

ACTIVITY REPORTING FORM

FOR CDC GRANTS PROGRAM
IMU Simons African Fellowship Program

(Deadline for completion: four (4) week after the end of the research visit)

Please note that at least four pictures of the supported activity should be included/ attached to this report. (by email).

After consideration by CDC, the intention is that this activity report and pictures will be made publicly available on the CDC website.

Name of grantee: Prof Yuliya Zelenyuk

Home institution and country of grantee: University of the Witwatersrand, SA

Name of the host: Prof Fedor Sukochev

Name of the host institution and country: UNSW, Australia

Topic of the research activity: Topological algebra and its applications to geometry and functional analysis

Dates spend at the center/host institution: 1 Dec 2018- 1 Feb 2019

The progress report should a brief (one page) activity report:

1. Summary statement (1-2 sentences) of major outcome of your visit: During the research visit I was working in the following two directions. Firstly, some dynamical properties of ultrafilters have been discovered. It is related to a long standing open problem of whether every point in Z^* lies in a maximal orbit closure. The problem still remains open. However, a significant contribution was obtained. Secondly, a question from enumerative combinatorics was finally answered. The number of 2-alternating r -colorings of a regular n -gon and the number of 2-alternating r -ary necklaces of length n were explicitly counted.
2. Brief description of your research activities during your research visit: discussions with the host and postgraduate students on the combinatorial problems arising in topological algebra; attending weekly seminars on functional analysis of the research group of Prof Sukachev; presenting a seminar (December 2018); attending AMSI Summer School (January 2019).
3. Students and post-doctoral fellows advised: G. Levitina (UNSW), D. Zanin (UNSW), S. Singh (Wits).
4. Joint activities with your host: Seminars, discussions, collaboration in the area of topological algebra, combinatorics and their applications.
5. Research in progress (as a result from the visit): Computing k -alternating r -colorings of Z_n and k -alternating r -ary necklaces of length n (2-alternating r -colorings of Z_n and 2-alternating r -ary necklaces of length n have been computed during the research visit).
6. Papers published or in preprint form as a result from the research visit: Alternating colorings of the vertices of a regular polygon (preprint).
7. Planned future activities as a result of your research visit: summer school for postgraduate students in the area of topological algebra; special session at the Summer Conference on Topology and its Applications, July 2019; further collaborative work on applications of topological algebra in functional analysis.