



Banff International Research Station

for Mathematical Innovation and Discovery

10w2162 Alberta Number Theory Days -- L-functions

Arriving Friday, April 30 and departing Sunday, May 2,
2010

Organizers: Paul Buckingham (University of Alberta), Matthew Greenberg (University of Calgary).

[Confirmed Participants](#)

[Information for Participants](#)

[Schedule and Abstracts \(PDF file\)](#)

[Mailing List](#)



Objectives

Collectively, the number theorists taken from the principal mathematics departments in Alberta -- at the universities of Alberta, Calgary and Lethbridge -- form a very strong group, with researchers being recognized not just in Canada, but globally. This is an exciting stage for number theory in Alberta, and with the recent formation of the PIMS Collaborative Research Group on L-functions and Number Theory incorporating the Alberta and British Columbia departments, the motivation is there to forge personal interaction and collaboration. Alberta Number Theory Days 2010 will provide such an opportunity, showcasing the state-of-the-art and generating discussion and inquiry. Although Western Canada already has a successful videoconferencing seminar via WestGrid, there is no substitute for face-to-face discussions. Indeed, it is in these situations that some of the most fruitful projects are conceived. A further role of the meeting will be to give graduate students the occasion to speak in a more formal setting and gain exposure within the community; an afternoon will be devoted to this.

One of the strengths of number theory in Alberta is the prevalence of mutual interests across the province. This will afford the conference a high degree of coherence, and the focus will be on L -functions and related topics. These objects play a central role in our understanding of the behaviour of numbers, and significant progress is currently being made in our comprehension of them. The Equivariant Tamagawa Number Conjecture of Burns and Flach, predicting in the number field setting that special values of L -functions contain deep information about the Galois structure of class-groups, has been established for abelian extensions of the rationals by Burns and Greither. Al Weiss, one of the invited speakers, is at the forefront of research in this area, and together with Jurgen Ritter was the first to formulate and prove cases of a non-abelian version of the ETNC's partner conjecture, the Main Conjecture of Iwasawa Theory. It is also a recurring theme in the research of Vinayak Vatsal, one of the confirmed speakers. As an indication of the significance of this important branch of number theory to Canada, we note that the 2010 Iwasawa Theory conference, the preeminent meeting for leading researchers in the subject, will be held at the Fields Institute this summer.

L -functions emanating from arithmetic situations such as these are in general intractable. It is conjectured by Langlands, however, that they should all arise as L -functions associated to automorphic representations. This application of automorphic forms to number theory in its various settings -- analytic properties of L -functions, Diophantine equations -- is one of the primary pursuits of researchers in Western Canada, and is a central theme for Michael Bennett, Imin Chen, Matthew Greenberg and Matilde Lalin, for example. In fact, such is the interest of Canadian number theorists in these ideas that Clifton Cunningham, invited to speak, is co-organizing a workshop on Jim Arthur's L -packets, an important notion in the study of Langlands' conjectures. Because of the dominance in Alberta of this way of viewing L -functions in relation to number theory, the proposed workshop will be well-placed to allow ideas to be readily exchanged between the participants.

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Credits

