The Algebra Seminar

The seminar will meet in-person on Tuesdays in room WH-100E at 2:45 p.m. There should be refreshments served at 3:45 in our new lounge/coffee room, WH-104. Masks are optional.

Anyone wishing to give a talk in the Algebra Seminar this semester is requested to contact the organizers at least one week ahead of time, to provide a title and abstract. If a speaker prefers to give a zoom talk, the organizers will need to be notified at least one week ahead of time, and a link will be posted on this page.

If needed, the following link would be used for a zoom meeting (Meeting ID: 948 2031 8435, Passcode: 053702) of the Algebra Seminar:

Algebra Seminar Zoom Meeting Link

Organizers: Alex Feingold, Daniel Studenmund and Hung Tong-Viet

To receive announcements of seminar talks by email, please email one of the organizers with your name, email address and reason for joining this list if you are external to Binghamton University.

Spring 2026

- **January 20**
  Organizational Meeting

  Please think about giving a talk in the Algebra Seminar, or inviting an outside speaker.

- **January 27**
  Alex Feingold (Binghamton University)
  Tessellations from hyperplane families: Weyl and non-Weyl cases

  Abstract: In collaboration with Robert Bieri and Daniel Studenmund, we have been studying tessellations of Euclidean spaces which arise from families of hyperplanes. A rich class of examples come from a finite type root system and associated finite Weyl group, W, whose affine extension acts on the tessellation. We have also seen examples which do not come from a root system and Weyl group, so we want to understand exactly what geometric properties of the hyperplane families are needed for our project. Our goal has been to define and study piecewise isometry groups acting on such tessellations. In this talk I will discuss the details of some Weyl and some non-Weyl tessellations.

- **February 3**
  Tim Riley (Cornell University)

Conjugator length

Abstract: The conjugacy problem for a finitely generated group G asks for an algorithm which, on input a pair of words u and v, declares whether or not they represent conjugate elements of G. The conjugator length function CL is its most direct quantification: $CL(n)$ is the minimal N such that if u and v represent conjugate elements of G and the sum of their lengths is at most n, then there is a word w of length at most N such that $uw=wv$ in G. I will talk about why this function is interesting and how it can behave, and I will highlight some open questions. En route I will talk about results variously with Martin Bridson, Conan Gillis, and Andrew Sale, as well as recent advances by Conan Gillis and Francis Wagner.

- **February 10**

Ryan McCulloch (Binghamton University)

A p-group Classification Related to Density of Centralizer Subgroups

Abstract: If $\mathfrak{P}$ is a property pertaining to subgroups of a p-group G, and if each subgroup with property $\mathfrak{P}$ contains $Z(G)$, then a group G whose subgroups are dense with respect to property $\mathfrak{P}$ must satisfy the following criteria: $|Z(G)|= p$ and every subgroup H of order at least p^2 contains $Z(G)$. I will discuss our progress in obtaining a classification of all such p-groups. This is joint work with Mark Lewis and Tae Young Lee.

- **February 17**

Tae Young Lee (Binghamton University)

Title: Finite groups with many elements of the same order

Abstract: It is a well-known fact that if more than 3/4 of the elements of a finite group are involutions then the group is abelian. Berkovich proved that if more than 4/15 are involutions then the group must be solvable. Motivated by these results, Deaconescu asked the following question: If at least half of the elements are of the same order, k, does the group have to be solvable? In this talk, we prove this when $k = p^a$ for primes p except when $p = 2,3$ and $a > 1$, and give counterexamples for larger powers of 2 and 3 except $k = 4$, and also for several other types of composite numbers. We also show that when $k > 4$, it is always possible to find a non-solvable group such that at least 3/19 of its elements have order k. This is a joint work with Ryan McCulloch.

- **February 24**

Lei Chen (Bielefeld University, by Zoom)

Covering a finite group by the conjugates of a coset

Abstract: It is well known that for a finite group G and a proper subgroup A of G, it is impossible to cover G with the conjugates of A. Thus, instead of the conjugates of A, we take the conjugates of the coset Ax in G and check if the union of $(Ax)^g$ covers G-{1} for g in G. Moreover, if $(Ax)^g$ covers G for all Ax in Cos(G:A), we say that (G,A) is CCI. We are aiming to classify all such pairs. It has been proven by Baumeister-Kaplan-Levy that this can be reduced to the case where A is maximal in G, and so that the action of G on Cos(G:A) is primitive, here Cos(G:A) stands for the set of right cosets of A in G. And they showed that (G,A) is CCI if G is 2-transitive. By O'Nan-Scott Theorem and CFSG (classification of finite simple groups), we see that G is either an affine group or almost simple. In the paper by Baumeister-Kaplan-Levy, it is shown that affine CCI groups are 2-transitive. Thus, it remains to consider the almost simple groups. By employing the knowledge of buildings, representation theory, and Aschbacher-Dynkin theorem, we prove that, apart from finitely many small cases, the CCI almost simple

groups are 2-transitive.

- **March 3**
  Chaitanya Joglekar (Binghamton University)
  Lattice basis reduction and the LLL algorithm

  Abstract: A lattice L is a subgroup of $\mathbb{R}^n$ isomorphic to $\mathbb{Z}^n$. Finding a vector in L of the shortest length has many applications in number theory, cryptography and optimisation. While finding a vector with the shortest length is an NP hard problem, the LLL algorithm finds a “short enough” vector in Polynomial time. In this talk, we will go over the LLL algorithm and demonstrate one of its applications, finding a Diophantine approximation for a finite set of rational numbers.

- **March 10**
  Hanlim Jang (Binghamton University)
  Title

  Abstract: Text of Abstract

- **March 17**
  William Cocke (Carnegie Mellon University)
  Title

  Abstract: Text of Abstract

- **March 24**
  (Binghamton University)
  Title

  Abstract: Text of Abstract

- **March 31**
  No Meeting (Spring Break)

- **April 7**
  No Meeting (Monday Classes Meet)

- **April 14**
  Luna Gal (Binghamton University)
  Title

  Abstract: Text of Abstract

- **April 21**
  (Binghamton University)
  Title

  Abstract: Text of Abstract

- **April 28**

Thi Hoai Thu Quan (Binghamton University)
Title

Abstract: Text of Abstract

- **May 5**
  (Binghamton University)
  Title

  Abstract: Text of Abstract

- Pre-2014 semesters
- Fall 2014
- Spring 2015
- Fall 2015
- Spring 2016
- Fall 2016
- Spring 2017
- Fall 2017
- Spring 2018
- Fall 2018
- Spring 2019
- Fall 2019
- Spring 2020
- Fall 2020
- Spring 2021
- Fall 2021
- Spring 2022
- Fall 2022
- Spring 2023
- Fall 2023
- Spring 2024
- Fall 2024
- Spring 2025
- Fall 2025