami University - Ohio, USA
Nirina Randrianarivony	Saint Louis university, USA
Christian Rosendal	University of Maryland, USA
Mark Rudelson	University of Michigan, USA
Seung-Yeon Ryoo	California Institute of Technology, USA
Bunyamin Sari	University of North Texas, USA
Thomas Schlumprecht	Texas A&M University, USA
Paul Simanjuntack	Texas A&M University, USA
Thomas Speckhofer	York University, Canada
Darrin Speegle	Saint Louis university, USA
Mitchell Taylor	ETH Zurich, Switzerland
Adi Tcaciuc	MacEwan University, Canada
Vladimir Troitsky	University of Alberta, Canada
Mary Angelica Tursi	Independent researcher, USA, USA
Veatriki Eleni Vrutsiou	University of Alberta, Canada
Pu-Ting Yu	University of Oregon, USA
Bentuo Zheng	University of Memphis, USA
Artem Zvavitch	Kent State University, USA

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