

National Security Agency

MATHEMATICAL SCIENCES PROGRAM

Grants for Research in the Mathematical Sciences

2016 Summary

The National Security Agency Mathematical Sciences Program (MSP) was started at NSA in 1987 in response to an increasingly urgent need to support mathematics in the United States. Indeed, the NSA realizes the mutual benefits of maintaining a healthy academic community and is proud to offer funding opportunities for eligible faculty members through the MSP.

Program Overview

The MSP supports self-directed, unclassified research, conferences, workshops, and other efforts in the areas of Algebra, Discrete Mathematics, Number Theory, Probability, and Statistics. The program no longer accepts proposals that involve cryptology. Research and conference proposals are reviewed by a Mathematics Review Panel, which is appointed and administered by the American Mathematical Society. Members of the Panel meet annually in May to discuss and to rank the proposals. During the annual panel meeting, panelists use external reviews and their own assessments of the merits of the proposals to arrive at a rating for each proposal. The panelists in each subject area then use these ratings to create a ranked list of proposals within each subject area. The final review panel recommendations are used by the NSA Mathematical Sciences Program Office to make funding decisions.

Annual Statistics

This was an atypical year for the NSA Mathematical Sciences Program. In an effort to remain viable to the mathematics community in awarding research grants, the MSP accepted only young investigator research grant proposals. This strategy was implemented due to the most recent budget reduction the program sustained this year. At the close of the proposal submission cycle, in 2016 the MSP entertained a total of 143 young investigator research proposals. After all proposals were thoroughly peer reviewed by the AMS and rated by the NSA's internal process, final decisions on awards were made in accordance with current MSP policies. Those policies emphasize the intellectual quality of the research proposed together with its broad impact of the technical field. Approximately one seventh of the submissions, a total of 21 proposals, were awarded funding as follows: 7 in Algebra, 5 in Discrete Mathematics, 5 in Number Theory, 3 in Probability, and 1 in Statistics. The number of proposals funded in each category was based upon the desire to award roughly the same proportion of proposals in a subject category as were received in that category.

It is the MSP's desire to recognize as many PIs as possible with funding during a period of decline in government research funding. To accomplish this, the MSP implemented a policy that prohibits the award of MSP research grants to individuals who possess grants from other United States government agencies (such as the NSF and the ARO) that supports their research for the same time period. There were seven researchers who declined the MSP award since their research was also recognized by either the NSF or the ARO.

The Mathematics Review Panel also evaluated 16 conference proposals, four of which were selected for funding. A complete list of new research awards and new conference awards is listed at the conclusion of this report.

Other Outreach Efforts

In addition to research and conference grants, the NSA offers other opportunities for students and faculty members in the mathematical sciences. One of the initiatives of the MSP and of the Agency at large is the development and training of a future generation of mathematicians. As part of this initiative, the NSA offers a summer internship program called the Director's Summer Program (DSP). The DSP is the Agency's premier outreach effort to the nation's most talented undergraduates in mathematics and computer science. Participants in the program spend the summer using their mathematical skills to help solve actual problems involving NSA's cryptologic and signals analysis mission. A similar program exists for graduate students, the Graduate Mathematics Program. The NSA is also keenly interested in promoting the involvement and advancement of underrepresented populations in the mathematical sciences. The Mathematical Sciences Program devotes a portion of its resources to conferences for undergraduates and graduate students, Research Experiences for Undergraduates (REUs), and other efforts that enhance participation in the mathematical sciences. In the past, the MSP has funded efforts such as the Infinite Possibilities Conference, the National Research Experience for Undergraduates Program, and the Mathematical and Theoretical Biology Institute Research Program for Undergraduates.

Further information on the Mathematical Sciences Program may be obtained from the website http://www.nsa.gov/research/math_research/index.shtml, or by contacting the following individuals.

Dr. Charles H. Toll
Director, MSP
National Security Agency
Suite 6844
Ft. Meade, MD 20755-6844
Phone: 443-634-4304
Fax: 443-634-4390
Email: chtoll@nsa.gov

Ms. Barbara A. Johnson
Program Administrator, MSP
National Security Agency
Suite 6844
Ft. Meade, MD 20755-6844
Phone: 443-634-4304
Fax: 443-634-4390
Email: bajohn1@nsa.gov

New Research Grants

Algebra (7):

Asher	Auel	Azumaya Algebras and Rationality
Melody	Chan	Algebraic and Tropical Moduli Spaces and Brill-Noether Theory
Alexander	Duncan	Generic Objects and Their Automorphisms
Jack	Huizenga	Geometry of Moduli Spaces of Vector Bundles
Li	Li	Bass in cluster Algebras and Their Geometries and Combinatorics
Kostya	Medynets	Orbit Equivalence Rigidity in Topological Dynamics
Jonathan	Wise	Valuative Logarithmic Geometry and Moduli Spaces

Discrete Mathematics (5):

M. Amin	Bahmanian	Amalgamations and Fair Detachments of Hypergraphs
Daniel	Cranston	Improved Bounds for Edge Coloring Simple Graphs: The Structure of Edge-critical Graphs
Christopher	Porter	Algorithmic Randomness and the Complexity of Probability Measures
Vince	Vatter	Rationality and Algebraicity of Permutation Classes
Gexin	Yu	A Study of Problems on Coloring, Covering and Packing of Graphs

Number Theory (5)

Andrei	Jorza	p-adic L-functions, Galois Representations and Analytic Geometry
Nathan	Kaplan	Arithmetic Statistics of Varieties Over Finite Fields
Beth	Malmskog	Curves With Many Points, Jacobian Varieties, and Reduction Properties
Micah	Milinovich	Zeros of L-functions and Estimates for Primes
Shuichiro	Takeda	Problems Motivated by the Theory of the Weil Representation

Probability (3):

Jonathon	Peterson	Random Walks in Random Environments
Yizao	Wang	From Random Partitions to Self-Similar Processes
Philip	Wood	Singularity, Random Dependence and Eigenvalues of Random Matrices

Statistics (1):

Gongjun	Xu	Rare-Event Analysis and Efficient Simulation for Random Fields and Random Matrices
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New Conference Grants

Conferences (4):

Guantao	Chen	Atlanta Lecture Series in Combinatorics and Graph Theory
Frederick	Hoffman	Forty-Eighth and Forty-Ninth Southeastern International Conferences on Combinatorics, Graph Theory and Computing
Rodney	Keaton	Automorphic Forms Workshop 2017
Thomas	Mathew	11th Annual Probability and Statistics Day at UMBC

For a list of the research grants whose second years are now being funded, please request a copy of the Year 2015 Summary on the Mathematical Sciences Program (available either from Kim Kuda of the AMS, kak@ams.org, or from the NSA MSP).