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Heisenberg funding for Asgar Jamneshan

The German Research Foundation (DFG) has accepted the mathematician Dr. Asgar Jamneshan from the University of Bonn into the Heisenberg program. The program offers researchers five years of funding so that they can carry out high-quality research within their projects and continue to enhance their academic reputation. Jamneshan is carrying out research into the foundations of higher-order Fourier analysis. The mathematician, who is an associate member of the "Hausdorff Center for Mathematics" Cluster of Excellence, will receive funding of up to 570,000 Euro.

Dr. Asgar Jamneshan works at the Mathematical Institute at the University of Bonn. His research focuses on the foundations of higher-order Fourier analysis and Dr. Jamneshan explains what this involves using the following example: If you take the natural numbers 1, 2, 3, etc. in series, toss a coin for each number and then place the number in a "pot" if the coin shows "heads," you will produce a random subset.

"You would expect that around half of the numbers would end up in the pot and that these numbers would be randomly distributed," says Jamneshan. However, Szemerédi's theorem, a central result in additive combinatorics, shows that ordered structures – so-called arithmetic progressions such as 5, 10, 15, 20, 25 – also arise in such subsets. The remarkable point is that this theorem also applies to every sufficiently large subset with a positive "fraction", irrespective of how the subset is selected.

"This means that structure cannot be completely destroyed – as long as the set is sufficiently large," says the mathematician. Yet it is still unclear what "sufficiently large" actually means in many problems. Researchers need tools from higher-order Fourier analysis in order to investigate these types of questions. "These principles are of fundamental importance for parts of pure mathematics and also play a role in applications such as theoretical computer science."

The DFG will provide the mathematician with funding of up to 570,000 Euro over the next five years within the Heisenberg program. Funding is initially awarded for a three-year period and can be extended for a further two years if approved in an interim evaluation. Heisenberg funding is awarded to highly qualified researchers to improve their prospects of securing a permanent position as a professor. "I have worked for a long time on the development of this research project and am delighted that it has been approved for funding by the DFG and their reviewers," says Jamneshan. "My goal is to push forward our understanding of as many of the questions addressed in the project as possible during my time in Bonn. The Mathematical Institute is a particularly suitable and inspiring environment for this research."

Profile

Asgar Jamneshan studied and received his doctorate at the Humboldt University of Berlin. He has worked at the University of Konstanz, ETH Zurich, the University of California, Los Angeles and Koç University in Istanbul. Jamneshan moved to the University of Bonn from TU Dresden at the beginning of April.

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Dr. Asgar Jamneshan from the Mathematical Institute at the University of Bonn.
Photo: Gregor Hübl/University of Bonn