

# 4ο Συμπόσιο Ανάλυσης

με την ευκαιρία της αφιέρωσης  
των Μυάζη Ανώσει

30–31 Μαΐου 2026

Σάββατο Πρωί: Καφές 10:00

Έναρξη 10:20

10:30–11:20 Michael Kolountzakis  
University of Crete

*Bounded and measurable common tiles for two lattices.* We prove that for any two lattices  $L, M \subseteq \mathbb{R}^d$  of the same volume there exists a measurable, bounded set  $E \subseteq \mathbb{R}^d$  such that  $E$  tiles  $\mathbb{R}^d$  when translated by  $L$  or by  $M$ . The motivation for this work was the so-called Steinhaus tiling problem which asks for a subset of the plane that simultaneously tiles the plane with all rotates of the integer lattice  $\mathbb{Z}^2$ . (This has been confirmed by Jackson and Mauldin without measurability and has been disproved in higher dimension for measurable sets by Kolountzakis and Wolff, both about a quarter century ago.) It is strongly connected with results about equidecomposition of sets by motions that are translations from a given group. The so-called measurable Hall's theorem by Cieřła and Sabok has played an important role in our proof.

This has been joint work with Mark Etkind, Sigrid Grepstad, Nir Lev and Manos Spyridakis.

11:30–12:20 Charalampos Magiatis  
University of the Aegean

*Compactness Conditions in Crossed and Semicrossed products.* We characterize the compact multiplication operators, the compact elements and the hypocompact radical of a crossed product  $C_0(X) \times_{\phi} \mathbb{Z}$  and of a semicrossed product  $C_0(X) \times_{\phi} \mathbb{Z}_+$ , where  $X$  is a locally compact metrizable space and  $\phi : X \rightarrow X$  is a homeomorphism, in terms of the corresponding dynamical system  $(X, \phi)$ . Also, we prove that there are no non-zero compact inner derivations of the crossed and of the semicrossed product and we describe the inner derivations that map the crossed product into the ideal of compact elements and the inner derivations that map the semicrossed product into the radical.

12:30–13:20 Chrysostomos Psaroudakis  
Aristotle University  
of Thessaloniki

*Homological Invariants - An Intrinsic Approach.* In this talk we will discuss homological invariants for algebras. It is known that several homological conjectures in representation theory are related with specific problems concerning the homological behaviour and the structure theory of algebras. In the first part of the talk, we will provide motivation and we will review the history of some homological conjectures (mainly of the finitistic dimension conjecture) as well as their importance. In the second part, which is based on joint work with Panagiotis Kostas and Jorge Vitória, we will present a new intrinsic approach to homological invariants in the broad context of compactly generated triangulated categories. In the last part of the talk, I will discuss how this intrinsic approach can be used to study derived categories of spaces appearing in Functional Analysis.

# 4ο Συμπόσιο Ανάλυσης

με την ευκαιρία της αφοιτηρέτησής

των Μεγίστων Σπουδών

30–31 Μαΐου 2026

Σάββατο Απόγευμα

16:30–17:20 Apostolos Giannopoulos  
National Technical  
University of Athens

17:30–18:20 Nikos Dafnis  
University of the Aegean

18:30–19:20 Μάνος Σαριδάκης  
Εθνικό Αστεροσκοπείο  
Αθηνών

*Functional perimeter and the dimensional Brunn-Minkowski inequality for log-concave measures.* We study the dimensional Brunn-Minkowski inequality for even log-concave probability measures  $\mu$  on  $\mathbb{R}^n$  via an analytic approach based on diffusion operators and gradient estimates. Our main result asserts that for every pair of symmetric convex sets  $K, L$  in  $\mathbb{R}^n$  and every  $\lambda \in (0, 1)$ ,  $\mu(\lambda K + (1 - \lambda)L)^{c_n} \geq \lambda \mu(K)^{c_n} + (1 - \lambda) \mu(L)^{c_n}$ , where  $c_n \geq c/n^3 \ln n$  for some universal constant  $c > 0$ . A key ingredient in our proof is the bound  $\int_{\mathbb{R}^n} |\nabla \psi| d\mu \leq Cn$  that we establish for isotropic log-concave probability measures  $\mu$  on  $\mathbb{R}^n$  with density  $e^{-\psi}$ , which is optimal in terms of the dimension. This estimate yields structural information on the size of sub-level sets of the gradient of  $\psi$  and puts forth a geometric obstruction to further improvements of the Brunn-Minkowski exponent. We also present applications of this estimate to the weighted perimeter of level sets, projections, moment and surface area measures of isotropic log-concave functions, highlighting the central role of the gradient of the logarithmic potential in high-dimensional convexity.

The talk is based on joint work with Alexandros Eskenazis and Natalia Tziotziou.

*The Geometry of Contoured Distributions.* We investigate the asymptotic behaviour of *contoured probability distributions* in  $\mathbb{R}^n$ , introduced by Guleryuz, Lutwak, Yang and Zhang. We deal with the relation of some basic geometric parameters of a convex body in  $\mathbb{R}^n$  and its corresponding contoured distribution, and we show that a contoured distribution may have log-concave properties, without been log-concave. Moreover, we provide a characterization of the log-concave distributions in  $\mathbb{R}^n$  that are also contoured distributions.

The talk is based on joint work with Antonis Tsolomitis.

*Από τη Γεωμετρία στη Βαρύτητα και από τις Συμμετρίες στα Σωματίδια: Η μαθηματική δομή της Φύσης.* Θα διερευνήσουμε τον τρόπο με τον οποίο τα Μαθηματικά αποκαλύπτουν τη βαθύτερη δομή του φυσικού κόσμου. Από τη μια πλευρά, θα δούμε πώς η γεωμετρία οδήγησε στη ριζοσπαστική κατανόηση της βαρύτητας μέσω της Γενικής Θεωρίας της Σχετικότητας, όπου ο χώρος και ο χρόνος δεν αποτελούν απλό υπόβαθρο, αλλά ενεργά δυναμικά στοιχεία της φύσης. Από την άλλη, θα αναδείξουμε τον θεμελιώδη ρόλο των συμμετριών στη σύγχρονη Φυσική, μέσα από τη σύνδεσή τους με τους νόμους διατήρησης (Θεώρημα της Noether) και τη μαθηματική τους περιγραφή μέσω των Ομάδων Lie, που βρίσκονται στον πυρήνα του Καθιερωμένου Προτύπου των στοιχειωδών σωματιδίων. Η ομιλία θα επιχειρήσει να αναδείξει πώς δυο μεγάλες μαθηματικές ιδέες, η γεωμετρία και οι συμμετρίες, συγκροτούν ένα ενιαίο πλαίσιο κατανόησης της φύσης. Παράλληλα, θα υπογραμμιστεί ο καθοριστικός ρόλος της μαθηματικής σκέψης ως πρωθητικής δύναμης στη Θεωρητική Φυσική.

19:30

Τελευταία Προτιμοποίησης

# 4ο Συμπόσιο Ανάλυσης

με την ευκαιρία της αφνιτηρέτισης  
των Μιχάλη Ανούση

30–31 Μαΐου 2026

Κυριακή Πρωί

11:00–11:50 Μαρίνα Ηλιοπούλου  
Πανεπιστήμιο Αθηνών

*Improved bounds on oscillatory integral operators under weak assumptions on the phase function.* We will discuss operators of two types: (a) Hörmander-type operators and (b) variable coefficient Schrödinger propagators. In each case the corresponding waves evolve inside tubes, whose central curves arise from the phase function. While in case (a) these are Kakeya sets of curves, in case (b) they are Nikodym sets of curves - and it is known that this causes essential differences in the  $L^p$ -theory of the two cases. In the talk, we will present appropriate, quite weak conditions on the phase function (distinct for each case), which prohibit the corresponding tubes to cluster in little space. This leads to improved Kakeya and Nikodym estimates for the corresponding sets of tubes, which in turn yield improved  $L^p$ -bounds for the corresponding operators.

This is joint work with M. Chen, S. Gan, S. Guo, J. Hickman and J. Wright.

The speaker's work on this is part of the research project "Algebraic techniques in harmonic analysis and incidence geometry", which is implemented in the framework of HFRI call "3<sup>rd</sup> Call for HFRI's Research Projects to Support Faculty Members & Researchers" (HFRI Project Number: 23652).

12:00–12:50 Nondas E. Kechagias  
University of Ioannina

*Homotopy groups of spheres and other curiosities.* The geometric objects of interest in algebraic topology can be constructed by fitting together spheres of varying dimensions. The homotopy groups of spheres describe the ways in which spheres can be attached to each other. From the viewpoint of algebraic topology, detailed knowledge of these groups would lead to a classification of geometric objects. Smoothly and avoiding technical details we will describe up to date results.

13:00–13:50 Αριστείδης Κατάβολος  
Πανεπιστήμιο Αθηνών

*Περίπατοι με τον Μιχάλη: Από τη σύνθεση τελεστών στην προσέγγιση ομάδων.* Θα περιγραφούν αποτελέσματα με τους Μ. Ανούση και Ι. Τοντορώφ σχετικά με την αλληλεπίδραση των Αλγεβρών Τελεστών με την Αρμονική Ανάλυση. Ξεκινώντας από τον συσχετισμό συνόλων φασματικής σύνθεσης στην Αρμονική Ανάλυση με σύνολα σύνθεσης σε άλγεβρες τελεστών, θα περάσουμε σε χαρακτηρισμούς των λεγομένων «μη μεταθετικών συνόρων Poisson», για να καταλήξουμε σε δυναμικούς χαρακτηρισμούς προσεγγιστικών ιδιοτήτων δράσεων ομάδων.



