Award Details

Cohomological invariants and perturbation problems for Fourier algebras and group algebras

Research Details

Competition Year:	2011	**Fiscal Year:**	2011-2012
Project Lead Name:	Choi, Yemon	**Institution:**	University of Saskatchewan
Department:	Mathematics and Statistics	**Province:**	Saskatchewan
Award Amount:	18,000	**Installment:**	1 - 5
Program:	Discovery Grants Program - Individual	**Selection Committee:**	Mathematics and Statistics
Research Subject:	Functional analysis and operator theory	**Area of Application:**	Mathematical sciences
Co-Researchers:	No Co-Researcher	**Partners:**	No Partners

Award Summary

My main field of research straddles the boundary of several domains within mathematics: functional analysis, harmonic analysis, and abstract algebra. Let me try to give an overview of what some of these terms mean. Functional analysis is a branch of mathematics which originated in the early 20th century, motivated by the need to formulate and study systems of differential equations that model various physical phenomena. It has historically had close links with the branch of mathematics known as Fourier analysis, which is an ancestor of harmonic analysis, and is concerned with the study of periodic motion or signals, such as vibration in a string or an air column, or electro-magnetic waves. A guiding principle in the modern approach to functional analysis, is that one gains greater understanding by looking at certain collections of equations or solutions as a family rather than in isolation, and that the family itself can be thought of as a single object possessing interesting symmetries or structure. My own research is concerned with ``homological properties'' of these objects: informally, one is trying to solve systems of equations associated to them, to find a set of solutions which in some sense generate all the solutions of the equations, and to investigate the stability of the solutions with respect to perturbations in the input, which will in turn give us information about the internal structure of these objects. I am particularly interested in cases where these objects arise from the study of groups and group actions, which are the mathematician's abstract framework for studying symmetry. The ways in which the structure of these groups are manifested in the structure of such objects has been the subject of much research over the last 50 years, but a lot remains mysterious. My contributions in these fields will form part of the well-established research activities in functional analysis and harmonic analysis in Canada.