



# Workshop in Harmonic Analysis, Sampling Theory, Machine Learning, and Data Science

November 21 - 25, 2022  
Buenos Aires - Argentina

## Confirmed lecturers

- Akram Aldroubi (Vanderbilt University)
- Martin Arjovsky (DeepMind)
- Enzo Ferrante (CONICET / UNL)
- Keaton Hamm (University of Texas at Arlington)
- Liliana Forzani (UNL)
- Emily King (Colorado State University)
- Felix Kraemer (Technische Universität München)
- Ilya Krishtal (Northern Illinois University)
- Stéphane Mallat (Collège de France)
- Pedro Massey (Universidad de La Plata)
- Armenak Petrosyan (Georgia Institute of Technology)

## Organizing Committee:

Carlos Cabrelli (UBA)    Ursula Molter (UBA)    Victoria Paternostro (UBA)    Ezequiel Rela (UBA)



# Contents

<b>Full Program</b>	<b>2</b>
<b>Keynote Speaker</b>	<b>3</b>
Probabilist Harmonic Analysis Models of Deep Neural Networks. ( <i>Stephane Mallat</i> ) . . . . .	3
<b>Courses</b>	<b>5</b>
The linear algebra behind a neural network ( <i>Liliana Forzani</i> ) . . . . .	5
Dimensionality Reduction and Manifold Learning ( <i>Keaton Hamm</i> ) . . . . .	6
A Tour of Mathematical Data Science ( <i>Emily King</i> )	7
A mathematical introduction to unlimited sampling ( <i>Felix Krahmer</i> ) . . . . .	8
<b>Plenary Talks</b>	<b>11</b>
Transport Transforms for Data Analysis and Machine Learning. ( <i>Akram Aldroubi</i> ) . . . . .	11
Five years of disappointments while researching distribution shift. ( <i>Martín Arjovsky</i> ) . . . . .	12
Domain generalization and fairness analysis in image classification. ( <i>Enzo Ferrante</i> ) . . . . .	13

Predictive algorithms for driving force identification from dynamical samples. ( <i>Ilya Krishtal</i> ) . . . .	14
Admissible subspaces and low-rank approximations from the Subspace Iteration method. ( <i>Pedro Massey</i> ) . . . . .	14
Rank-aware joint sparse recovery: theory and appli- cations ( <i>Armenak Petrosyan</i> ) . . . . .	15
<b>Short Talks</b>	<b>17</b>
Frames via Unilateral Iterations of Bounded Opera- tors ( <i>Victor Bailey</i> ) . . . . .	17
Laws of Large Numbers, Spectral Translates and Sam- pling over LCA Groups. ( <i>Juan Medina</i> ) . . . . .	18
The boundedness of basic harmonic analysis opera- tors in Gaussian variable Lebesgue spaces. ( <i>Wil- fredo Urbina</i> ) . . . . .	19
<b>Posters</b>	<b>21</b>

# Program

	Monday 21	Tuesday 22	Wednesday 23	Thursday 24	Friday 25	
10:00-10:30		Course - King	Course - King	Course - Hamm	Course-Hamm	10:00-10:30
10:30-11:00						10:30-11:00
11:00-11:30						11:00-11:30
11:30-12:00		Coffee Break	Coffee Break	Coffee Break	Coffee Break	11:30-12:00
12:00-12:30		Plenary Talk - Aldroubi	Plenary Talk - Ferrante	Plenary Talk - Arjovsky	Plenary Talk - Krishtal	12:00-12:30
12:30-13:00						12:30-13:00
13:00-13:30						13:00-13:30
13:30-14:00	Course - Forzani	Lunch	Lunch	Lunch		13:30-14:00
14:00-14:30						14:00-14:30
14:30-15:00						14:30-15:00
15:00-15:30						15:00-15:30
15:30-16:00		Course - Krahmer	Course - Krahmer	Plenary talk - Massey		15:30-16:00
16:00-16:30				Short Talk - Urbina		16:00-16:30
16:30-17:00		Coffee Break	Coffee Break	Coffee - Posters		16:30-17:00
17:00-17:30	Plenary Talk Mallat	Plenary Talk - Petrosyan	Short Talk - Medina			17:00-17:30
17:30-18:00				Short Talk - Bailey		17:30-18:00
18:00-18:30						
18:30						
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# Laws of Large Numbers, Spectral Translates and Sampling over LCA Groups.

Juan Medina

UBA -CONICET

*Wednesday 23, 17:00-17:30 hs.*

Klůvnek extended the Whittaker.Kotel'nikov-Shannon theorem to the abstract harmonic analysis setting over a LCA group  $G$  [5]. In this context, the classical condition for  $f \in L^2(\mathbb{R})$  to be band limited is replaced by  $\widehat{f}$  having its support essentially contained in a transversal set of a compact quotient group. Later it was proved that, in general, this condition is also necessary [1, 2,3]. Moreover, the classical interpolation formula is also equivalent to a Plancherel like isometric formula involving the  $L^2(G)$  norm of  $f$  and the norm of the sequence of its samples over a subgroup  $H$ . Here, recalling some Laws of Large Numbers, we will prove an equivalent result for the support of the spectral measure  $\mu_X$  of a Gaussian stationary random process  $X$ , indexed over a LCA group  $G$ . The conditions are formulated in terms of an almost sure isometric formula involving the sample variances of  $X$ , and its samples over a subgroup  $H$  respectively. The present result, partially relies on the techniques introduced recently in [4] for the study of the equivalence between the notions of  $AP$ -frame and  $L^2(\mathbb{R})$ -frame.

## References

1. M.G. BEATY, M.M. DODSON, *The Whittaker-Kotel'nikov-Shannon Theorem, Spectral Translates and Plancherel's Formula*, J. Fourier Anal. Appl. 10, 2, pp. 179-199, 2004.

2. M.G. BEATY, M.M. DODSON, S.P. EVESON, *A Converse to Kluvánek's Theorem*, J. Fourier Anal. Appl. 13, 2, pp. 179-199, 2007 pp.188-196.
  3. M.G. BEATY, M.M. DODSON, S.P. EVESON, J.R. HIGGINGS, *On the approximate form of Kluvánek's theorem*, J. Approx. Theory, 160, pp.281-303, 2009.
  4. H.D. CENTENO, J.M. MEDINA, *AP-frames and Stationary Random Processes*, Appl. Comput. Harmon. Anal., 61, pp.1-24, 2022.
  5. I. KLUVÁNEK, *Sampling theorem in abstract harmonic analysis*, Matematicko-Fyzikalny Casopis, 15, 1, pp. 43-47, 1965.
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## **The boundedness of basic harmonic analysis operators in Gaussian variable Lebesgue spaces.**

Wilfredo Urbina  
Roosevelt University

*Thursday 24, 16:00-16:30 hs.*

In recent years the boundedness of Gaussian maximal function and Gaussian singular integrals have been extended to variable Lebesgue spaces. Nevertheless, the boundedness of more basic operators like the maximal of the Ornstein-Uhlenbeck semigroup or the Gaussssian Riesz potentials had not been considered. In this talk we will discuss their boundedness in that setting.

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