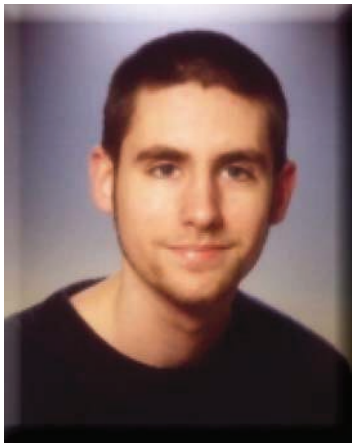
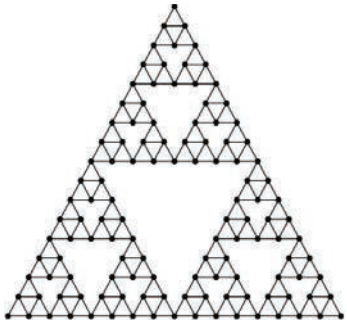
Research Profile of Dr Stephan Wagner, Meiring Naude Medal Winner For 2010



Stephan Wagner was born in Graz, attending high school at the BG/BRG Lichtenfels, where he did his school passing exam in 2000. His mathematical career began as a participant of a mathematical olympiad, winning numerous medals by the international mathematical olympiad between 1998-2000. He studied further at the Technical University of Graz (TU Graz) in 2000. In 2002, he did his civilian service at the Jugend am Werk GmbH Steiermark. Stephan gained his master's degree in September 2004 under the supervision of Prof. Robert Tichy and afterwards, worked as a project assistant at the Institute of Mathematics A of the TU Graz and finished his doctoral studies in March 2006.

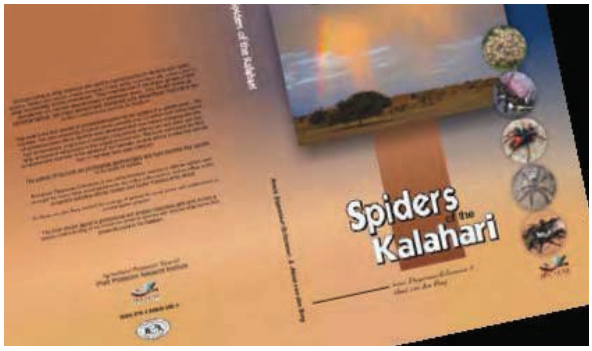
He is currently working as a lecturer at Stellenbosch University since January 2007. Dr Wagner's research combines several areas of mathematics, in particular combinatorics, number theory and graph theory, and it is mainly concerned with enumeration problems in various contexts. Such problems are of a purely mathematical interest, but they also arise quite frequently in mathematical models stemming from physics or chemistry. Projects that he is working on include



- Enumeration on self-similar structures: several models in statistical physics are related to counting problems. The typical setting is a set of sites (occupied e.g. by atoms) and bonds between them, forming a lattice (such as a square grid or a honeycomb). In recent physics literature, self-similar structures (of which the famous Sierpiński gasket – see the picture – is an example) have been brought forward as simple models of porous media. In collaboration with Elmar Teufl from the University of Tübingen in Germany, Wagner is investigating counting problems on such structures, e.g.: in how many ways can one choose a set of bonds in such a way that every site is covered exactly once; in particular: how fast does this number grow as the number of sites tends to infinity? What can be said about the shape of a randomly selected set of bonds with this property?

- Similar problems occur in mathematical chemistry: molecules can be modelled in the same fashion, as atoms connected by bonds. Simple parameters, defined in a purely mathematical way such as the Hosoya index (the number of ways to choose a set of bonds no two of which share an atom) are known to correlate well with physicochemical properties such as the boiling point. Natural questions that arise and that form part of Wagner's work are: given a specific family of molecules, what can be said about maximum or minimum of such parameters, or about average values?=

Other News



Ansie Dippenaar-Schoeman FRSSAf, South Africa's leading arachnologist and Specialist Scientist at the ARC and Programme Manager of the Arachnology Unit of the Biosystematics Division of Plant Protection Research Institute and Institute of the Agricultural Research Council has published "***Spiders of the Kalahari***". It contains 260 high quality photographs of 79 spider genera/species from 40 families and covers 39 web-dwelling taxa, and 40 ground- and plant dwellers. It provides information on their morphology, life-cycle, role in nature,