# Analysis and Geometry in Non-Riemannian Spaces

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The School of Mathematics and Statistics of the University of New South Wales (UNSW) hosted the 'Workshop Analysis and Geometry in Non-Riemannian Spaces' in collaboration with the Australian Mathematical Society. The Workshop was held at the School of Mathematics and Statistics of UNSW from 2 to 4 November 2015.

Michael Cowling (UNSW) opened the inaugural session with a brief introduction. He explained the intentions and the purposes of the Workshop, which was organized to gather mathematicians working in the setting of non-Riemannian spaces both from the point of view of analysis and geometry, with the goal of promoting the synergy between these two areas of Pure Mathematics. The basic idea is that once one endows a Lie group (and more in general a homogeneous manifold) with a left-invariant length distance, it becomes possible to associate to such groups differential operators that are intrinsic in a similar way as the Laplace–Beltrami operator is for Riemannian manifolds. This observation links together differential geometry problems in Lie groups and homogeneous manifolds to harmonic analysis questions. It is a fact that a better understanding of the geometry of these spaces facilitates the comprehension of analytic problems.

The workshop lasted three days and was organized as follows: five one-hour lectures the first day, four the second day and three the last day. On the one hand, a relative small number of contributions allowed enough time to the speakers to present their work in some detail. On the other hand, the participants could take advantage of the breaks to discuss problems with the invited speakers and among each other. Here is a list of topics that were addressed: harmonic analysis on Lie groups and homogeneous spaces (sub-Laplacians, spectral analysis, Hardy spaces and BMO); CR-geometry and parabolic geometry (conformal structures, complex structures, holonomy); geometry of groups (Coxeter groups, metric geometry of nilpotent Lie groups).

Most of the lectures were given using Beamer presentation supplemented by the use of the whiteboard. The pdf files of the presentations will be available in the webpage of the event: http://conferences.science.unsw.edu.au/SR2015/index.html. Here is the list of the speakers (in alphabetical order): Xuan Duong (Macquarie University), Michael Eastwood (University of Adelaide), Tom ter Elst (University of Auckland), Rod Gover (University of Auckland), Enrico Le Donne (University

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of Jyväskylä), Thomas Leistner (University of Adelaide), Ji Li (Macquarie University), Gerd Schmalz (University of New England), Adam Sikora (Macquarie University), Stephan Tillmann (University of Sydney), Anne Thomas (University of Sydney), Lesley Ward (University of South Australia). The Workshop was attended by 20 people, some of them graduate students. There have been productive interactions, which in some cases led to new collaborations. While a small new network has been created and new projects between mathematicians in Australia and New Zealand are growing, the organizers look forward to a second meeting around similar topics next year!