The Arithmetic Seminar

TOPICS: Arithmetic in the broadest sense that includes Number Theory (Elementary Arithmetic, Algebraic, Analytic, Combinatorial, etc.), Algebraic Geometry, Representation Theory, Lie Groups and Lie Algebras, Diophantine Geometry, Geometry of Numbers, Tropical Geometry, Arithmetic Dynamics, etc.

PLACE and TIME: This semester the seminar meets primarily on Tuesdays at 4:15 p.m. in WH 100E, with possible special lectures on Mondays at 3:30 or other days. Before the talks, there will be refreshments in WH-102.

ORGANIZERS:
Regular Faculy: Alexander Borisov, Marcin Mazur, Adrian Vasiu,
Post-Docs: Vaidehee Thatte, Fikreab Solomon Admasu.

Current Ph.D. students: Patrick Carney, Andrew Lamoureux, Micah Loverro, and Sayak Sengupta.

Graduated Ph.D. students (in number theory and related topics): Ilir Snopce (Dec. 2009), Xiao Xiao (May 2011), Jinghao Li (May 2015), Ding Ding (Dec. 2015), Patrick Milano (May 2018), Changwei Zhou (May 2019).

SEMINAR ANNOUNCEMENTS: To receive announcements of seminar talks by email, please join our mailing list.

Related seminar: The student/postdoc "No Theory Seminar":
https://sites.google.com/view/vaideheethatte/conference-seminar-organization/nts-bu

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Previous Arithmetic Seminar Talks

- ——————— Fall 2019
- Spring 2019 ——– Fall 2018
- Spring 2018 ——– Fall 2017
- Spring 2017 ——– Fall 2016
- Spring 2016 ——– Fall 2015
- Spring 2015 ——– Fall 2014

Spring 2020

All remaining Arithmetic Seminar talks are cancelled/postponed. Some of the talks may be rescheduled in the online format, if the speaker is willing and able to do it.

- **January 28**
  Speaker: N/A
  Title: Organizational Meeting
  Abstract: We will discuss schedule and speakers for this semester

- **February 4**
  Speaker: Fikreab Admasu (Binghamton University)
  Title: Buildings with examples
  Abstract: This talk will be an introduction to buildings with examples. Jacques Tits introduced the notion of buildings to provide a systematic geometric description of certain groups such as finite simple groups. They have found applications in several other areas. We will look at some examples such as affine buildings and finite projective planes.

- **February 11**
  Speaker: Fikreab Admasu (Binghamton University)
  Title: Buildings and an application
  Abstract: In this second talk, we will look at the construction of buildings such as spherical buildings. One application of buildings, due toJ. Igusa, M. du Sautoy and A. Lubotzky is that the local factors of the zeta function of a class of nilpotent groups is expressed in terms of the combinatorics of the building of the associated algebraic group.

- **February 18**
  Speaker: Alexander Borisov (Binghamton University)
  Title: Lehmer's Conjecture and Dimitrov's proof of Schinzel-Zassenhaus Conjecture
  Abstract: Mahler measure $M(f)$ of a univariate monic integer polynomial f is the product of absolute values of its complex roots outside of the unit circle. A long-standing conjecture, known as Lehmer's Conjecture, asserts that there is a positive constant C, such that $M(f)$ either equals 1 or is at least $1+C$. A somewhat weaker conjecture, due to Schinzel and Zassenhaus, says that for some positive C, independent of the degree d of the polynomial f, the maximum absolute value of roots of f either equals 1 or is at least $1+C/d$. In a very recent breakthrough development the proof of this weaker conjecture was announced by Vesselin Dimitrov. I will explain some background and sketch Dimitrov's argument.

- **February 25**
  Speaker: Mahdi Asgari (Cornell University and OSU)
  Title: Symmetric Algebras and L-functions
  Abstract: I will explain the role that decompositions of certain symmetric algebras play in linking the local and global Langlands L-functions through a process called “unramified computation” and present some results along these lines, both old and new.

- **March 3**
  Speaker: Bin Guan (CUNY)
  Title: Averages of central values of triple product L-functions
  Abstract: Feigon and Whitehouse studied central values of triple L-functions averaged over newforms of weight 2 and prime level. They proved some exact formulas applying the results of Gross and Kudla which link central values of triple L-functions to classical “periods”. In this talk, I will show more results of this problem for more cases using Jacquet's relative trace formula, and some application of these average formulas to the non-vanishing problem.

- **March 10**
  Speaker: Jaiung Jun (SUNY New Paltz)
  Title: Lattices, spectral spaces, and closure operations on idempotent semirings
  Abstract: Spectral spaces, introduced by Hochster, are topological spaces homeomorphic to the prime spectra of commutative rings. In this talk, we introduce an analogous statement for idempotent semirings - a topological

space is spectral if and only if it is the saturated prime spectrum of an idempotent semiring. We then introduce more examples of spectral spaces arising from idempotent semirings.

- **March 17 CANCELLED/POSTPONED**
  Speaker: Biao Wang (SUNY Buffalo)
  Title: Some arithmetic functions and Chebatorev densities
  Abstract: For M\"{o}bius function μ, it is well-known that the prime number theorem is equivalent to $\sum_{n=1}^\infty\frac{\mu(n)}{n}=0$. In 1977, Alladi showed a formula on the restricted sum of $\frac{\mu(n)}{n}$ over the conjugacy class of smallest prime divisor of n. In 2017, Dawsey generalized Alladi's result to the setting of Chebotarev densities for finite Galois extensions of $\mathbb{Q}$. In this talk, we will introduce the analogues of their formulas with respect to the Liouville function and the Ramanujan sum, and propose a conjecture for more general arithmetic functions.

- **March 24 CANCELLED/POSTPONED**
  Speaker: Bogdan Ion (University of Pittsburgh)
  Title: Bernoulli polynomials and Dirichlet series
  Abstract: For a given sequence one can associate a power series and a Dirichlet series. We investigate the relationship between possible singularities that appear when we analytically continue both of these series. The most basic case, when the power series has a pole singularity at z=1 is analyzed in detail by employing some (infinite order) discrete derivative operator (associated to the power series) that we call Bernoulli operator. Its main property is that it naturally acts on the vector space of analytic functions in the plane (with possible isolated singularities) that fall in the image of the Laplace-Mellin transform (for the variable in some half-plane). The action of the Bernoulli operator on the function t^s, provides the analytic continuation of the associated Dirichlet series and also detailed information about the location of poles, their resides, and special values. Using examples of arithmetic origin, I will attempt to illustrate what is reasonable to expect when the power series has a non-pole singularity at z=1.

- **March 31 CANCELLED/POSTPONED**
  Speaker: Andrew Lamoureux (Binghamton University)
  Title: TBA
  Abstract: TBA

- **April 14 CANCELLED/POSTPONED**
  Speaker: Vaidehee Thatte (Binghamton University)
  Title: TBA
  Abstract: TBA

- **April 21 CANCELLED/POSTPONED**
  Speaker: Sayak Sengupta (Binghamton University)
  Title: TBA
  Abstract: TBA

- **April 28 CANCELLED/POSTPONED**
  Speaker: Patrick McGinty (Binghamton University)
  Title: TBA
  Abstract: TBA

- **May 5 CANCELLED/POSTPONED**
  Speaker: Helene Esnault (IAS and FU Berlin)

Title: TBA

Abstract: TBA