

## **Qing Xiang**

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### **Research Interests**

- Algebraic design theory, especially difference sets and their variations; algebraic coding theory and sequences; finite geometry and association schemes; additive combinatorics

### **Employment History**

- 2006–: Professor, Department of Mathematical Sciences, University of Delaware
- 2001–2006: Associate Professor, Department of Mathematical Sciences, University of Delaware
- 1997–2001: Assistant Professor, Department of Mathematical Sciences, University of Delaware
- 1995–1997: Harry Bateman Research Instructor, Department of Mathematics, California Institute of Technology

### **Education**

- Ph.D. in Mathematics, The Ohio State University, 1995.
- M.S. in Mathematics, Sichuan University, P. R. China, 1990.

### **Awards/Grants**

- 2011–2012: NSA Conference Grant (Co-PIs, Jeff Dinitz, Peter Dukes and Esther Lamken), \$15,997.
- 2010–2013: NSF Grant DMS 1001557 (together with REU supplement in 2011), \$180,371.
- 2010–2011: NSF China, No. A10928101, RMB 200,000 (\$30,000)
- 2010–2011: NSF Conference Grant DMS 0962694, \$24,118.
- 2009–2010: NSA Conference Grant (Co-PI, Felix Lazebnik), \$13,000.
- 2007–2010: NSF Grant DMS 0701049, \$137,415.

- 2004–2007: NSF Grant DMS 0400411, \$110,000.
- 2002–2004: NSA Young Investigator Grant, \$36,000.
- 2001–2004: NSF ITR Grant (Co-PI of D. Saunders and B. Caviness).
- 2000–2002: NSA Young Investigator Grant, \$36,000.
- 1998–2000: NSA Young Investigator Grant, \$26,000.
- 1997–1998: NSA Young Investigator Grant, \$13,999.
- 2000–2001: University of Delaware Research Foundation Grant, \$24,570.
- 1998–1999: University of Delaware Research Foundation Grant, \$20,747.
- 1999: Kirkman Medal, The Institute of Combinatorics and its Applications
- 1994: A selected speaker in AMS special session on “New Doctoral Work in Mathematics”, October, 1994, Stillwater, Oklahoma. Received a travel grant from NSF.

### Professional Service

- Editorial work
  - An Editor-in-Chief, *the Electronic Journal of Combinatorics* (2006-)
  - Editor Board, *Designs, Codes and Cryptography* (2007-)
  - Editor Board, *Journal of Combinatorial Designs* (2009-)
  - Editor Board, *Journal of Combinatorics and Number Theory* (2009-)
- Conference organizing
  - (with Jeff Dinitz, Peter Dukes and Esther Lamken) “WilsonFest: A conference in honor of Rick Wilson”, Caltech, Pasadena, March 25–29, 2012. This conference was funded by NSA and the Division of Physics, Mathematics and Astronomy of Caltech.
  - (with Hadi Kharaghani, Saieed Akbari, Richard Brualdi, Willem Haemers, Behruz Tayfeh-Rezaie) BIRS workshop “Linear Algebraic Techniques in Combinatorics/Graph Theory”, Banff International Research Station, Canada, Jan. 30–Feb. 4, 2011.
  - (with James A. Davis) Special session on Designs, Codes in AMS Fall Southeastern sectional meeting (#1065) at University of Richmond, November 2010.
  - (with Felix Lazebnik) Conference on Designs, Codes and Geometries at University of Delaware (Virdent Center, Lewes, Delaware) on the occasion of Gary Ebert’s retirement from University of Delaware, March 29–April 1, 2010. This conference was funded by NSF, NSA and the Department of Mathematical Sciences at University of Delaware
  - (with Chris Godsil and Peter Sin) BIRS workshop “Invariants of Incidence Matrices”, Banff International Research Station, Canada, March 29–April 3, 2009.

(with James A. Davis and Keith Mellinger) Special session on Designs, Codes and Geometries in AMS Eastern sectional meeting (#1005) at University of Delaware, April 2005.

- Reviewer of grant proposals for National Science Foundation (NSF), National Security Agency (NSA), National Science Foundation of Denmark.

### **Post-doctoral Fellows and Ph. D. Students**

- Tao Feng, Unidel Postdoc at University of Delaware (2009–2011)
- David B. Chandler, Ph.D. 2004. (First job: Postdoc at Academia Sinica, Taiwan.)
- Frank Fiedler, Ph. D. 2004. (First job: Postdoc at Simon Fraser University, Canada.)
- Zeying Wang, Ph. D. 2008. (First job: Postdoc at Ohio University.)
- Junhua Wu, Ph. D. 2008. (First job: Postdoc at Worcester Polytechnic Institute.)

### **Summer Undergraduate Students**

- Julia Cagney, Summer 2011
- Ray Garcia, Summer 2009
- Spencer Tofts, Summer 2007
- Todd Molnar, Summer 2005 and Summer 2006

### **Invited Conference Talks**

- 09/2012: Plenary speaker, “Combinatorics 2012”, Perugia, Italy.
- 06/2012: Invited speaker, “SETA 2012: SEquences and Their Applications”, University of Waterloo, Canada.
- 05/2012: Plenary speaker, “Rocky Mountain Discrete Math Days”, University of Wyoming.
- 11/2011: Plenary speaker, “Algebraic Combinatorics : in memory of Bob Liebler”, Fort Collins, Colorado State University.
- 06/2011: Invited talk in “Conference on Number Theory and Related Areas”, Hefei (University of Science and Technology) and Yellow Mountain, China.
- 05/2011: Forty-minute invited talk in the workshop “Coding, Cryptology and Combinatorial Designs”, jointly organized by the IMS of National University of Singapore and Nanyang Technological University, Singapore.

- 10/2010: One-hour invited talk in “Workshop on Combinatorial Designs”, Guangxi Normal University, Guilin, China
- 07/2010: One-hour invited talk in “The Carleton Finite Fields Workshop”, Carleton University, Canada
- 06/2010: One-hour invited talk in “The 12th National Algebra Conference”, Lanzhou, China
- 05/2010: Fifty-minute invited talk in “The Fourth Workshop on Finite Fields and Their Applications”, (BiCMR) Beijing International Center for Mathematical Research, Beijing, China
- 05/2009: One-hour invited talk in “2nd Canadian Discrete and Algorithmic Mathematics Conference”, CRM, Montreal, Quebec, Canada
- 05/2009: Fifty-minute invited talk in “IPM20-Combinatorics 2009”, Tehran, Iran
- 03/2009: One-hour invited talk in “Sixth Combinatorics Day at the University of Lethbridge”, University of Lethbridge, Lethbridge, Alberta, Canada
- 02/2009: The Wilson Endowment Seminar Series, Eastern Kentucky University
- 11/2008: One-hour invited talk in the BIRS workshop “Combinatorial Design Theory”, Banff International Research Station, Canada
- 08/2008: One-hour invited talk in “Geometric and Algebraic Combinatorics 4”, Oisterwijk, the Netherlands
- 07/2008: Invited half-hour talk in “The 3rd National Conference on Combinatorics and Graph Theory”, China East Normal University, Shanghai, China
- 05/2008: Invited talk in “Ottawa-Carleton Discrete Mathematics Days 2008”, Carleton University, Ottawa, Canada
- 02/2008: Invited talk in “Chat Yin Ho memorial conference on algebra and combinatorics”, University of Florida
- 12/2007: Forty five-minute invited talk in “the Fourth International Congress of Chinese Mathematicians”, Zhejiang University, Hangzhou, China
- 09/2007: Fifty-minute invited talk in “Conference on Group Representations and Combinatorics”, University of Florida
- 08/2007: Fifty-minute invited talk in “Rocky Mountain Discrete Mathematics Days 2007”, Colorado State University, CO
- 06/2007: Forty five-minute invited talk in “International workshop on coding and cryptography” Wuyi Mountain, Fujian, China

- 09/2006: One-hour invited talk, Finite Geometries (Second Irsee Conference), Kloster Irsee, Germany
- 07/2006: One-hour invited talk, International workshop on finite fields and their applications, Beijing, China
- 04/2006: Two one-hour talks, Design Theory, Graph Theory, and Computational Methods, School of Mathematics, IPM, Tehran, Iran
- 11/2003: One-hour invited talk in “The 17th Midwest conference on Combinatorics, Cryptography and Computing”, University of Nevada, Las Vegas, NV
- 05/2003: One-hour invited talk in “Conference on Coding Theory and Quantum Computing”, University of Virginia, VA
- 05/2003: Forty-minute invited talk in “Discrete Mathematics Day at WPI”, Worcester, MA
- 06/2002: One-hour invited talk in “Combinatorics 2002”, Maratea, Italy
- 05/2002: One-hour invited talk in the fourth Shanghai conference on combinatorics, Shanghai, China
- 03/2001: Half-hour invited talk in the minisymposium on additive number theory, Lisbon, Portugal,
- 05/2000: Forty-minute invited talk in Ohio State–Denison Conference (Dijen 65 conference)
- 08/1999: One-hour invited talk in the Fifth International Conference on Finite Fields and Applications, Augsburg, Germany
- 08/1998: Three-hour invited lectures in NATO advanced study institute, Badwindsheim, Germany
- 07/1998: One-hour invited talk in IMA workshop on “Codes and Cryptography”, University of Minnesota
- 05/1998: One-hour invited talk in Ohio State–Dennison Conference
- 03/1998: One-hour invited talk in Oberwolfach meeting “Designs and Codes”, Germany
- 01/1996: One-hour invited talk in Oberwolfach meeting “Kombinatorik” Germany
- 10/1994: One-hour invited talk in American Mathematical Society special session on “New Doctoral Work in Mathematics”, Stillwater, Oklahoma

### **Colloquia, Seminars and Some Conference Talks Since September 1997**

85. Talk on binary codes from conics in  $PG(2, q)$  given at Shanghai Jiaotong University, Dec. 2011.
84. Talk on Hadamard matrices given at Chongqing University, Dec. 2011.
83. Seminar talk at Shanghai Normal University, Apr. 2011.
82. Seminar talk at Nanjing University, Apr. 2011.
81. Seminar talk at Dalian University of Technology, Apr. 2011.
80. Seminar talk at Beijing Jiao Tong University, Mar. 2011.
79. PIMS University of Calgary Voyageur Colloquium, Calgary, Canada, Feb. 2011.
78. Joint combinatorics and algebra seminar at University of Florida, Gainesville, FL, Jan. 2011.
77. Colloquium talk at University of Florida, Gainesville, FL, Jan. 2011.
76. Seminar talk at Zhejiang University (ISEE Department), Hangzhou, China, Nov. 2010.
75. Seminar talk at Yunnan University, Kunming, Yunnan, China, Oct. 2010.
74. Seminar talk at Shanghai Normal University, Shanghai, China, Oct. 2010.
73. Seminar talk at Shanghai Jiao Tong University, Shanghai, China, Oct. 2010.
72. Talk given in “Symmetries of Graphs and Networks”, Rogla, Solvenia, Aug. 1–Aug. 6, 2010.
71. Invited talk in one-day conference at Shanghai Normal University, June, 2010.
70. Colloquium talk at Nanjing University of Aeronautics and Astronautics, June, 2010.
69. Seminar talk at Shanghai Normal University, Shanghai, China, June 2009.
68. Seminar talk at Academy of Mathematics and Systems Science, Chinese Academy of Science, Beijing, China, June 2009.
67. Seminar talk on  $p$ -ary bent functions at State Key Laboratory of Information Security, Graduate School of Chinese Academy of Sciences, Beijing, China, June 2009.
66. Colloquium talk at University of Regina, Regina, Canada, April 6, 2009
65. Invited twenty-minute talk in AMS special session on SAGE and Mathematical Research Using Open Source Software, Washington D.C., Jan. 8, 2009.
64. Seminar talk at Hubei University, July 2008.
63. Seminar talk at Nanjing University, July 2008.

62. Short course on finite geometry, given at Suzhou University, June 2008.
61. Seminar talk at Suzhou University, Dec. 2007.
60. Talk given in AMS sectional meeting, special session on coding theory, Chicago, Oct. 2007.
59. Five 3-hour lectures (for graduate students from several universities in China) at Zhejiang University, June 2007.
58. Seminar talk at Nanjing University, June, 2007.
57. Three seminar talks at Shanghai Jiaotong University, May-June, 2007.
56. Discrete seminar talk, University of South Florida, March 2007.
55. Algebra seminar talk, University of Florida, March 2007.
54. Combinatorics seminar talk, University of Florida, March 2007.
53. Seminar talk, School of Mathematical Sciences, Nanjing University of Aeronautics and Astronautics, July 2006.
52. Seminar talk, Department of Mathematics, Nanjing University, July 2006.
51. Talk given in “Combinatorics 2006”, Ischia, Italy, June 2006.
50. Seminar talk, Dipartimento di Matematica ‘Roberto Magari’, Universita degli Studi di Siena, Siena, Italy, June 2006.
49. Talk given in “Symposium in honor of Jack van Lint”, Koningshof, Veldhoven, the Netherlands, Oct. 2005.
48. Talk given in the number theory session of “XVI Coloquio Latinoamericano de lgebra”, Uruguay, Aug. 2005.
47. Seminar talk, Department of Mathematics, Shanghai Jiaotong University, June 2005.
46. Seminar talk, Department of Mathematics, Zhejiang University, June 2005.
45. Seminar talk, Department of Mathematics, Beijing Jiaotong University, June 2005.
44. Seminar talks, Department of Mathematics, Tsinghua University, Sept. 2003 and June, 2005.
43. Seminar talk, Department of Mathematics, Peking University, June, 2005.
42. Discrete Math Seminar, Department of Mathematical Sciences, Clemson University, Jan. 2005.

41. Seminar talk, Zhongshan University, Guangzhou, P. R. China, Aug. 1, 2004.
40. Talk given in “Incidence Geometry”, International Conference, La Roche, Belgium, May 23–29, 2004.
39. Mathematics Colloquium, Philips Research Laboratories, Eindhoven, The Netherlands, May, 2004.
38. Colloquium, Department of Mathematics, College of William and Mary, VA, Mar. 2004.
37. Number theory seminar, Department of Mathematics, University of California, Irvine, CA, Jan. 2004.
36. Combinatorics seminar (two talks), Department of Mathematics, Caltech, Pasadena, CA, Jan. 2004.
35. Algebraic combinatorics seminar, Department of Combinatorics and Optimization, University of Waterloo, Ontario, Canada, Dec. 2003.
34. Colloquium, Department of Mathematics, University of Florida, Gainesville, Florida, Nov. 2003.
33. Talk given in AMS special session on “Association Schemes: 1973–2003”, University of North Carolina, Chapel Hill, Oct. 2003.
32. Seminar talk, Department of Mathematics, Tsinghua University, Sept. 2003.
31. Seminar talk, Department of Mathematics, Peking University, Sept. 2003.
30. Seminar talk, Department of Mathematics, National University of Singapore, Aug. 2003.
29. Third Pythagorean conference (Geometry, Designs and Cryptology), Faliraki, Rhodes, Greece, June 1–7, 2003.
28. Combinatorics seminar, Ohio State University, April, 2003.
27. “Geometric and algebraic combinatorics II”, Aug. 11–16, 2002, Oisterwijk, The Netherlands.
26. Seminar talk, Philips Research Laboratories, Eindhoven, The Netherlands, Aug. 2002.
25. Combinatorics seminar, Peking University, May, 2002.
24. Colloquium, Institute of Mathematics, Academia Sinica, Taiwan, Jan. 2002.
23. Algebra Seminar, National University of Singapore, Jan. 2002.
22. Talk given in AMS Special Session on “Codes and Designs”, Ohio State University, Sept. 2001.

21. Workshop at RIMS, Kyoto University, Japan, August, 2001.
20. Combinatorics Seminar, Suzhou University, P. R. China, July, 2001.
19. Combinatorics Seminar, Ohio State University, Mar. 2001.
18. Colloquium, Wright State University, Mar. 2001.
17. Combinatorics Seminar, University of Pennsylvania, Dec. 2000.
16. MSRI workshop on “Emerging Applications of Combinatorial Designs”, Nov. 2000.
15. Number Theory Seminar, CUNY graduate center, Sept. 2000.
14. Fourth Isle of Thorns Finite Geometry Conference, University of Sussex, July 2000.
13. Seminar, University of Magdeburg, Germany, July, 2000.
12. Colloquium, Wesleyan University, March, 2000.
11. Colloquium, University of Virginia, February, 2000.
10. Department of Mathematics Seminar, National University of Singapore, Singapore, January, 2000.
9. “Geometric and Algebraic Combinatorics, J. J. Seidel 80”, August, 1999, Oisterwijk, The Netherlands.
8. Combinatorics Seminar, Ohio State University, May, 1999.
7. Seaway Number Theory Conference, Penn State, April, 1999.
6. Talk given in AMS special session on “Groups and geometries”, University of Florida, March 1999.
5. Colloquium, University of Richmond, February 1999.
4. Algebraic Combinatorics Seminar, Colorado State University, December 1998.
3. Discrete Mathematics Seminar, Clemson University, November 1998.
2. Combinatorics Seminar, Ohio State University, May 1998.
1. Number Theory Seminar, University of California, San Diego, March, 1998.

## **Publications**

- Papers accepted or submitted for publication

74. Cyclotomy, Gauss sums, difference sets and strongly regular Cayley graphs, submitted.

- 73. (with Tao Feng, Koji Momihara) Constructions of strongly regular Cayley graphs and skew Hadamard difference sets from cyclotomic classes, submitted.
- 72. (with David B. Chandler and Junhua Wu) Power sums over subspaces of finite fields, to appear in *Finite Fields and Their Applications*.
- 71. (with Tao Feng, Bin Wen, and Jianxin Yin) Partial difference sets from  $p$ -ary weakly regular bent functions and quadratic forms, to appear in the conference proceedings in honor of Professor Keqin Feng.

- Papers published

- 70. (with Gennian Ge and Tao Yuan) Constructions of strongly regular Cayley graphs using index 4 Gauss sums, to appear in *J. Alg. Combin.*, DOI: 10.1007/s10801-012-0368-y.
- 69. (with Tao Feng, Fan Wu) Pseudocyclic and non-amorphic fusion schemes of the cyclotomic association schemes, to appear in *Des. Codes and Cryptogr.*, DOI 10.1007/s10623-011-9595-9.
- 68. (with Tao Feng) Strongly regular graphs from union of cyclotomic classes, to appear in *J. Combin. Theory (B)*, <http://dx.doi.org/10.1016/j.jctb.2011.10.006>.
- 67. (with Tao Feng) Cyclotomic constructions of skew Hadamard difference sets, *J. Combin. Theory (A)* **119** (2012), 245–256.
- 66. (with Tao Feng and Zhi-Wei Sun) Exterior algebras and two conjectures on finite abelian groups, *Israel J. Math.* **182** (2011), 425–437.
- 65. (with Peter Sin and Junhua Wu) Dimensions of some binary codes arising from a conic in  $PG(2, q)$ , *J. Combin. Theory (A)* **118** (2011), 853–878.
- 64. (with Jiyou Li and David B. Chandler) Permutation polynomials of degree 6 or 7 over finite fields of characteristic 2, *Finite Fields Appl.* **16** (2010), 406–419.
- 63. (with W. Haemers) Strongly regular graphs with parameters  $(4m^4, 2m^4 + m^2, m^4 + m^2, m^4 + m^2)$  exist for all  $m > 1$ , *Europ. J. Combin.*, **31** (2010), 1553–1559.
- 62. (with David B. Chandler and Peter Sin) Incidence modules for symplectic spaces in characteristic two, *J. Algebra*, **323** (2010), 3157–3181.
- 61. (with Cunsheng Ding, Jin Yuan, and Pingzhi Yuan) Explicit classes of permutation polynomials of  $F_{3^m}$ . *Sci. China Ser. A* **52** (2009), 639–647.
- 60. (with T. Hellesest, H. D. L. Hollmann, A. Kholosha, Z. Wang) Proofs of two conjectures on ternary weakly regular bent functions, *IEEE Trans. Inform. Theory*, **55** (2009), 5272–5283.
- 59. (with Ka Hin Leung) On the dimensions of the binary codes of a class of unitals, *Discrete Math.* **309** (2009), 570–575.
- 58. (with Tao Feng) Semi-regular relative difference sets with large forbidden subgroups, *J. Combin. Theory (A)* **115** (2008), 1456–1473.

57. (with Xiwang Cao and Henk D. L. Hollmann) New Kloosterman sum identities and equalities over finite fields, *Finite Fields Appl.* **14** (2008), 823–833.
56. Modular ranks of some geometric incidence matrices, Proceedings of the 4th International Congress of Chinese Mathematicians (ICCM 2007), Vol. I, 348–358.
55. (with David B. Chandler and Peter Sin) The permutation action of finite symplectic groups of odd characteristic on their standard modules, *J. Algebra* **318** (2007), 871–892.
54. (with Guobiao Weng, Weisheng Qiu, Zeying Wang) Pseudo-Paley graphs and skew Hadamard difference sets from presemifields, *Designs, Codes and Cryptography* **44** (2007), 49–62.
53. (with Cunsheng Ding and Zeying Wang) Skew Hadamard difference sets from the Ree-Tits slice symplectic spreads in  $\text{PG}(3, 3^{2h+1})$ , *J. Combin. Theory, Ser. A*, **114** (2007), 867–887.
52. (with James A. Davis) Amorphic association schemes with negative Latin square type graphs, *Finite Fields Appl.* **12** (2006), 595–612.
51. (with Henk D. L. Hollmann) Association schemes from the action of  $\text{PGL}(2, q)$  fixing a nonsingular conic in  $\text{PG}(2, q)$ , *J. Algebraic Combin.* **24** (2006), 157–193.
50. (with Peter Sin) On the dimensions of certain LDPC codes based on  $q$ -regular bipartite graphs, *IEEE Trans. Inform. Theory* **52** (2006), 3735–3737.
49. (with Henk D. L. Hollmann) Pseudocyclic association schemes arising from the actions of  $\text{PGL}(2, 2^m)$  and  $\text{PFL}(2, 2^m)$ , *J. Combin. Theory (A)* **113** (2006), 1008–1018.
48. (with D. B. Chandler and Peter Sin) The invariant factors of the incidence matrices of points and subspaces in  $\text{PG}(n, q)$  and  $\text{AG}(n, q)$ , *Trans. Amer. Math. Soc.* **358** (2006), 4935–4957.
47. (with Mikhail Muzychuk) Symmetric Bush-type Hadamard matrices of order  $4m^4$  exist for all odd  $m$ , *Proceedings of the AMS* **134** (2006), 2197–2204.
46. Recent results on  $p$ -ranks and Smith normal forms of some  $2 - (v, k, \lambda)$  designs, *Contemporary Mathematics* **381**, 2005, *the proceedings of a conference on coding theory and quantum computing held at University of Virginia, May 2003*, 53–67.
45. Recent progress in algebraic design theory, *Finite Fields Appl.* (Ten Year Anniversary Edition) **11** (2005), 622–653.
44. (with Henk D. L. Hollmann) A class of permutation polynomials of  $F_{2^m}$  related to Dickson polynomials, *Finite Fields Appl.* **11** (2005), 111–122.
43. (with F. Fiedler and K. H. Leung) On Mathon’s construction of maximal arcs in Desarguesian planes. II, *J. Combin. Theory (A)* **108** (2004), 99–122.
42. (with J. A. Davis) Negative Latin square type partial difference sets in nonelementary abelian 2-groups, *Journal of London Math. Soc.* **70** (2004), 125–141.

41. (with Henk D. L. Hollmann) Kloosterman sum identities over  $F_{2^m}$ , *Disc. Math.* **279** (2004), 277–286.
40. (with F. Fiedler and K. H. Leung) On Mathon’s construction of maximal arcs in Desarguesian planes, *Advances in Geometry*, special issue dedicated to Adriano Barlotti, (2003), S119–S139.
39. (with D. B. Chandler) Cyclic relative difference sets and their  $p$ -ranks, *Designs, Codes and Cryptography* **30** (2003), 325–343.
38. Association schemes from ovoids in  $PG(3, q)$ , *J. Geometry* **76** (2003), 294–301.
37. (with D. B. Chandler) The invariant factors of some cyclic difference sets, *J. Combin. Theory (A)* **101** (2003), 131–146.
36. (with Xiang-dong Hou, Ka Hin Leung) A generalization of an addition theorem of Kneser, *J. Number Theory* **97** (2002), 1–9.
35. (with K. T. Arasu, H. D. L. Hollmann, K. Player) On the  $p$ -ranks of GMW difference sets, in “Codes and Designs” (editors K. T. Arasu, Á. Seress), Proceedings of a conference honoring Professor Dijen Ray-Chaudhuri on the occasion of his 65th birthday, Walter de Gruyter 2002, 9–35.
34. (with G. L. Ebert, S. Egner, H. D. L. Hollmann) Proof of a conjecture of Van Dam and De Caen on a four-class association scheme, *European J. Combin.* **23** (2002), 201–206.
33. (with G. L. Ebert, S. Egner, H. D. L. Hollmann) On a four-class association scheme, *J. Combin. Theory (A)* **96** (2001), 180–191.
32. (with R. D. Baker, G. L. Ebert, Ka Hin Leung) A trace conjecture and flag-transitive planes, *J. Combin. Theory (A)* **95** (2001), 158–168.
31. (with Henk D. L. Hollmann) A proof of Welch and Niho conjectures on cross-correlations of binary  $m$ -sequences, *Finite Fields and Their Applications* **7** (2001), 253–286.
30. (with Henk D. L. Hollmann) On binary cyclic codes with few weights, in “Finite Fields and Applications” (editors D. Jungnickel and H. Niederreiter), proceedings of Fq5, Springer 2001, 251–275.
29. (with Henk D. L. Hollmann) Maximal Arcs in projective three-spaces and double-error-correcting cyclic codes, *J. Combin. Theory (A)* **93** (2001), 168–172.
28. (with Xiang-dong Hou, Ka Hin Leung) New partial difference sets in  $Z_{p^2}^t$  and a related problem about Galois rings, *Finite Fields and Their Applications* **7** (2001), 165–188. Special issue for Professor Chao Ko’s 90th birthday.
27. (with J. A. Davis) A family of partial difference sets with Denniston parameters in nonelementary abelian 2-groups, *European J. Combin.* **8** (2000), 981–988.
26. (with J. A. Davis) Constructions of low rank relative difference sets in 2-groups using Galois rings, *Finite Fields Appl.* **6** (2000), 130–145.

25. Recent results on difference sets with classical parameters, in the Proceedings of NATO Advanced Study Institute *Difference Sets, Sequences, and Their Correlation Properties*, Badwindsheim, Germany, A. Pott et. al (eds.), 1999, 419–437.
24. Maximally nonlinear functions and bent functions, *Des., Codes and Cryptography* **17** (1999), 211–218.
23. (with Ron Evans, Henk D. L. Hollmann and Christian Krattenthaler) Gauss sums, Jacobi sums and  $p$ -ranks of cyclic difference sets, *J. Combin. Theory (A)* **87** (1999), 74–119.
22. (with A. E. Brouwer, R. M. Wilson) Cyclotomy and strongly regular graphs, *J. Alg. Combin.* **10** (1999), 25–28.
21. (with K. Feng, P. J. -S. Shiue) On aperiodic and periodic complementary binary sequences, *IEEE Trans. Inform. Theory* **45** (1999), no. 1, 296–303.
20. On balanced binary sequences with two-level autocorrelation functions, *IEEE Trans. Inform. Theory* **44** (1998), no. 7, 3153–3156.
19. On reversible abelian Hadamard difference sets, *J. Statist. Plann. Inference* **73** (1998), 409–416.
18. Difference families from lines and half lines, *Europ. J. Combin.* **19** (1998), 395–400.
17. (with D. K. Ray–Chaudhuri) New necessary conditions for abelian Hadamard difference sets, *J. Statist. Plann. Inference* **62** (1997), 69–79.
16. (with T. Norwood) On GMW designs and a conjecture of Assmus and Key, *J. Combin. Theory (A)* **78** (1997), 162–168.
15. (with R. M. Wilson) Constructions of Hadamard difference sets, *J. Combin. Theory (A)* **77** (1997), 148–160.
14. (with Y. Q. Chen, D. K. Ray–Chaudhuri) Constructions of partial difference sets and relative difference sets using Galois rings II, *J. Combin. Theory (A)* **76** (1996), 179–196.
13. (with D. K. Ray–Chaudhuri) Constructions of partial difference sets and relative difference sets using Galois rings, *Des., Codes and Cryptography* **8** (1996), 215–227.
12. Note on Paley type partial difference sets, *Groups, difference sets, and the Monster (Columbus, OH, 1993)*, 239–244, Ohio State Univ. Math. Res. Inst. Publ., 4, de Gruyter, Berlin, 1996.
11. (with Y. Q. Chen) On Xia’s construction of Hadamard difference sets, *Finite Fields Appl.* **2** (1996), no. 1, 87–95.
10. Reversible  $(m, n, k, \lambda_1, \lambda_2)$ -abelian divisible difference sets with  $k - \lambda_1$  nonsquare, *Discrete Math.* **142** (1995), no. 1–3, 193–201.
9. (with Maohua Le) A result on Ma’s conjecture, *J. Combin. Theory (A)* **73** (1996), no. 1, 181–184.

8. A note on  $(m, 2, m - 1, (m - 2)/2)$  relative difference sets, *Ars Combin.* **41** (1995), 199–202.
7. Some results on multipliers and numerical multiplier groups of abelian difference sets, *Graphs and Combinatorics* **10** (1994), no.3, 293–304.
6. (with K. T. Arasu) Multiplier theorems, *J. Combin. Des.* **3** (1995), no. 4, 257–268.
5. (with Y. Q. Chen) On the size of the multiplier groups of cyclic difference sets, *J. Combin. Theory (A)* **69** (1995), no 1, 168–169.
4. (with Y. Q. Chen and S. K. Sehgal) An exponent bound on abelian skew Hadamard difference sets, *Des., Codes and Cryptography* **4** (1994), 313–317 .
3. Some results on  $-1$  multiplier of difference lists, *Combinatorics '90*, 559–566, Annals of Discrete Mathematics **52**, North–Holland, Amsterdam, 1992.
2. (with K. T. Arasu) On the existence of periodic complementary binary sequences, *Des., Codes and Cryptography* **2** (1992), 257–262.
1. (with W. Wei and S. Gao) Extraneous multipliers of abelian difference sets, *Combinatorial Designs and Applications*, Lecture Notes in Pure and Appl. Math., Dekker, New York, **126** (1990), 165–173.

### Courses Taught at University of Delaware

- M210, Discrete Mathematics I, Fall 97, Winter 97, Fall 98, Fall 00, Fall 01, Fall 02, Spring 07, Spring 08, Fall 08, Spring 09 and Spring 10.
- M230, Finite Mathematics, Spring 99.
- M245, Introduction to Proofs, Fall 07, Spring 09.
- M315, Discrete Mathematics II, Fall 97, Spring 99, Fall 99, Spring 06.
- M349, Linear Algebra, Spring 03, Spring 05, Spring 06, and Fall 09.
- M389, Introduction to Graph Theory, Spring 01, Spring 02.
- M451, Abstract Algebra (undergraduate), Fall 02, Fall 04.
- M549, Coding Theory and Cryptography, Fall 04, Fall 06.
- M650, Abstract Algebra (graduate), Spring 03.
- M688, Combinatorics and Graph Theory I, Spring 98, Fall 01, Spring 05, Spring 07, Spring 08.
- M689, Combinatorics and Graph Theory II, Spring 01, Fall 07.
- M826, Topics in Number Theory, Spring 00 and Spring 10.
- M826, Topics in Algebraic Coding Theory, Spring 02.

- M845, Group Theory with Applications, Fall 99, Fall 09.
- M888, Topics in Finite Fields and Character Sums, Fall 98.