

Research interests of those who used to work in the department

Departures in 2017:

Zuofeng Shang

The goal of my research is to explore various statistical methods that can handle large and massive data sets. My efforts are currently devoted to nonparametric/semiparametric and Bayesian methods.

Wiktor Mogilski

My general research interests lie in the areas of geometric group theory, geometric topology, algebraic topology, and discrete geometry. More specifically, I am currently interested in various problems centered around Coxeter groups, L^2 -homology, and polytopes. I have been recently working on the topic of weighted L^2 -homology (of Coxeter groups) and the related Singer conjecture. I am also interested in discrete variations and generalizations of the classical Four-Vertex theorem.

Andrey Gogolev

My general interest is in smooth dynamics and related areas of geometry and topology. More specifically I am interested in various classification problems in hyperbolic dynamics.

Christoforos Neofytidis

My main research interests are at the interface of topology, geometry and group theory. I am particularly interested in maps of non-zero degree. For instance, I investigate the existence of non-zero degree maps as defining a partial ordering on the homotopy types of closed oriented manifolds of the same dimension. This theme interacts with the purely group theoretic concept of "largeness" and with the study of topological invariants, such as functorial seminorms on homology. One topic which attracts my interest is the study of fundamental groups of aspherical manifolds and, more generally, of Poincare Duality groups, especially of groups with non-trivial center. This leads quite often to the investigation of several other notions of geometric group theory, such as L^2 -invariants and volume gradients.

Tam Nguyen-Phan

My interests lie in Differential Geometry and Geometric Topology. Recently I have been focusing on understanding the topology of noncompact, complete, finite volume, nonpositively curved Riemannian manifolds. For example, I study the question which closed manifolds occur as a cross section of a cusp of such manifolds. I am also interested in constructing new examples of this class of manifolds, and more generally, aspherical manifolds.

Vaidyanathan Sivaraman

My research interests lie in combinatorics, especially graph theory and matroid theory. Particular topics of interest include well-quasi-ordering, graph invariants (particularly chromatic number, Hadwiger number, girth), minor-closed classes of graphs, induced subgraphs, signed graphs, matroids coming from graphs, signed-graphic matroids, and statistical properties of matroids.

Peng Shao

I am interested in both classical harmonic analysis on Euclidean spaces, such as Stein-Tomas restriction type problems, and the application of harmonic analysis technique in partial differential equations. Besides of these I am also interested in additive combinatorics and its interaction with harmonic analysis and number theory.

Grigory Sokolov

Sequential analysis and multi-population optimal change-point detection, including the problem of sequential change detection in decentralized multi-sensor networks under bandwidth and energy constraints. Numerical analysis, methods and applications; parallel programming.

Somnath Basu

I'm interested in algebraic topology in a broad sense. I've been primarily working on analyzing manifolds and their invariants by studying the algebraic and differential topology of their loop spaces.

Joseph Brennan

My main research focus is on finite p -groups. Specifically, I am investigating the structure of finite p -groups which possess an abelian subgroup of index p . Broadly, I am interested in metabelian groups and maximal subgroups.

Magdalena Czubak

My research interests are at the interface of partial differential equations with other fields such as harmonic analysis, differential geometry, gauge theory, and mathematical physics. So far I have worked on questions involving well-posedness and singularity formation for dispersive equations, topological defects in gauged theories, Navier-Stokes on negatively curved manifolds, and the regularity of the fractional Burgers equation.

Shyamal De

My research interests involve various statistical problems in sequential experiments such as sequential multiple hypothesis testing, simultaneous confidence sets estimation, and adaptive test procedures.

Withanage De Mel

My main research interests are inferential methods with recurrent event data. I would also like to work with applied stochastic processes and Financial Time Series.

Joel Dodge

I am interested in equivariant main conjectures in Iwasawa theory and using them to prove classical conjectures on special values of L -functions. Examples include the Coates-Sinnott conjecture, the Brumer-Stark conjecture and index formulas à la Sinnott-Kurihara.

Ye Li

I study heat flows and their applications in geometry and general relativity. I am also interested in higher order asymptotics.

Stratos Prassidis

My research interests are in the calculations of algebraic K -groups using algebraic and geometric methods. The main focus of my work is related to the calculation of the non-controlled part of K -theory (Nil-groups). Also, I am interested in rigidity problems in the equivariant and stratified setting, specially the ones that can be described combinatorially. Furthermore, I am interested in problems that connect the spectral theory of graph with geometric properties of groups.

Noroharivelo Randrianampy

I am mostly doing saddlepoint approximation methods. This is an area of computational statistics estimating a distribution through moment generating function. I am interested in application of statistics in health related field, like right censored data, exponential regression, mathematical models of disease (malaria), epigenetics and methylation.

Daniel Vallieres

My research interests are in algebraic number theory with an emphasis on special values of L-functions. So far, the abelian Stark conjecture on Artin L-functions at 0 has been my main source of inspiration for most of my work. I am interested in everything related to this conjecture such as the equivariant Tamagawa number conjecture, the theory of complex multiplication of abelian varieties, Drinfeld modules and Iwasawa theory.

In the future, I would like to have a look at other special values (as the Coates-Sinnott conjecture at negative integers) and other motives (as elliptic curves).

Matt Zaremsky

My interests lie in the realm of geometric group theory. The common thread among most of my research projects involves analyzing the geometry and topology of some relevant space, and using that to deduce properties of some interesting group. Some examples of my current favorite groups include Thompson's groups, $\text{Out}(F_n)$, algebraic and arithmetic groups, and Coxeter and Artin groups, especially braid groups. Some relevant spaces involved include poset geometries, Outer space, and buildings.

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