	Monday	Tuesday	Wednesday	Thursday	Friday
9:30-10:30	Registration	Course 1	Course 1	Course 3	Course 3
10:30-11:00	coffee break	coffee break	coffee break	coffee break	coffee break
11:00-12:00	Course 1	Course 3	Course 1	Tutorial 1	Course 2
12:00-13:15	lunch break	lunch break	lunch break	lunch break	lunch break
13:15-14:15	Course 2	Course 2	Course 2	Course 2	Seminar I
14:15-15:00	coffee break	coffee break	coffee break	coffee break	coffee break
15:00-16:00	Course 3	Tutorial 1	Course 3	Tutorial 3	Seminar II
16:15-17:15	Course 1	Tutorial 3	Tutorial 2	Tutorial 2	

Course 1: Relative trace formulas in analytic number theory

- *Lecturer*: Valentin Blomer
- *TA*: Edgar Assing
- *Abstract*: The relative trace formula of Petersson-Bruggeman-Kuznetsov is a powerful tool to connect automorphic forms and number theory. It leads to a cross-fertilization of both fields: arithmetic problems can be solved by the theory of automorphic forms, and automorphic forms can be investigated by number-theoretic methods. The course will present various examples of this fascinating interplay, also for higher rank groups.

Course 2: Introduction to stabilization in the context of relative trace formulae

- *Lecturer*: Jayce Getz
- *TA*: Chung-Ru Lee and Spencer Leslie
- *Abstract*: A profitable strategy for proving cases of (relative) Langlands functionality is to compare relative trace formulae. The geometric sides of relative trace formulae are indexed by the set-theoretic quotients of the rational points of an affine variety by the rational points of a reductive group. On the other hand, when comparing relative trace formulae, it is often the case that one can only compare the rational points of the corresponding GIT quotient. Thus one requires a reorganization of the relative trace formula into "stable" pieces indexed by a family of GIT quotients. This course will serve as an introduction to this process.
- *References*: Chapters 14-18 of https://sites.duke.edu/heekyounghahn/files/2022/04/GTM.pdf

Course 3: Comparison of relative trace formulas and factorization of automorphic period

- *Lecturer*: Raphael Beuzart-Plessis
- *TA*: Huajie Li
- *Abstract*: The aim of this minicourse is to present a proof, following Jacquet, of a celebrated result of Waldspurger on toric periods for automorphic forms on GL(2) using a comparison of relative trace formulae. Time permitting, I also plan to give a broad introduction to the Gan-Gross-Prasad conjectures that provide higher rank generalizations of Waldspurger's theorem and indicate some of the recent developments on those that have been obtained via relative trace formulae techniques. Some

backgrounds on automorphic forms and representation theory of real and p-adic reductive groups (particularly for GL(2)) is certainly advisable although we will strive to introduce and recall the relevant objects and facts along the way.

- *References*:
  - (for background) D. Bump "Automorphic forms and representations" Cambridge Studies in Advanced Mathematics, 55. Cambridge University Press, Cambridge, 1997. xiv+574 pp. ISBN: 0-521-55098-X
  - (original article) H. Jacquet "Sur un résultat de Waldspurger" Ann. Sci. École Norm. Sup. (4) 19 (1986), no. 2, 185–229.
  - W. T. Gan, B. H. Gross, D. Prasad, "Symplectic local root numbers, central critical L-values, and restriction problems in the representation theory of classical groups" in Sur les conjectures de Gross et Prasad. I. Astérisque No. 346 (2012), 1–109.

Seminar Talks

Talk I: Average and extreme values of toric periods

- *Speaker:* Bart Michels
- *Abstract:* Given a rational semisimple algebraic group G, an anisotropic subgroup H and a fixed adelic H-coset, one may ask about the average size of the corresponding periods of (spherical) automorphic forms as their spectral parameter grows, and about the existence of large deviations from this average size. Obtaining the average size is equivalent to obtaining asymptotics for real oscillatory integrals appearing in a relative trace formula. In the case of toric periods that generalize Waldspurger's period integral, I will explain how the geometry of maximal flat submanifolds of symmetric spaces plays a role in obtaining the average growth rate. Existence of large deviations can sometimes be heuristically explained through arithmetic underlying the periods, and conversely, when proven, can hint at the existence of interesting underlying arithmetic, as I will illustrate with a large deviation result for toric periods on forms of PGL(3).

Talk II: The Kuznetsov formula for GSp(4)

- *Speaker:* Felicien Comtat
- *Abstract:* In this talk, I will present my work on the Kuznetsov formula for GSp(4). The latter relates Whittaker coefficients of Maass forms on GSp(4) for a certain congruence subgroup to sums of generalised Kloosterman sums. In the first part of the talk, I will give an overview of how the Kuznetsov formula for GSp(4) can be proved by integrating a trace formula against a character of the unipotent subgroup. I will then explain how the Kuznetsov formula can be used to derive an equidistribution result for the Satake parameters of automorphic representations, and present my ongoing work on this topic.