

Curriculum Vitae

Name: Dwijendra K. Ray-Chaudhuri
Aliases: Dijen K. Ray-Chaudhuri, Dijen Ray-Chaudhuri, D. K. Ray-Chaudhuri
Date of Birth: November 1, 1933
Narayangang, Bengal, British India
Citizenship: U. S. Citizen
Family: Wife-Joyasree Ray-Chaudhuri (Aliases, Joy, Joya)
Daughters - Joyati and Debi
Son - Ishan
Education: M.Sc., Calcutta University, India: 1956
Ph.D., University of North Carolina at Chapel Hill: 1959

Professional Experience

Research Fellow, Indian Statistical Institute: 1956-57
Research Associate, Case Institute of Technology: 1959-60
Assistant Professor, University of North Carolina: 1960-61
Research Staff, Bell Telephone Laboratories: Summer 1960
Research Consultant, Rand Corporation: Summer 1961
Research Staff, Indian Statistical Institute, Calcutta: 1961-62
Adjunct Associate Professor, N. Y. University: 1963-64
IBM Thomas J. Watson Research Center, staff member in the Department of Mathematical Sciences: September 1962-September 1965
Consultant, Cornell Medical Center and Sloan Kettering Institute, N.Y., N.Y.: 1964-65
Visiting Associate Professor, Mathematics Research Center, University of Wisconsin: 1965-66
Professor, Department of Mathematics, The Ohio State University, Columbus, Ohio: 1966-present
Chairman, Department of Mathematics, The Ohio State University, Columbus, Ohio: January 1979-June 1982
Professor of Statistics, The Ohio State University, Courtesy Appointment: June 1985-June, 1998
Visiting Professor, University of Göttingen, West Germany: Summer 1972
Visiting Professor, University of Erlangen, West Germany: Summer 1976
Visiting Professor, University of London: January - June, 1984
Visiting Professor, Free University, Berlin: July - December 1984
Visiting Professor, Tata Institute of Fundamental Research, Bombay: December 1987
Chairman, Department of Mathematics, The Ohio State University, October 1, 1990 - September 30, 1994.

Remarks on Research and Ph.D. Students:

I have worked on a broad range of problems of Combinatorial Mathematics that arise in the theory of error-correcting codes, graph theory, design theory, geometry, information retrieval, etc. My contribution in algebraic coding theory (jointly with R. C. Bose) known as BCH codes is considered to be of fundamental importance in the subject; books in this area (for instance, Algebraic Theory of Coding by Berlekamp, Theory of Error-Correcting Codes by McWilliams and Sloane) devote a chapter or more to the subject of BCH codes. In 1968, R. M. Wilson and I solved the general case of "Kirkman's School Girl Problem", an outstanding combinatorial problem since 1850 which attracted the interest of many important mathematicians. This paper contributed seminal ideas which led to great developments in Design Theory. I was an invited one-hour speaker in the annual winter meeting of A.M.S., 1973. Popular scientific articles on BCH codes and the solution of Kirkman's School Girl Problem written by various authors have appeared in the Scientific American (midsixties and May 1980) and in the Encyclopedia Britannica (Encyclopedia Britannica, Macropaedia vol. 4, Knowledge in Depth, 15th edition, 1984, p. 947 and p. 948). I was a 45-minute invited speaker in the Nice International Congress of Mathematicians (1970). I have supervised the Ph.D. theses of 31 students some of whom are now established mathematicians, some of my PhD's are employed in industry, one in NSA and one in Sandia Laboratories. My former student Richard M. Wilson (presently a full professor at the California Institute of Technology) received the Polya prize. My former students R. M. Wilson and Jeff Kahn (presently a full professor at Rutgers University) received Sloan Fellowships, Kahn gave a 45 minute address at the Zurich (1994) International Congress. My former student Akos Seress is a renowned researcher in computational group theory. My former student E. Brickell (presently at Sandia Laboratories) discovered a method to break the well-known iterated knap-sack encryption and received an award. Brickell is a founding editor of the Journal of Cryptology. My 24th Ph.D., Qin Xiang, (assistant professor at the University of Delaware) gave major invited addresses in several international meetings. Since 1966, I have been developing our Combinatorics group which is recognized as one of the best in the world. I introduced several graduate Combinatorics sequence of courses at OSU. Later we created the Applied Discrete Mathematics Master's program. Since 1968, the Combinatorics group produced at least 50 Ph.D.'s. I had been involved over the years in recruiting 7/8 Combinatorists at OSU.

Contribution as Chairman

OSU Mathematics Department is a very distinguished large department. I had the honor and privilege to serve as chairman of our department for two terms. During my first term as Chairman, we recruited 15 tenure-track faculty in the Columbus Campus, including distinguished colleagues like, Burghlelea, Moscovici, Goss, Stanton, Sinnott, Ash, etc. In 1990-91 I nominated 3 faculty for PYI awards, two of my nominations were successful. In my second term, my main contribution was to take care of our budget deficit. I have participated as a teacher of a Combinatorics course for at least 8 years in the nationally famous Young Scholar Program of Arnold Ross.

Publications (papers already published or accepted for publication by peer-reviewed journals)

1. On the application of the geometry of quadrics to the construction of partially balanced incomplete block designs and error-correcting codes, The Institute of Statistics, UNC, Chapel Hill, NC Mimeo Series, No. 230, June 1959.
2. (Jointly with R. C. Bose) On a class of binary error-correcting group codes, Information and Control 3, (1960), 68-79.
3. (jointly with R. C. Bose) Further results on error-correcting group codes, Information and Control 3, (1960), 279-298.
4. On the construction of minimally redundant reliable system designs, Bell Systems Technical Journal, 40, (1961), 595-611.
5. Some results on quadrics in finite projective geometry based on Galois fields, Canadian Journal of Mathematics, 15, (1962), 129-138.
6. An algorithm for the minimum cover of an abstract complex, Canadian Journal of Mathematics, 15, (1965), 11-24.
7. On some connections between balanced incomplete block designs and minimum covers, Colloques Internationaux Du'Centre National de la Recherche Scientifique, No. 110, le Plan D'experiences, Paris, (August 29-September 6, 1961), 129-136.
8. Some configurations in finite projective spaces and partially balanced incomplete block designs, Canadian Journal of Mathematics, Vol. 17, (1965), 114-123.
9. (jointly with A. J. Hoffman) On the line graph of a finite affine plane, Canadian Journal of Mathematics, Vol. 17, (1965), 687-694.

10. (jointly with A. J. Hoffman) On the line graph of a symmetric balanced incomplete block design, *Transactions of American Mathematical Society* 116, (1965), 238-252.
11. Application of the geometry of quadrics for constructing partially balanced incomplete block designs, *Annals of Mathematical Statistics*, 33, 1175-1186.
12. Characterization of line graphs, *Journal of Combinatorial Theory*, 3, (1967), 201-214.
13. Combinatorial information retrieval systems for files, *SIAM Journal for Applied Mathematics*, Vol. 16, no. 5, (September 1968), 201-214.
14. (jointly with C. T. Abraham and S. P. Ghosh) File organization schemes based on finite geometries, *Information and Control*, Vol. 12, no. 2, (February 1968), 143-163.
15. (jointly with Richard M. Wilson) Solution of Kirkman's School Girl Problem, *Proceedings of Symposia in 'Pure' Mathematics, Combinatorics*, Vol. 19, American Mathematical Society, 1987-203.
16. (jointly with Gregory Chow) An alternative proof of Hannan's Theorem on canonical correlations and multiple equations systems, *Econometrica*, Vol. 35, no. 1, (January 1967), 139-142.
17. (jointly with R. M. Wilson) On the existence of resolvable balanced incomplete block designs, *Combinatorial Structures and their Applications*, Gordon and Breach, New York, 1970.
18. On some connections between graph theory and experimental design and some recent existence results, invited paper published in the Proceedings of an advanced seminar at Mathematics Research Center, University of Wisconsin, 1969, Graph Theory and Applications, Academic Press, 1970 (ed. B. Harris), 149-166.
19. (jointly with H. Hanani and R. M. Wilson) On resolvable designs, *Discrete Mathematics* 3, (1972), 343-357.
20. On some recent developments in the theory of combinatorial designs, invited paper published in the Proceedings of International congress of Mathematicians, Nice, France, September 1970, Tome 3, 223-227.
21. (jointly with R. M. Wilson) The existence of Resolvable Block Designs, invited paper published in the Proceedings of International Combinatorics Symposium, Fort Collins, Colorado, 1971, A Survey of Combinatorial Theory, ed. J. N. Srivastava, North Holland, 1973, 361-375.
22. Uniqueness of association schemes, *Accademia Nazionale Dei Lincei, Atti Dei Convegni Lincei*, 17, Roma, 1973, *Colloquio Internazionale sulle Teorie Combinatorie*, Tomo II, 465-479.

23. (jointly with R. M. Wilson) On t -designs, Osaka J. Mathematics, 12, (1975), 737-744.
24. (jointly with A. P. Sprague) Characterization of Projective Incidence Structures, Geometriae Dedicata 5, (1976), 361-376.
25. (jointly with N. M. Singhi) A characterization of the line hyperplane design of a projective space and some extremal theorems for matroid designs, Number Theory and Algebra, Academic Press, 1977, 289-301 (edited by H. Zassenhaus).
26. Combinatorial characterization theorems for geometric incidence structures, Proceedings of the sixth British Combinatorial Conference, Combinatorial Surveys, (ed. P. J. Cameron), Academic Press, 1977, 87-116.
27. (jointly with A. H. Chan) Characterization of line graph of an affine space, Journal of Combinatorial Theory A 26, 1979, 48-64.
28. Some characterization theorems for graphs and incidence structures, Colloquia Mathematica Societatis János Bolyai, 18, Combinatorics, Keszthely (Hungary) 1976, 821-842.
29. (jointly with A. H. Chan) Embedding of a pseudo-residual design into a Mobius plane, Journal of Combinatorial Theory A, 31 (1981).
30. (jointly with A. P. Sprague) A combinatorial characterization of attenuated spaces, Utilitas, 15, 1979, 3-29.
31. (jointly with H. P. Ko) Group divisible difference sets and families from s -flats of finite geometries, Congressus Numeratum XXIV, Florida Atlantic University, Boca Raton, Proc. 10th S-E Conf. Combinatorics, Graph Theory and Computing, Volume II, 1979, 601-627.
32. Affine triple systems, special invited paper, Proceedings of the International Conference on Combinatorics and Graph Theory, Calcutta, 1980, Springer-Verlag Lecture Note Series, 1982, (ed. S. B. Rao), 885, 60-69.
33. (jointly with H. P. Ko) Intersection theorems for group divisible difference sets, Discrete Mathematics, 39 (1982), 39-58.
34. (jointly with H. P. Ko) Multiplier Theorems, Journal of Combinatorial Theory A, 30, (1981), 134-157.
35. Group Divisible Difference Sets, Enumeration and Design, 1984, Academic Press Canada, 271-283 (Proceedings of Waterloo Silver Jubilee Conference 1982).
36. (jointly with S. B. Rao and N. M. Singhi) On the Imprimitive Association Schemes, Combinatorics and Applications edited by K. S. Vijayan and N. M. Singhi (Proceedings of the Seminar on Combinatorics and Applications in honor of Professor S. S. Shrikhande), Indian Statistical Institute, Calcutta, (December 1982), 273-292.

37. (jointly with E. Brickell) Characterization of Incidence structures of Intervals of Affine Geometries, *Mitteilungen aus dem Mathem. Seminar Giessen, Sonderdruck aus Heft 166, Coxeter-Festschrift, Teil V, Giessen, 1984*, 17-33.
38. (jointly with Robert Roth) Hall triple systems and commutative Moufang Exponent 3 loops, *Journal of Combinatorial Theory, (A), Vol. 36, # 2, 1984*, 129-162.
39. (jointly with K. T. Arasu) Divisible Quotient Sets and their Multipliers, *Congressus Numeratum, Vol. 49, (1985)*, 321-338.
40. (jointly with K. T. Arasu) Multiplier Theorems for a Difference List, *Ars Combinatoria, 22 (1986)*, 119-137.
41. (jointly with N. M. Singhi) On existence of t -designs with large v and λ , (1987) *Siam J. of Discrete Mathematics, Vol. 1, 1988*, 98-104.
42. (jointly with N. M. Singhi) On existence and number of orthogonal arrays, *JCT, A, Vol. 47, no. 1, (1988)*, 28-36.
43. (jointly with N. M. Singhi) q -analogues of t -designs and their existence, *Linear Algebra and Its Applications, 114-115 (1989)*, 57-68.
44. (jointly with M. Deza and N. M. Singhi) Positive independence and enumeration of codes with a given distance pattern, *The IMA Volumes, Springer-Verlog, vol. 20, Part 1 (1990)*, 93-101.
45. (jointly with N. M. Singhi) Some recent results on t -designs, *Sankhyā, vol. 54, (dedicated to R. C. Bose) 1992*, 383-391.
46. jointly with Erin J. Schram) Designs on Vector Spaces Constructed Using Quadratic Forms, *Geometriae Dedicata, vol. 42, 1-42 (1992)*.
47. (jointly with T. Zhu) A recursive method for construction of designs, *Discrete Mathematics, 106/107 (1992)* 399-406.
48. (jointly with T. Zhu) S -intersection Families and Tight Designs, the Proceedings of the Marshall Hall Conference, John Wiley and Sons, 1993, editor D. Jungnickel and S. Vanstone, "A Wiley Interscience Publication", 67-75.
49. (jointly with K. T. Arasu and N. M. Singhi), Simple Designs, *Journal of Combinatorics, Information and System Sciences, vol. 18, Nos. 1-2, 130-135, (1993)*.
50. (jointly with N. M. Singhi and G. R. Vijaykumar) Signed Graph Having Least Eigenvalue Around -2 , *Journal of Combinatorics, Information and System Science, vol. 17, Nos. 1-2, 148-162 (1992)*.

51. (jointly with N. M. Singhi, S. Sanyal and P. S. Subramanian) Theory and Design of t -unidirectional Error Correcting and d -unidirectional Error Detecting Codes, IEEE Transactions on Computers, vol. 43, No. 10, October 1994, 1221-1226.
52. (jointly with E. Schram) A Large Set of Designs on Vector Spaces, Journal of Number Theory, Vol. 47, No. 3, June 1994, 247-272.
53. (with X. Wu) A belianization of Nonabelian Difference Sets J. of Combinatorics, Information and System Sciences, vol. 20, 173-195 (1995).
54. (with H. M. Shaw) A greedy Algorithm for Maximum Multicommodity Flows on Dominance Networks, J. of Combinatorics, Information and System Sciences, Vol. 20, 161-171 (1995).
55. Vector Space Designs, The CRC Handbook of Combinatorial Designs (1996) ISBN 0-8493-8948-8, (peer reviewed), pages 492-496.
56. (with Qing Xiang) Construction of partial difference sets and relative difference sets using Galois rings, Designs, Codes and Cryptography 8, 215-227 (1996), peer reviewed.
57. (with Y. Q. Chen and Q. Xiang) Construction of partial difference sets and relative difference sets using Galois Rings II, Journal of Comb. Theory, Series A, vol. 76, No. 2, Nov. 1996.
58. (with Tianbao Zhu) Orthogonal Arrays and Ordered Designs, Journal of Statistical Planning and Inference 58, (1997), 177-183.
59. (with Q. Xiang) New necessary conditions for abelian Hadomand difference sets, JSPI 61, (1997), 69-75.
60. (with Jin Qian) Frankl-Furedi Inequalities for Polynomial Semi-lattices, Electronic J. of Combinatorics, 4 91997), R28 (15 pages).
61. (with J. Qian) Extremal Case of Frankl-Ray-Chaudhuri-Wilson Inequality, accepted for Journal of Statistical Planning and Inference.
62. (with H. Mohacsy) Candelabra systems and t -designs, to appear in JSPI (2002).
63. (with Jin Qian) On Mod- p Alon-Babai-Suzuki Inequality, J. of Algebraic Combinatorics 12(2000), 85-93.
64. (with Jason T. Blackford) A transform approach to permutation groups of cyclic codes over Galois rings, IEEE Transactions on Information Theory, Vol 46, No 7, Nov. 2000, p. 2050-2058
65. (with Irfan Siap and Nuh Aydin) New 1-generator quasi-twisted codes over $GF(5)$, DIMACS Series on Discrete Mathematics and Theoretical Computer Science, Vol 56(2001) p. 265-275
66. (with Irfan Siap) On r -fold complete weight enumerator of r linear codes, Contemporary Mathematics (American Math. Society) Vol. 259(2000) p. 501-513.

67. (with Jin Qian) Combinatorial Inequalities for Quasi-polynomial semi-lattices, J. of Combinatorics, Information and System Sciences, Vol. 3, Nos 3-4(1999) p. 201-218.
68. (with Irfan Siap and Nuh Aydin) New Ternary Quasi-Cyclic Codes with Better Minimum Distances, IEEE Transactions on Information Thy. Vol. 46, No. 4 (2000), p 1554-1558.
69. (with Irfan Siap) New Linear Codes over \mathcal{F}_3 and \mathcal{F}_5 and improvements on Bounds, Designs, Codes and Cryptography, 21, 223-233 (2000)
70. (with Nuh Aydin and Irfan Siap) The structure of 1-generator Quasi-twisted Codes and Improvements on Bounds, Designs, Codes and Cryptography, 24, 313-326 (2001).
71. (with Jin Qian) Combinatorial Inequalities, Extended (refereed) Abstract, Erdős Conference, Budapest (1999)
72. (with Hedvig Mohacsy) A Construction for Group-Divisible t -designs with strength $t \geq 2$ and index 1. Accepted, J. of Statistical Planning and Inference.
73. (with Hedvig Mohacsy) A Construction for Infinite Families of Steiner 3-designs, J. of Combinatorial Theory, A. 94, p 127-141 (2001).
74. (with Nuh Aydin) Quasi-Cyclic Codes Over 214 and Some New Binary Codes, to appear, IEEE Transactions on Information Thy.
75. (with I. Siap) On r -fold complete weight enumerators of linear codes over Galois rings.

Books and Monographs

76. (jointly with H. B. Mann) Lectures on error-correcting codes, Mathematics Research Center Orientation Series No. 6, U.S. Army Mathematics Research Center, Madison, Wisconsin.
77. (editor, Jointly with C. Berge) Hypergraph seminar, (1972), Springer-Verlag Lecture Notes on Mathematics, 411.
78. (editor) Relation between combinatorics and other parts of mathematics, Proceedings of Symposia in Pure Mathematics, A.M.S., 34, (1979).
79. (editor) The IMA Volumes, Springer-Verlag, Vol 20, Coding Theory and Design Theory, Part I.
80. (editor) The IMA Volumes, Springer-Verlag, Vol. 21, Coding Theory and Design Theory, Part II.
81. (guest editor) Combinatorial Mathematics and Applications, Sankhyā, vol. 54, 1992 (Special volume dedicated to the memory of R. C. Bose).
82. (editor jointly with N. M. Singhi) Journal of Combinatorics, Information & System Sciences, vol. 17, Nos. 1-2, (1992). (Prof. R. C. Bose Memorial Issue).

Submitted Papers

Dwijendra K. Ray-Chaudhuri

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83. (with Hedvig Mohacsy) An Existence Theorem for Group Divisible Designs of Large Order, *J. Combinatorial Theory, A*
84. (with J. George Yeh) New Infinite Families of Large Sets of Designs, *J. Combinatorial Designs*
85. (with Irfan Siap) New Linear codes over \mathcal{F}_5 obtained by Tripling Method, *J. Algebraic Combinatorics*
86. (with Kan Liu) Divisible Difference Sets and Difference sets by Cyclotomy, *Designs, Codes and Cryptography*.

Some Important Papers Written by Ph.D. Students from Ph.D. Theses

87. R. M. Wilson, An existence theory for pairwise balanced designs I: Composition Theorems and Morphisms, *J. Combinatorial theory (A)*, 13 (1972), 220-245.
88. R. M. Wilson, An existence theory for pairwise balanced designs II: The structure of PBD-closed sets and existence conjectures, *J. Combinatorial Theory (A)* 13, (1972), 246-273.
89. R. M. Wilson, Cyclotomy and Difference Families in Elementary Abelian Groups, *J. Number Theory*, 4, (1972), 17-47.
90. B. T. Datta, Nonexistence of 6-dimensional tangential 2-blocks, *J. Combinatorial Theory (B)* 21 (2), (1976), 171-193.
91. B. T. Datta, On tangential 2-blocks, *Discrete Mathematics* 15 (1976), 1-22.
92. Alan P. Sprague, Characterization of Projective Graphs, *J. Combinatorial Theory (B)* 24, (3), (1978), 294-300.
93. Alan P. Sprague, A characterization of 3-nets, *JCT A* 27, (1979), 223-253.
94. Alan P. Sprague, Pasch's Axiom and Projective Spaces, *Discrete Math* 33, (1981), 79-87.
95. Jeff Kahn, Locally Projective Planar Lattices which Satisfy the Bundle Theorem, *Math. Z.* 175, (1980), no. 3, 219-247.
96. Jeff Kahn, Finite Inversive Planes Satisfying the Bundle Axiom, *Geometriae Dedicata* 12, (1982), 171-187.
97. Jeff Kahn, "Inversive Planes Satisfying the Bundle Theorem, *JCT A* 29, (1980), 1-19.
98. K. S. Vijayan, On Arc-transitive graphs, *Proceedings of the Vth Hungarian Combinatorics Conference, 1976*.
99. A. Moon, Embedding a pseudo-residual into an affine-resolvable BIBD, *Discrete Mathematics*.
100. A. Moon, Characterization of Johnson Graphs, *JCT B*.

Some Important Unpublished Results

101. (jointly with A. J. Hoffman) Characterization of regular line graphs.
102. (jointly with K. Chang and R. M. Wilson) Asymptotic existence theory of group divisible designs.
103. (jointly with K. Chang) Asymptotic existence theory of lattice designs.
104. (jointly with K. S. Vijayan) Characterization of bipartite 3-class metric association schemes.
105. (jointly with John LeFever) Reconstruction of 2-trees.

Unpublished Papers

106. On some extension of sampling with probability proportional to size, unpublished thesis accepted for Associate Fellowship of Indian Statistical Institute, Calcutta, 1957.
107. Bounds on the number of linear error-correcting codes, IBM T. J. Watson Research Center Report, RC 1461 (1965).

Research in Progress

1. Commutative algebraic methods on the construction and enumeration of t -designs on partially ordered sets.
2. Composition theorems for t -designs ($t \geq 3$) and applications.
3. Difference Sets and applications.
4. Problems of Coding Theory.
5. Combinatorial Inequalities.
6. Circulant weighing matrices.

Ph.D. Students, Thesis Subjects and Present Affiliation

1. R. M. Wilson, 1969 (Combinatorial Designs), Professor at California Institute of Technology.
2. B. T. Datta, 1971 (Algebraic Theory of Graph Coloring - Tangential 2-Blocks), Associate Professor, The Ohio State University, Lima, Ohio.
3. Alan P. Sprague, 1973 (Characterization of Projective and Affine Association Schemes), Asst. Professor, Department of Computer and Information Science, University of Alabama - Birmingham.
4. K. S. Vijayan, 1973 (Association Algebras and s -regular Graphs), Associate Professor, Indian Statistical Institute, Calcutta.
5. A. H. Chan, 1975 (Line Graphs of Affine Space and Pseudo Residuals of Mobius Planes), Professor, Northeastern University, Boston.

6. K. Chang, 1976 (Group Divisible Designs and Lattice Designs), Merck & Co., Rahway, NJ.
7. D. Nemzer, 1977 (Root Systems and Line Graphs of Multigraphs), Chemical Abstracts.
8. John LeFever, 1977 (Ulam's Reconstruction Problem for 2-Trees and 3-Trees), employed in industry and part time at California State Polytechnique University, Pomona, California.
9. H-P. Ko, 1978 (Group Ring Methods for Group Divisible Difference Sets), General Electric, Schenectady.
10. Jeff. Kahn, 1979 (Embedding of Mobius Planes with Bundle Axiom), Professor, Rutgers University, NJ.
11. Robert Roth, Jr., 1979 (Affine Triple Systems and Commutative Moufang Loops), Associate Professor, Emory University, Atlanta, Georgia.
12. Richard Games, 1980 (The packing Problem in Projective Spaces), Mitre Corporation, Boston, MA.
13. Ernest Brickell, 1981 (Characterization of Projective and Affine Lattices), Research Staff, Sandia Corporation, Albuquerque, New Mexico.
14. A. Moon, 1981 (Embedding of Designs and Uniqueness of Johnson Schemes), (jointly with E. Bannai), Bell Lab. at Holmdel.
15. K. T. Arasu, 1983 (Difference lists, multipliers, Cyclic planes), Professor, Wright State University, Dayton, Ohio.
16. A. Seress, 1985 (The Gossip Problem), Professor, The Ohio State University.
17. D. Miklos, 1986 (Chvatal's Conjecture on Stars of Hereditary Hypergraphs), Hungarian Academy of Sciences.
18. Erin J. Schram, 1989 (Vector Space Design), NSA, Maryland.
19. J. J. Kim, 1992 (Mandatory Representation Designs), Seoul, Korea.
20. L. Nararayani, 1992 (Composition of Codes and Design).
21. H.-M. Shaw, 1992 (Multi-Commodity Network Flow Algorithms), Taiwan.
22. Tianbao Zhu, 1993 (Combinatorial Designs), employed in industry.
23. Xiaohong Wu, May, 1994 (Difference Sets), Extraneous Multipliers and Abelianization.
24. Qing Xiang, 1995 (Difference sets: Their Multipliers and Existence) Associate Professor at University of Delaware.
25. Hedvig Mohacsy, 1998, (Candelabra Systems and Designs), Lecturer at The Ohio State University.
26. Kan Liu, 1999 (Divisible Difference Sets and Difference Sets for Cyclotomy).(coadvisor S. Sehgel)

27. Tom Blackford, 1999 (Permutation Groups of Affine Invariant Quaternary Codes), RPI, Troy, New York.
28. Jin Qian, 1999 (Combinatorial Inequalities). 2000, employed in Industry
29. Irfan Siap, 1999, Generalized r -fold weight enumerators for linear codes and new linear codes with improved minimum distances), Professor of Mathematics in Turkey
30. Jieh-Shan, George Yeh, 1999, (Large sets of disjoint $t - (v, k, \lambda)$ - designs.
31. Ali Nabavi, 2000, (The spectrum of circulant weighing matrices of weight 16).
32. Nuh Aydin, 2001 (New Quasi-cyclic and Quasi-twisted codes and a Class of Optimal Polynomial Codes.)

Postdoctoral Research Associate

John Blanchard, a Ph.D. of Boris Mityagin in Analysis, under my encouragement and supervision solved my conjecture on a finiteness result on strength t orthogonal arrays, a difficult extension of a celebrated theorem of Chowla Erdős and Straus on orthogonal latin squares.

Invited Talks

1. Gave a 45 minute invited talk in the International Congress of Mathematicians, Nice France, 1970.
2. Gave a one-hour talk in the annual Winter meeting of AMS in 1973.
3. Case Institute of Technology (1959).
4. Bell Telephone Laboratories at Murray Hill (1960).
5. The University of North Carolina at Chapel Hill (1961).
6. Massachusetts Institute of Technology (1961).
7. IBM T. J. Watson Research Center (1961).
8. Conference of the International Statistical Institute, Paris (1961).
9. University of Paris (1961).
10. Indian Statistical Institute (1962).
11. Indian Mathematical Congress at Ahmedabad (1962).
12. Punjab University (1962).
13. Case Western Reserve (1963).
14. Princeton University (1963).
15. Matroid Conference at the National Bureau of Standards, Washington, D.C. (1964).
16. University of Wisconsin at Madison, (1965).
17. M.R.C. at Madison (1965).
18. University of Wisconsin, Milwaukee (1966).
19. A.M.S. Special Session at Rutgers, NJ (1965-66).
20. Combinatorics Conference at the University of Waterloo (1965-66).

21. The Ohio State University (1966).
22. Tata Institute of Fundamental Research (1967).
23. Indian Statistical Institute (1967).
24. Calcutta University (1967).
25. First Chapel Hill Combinatorics Conference, 1967.
26. A.M.S. Meeting on Combinatorics at UCLA (1968-69).
27. Colloquium at the University of Arizona (1968-69).
28. Colloquium at the University of North Carolina (1968-69).
29. Mathematics Research Center at Wisconsin (1969).
30. International Combinatorics Conference at Calgary, Canada (1969-70).
31. International Symposium on Combinatorial Mathematics, Fort Collins, Colorado (1971).
32. Colloquia at the University of Göttingen (1972).
33. University of Giessen (1972).
34. University of Erlangen (1972).
35. Brussels University, Belgium, (1972).
36. New York Academy of Sciences Conference in the early seventies.
37. International Combinatorics and Statistics Conference at Calcutta (1972).
38. Oberwolfach Conference on Finite Geometry, (1973).
39. Special Session at the Vancouver International Congress (1974).
40. Battelle Memorial Institute (1975).
41. College Research Lecture at The Ohio State University (1975).
42. Invited one-hour address at the Ohio Chapter Math Association Meeting (1975).
43. South Eastern Conference on Graph Theory and Combinatorics, Baton Rouge, Louisiana (one hour) (1976).
44. International Combinatorics and Set Theory Conference in Hungary (1976).
45. Colloquium at the University of Erlangen (1976).
46. Colloquium at the University of Berlin (1976).
47. International Combinatorics Conference at Paris, (1976).
48. Combinatorics and Graph theory Conference at the University of Waterloo (1977).
49. British Combinatorics Conference at Royal Holloway College, London (one of the 10 principal speakers) (1977).
50. Colloquium at Chapel Hill, NC (1977).
51. University of South Carolina, Clemson (1977).
52. International Symposium on Combinatorial Mathematics and Optimization at Ft. Collins, Colorado (1978).
53. Group Ring Conference at Edmonton, Alberta (1978).
54. International Conference on Combinatorics and Graph Theory, Calcutta, India (1978).

55. Colloquium at Kansas State University (1979-80).
56. Invited address at M.A.A. meeting at John Carroll Univeristy (1979-80).
57. Invited talk at the OSU-Dennison Conference (1980).
58. Invited one-hour address in the Summer meeting of M.A.A. at Pittsburg (1981).
59. Invited speaker (45 minutes) at Waterloo Combinatorics Conference (1982).
60. Invited talk at Oberwolfach finite geometry conference (1982).
61. Invited talk at Finite Geometry Conference in University of Brussels (1982).
62. Colloquium at Miami Univeristy, Ohio (1983).
63. Colloquium at MIT, Boston (1983).
64. Westfield College, University of London (1984).
65. University of Birmingham, U.K. (1984).
66. Univeristy of Sussex, U.K. (1984).
67. British Open University (1984).
68. University College, London (1984).
69. Cambridge University, U.K. (1984).
70. Oxford University, U.K. (1984).
71. University of Wales, Aberystwith, U.K. (1984).
72. Free University, Berlin (1984).
73. University of Göttingen (1984).
74. Mainz University (1984).
75. Invited talk at the German Mathematical Society at Kaiser Lautern (1984).
76. Mathematics Centrum, Amsterdam (1984).
77. Rijks Universiteit at Ghent, Belgium (1984).
78. Indian Statistical Institute, Calcutta (1984).
79. Mehta Research Institute, Alahabad, India (1984).
80. Hungarian Academy of Sciences, Budapest (1984).
81. Colloquium at Wright State University, Dayton (1985).
82. Colloquium at University of Kentucky, Lexington (1986).
83. Colloquium at Bowling Green State University (1987).
84. Tokyo Christian Woman's Science University (1987).
85. Osaka University, Japan (1987).
86. Tata Institue of Fundamental Research, Bombay (1987).
87. Bombay University (1987).
88. Indian Statistical Institute, Calcutta (1987).
89. OSU-Dennison Conference (1988).
90. IMA workshop on Coding theory and Design Theory, May-June 1988, Mineapolis.
91. R. C. Bose Memorial Conference, December, 1988, Calcutta, Indian Statistical Institute.
92. International Conference on Statistical Data Analysis and Inference, Neuchetel, Switzerland, 1989 (in honor of C. R. Rao).

93. Argonne Distinguished Lecture Series, Emory University, March, 1990 - 3 lectures on Coding Theory, Commutative Algebra and Designs.
94. One hour invited talk on intersecting families and designs, at Clemson University, Combinatorics Conference, 1991.
95. Twenty minute invited talk at the Design Theory Special Session of AMS Winter Annual Meeting, 1992.
96. One hour invited talk at the Wichita State Combinatorics Conference.
97. Invited to Oberwolfach Conference on Designs and Codes, 1994.
98. Forty minute invited talk at Bose Memorial Conference, Fort Collins, Colorado, 1995.
99. Thirty minute invited talk at Clemson Combinatorics Conference, 1995.
100. Colloquium at Central Michigan University, 1996.
101. Forty minute invited talk at the Institute of Mathematical Statistics Conference, Chapel Hill, NC, 1996.
102. Twenty minute invited talk at AMS Chicago Meeting, 1998.
103. Colloquium at Caltech, 1997.

Some important invitations that I was not able to accept.

1. International Federation of Information Processing Congress, U.S.S.R. (1963).
2. Oberwolfach Conference on Enumeration Theory organized by Foata and Jacobs (1974).
3. International Conference on Combinatorics and Set Theory in Hungary to celebrate 60th birthday of Paul Erdos (1974).
4. British Combinatorics Conference at Sussex (1975).
5. Invitation from the Tata Institute of Fundamental Research as a visiting professor for 3 months (1976-77).
6. Congress on "les developement recents de la theorie de l'information et leurs applications" at Paris (1977).
7. International Conference at Szeged, Hungary (1980).
8. Invitation from Westfield College, University of London (1980).
9. Conference on Finite Geometries and Designs at Sussex, U.K. (1980).
10. Conference on Graph Theory at Haifa Israel (1981).
11. Hungarian Combinatorics and Set Theory Conference (1981).
12. Conference on Geometry, Rome (1981).
13. International Colloquium on Combinatorics at Marseille, France (1981).
14. International Combinatorics Conference at Calcutta (1981).
15. Oberwolfach Information Theory Meeting (1986).
16. Graph Theory and Combinatorics Meeting of the French Mathematical Society, France (1986).
17. International Conference on Finite Geometry and Combinatorics, Denize, Belgium (1986).

18. International Conference on Combinatorics, Universita Cattolica Del Sacro Cuore, Passadella, Mendola, Italy (1986).
19. The First China-U.S.A. International Conference on Graph Theory, China (1986).
20. Combinatorics Conference at Montreal (1986).
21. Invitation from Universidad Tecnica Federico Santa Maria, Chile (1986).
22. Seventh Hungarian Colloquium on Combinatorics (1987).
23. Rajchandra Bose Symposium on Probability, Statistics and Design of Experiments, December, 1988, New Delhi.
24. Oberwolfach Conference on Combinatorics, 1989.
25. Oberwolfach (West Germany) Conference on Finite Geometry, 1989.
26. British Combinatorics Colloquium, East Anglia, 1989.
27. Invitation to visit Academy Sincia, Beijing, 1989.
28. Invitation to be a principal speaker at Kyoshu University, Fukoka, International Combinatorics Conference, 1993.
29. Twenty minute invited speaker at the AMS special session on Designs and Codes, Richmond, 1994.
30. First Pythagorean Conference, Greece, 1996.
31. Colloquium at University of Pittsburg, 1996.
32. International Conference on Combinatorics, Information Theory and Statistics, U. of Southern Maine, Portland, ME, 1997.
33. International Conference on Combinatorics etc., Hong Kong, 1997.
34. G. Tallini Memorial Conference, Italy, 1996.
35. Forty minute invited talk at RIMS Conference, Kyoto, 1996 and 1998.
36. Conference, Hungary 1999.
37. J. Seidel Conference, Netherlands, 1999.
38. DIMACS Exploratory Workshop on Codes and Association Schemes, 1999.
39. Colloquium at Fukoka University, Japan (1998)
40. International Triennial Calcutta (India) Symposium on Probability and Statistics (1997, 2000)
41. International symposium on Number Theory and Discrete Mathematics in honor of S. Ramanujan (Chandigarh, India, 2000)
42. Hypergraph Workshop in honor of G. Katona (Budapest, 2001)
43. Tenth International Colloquium on Numerical Analysis and Computer Science, Plovdiv, Bulgaria, 2001.

Present Invitations

1. ICM satellite conference on Combinatorics (2002, Hebei Normal University, China).
2. The 16th Midwest conference on Combinatorics, Cryptography and Computing.

3. 14th International Conference on Formal Power Series and Algebraic Combinatorics (Melbourne, Australia, 2002).
4. R.C. Bose Centenary Symposium on Discrete Mathematics and Applications, (Kolkata, India, 2002.)
5. The SSGRR-2002S (Summer) Conference on “Infrastructures for e-business, e-education, e-science and e-medicine”) L’Aquila, Italy, 2002, (Invited as a “Researcher from the list of most referenced scientists”.)

Research Grants

From 1966 to 1983, every Summer I had research support from either NSF or from the Office of Naval Research. My grant supported many visiting mathematicians and students at OSU. I had a 2-year research grant from NSA (1988-90). During 1991-92, I was co-PI with William Dunham in a grant. I was named as a lecturing participant in an NSF Grant of Arnold Ross on Summer Young Scholar Program.

Committee-Work - I served as

1. Chairman of Department’s Executive Committee for several years.
2. Chairman of Department’s Advisory Committee for several years.
3. Chairman of Colloquium Committee for 3 years.
4. Member of Department’s Executive Committee or Advisory Committee for at least 12 years.
5. Member of Graduate Committee for at least 8 years.
6. Member of CENT (Promotion and Tenure Committee) for many years.
7. Chairman of College Education and Human Resources Committee for 3 years, 1987-1989.
8. Member of Self Study Committee.
9. Chairman of PROCOMP (promotion committee for Professor) at least 3 years and as a member for many years.
10. Served on numerous Ph.D. committees as a member or as a Graduate School representative since 1967.
11. Member of Dean’s Advisory Committee for 2 years.
12. Member, Board of Directors, Mathematics Research Institute, The Ohio State University, 1989-1990.
13. Member, Dean’s Executive Council for more than 4 years.

Awards and Other Distinctions

I have received the Senior U.S. Scientist Award of the Humboldt Foundation of Germany. I have received the Distinguished Senior Research Award of The Ohio State University, 1983. I was a member of the IMA Board of Governors at Minneapolis, 1986-88. I was elected President for Forum (1992-93), an organization of mathematicians and statisticians

in New Delhi which publishes the Journal for Combinatorics, Information and System Sciences from New Dehli, India. I am a Foundation Fellow of the Institute of Combinatorics and its Applications (ICA). I was awarded the Euler Medal of ICA (the senior award of ICA) in Spring 2000. DIJEN 65 conference was held at Columbus in Spring 2000 by my former Ph.D's and mathematical collaborators. Proceedings of the conference will appear as a refereed volume of the OSU Mathematics Research Institute.

Other Professional Activities

I am a member of the American Mathematical Society and the Society for Industrial and Applied Mathematics. I was a member of Mathematical Association of America for many years. I have served or presently serve on the editorial boards of

1. Discrete Mathematics
2. Journal of Combinatorial Theory B
3. Journal of Statistical Inference and Planning
4. Combinatorica
5. Designs Codes and Cryptography
6. International Journal of Mathematics and Mathematical Sciences
7. Advances in Management Science
8. Journal of Combinatorics, Information and System Sciences

(The last two are published from India.)

I have organized three very successful conferences

1. The Hypergraph Conference in Columbus
2. The AMS Symposium on Combinatorics, Columbus, 1978
3. IMA Workshop on Coding Theory and Design Theory, May-June 1988, Minneapolis

I have reviewed for

1. National Science Foundation
2. National Research Council of Canada
3. Journal of Combinatorial Theory A and B
4. Combinatorica
5. Journal of Statistical Inference and Planning
6. Discrete Mathematics
7. Canadian Journal of Mathematics
8. Aequationes Mathematica and some other journals
9. Transactions of American Mathematical Society

I was a member of the Organizing Committee of the Applied Combinatorics Year of IMA. I organized the Design Theory and Coding Theory sections of the Applied Combinatorics

Year at IMA in May-June, 1988. I was the organizer of the conference on Relation between Combinatorics and other parts of Mathematics, AMS Meeting in Columbus (1978). I am an organizer of the Special Session on Coding Theory and Designs of the AMS meeting, Sept. 21-23, 2001 to be held in Columbus, Ohio.