

CURRICULUM VITAE

Sung Yell Song, Associate Professor

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1 Education and Professional Experience

1.1 Education

Ph.D. 1987 in Mathematics. Ohio State University, Columbus, Ohio
M.S. 1983 in Mathematics. Ohio State University, Columbus, Ohio
M.Ed. 1980 in Mathematics Education. Seoul National University, Korea
B.S. 1974 in Mathematics Education. Seoul National University, Korea

1.2 Experience

08/1994 - Present Associate Professor at Iowa State University
06/2000 - 08/2001 Visiting Professor at POSTECH, Korea
08/1988 - 07/1994 Assistant Professor at Iowa State University
07/1987 - 07/1988 Lecturer at the Ohio State University
07/1981 - 06/1987 Graduate Teaching Associate at the Ohio State University
08/1974 - 08/1977 Instructor at Korean Naval Academy

1.3 Awards

The 2005 Vinograde Award for Excellence in Teaching and Advising of Graduate Students in Mathematics, presented by Mathematics Graduate Student Council

1.4 Editorship

Editor-in-Chief of Journal of Applied Mathematics and Computing (2007 –)

1.5 Professional affiliations and societies

- Information Assurance Center at Iowa State University (2004 –)
- The Combinatorial & Computational Mathematics Center, POSTECH, Korea (1999 – 2008)
- American Mathematical Society (1983 –)
- Mathematical Association of America (2002 –)
- International Linear Algebra Society (1999 –)
- Korean-American Scientists and Engineers Association (KSEA) (1988 –)

1.6 Current fields of interests

Combinatorics and Algebraic Combinatorics, in particular, association schemes and their related topics, including, distance-regular graphs, classical groups and geometries, permutation groups, algebraic codes, combinatorial designs, sampling plans, and cryptography.

2 Research Activities

2.1 Publications

Refereed journal articles

1. (with G. Bhattacharyya and R. Tanaka) Terwilliger algebras of wreath products of one-class association schemes *Journal of Algebraic Combinatorics* (DOI:10.1007/s10801-009-0196-x).
2. (with G. Bhattacharyya, J. Hegeman, J. Kim, J. Langford) Some Existence and Construction Results of Polygonal Designs, *European Journal of Combinatorics* **29** (2008), 1396–1407.
3. (with E. Bannai, H. Yamada) Character Table of the Permutation Group $G_2(q)$ on the Hyperplanes in the Corresponding Orthogonal Geometry, *Journal of Applied Mathematics and Computing*, **26**, No.1-2 (2008), 125-131.
4. (with S. Bang) On Generalized Semidirect Product of Association Schemes, *Discrete Mathematics* **303** (2005), 5-16. [MR 2006f:05188]
5. (with S. Bang and M. Hirasaka) Semidirect Products of Association Schemes, *Journal of Algebraic Combinatorics* **22** No.1 (2005), 23-38. [MR 2006f:05189]
6. Fusion Relations in Products of Association Schemes, *Graphs and Combinatorics*, **18** (2002) 3, 655-665. [MR 2003i:05140]
7. (with A. Bailer, K. See, J. Stufken) Relative Efficiencies of Sampling Plans for Selecting a Small Number of Units from a Rectangular Region. *Journal of Statistical Computation and Simulation* **66** No.4 (2000), 273 - 294. [MR1803578]
8. (with K. Driessel, K. See, and J. Stufken) Polygonal Designs: Some Existence and Non-existence Results, *Journal of Statistical Planning and Inference*, **77** (1999) 155-166. [MR 2000a:62187]
9. (with K. See) Association Schemes of Small Order, *Journal of Statistical Planning and Inference* **73** (1998), 225-271. [MR 99m:05172]
10. (with K. See and J. Stufken) On a Class of Partially Balanced Incomplete Block Designs with Applications in Survey Sampling, *Communications in Statistics, Theory and Methods* **1**(1997), 1-13. [MR 98f:62021]
11. Commutative Association Schemes Whose Symmetrizations Have Two Classes, *Journal of Algebraic Combinatorics* **5** (1996), 47-55. [MR 96k:05213; Zbl.Math. 843.05103]
12. Class 3 Association Schemes Whose Symmetrizations have Two Classes, *Journal of Combinatorial Theory A* **70** (1995), No. 1, 1-29. [MR 96b:05176; Zbl.Math. 842.05099]

13. (with E. Bannai) Character Tables of Fission Schemes and Fusion Schemes, *Europ. J. Combinatorics* **14** (1993), 385-396. [MR 94f:05149; Zbl.Math. 794.05131]
14. (with E. Bannai, Shen Hao, and H. Wei) Character Tables of the Association Schemes Coming from Finite Unitary and Symplectic Groups, *Journal of Algebra*, **144** (1991), 189-213. [MR 92m:05204; Zbl.Math. 824.20009]
15. (with E. Bannai and W. M. Kwok) Ennola Type Dualities in the Character Tables of Some Association Schemes, *Memoirs of the Faculty of Science, Kyushu University Ser. A*, Vol. 44, No. 2 (1990), 129-143. [MR 92d:05180; Zbl.Math. 808.20011]
16. (with E. Bannai and Shen Hao) Character Tables of the Association Schemes of Finite Orthogonal Groups Acting on the Nonisotropic Points, *Journal of Combinatorial Theory, A* (2) **54** (1990), 164-200. [MR 91k:20047; Zbl.Math. 762.20005]
17. (with E. Bannai & N. Kawanaka) Character Table of Hecke Algebra $\mathcal{H}(GL_{2n}(F_q), Sp_{2n}(F_q))$, *Journal of Algebra*, (2) **129** (1990), 320-366. [MR 91d:20052; Zbl.Math. 761.20013]
18. (with E. Bannai) The Character Table of the Commutative Association Scheme Coming from the Action of $GL(n, q)$ on Non-incident Point-Hyperplane Pairs, *Hokkaido Mathematical Journal* **19** (1990), 417-429. [MR 92a:05132; Zbl.Math. 762.20003]
19. (with K. W. Johnson and J.D.H. Smith) Characters of Finite Quasigroups VI: Critical Examples and Doubletons, *Europ. J. Combinatorics*, **11** (1990), 267-275. [MR 91f:20079; Zbl.Math. 704.20056]
20. (with E. Bannai) On the Character Table of the Association Scheme $Sp(4, q)/Sz(q)$, *Graphs and Combinatorics*, **5** (1989), 291-293. [Zbl.Math. 762.20002]
21. (with E. Bannai) The Character Tables of Paige's Simple Moufang Loops and Their Relationship to the Character Tables of $PSL(2, q)$, *Proceedings London Mathematical Society* (3) **58** (1989), 209-236. [MR 90b:20057; Zbl.Math. 682.20050]
22. Products of Distance Regular Graphs, *Utilitas Mathematica* **29**, (1986) 173-175. [MR 87g:05209; Zbl.Math. 576.05040]

Book entries

23. (with L. Jorgensen, G. Jones, and M. Klin) Normally regular digraphs, association schemes, and related combinatorial structures, in: Misha Klin and Andrew Woldar (Eds.), *Combinatorial Structures*, (submitted)
24. (with C. Godsil) Association Schemes, in: C. Colbourn and J. Dinitz (Eds.), *The CRC Handbook of COMBINATORIAL DESIGNS* (2nd Ed.), CRC Press Inc., Boca Raton, 2007, pp 325-330.
25. (with S. Bang) Characterization of Maximal Rational Circulant Association Schemes, in: K. Arasu and A. Seress (Eds.), *Codes and Designs*, Ohio State Univ. Math. Res. Inst. Publ. 10 (2002), Walter de Gruyter, Berlin, pp. 37 - 48. [MR 2003m:05215]
26. (with K. See) Spatially Constrained Sampling, in: A. H. El Shaarawi and W. W. Piegorsch (Eds.), *Encyclopedia of Environmetrics*, J. Wiley, New York, 2002, V.4: pp. 2080-2083.

27. Commutative Association Schemes and Their Fusion and Fission, in: I. Jeong (Ed.), *Collected Papers Dedicated to Professor Yeonsik Kim on the Occasion of His 60th Birthday*, University Press, Korea, 1992, pp. 113-130.
28. Commutative Association Schemes and Related Algebra, *Proceedings of the Fifth KIT Mathematics Workshop*, Korea Institute of Technology, Korea, August, 1990, 5, 143-173. [MR 92d:05184]
29. The Character Tables of Certain Association Schemes, Ph. D. dissertation (Advisor: Dr. Eiichi Bannai), The Ohio State University, Columbus, Ohio, 1987.

Conference or workshop proceedings

30. (with H. Tanaka) Group-Case Commutative Association Schemes and Their Character Tables, in: *Proceedings of Algebraic Combinatorics* (Ed. A. Munemasa): An International Conference in Honor of Eiichi Bannai, held in Sendai, Japan in June 26–30, 2006. pp. 204 – 213. (arXiv:0809.0748v1)
31. (with D. H. Choi) Calculation of the Spanning Time for Abstract Biological Codes, *Proceedings of Hungarian Korean Mathematics Conference*, held in June, 2001, Hungarian Academy of Science.
32. (with S. Bang & M. Hirasaka) Semidirect Product of Association Schemes, in: S-G. Lee & M. Y. Sohn (Eds.), *Proceedings of Com²MaC Symposium on Combinatorics, Graph Theory, Algorithms and Matrix Theory*, 2001, pp. 55-70.
33. (with K. See) Certain Combinatorial Block Designs and Spatially Constrained Sampling, in: S. G. Lee & M. Y. Sohn (Eds.), *Proceedings of Com²MaC Symposium on Combinatorics, Graph Theory, Algorithms and Matrix Theory*, 2001, pp. 127-140.
34. Delsarte's Theory on Codes, in: Hyun Kwang Kim(Ed.) *Proceedings of Com²MaC Workshop on Codes, Designs and Cryptography*, January, 1999, 149-227.
35. Designs, Graphs, and Association Schemes: Existence of Certain Partially Balanced Incomplete Block Designs, In: *Proceedings of 1996 Federation of Korean Scientists and Engineers Conference* held in June 1996. Basic Science Group, (Math & Stat). 149-157.
36. Posets Related to Some Association Schemes, (Dedicated to Professor Han Shick Park on his 60th birthday), *Journal of the Korea Society of Mathematical Education* **25**, (1987), 57-69.

Other publications

1. What is happening in Mathematics, Report on Science and Technology Research Trends, Korean-American Scientists and Engineers Association, January 2009, 57 – 60.
2. Reflections on Applied and Pure Math Symposium at US-Korea Conference held in San Diego, CA, in August 17 – 19, 2008, KSEA Letters, **37** (2008) No.1, 12.
3. (with Sang-Gu Lee and Jihwa Noh) Educational policy and curriculum of Korean school mathematics in the late 19th and early 20th century *J. Korea Soc. Math. Ed.* (Ser. E) *Communications of Mathematical Education*, Vol. **23**, No 4, (2009), 1093 – 1130.
4. (with Sejeong Bang, Mitsugu Hirasaka, Hyun K. Kim, and Jack H. Koolen) Preface for the special issue of Discrete Mathematics covering the 2004 Com²MaC Conference on Association Schemes, Codes and Designs. *Discrete Math.* 308 (2008), no. 14. p. 1.

- (with Eiichi Bannai, Akihiro Munemasa, and Paul Terwilliger) Preface for the special issue of Discrete Mathematics covering the 2000 Com²MaC Conference on Association Schemes, Codes and Designs. *Discrete Math.* 264 (2003), no. 1-3. p. 1.

Works submitted or in progress

- (with Jianmin Ma) Four-class commutative association schemes whose symmetrization have two classes.
- (with D. Eisenstat, J. Kim, D. Watson) Strongly regular graphs with parameters (64, 28, 12, 12) (in revision).
- (with M. Maxwell) Characterization of distance-regular graphs obtained from almost perfect nonlinear functions defined on $\text{GF}(2^n)$ (in preparation).
- (with J. Kim) Classification of small class association schemes of order 64 (in preparation).
- (with P.-H. Zieschang) Products and decompositions of commutative association schemes (in preparation).
- (with S. Bang and M. Klin) S-Rings and class 3 association schemes whose symmetrizations are complete multipartite graphs (in preparation).
- (with S. Bang) Representations of products and compositions of association schemes (in preparation).
- The Terwilliger Algebras of wreath product association schemes (in preparation).
- (with M. Maxwell) Almost perfect nonlinear functions and almost bent functions over $\text{GF}(q)^n$ (in preparation).
- Arithmetic in the Jacobian of a hyperelliptic curve (in preparation).
- (with K. See) An approximation with multilinear models for three-way arrays. (Preprint)

2.2 Talks presented

* Supported in part by non-ISU funding.

Meeting or conference talks

- April, 2009, Special Session on Algebraic Graphs and Association Schemes at the 1050th AMS Eastern Section Meeting, Worcester, MA. *The T-Algebra of the Wreath Product of Association Schemes.*
- * August, 2008, Applied and Pure Mathematics Symposium at US-Korea Conference, held in San Diego, California, Aug. 14 - 16, 2008. *Subconstituent algebras of association schemes.*
- October, 2007, Special Session on Association Schemes and Related Topics at the 1030th AMS Central Sectional Meeting, Chicago, Illinois. *Symmetrizable association schemes and related combinatorial structures.*

4. * August 2007, 2007 US - Korea Scientists and Engineers Conference held in Washington, D.C., in August 9 - 11, 2007. *Wreath product of commutative association schemes.*
5. June 2007, The 6th Slovenian International Conference on Graph Theory, in Bled, Slovenia, in June 24 - 30, 2007. *Terwilliger algebras of wreath product association schemes.*
6. * June, 2007, The 1st Korea-Slovenia International Conference on Combinatorial and Computational mathematics, Koper, Slovenia, June 21 - 23, 2007. *Wreath product of certain association schemes and their subconstituent algebras* (plenary talk).
7. * December 2006, 2006 Korean Computer Scientists and Engineers Association Symposium held in Tempe, Arizona, in December 15-16. *Cryptographically secure identification schemes.*
8. * August 2006, 2006 US - Korea Scientists and Engineers Conference held in Teaneck, New Jersey, in August 10 - 12, 2006. *A Study of Subconstituent Algebras of Symmetric Association Schemes.*
9. * June, 2006, Algebraic Combinatorics Conference in Honor of Eiichi Bannai's 60th Birthday, Sendai, Japan, in June 26 - 30, 2006. *Group-Case Commutative Association Schemes and Their Character Tables.*
10. October, 2005, Special Session on Association Schemes and Related Topics at the 1011st AMS Central Section Meeting, Lincoln, Nebraska. *The \mathcal{T} -Algebra of the Wreath Product of Association Schemes.*
11. August, 2005, Geometric & Algebraic Combinatorics, Netherlands, in August 14 - 19, 2005. *Classification of Small-Class Association Schemes Obtained from Some Nonlinear Functions: On Strongly Regular Graphs with Parameters (64, 28, 12, 12).*
12. * July, 2004, 2004 Com²MaC Conference on Association Schemes, Codes and Designs, held in Busan, Korea, in July 19 - 23, 2004. *Polygonal Designs: Some existence and non-existence results.*
13. October, 2003, Special Session on Association Schemes; 1973-2003 at the 991st AMS Southeastern Section Meeting, Chapel Hill, North Carolina. *Generalized Semidirect Products of Association Schemes.*
14. October, 2003, Special Session on Character Theory of Finite Groups and Algebraic Combinatorics at the 990th AMS Eastern Section Meeting, Binghamton, New York. *Character Tables of Certain Association Schemes.*
15. May, 2003, The Graph Theory of Brian Alspach, in honor of Brian's 65th Birthday, Simon Fraser University, Burnaby, B.C. Canada, in May 25-29, *Semidirect Product of Association Schemes.*
16. * July, 2002, International Conference on Graphs and Combinatorics held at POSTECH, Korea in July 8 - 10. *Products in Graphs and Association Schemes.*
17. June, 2002, Special Session on Association Schemes and Distance-Regular Graphs at the 978th AMS Western Section Meeting, Portland, Oregon. *Semidirect Product Association Schemes and Their Representations* (by abstract).
18. Sept. 2001, Special Session on Coding Theory and Designs at the 969th AMS Central Section Meeting, Columbus, Ohio. *Products of Association Schemes.*

19. * June, 2001, Hungarian-Korean Mathematics Conference, Renyi Institute of Hungarian Academy of Science, Budapest, Hungary, *Spanning Time for Abstract Biological Codes*.
20. * March, 2001, Symposium on Algebraic Combinatorics, Operator Algebra and Spin Models, Kyushu University, Japan, *Classification and Characterization of Association Schemes*.
21. * October 2000, Korean Math Society Meeting on Mathematics in the New Millennium, Seoul, Korea, *Association Schemes and Codes*.
22. * October 2000, International Workshop on Combinatorics - 12th Franco-Japanese Conference, Yamagata, Japan. *Commutative Association Schemes Whose Symmetrizations Have Two Classes*.
23. * September 2000, Korean Applied and Computational Mathematics Society Annual Meeting, Sunmoon Univ., Korea, *Graphs, Codes and Designs*.
24. * July 2000, Conference on Algebraic Combinatorics, Monster and Vertex Operator Algebras, Santa Cruz, California, *Characterization of a class of association schemes coming from free abelian groups*.
25. * July 2000, Combinatorial and Computational Mathematics Conference on Association Schemes, Codes and Designs, POSTECH, Korea. *Calculation of the Spanning Time for Abstract Biological Codes*.
26. * June 2000, Korean Math Society Honam Regional Conference, Jeonbug National Univ., Korea, *Algebras and Codes*.
27. * May 2000, The 25th Ohio State - Denison Math Conference in Combinatorics, Group Theory, and Ring Theory, Columbus, Ohio. *Wreath Product Association Schemes and Their Realization*.
28. March 1999, Special Session on Combinatorial Designs at the 941st AMS Central Section Meeting, Urbana, Illinois. *On Algebraic Designs in Association Schemes*.
29. * January 1999 (three 75-minute lectures) At the Workshop on Codes, Cryptography, and Computing held at the Center for Combinatorics and Computational Mathematics, Pohang Institute of Science and Technology, Korea. *Delsarte's Theory on Codes*.
30. September 1998, Special Session on Algebraic Combinatorics at the 935th AMS Central Section Meeting, Chicago, Illinois. *The Terwilliger Algebra for the Wreath Product of Association Schemes*.
31. August 1998, The Workshop on Coding Theory, Cryptography and Computer Security, Lethbridge, Canada. *Designs and Codes in Association Schemes*.
32. * May 1998, The 24th Ohio State-Denison Math Conference, Granville, Ohio. *Association Schemes Coming from the Actions of Classical Groups Acting on Finite Geometries*.
33. November 1996, The 11th Midwestern Conference on Combinatorics, Cryptography and Computing, Las Vegas, Nevada, *Classification of Association Schemes of Small Order*.
34. * July 1996, The 13th Algebraic Combinatorics Symposium, Hokkaido, Japan, *The Subconstituent Algebra for the Wreath Product of Association Schemes*.
35. * June 1996, 1996 Korean Scientists and Engineers Conference, Seoul, Korea, *Designs, Graphs and Association Schemes*.

36. * June 1996, The 3rd Combinatorics and Theoretical Computer Science Conference, POSTECH, Pohang, Korea, *An Algebraic Method in Graph Theory*.
37. May 1996, International Conference on Modern Algebra and Its Applications, Nashville, Tennessee, *The Terwilliger Algebra of a Group Case Association Scheme*.
38. * May 1996, The 23rd Ohio State-Denison Math Conference, Granville, Ohio, *The Subconstituent Algebra of a Distance-Regular Graph*.
39. February 1996, Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Baton Rouge, Louisiana, *On The Existence of Partially Balanced Incomplete Block Designs*.
40. October 1995, The 10th Midwestern Conference on Combinatorics and Computing, Carbondale, Illinois, *New Association Schemes from Old*.
41. June 1995, R. C. Bose Memorial Conference on Statistical Design and Related Combinatorics, Ft. Collins, Colorado, *Association Schemes and Their Fusion Schemes and Fission Schemes*.
42. October 1994, The 9th Midwestern Conference on Combinatorics and Computing, Lincoln, Nebraska, *Schur Rings Coming from Doubly-Regular $(m, 2)$ -Team Tournaments*.
43. January 1994, Conference on Algebraic Combinatorics: Association Schemes and Representation Theory, Oberwolfach, Germany, *Character tables of Commutative Association Schemes and Their Fusions and Fissions*.
44. * November 1993, International Conference on Algebraic Combinatorics, Fukuoka, Japan, *Symmetrizable Commutative Association Schemes of Class Four*.
45. October 1993, The 886th AMS Meeting, The Special Session on Algebraic Combinatorics, College Station, Texas, *Symmetric Pseudocyclic Association Schemes*.
46. May 1993, Shanghai Conference: Designs, Codes and Finite Geometries, Shanghai, P. R. China, *Fission Schemes of Pseudocyclic Association Schemes*.
47. October 1992, The 876th AMS meeting, the Special Session on Combinatorics and Graph Theory, Dayton, Ohio, *Symmetrizable Commutative Fission Schemes*.
48. * May 1992, The 21st Ohio State-Denison Conference, Granville, Ohio, *Posets Related to Fusion Schemes*.
49. October 1991, Sixth Midwestern Conference on Combinatorics, Cryptography, and Computing, Lincoln, Nebraska, *Commutative Fission Schemes of Rank Three Symmetric Schemes*.
50. * August 1991, International Conference on Algebraic Combinatorics, Vladimir, former USSR, *Character Tables of Fusion Schemes and Fission Schemes*.
51. * September 1990, International Meeting on Algebraic Combinatorics, Kyushu University, Japan, *Recovering the Character Table of an Association Scheme from Its Fusion Table*.
52. * September 1990, Conference on Groups and Combinatorics, Konan University and Osaka Kyoiku University, Japan, *Character Tables of the Commutative Association Schemes Associated to Finite Geometry*.
53. * August 1990, The Fifth Korea Institute of Technology Mathematics Workshop, Korea Institute of Technology, Korea, *Commutative Association Schemes and Related Algebra*.

54. * January 1988, The 839th AMS meeting, Atlanta, Georgia, *Character Tables of Association Schemes Obtained from the Action of Orthogonal Groups on the Sets of Non-isotropic Points*.
55. * April 1987, The 833rd AMS meeting, the Special Session on Algebraic Combinatorics, Kent, Ohio, *The Character Table of a Certain Association Scheme and Its Relationship to that of $PSL(2, q)$* .
56. * May 1986, Ohio State - Denison Mathematics Conference, Granville, Ohio, *Products of the Distance Regular Graphs*.

Special lectures given

1. Give a series of lectures on nonlinear functions and their applications at the Research Institute of Mathematics at Seoul National University in Korea in July 3 – 4, 2006; July 3: *Almost Perfect Nonlinear Functions and Their Cryptographic Use*
July 4: *Almost Perfect Nonlinear Functions and Related Combinatorial Structures*
2. July 1 - August 2, 2002, Principal Lecturer at the Summer Open School on *Mathematics for Cryptology*, held at the Combinatorial and Computational Mathematics Center, POSTECH, Pohang, Korea.

Colloquium talks given at other institutions

1. * September, 2009, University of Puerto Rico, Rio Piedras, *Bose-Mesner algebra and subconstituent algebra of an association scheme and Existence, Construction and Characterization of Directed Strongly Regular Graphs*.
2. * April, 2009, Eastern Kentucky University, *Wreath Products of Association Schemes*.
3. * July 2006, SoongSil University, Seoul, Korea, *Topics in Algebraic Combinatorics*.
4. * July, 2006, Seoul National University, Seoul, Korea, *Subconstituent Algebras of Commutative Association Schemes*.
5. * April 2001, Korea Advanced Institute of Science and Technology. Dae-Jeon, Korea, *Algebraic Codes and Graphs*.
6. * March 2001, Kanazawa Univ., Kanazawa, Japan, *Products of Graphs and Association Schemes*.
7. * December 2000, Changwon National Univ., Changwon, Korea, *Error-Correcting Codes*.
8. * November 2000, Seoul National Univ., Seoul, Korea, *Codes and Association Schemes*.
9. * November 2000, Cheonnam National Univ., Kwangju, Korea, *Links between Algebraic Graphs and Codes*.
10. November 2000, POSTECH. *Links between Graphs, Codes and Association Schemes*.
11. * November 2000, Ajou Univ., Suwon, Korea, *Error-Correcting Codes: Finding a Liar*.
12. * November 2000, Catholic Univ., Daegu, Korea, *Error-Correcting Codes*.
13. * October 2000, Kangnung National Univ., Kangnung, Korea, *Error-Correcting Codes*.

14. * January 1999, Seoul National University, Seoul, Korea. *Delsarte's Approach to Algebraic Coding.*
15. * January 1999, Korean Institute of Science and Technology. *Designs and Codes in Association Schemes.*
16. * June 1996, Seoul National University, *The Subconstituent Algebra of a Distance-Regular Graph.*
17. * June 1994, Seoul National University, Seoul, Korea, *Spin Models and Link Invariants.*
18. * April 1992, Ohio State University, Columbus, Ohio, *Fission Schemes and Graph Decompositions.*
19. * September 1989, The Inter-University (Univ. of Colorado at Denver, Univ. of Wyoming, and Colorado State Univ.) Algebraic Combinatorics Seminar, Fort Collins, Colorado, *Paige's Simple Moufang Loops and a Study of Commutative Association Schemes.*
20. * November 1988, The Ohio State University, Columbus, Ohio, *Commutative Association Scheme Coming from the Permutation Group $GL(n, q)$ on the Set of Non-incident Point and Hyperplane Pairs.*
21. * September 1987, Wright State University, Dayton, Ohio, *The Paige's Simple Moufang Loops and $PSL(2, q)$.*

Departmental colloquium talks given

1. October 2006, Commutative Association Schemes and Their Character Tables.
2. March 2003, Discrete Fourier Transformation and Its Applications
3. September 1999, Universal Algebra, Design Theory and Survey Sampling Go Hand in Hand.
4. November 1997, Designs, Codes and Association Schemes.
5. October 1995, Association Schemes with Small Orders.
6. October 1993, Association Schemes, Knot Theory, and Spin Models.
7. May 1992, Decompositions of Strongly Regular Graphs.
8. November 1990, Topics in Algebraic Combinatorics.
9. October 1990, Some Enumeration Theorems in Finite Classical Geometries.
10. September 1989, Paige's Simple Moufang Loops and a Study of Commutative Association Schemes.

2.3 Travel grants and research supports received (from all sources)

1. June 2007. Foreign Travel Grant Award from Iowa State University (\$1,086)
2. June 2007. Travel Grant from Korea Research Foundation to attend the 1st Korea-Slovenia International Conference on Combinatorial and Computational Mathematics held in Koper, Slovenia in June 21 - 23. (\$1,000)

3. June 2006. Travel award received from Japan Society for Promotion of Science to participate the Algebraic Combinatorics: an International Conference in Honor of Eiichi Bannai's 60th Birthday held in Sendai, Japan, in June 26 – 30, 2006 (\$1,500)
4. Summers 2004 and 2005. Incentive grant to mentors for ISU Summer Mathematics Research Experience for Undergraduate Program (from NSF grant DMS-0353880 via Justin Peters and Leslie Hogben as PIs) (\$2,000/per Summer).
5. August 2004. Travel Support for Mentors from the Ohio State University to attend the Young Mathematicians Conference, sponsored by the National Science Foundation, Columbus, Ohio. (\$500)
6. July 2004. Travel support from Combinatorial and Computational Mathematics Center to organize the 2004 Com²MaC Conference on Association Schemes, Codes, and Designs, Busan, Korea, (\$1,500)
7. July, 2004. Funding to hold an international conference, "The 2004 Com²MaC Conference on Association Schemes, Codes, and Designs," which was held in July 19-23, in Busan, Korea, (\$20,000 from Korean Science & Engineering Foundation).
8. May 2002. Travel support from Korean Science & Engineering Foundation to visit and give open school lecture at Combinatorial and Computational Mathematics Center, POSTECH, Pohang, Korea, (\$5,000 during June 25 - August 3, 2002).
9. June 2000 - July 2001. Travel and research support from KOSEF during the stay at Combinatorial and Computational Mathematics Center, POSTECH, Pohang, Korea, (total \$7,200 during the period of 2000 - 2001 for research in connection with the center's activity).
10. August 2000 - May 2001. University Faculty Development Assignments for the academic year 2000 - 2001. (Visit Math Dept. POSTECH, Pohang, Korea)
11. July, 2000. Funding to hold an international conference, "The 2000 Com²MaC Conference on Association Schemes, Codes, and Designs," which was held in July 3 – 7, 2000, in Pohang, Korea, (\$30,000 from Korean Science & Engineering Foundation).
12. January 1999. Travel support for holding a workshop. Received from KOSEF via Combinatorial and Computational Mathematics Center to visit Com²MaC, Pohang Institute of Science and Technology, Pohang, Korea, (total \$3,000, during the period of 1999-2000).
13. Summer 1992. Faculty Incentive Grant from ISU Liberal Arts and Science Research Institute; Summer Research Award (\$4,000).
14. Summer 1991. Foreign Travel Grant Award from Iowa State University (\$1,700)
15. Summer 1989. University Research Grant from Iowa state University (\$640)
16. Summer 1989. Science and Humanity Research Institute Grant from Iowa State University(\$3,000).

2.4 Grant proposals submitted

- MCTP CO-PI, 2009
- October 2006, Project title: "Algebraic techniques in the theory of association schemes" Submitted the proposal to National Security Agency. (Unfunded)

- November 2002, Project title: “Association schemes: construction and classification,” Submitted the proposal to National Security Agency. (Unfunded)
- February 1998, Project title: “Analysis of discrete structure,” submitted the proposal, jointly with J. H. Kwak, Hyunkwang Kim and five other researchers at POSTECH, to Korean Science and Engineering Foundation. Unspecified amount of grant money were allocated to me for summer research visit to Combinatorial and Computational Mathematics Center for the duration of the next 10 years starting from 1999. (My activities and involvements as well as the actual awarded amount of money have been listed in the previous section.)
- November 1992, “Fusion schemes and fission schemes of some commutative association schemes,” submitted the proposal to National Security Agency. (Unfunded)
- November 1989, “Study of commutative association schemes - collecting new examples, studying their properties and calculating their character tables,” applied for NSF Postdoctoral Fellowship. (Unfunded)
- April 1989, “Latin squares determinants, their relation to problems in combinatorics and group theory and methods for their computation,” submitted the proposal to National Security Agency, jointly with K. W. Johnson. (Unfunded)

3 Teaching Responsibilities

3.1 List of courses taught and student evaluation data

* Average of overall rating of student evaluation for the instruction:
(5 for the highest, 3 for average, 1 for the lowest.)

Yr. & Sem.	Courses Taught	Enrl.	Resp.	Rates*
Spring 09	M610 Seminar	7		
	M314 Graphs and Networks	15		
	M699 Grad. Research (O. Olmez)	1		
Fall 08	M605 Design Theory and Association Schemes	8	6	4.50
	M165 Calculus I	180	84	3.69
Spring 08	M314 Graphs and Networks	20		4.17
Fall 07	M510 Linear Algebra	15	13	4.23
	M301 Matrices and Linear Algebra	15	11	4.18
	M699 Grad. Research (G. Bhattacharyya)	1		
Spring 07	CprE-InfAs-M533 Cryptography	20	12	3.50
	CprE-InfAs-M533 Cryptography XE (EDE)	18	7	3.57
	M301A Abstract Algebra	18	12	4.33
	M699 Grad. Research (G. Bhattacharyya)	1		
Fall 06	M605 Design Theory and Association Schemes	5	5	4.60
	M307 Matrices and Linear Algebra	35	20	3.65
	M699 Grad. Research (G. Bhattacharyya)	1		
Spring 06	CprE-InfAs-M533 Cryptography	25	16	3.44
	CprE-InfAs-M533 Cryptography XE (EDE)	28	7	2.86
	M307 Matrices and Linear Algebra	30	15	3.67
	M290H Honors Research (Katie Kolega)	1		
	M699 Grad. Research (G. Bhattacharyya)	1		
Fall 05	M690I Combinatorics	6	5	4.80
	M435 Geometry	34	23	4.04
	M699 Grad. Research (G. Bhattacharyya)	1		
Spring 05	M317 Theory of Linear Algebra	26	13	4.38
	M505 Abstract Algebra II	8	8	4.63
	M290H Honors research (Johnston & DeGraaf)	2		
	M699 Grad. Research (J. Kim & M. Maxwell)	2		
Fall 04	M504 Abstract Algebra	11	11	4.73
	M452X Discrete Math for Info. Assu.	7	6	4.33
	M699 Grad. Research (J. Kim & M. Maxwell)	2		
Spring 04	M265H Honors calculus III	18	13	3.38
	M265 Calculus III	14	10	3.80
	M699 Grad. research (J. Kim & M. Maxwell)	2		
Fall 03	M166H Honors calculus II	11	9	4.33
	M551 Design theory & association schemes	7	6	4.83
	M690Q Topics in group thry.	1		
	M699 Grad. research (J. Kim & M. Maxwell)	2		

List of courses taught and student evaluation data-Continued

Yr. & Sem.	Courses Taught	Enrl.	Resp.	Rates*
Spring 03	M301 Abstract algebra	16	15	3.60
	M350 Number theory	6	6	3.83
	M690Q Topics in rings	1		
	M699 Grad. research (J. Kim & M. Maxwell)	2		
Fall 02	M166H Honors calculus II	18	16	3.69
	M452X Discrete math. for inform. assurance	5	5	4.75
	M690i Topics in combinatorics (3 Cr. J. Kim)	1		
	M699 Research (6 Cr. M. Maxwell)	1		
Spring 02	M552 Enumer. combinatorics & ordered sets	7	6	4.83
	M166 Integral calculus	20	17	4.29
	M699 Research (J. Kim & M. Maxwell)	2		
Fall 01	M317 Theory of linear algebra	22	13	3.77
	M165 Differential calculus	194	65	3.05
	M690 Individual Studies	3		
F00-S01	(Leave of Absence)			
Spring 00	M317 Theory of linear algebra	23	17	4.00
	M510 Matrix analysis	15	11	4.55
Fall 99	M317 Theory of linear algebra	29	16	4.19
	M551 Design theory & association schemes	6	6	4.67
	M690E Advanced topics in linear algebra	1		
Spring 99	M314 Graphs and networks	17	14	4.00
	M552 Ordered sets and lattices	5	5	5.00
Fall 98	M317 Theory of linear algebra	29	18	3.89
	M150A Math for business & social science	25	19	3.67
Spring 98	M266 Differential Equations	21	15	4.33
	M150E Math for business & social science.	65	22	4.32
	M599 (3cr.) Creative component	1		
Fall 97	M150 Math for business & social sci.	166	76	3.16
	M551 Design theory & association schemes	4	4	5.00
	M599 Creative component (Manlong Rao)	1		
Spring 97	M166 Calculus II	35	20	4.10
	M505 Abstract algebra II	5	5	4.60
Fall 96	M166 Calculus II	38	20	4.20
	M504 Abstract algebra I	8	4	4.75
Spring 96	M265 Calculus III	34	15	3.33
	M307 Linear algebra	33	31	3.71
Fall 95	M165H Calculus I	17	12	4.58
	M551 Design thry & association schemes	3	3	5.00
Spring 95	M314 Graph theory	25	20	4.16
	M552 Ordered sets and lattices	6	6	4.83
Fall 94	M304 Combinatorics	19	16	3.69
	M307 Linear algebra	20	12	3.14
	M599 Creative Components (You Wang)	1		
Spring 94	M510 Matrix theory		10	4.60

List of courses taught and student evaluation data-Continued

Yr. & Sem.	Courses Taught	Enrl.	Resp.	Rates*
Fall 93	M301 Abstract algebra M551 Design theory and association schemes		17 6	4.53 5.00
Spring 93 Fall 92	M307 Linear algebra M265 Calculus III M551X Design theory and association schemes		22 35 8	4.14 4.29 4.62
Spring 92 Fall 91	M314 Graph theory M166 Calculus II M304 Combinatorics		22 29 27	4.32 3.66 4.00
Spring 91 Fall 90	M505 Abstract algebra II M265 Calculus III M504 Abstract algebra I		5 24 12	4.40 3.62 3.22
Spring 90 Fall 89	M265 Calculus III M265 Calculus III M304 Combinatorics		30 21 13	4.03 3.90 3.62
Spring 89 Fall 88	M265 Calculus III M314X Graph theory M265 Calculus III (Sec A) M265 Calculus III (Sec B)		16 17 29 23	4.50 3.94 3.76 4.30

3.2 Student advising

Undergraduate Math Majors supervised

Andrew Russel (F08 -) Josh Lagrange (F08 -)
 Katherine M. Waters (S05-S09) Jack E. Kozad (F06-)
 Khuan Tac Ho (S05-S07) Rebecca Sue Pencook (S05-S07)

Masters students supervised:

John Batchelor (in progress)
 Matthew Kelley (– 2008) Chad Roye Brewbaker (05, Com S/Math)
 Manlong Rao (Graduated 1998) You Wang (Graduated 1995)

Doctoral students supervised

<u>Name</u>	<u>Conferred</u>	<u>Title of Thesis</u>
Oktay Olmez	(current)	
Gargi Bhattacharyya	Aug. 2008	Terwilliger algebras of wreath products of association schemes
Joo Hyung Kim	Aug. 2005	Classification of small class association schemes obtained from certain combinatorial objects
Mandi Maxwell	May 2005	Almost Perfect Nonlinear functions and related combinatorial structures

Member of Ph.D. Program of Study Committee of:

Current (7+1):

Yi-Lin Cheng

Jacob C. Manske

Andrew T. Wells

Shiaau-Er Huarng (Statistics)

Michael J. Hilgemann

Fernando Miranda-Mendoza

Rana C. Mikkelsen (12/08)

Past (27+8):

Su Chang (12/09 EE-CPRE.))

Haseena S. Ahmed (08/08)

Mehmet Dagli (05/08)

Jangwoon Lee (08/08)

Key One Chung (08/07)

Theodore A. Rice (08/07)

Eunyon Kim (05/05)

Bernard Kivunge (08/04)

Hee-Dae Kwon (08/03)

Joy Becker (05/02)

Soon-Keol Kwon (05/96)

Lois Thur (05/96)

Frank A. Hummer (05/94)

Xiaorong Shen (05/93)

Tengku Fuad (05/91)

Jae-Hyung Lee (05/97, Statistics)

Seoyoung Lee (12/97, EE-CPE)

Chungyeol Shin (05/96, Statistics)

Hyong Jun (05/92, Chemistry)

Jaemin Shin (08/08)

James Richard Fiedler (05/08)

Matthew Alan Halverson (08/08)

Kristen Meyer (05/06)

Amy Wangsness (05/05)

Patrick Mutungi (08/04)

Sung-Dae Yang (05/04)

Ji-Young Choi (05/02)

Duck-Hwan Choi (12/98)

Brenda Diesslin (05/96)

Hye-Jeong Kang (05/95)

Michael Hobart (05/93)

Jon D. Phillips, Jr.(05/92)

Jae-Kwang Kim (08/00, Statistics)

Tae-Sung Shin (12/97, Statistics)

Win-Chin Lin (12/97, Statistics)

Seoung-Gon Ko (05/95, Statistics)

Member of MS Program of Study Committee for

Nancy Minyard (09, EECPE)

Lin Tong (09)

Meyer D. Sarasio (08)

John Njue (04)

Doug Ray (04)

Joy Becker (99)

Shuxia Sun (98)

JooHo Lee (97, Elec Eng/Cp Eng)

Hyen-Hyee Cho (93, Stat)

Jincheol Yoo (93, Stat)

Bryce Allen (08)

Eun-Mee Yoon Ann (07)

Ted Rice (05)

Minhwui Paik (03, Stat.)

Hee-Dong Kim (98, IMSE)

Jaeyeon Won (98, IMSE.)

Dae-Lyong Kim (95, Stat.)

Sang Heon Oh (93, Stat)

Peitsang Wu (92, IMSE)

3.3 Curriculum development

- With J. D. H. Smith, created new courses in Combinatorics M551 & M552 as graduate post-core courses in combinatorics. (Offered MATH 551X (Design Thry and Association Schemes) in Fall 1992 for the first time and 14 students enrolled.)
- Proposed to create Math 452X: Discrete Mathematics for Information Assurance. (M452X was offered in the Fall of 2002, for the first time and 5 students enrolled.)
- Currently writing up lecture notes for graduate combinatorics and cryptography courses:

- Association Schemes, Codes and Designs
- Finite Sets, Extremal Set Systems and Relations
- (with Jung Hee Cheon) Discrete Mathematics for Information Assurance

3.4 Mentoring undergraduate research program

- Served as a mentor for ISU Summer Mathematics Research Experience for Undergraduate Program:
 - 2009 (June 8 - Aug 2.) Francis Adams (Carlton College), Alex Gendreau (Welseley College) (Project: Directed Strongly Regular Graphs)
 - 2005 (June 6 – July 29), David Eisenstat (Rochester) and David Watson (Carlton). (Project: Classification of Strongly Regular Graphs on 64 vertices.)
 - 2004 (June 7 – July 30), John Hegeman (Stanford) and Jeff Langford (Drake). (Project: Polygonal Designs: Existence and Construction.)
- Mentoring freshmen honor students:
 - Spring 06: Katie Kolega (Mech. E.) (Project: Identification codes and check digits)
 - Spring 05: Nicholas Johnston (Elec. E.) and Daniel De Graaf (Elec. E.) (Project: Almost Perfect Nonlinear Functions and Their Applications to DES-like Cryptosystem)

4 Service & Extension - Professional Activities

4.1 Editorial service

- Editing Journal of Applied Mathematics and Computing, published by Springer, Germany (2007 -)
- Served as a Guest Editor of Discrete Mathematics, Vol 308 (2008), Issue 14, ISSN 0012-365X, July 28, 2008. This is a Special Issue covering the International Conference on Association Schemes, Codes and Designs: Com²MaC 2004, held at Pusan National University, Pusan, July 16 - 26, 2004. (with S. Bang, M. Hirasaka, H. Kim, J. Koolen as Co-Guest Editors).
- Member of the Editorial Committee for Mathematics for the publisher, Foxwell and Davies Italia srl., Napoli, Italy. (2003 - present)
- Associate Editor for Journal of Applied Mathematics and Computing (2002 - 2007)
- Co-Editor of Com²MaC Lecture Note Series published by the Combinatorial and Computational Mathematics Center at POSTECH, Korea (with S. Hong as a Co-Editor), (2001 - 2004).
- Served as a Guest Editor of Discrete Mathematics, Vol 264, No. 1-3, pages 1 - 238, March 6, 2003. This is a Special Issue covering the International Conference on Association Schemes, Codes and Designs held at Pohang University of Science and Technology, Pohang, July 3–7, 2000. (with E. Bannai, A. Munemasa and P. Terwilliger as Co-Guest Editors).

- Served as an Associate Editor for The Korean Journal of Computational and Applied Mathematics (October 1999 - September 2002).
- Served as the Executive Editor of the Korean Journal of Computational and Applied Mathematics (October 1997 - September 1999).

4.2 Refereeing service

Refereed articles for the journals:

- Advances in Geometry (02, 09(2))
- Applied Mathematics Letters (02)
- Ars Combinatoria (04)
- Annals of Combinatorics (07)
- Communications in Statistics - Simulation and Computation. (09)
- Communications in Statistics (Theory and Methods) (96, 97)
- Communications of Korean Mathematical Society (01)
- Computational Statistics and Data Analysis (10)
- Discrete Mathematics (91, 94, 95, 99, 00, 01, 02, 03, 04(2), 05, 08)
- European Journal of Combinatorics (07)
- Graphs and Combinatorics(89, 90, 94, 95, 98, 00, 04, 05, 07)
- Indian Journal of Pure and Applied Mathematics (01)
- Journal of Algebraic Combinatorics (93, 96, 97, 02, 03, 05, 07)
- Journal of Applied Mathematics and Computing (02)
- Journal of Combinatorial Designs (01)
- Journal of Combinatorial Theory A (98, 05)
- Journal of Korean Mathematical Society (95(2), 96(2), 97)
- Journal of Statistical Planning and Inference (99, 03, 05, 07)
- Korean Journal of Computational & Applied Mathematics (98(2), 99)
- Kyushu Journal of Mathematics (96, 97, 98, 99)
- Linear Algebra and Its Applications (91, 99)

Refereed articles for the proceedings of:

- International Conference on Combinatorics, Information Theory and Statistics (1998)
- The 8th International Conference on Formal Power Series and Algebraic Combinatorics (1996)

- Recent Development in Algebraic Combinatorics (1996).

Reviewed book manuscripts for:

- John Wiley & Sons (92)
- Prentice Hall (95, 96)
- Cambridge University Press (00)
- McGraw-Hill (06)

Served as an external reviewer of the theses for

- W. K. Kok, University of Malaya, Malaysia (Ph.D 2004)
- Sejeong Bang, POSTECH, Pohang Korea (Ph.D. 2002)
- Yong Sung Park, POSTECH, Pohang, Korea (MS 2000)
- Ena Jamal, Universiti Sains Malaysia (MS 1997)

Served as an external reviewer of the faculty tenure and promotion cases for

- University of Texas at Brownsville (2006)
- Emory University(2006)
- Merrimack College (1997)

4.3 Reviewing service

Reviews wrote for *Mathematical Reviews*

1. MR2419166 Vidar, Melvin A. Tridiagonal pairs of shape $(1, 2, 1)$. *Linear Algebra Appl.* 429 (2008), no. 1, 403–428.
2. MR2375490 Bagherian, J.; Ponomarenko, Ilia; Rahnamai Barghi, A. On cyclotomic schemes over finite near-fields. *J. Algebraic Combin.* 27 (2008), no. 2, 173–185.
3. MR2338239 (2008h:05117) Belousov, I. N.; Makhnev, A. A. A distance-regular graph with the intersection array $8, 7, 5; 1, 1, 4$ and its automorphisms. *Proc. Steklov Inst. Math.* 257 (2007), suppl. 1, S47–S60.
4. MR2310420 (2008f:05212) Muzychuk, Mikhail A generalization of Wallis-Fon-Der-Flaass construction of strongly regular graphs. *J. Algebraic Combin.* 25 (2007), no. 2, 169–187.
5. MR2261869 (2007i:05198) Suzuki, Hiroshi On strongly closed subgraphs with diameter two and the Q -polynomial property. *European J. Combin.* 28 (2007), no. 1, 167–185.
6. MR2236029 (2007i:05193) Comellas, F.; Fiol, M. A.; Gimbert, J.; Mitjana, M. On the weak distance-regularity of Moore-type digraphs. *Linear Multilinear Algebra* 54 (2006), no. 4, 265–284.
7. MR2212505 (2006m:05259) Coolsaet, Kris; Degraer, Jan; Spence, Edward The strongly regular $(45, 12, 3, 3)$ graphs. *Electron. J. Combin.* 13 (2006), no. 1, Research Paper 32, 9 pp. (electronic).

8. MR2181732 (2006j:05221) Zhang, Yong-lin The construction of association schemes by parameter amendment. *Acta Math. Appl. Sin. Engl. Ser.* 21 (2005), no. 4, 683–692.
9. MR2142839 (2006d:05191) Hanaki, Akihide; Yoshikawa, Masayoshi On modular standard modules of association schemes. *J. Algebraic Combin.* 21 (2005), no. 3, 269–279.
10. MR2114417 (2005k:05247) Terwilliger, Paul; Vidunas, Raimundas. Leonard pairs and the Askey-Wilson relations. *J. Algebra Appl.* 3 (2004), no. 4, 411–426.
11. MR2106965 (2005k:05241) Chan, Ada; Hosoya, Rie. Type-II matrices attached to conference graphs. *J. Algebraic Combin.* 20 (2004), no. 3, 341–351.
12. MR2071667 (2005d:05157) Yamazaki, Norio. A characterization of the group association scheme of A_n . *J. Math. Soc. Japan* 56 (2004), no. 3, 649–685.
13. MR2055679 (2005e:05161) Tanaka, Hajime. Association schemes of affine type over finite rings. *Adv. Geom.* 4 (2004), no. 2, 241–261.
14. MR2047536 (2005d:05154) MacLean, Mark S. Taut distance-regular graphs of even diameter. *J. Combin. Theory Ser. B* 91 (2004), no. 1, 127–142.
15. MR2034029 (2005a:05219) Comellas, F.; Fiol, M. A.; Gimbert, J.; Mitjana, M. Weakly distance-regular digraphs. *J. Combin. Theory Ser. B* 90 (2004), no. 2, 233–255.
16. MR2009392 (2004h:05131) Bang, S.; Koolen, J. H.; Moulton, V. A bound for the number of columns $l_{(c,a,b)}$ in the intersection array of a distance-regular graph. *European J. Combin.* 24 (2003), no. 7, 785–795.
17. MR1993169 (2004e:05208) Metsch, Klaus. On the characterization of the folded halved cubes by their intersection arrays. *Proceedings of the Conference on Finite Geometries (Oberwolfach, 2001)*. *Des. Codes Cryptogr.* 29 (2003), no. 1-3, 215–225.
18. MR1957967 (2004b:05206) van Dam, E. R.; Fon-Der-Flaass, D. Codes, graphs, and schemes from nonlinear functions. *European J. Combin.* 24 (2003), no. 1, 85–98.
19. MR1923085 (2003j:05132) Hiraki, Akira; Koolen, Jack. An improvement of the Godsil bound. *Ann. Comb.* 6 (2002), no. 1, 33–44.
20. MR1876578 (2003b:05161) Nakano, Hiroshi. On a distance-regular graph of even height with $k_e = k_f$. *Graphs Combin.* 17 (2001), no. 4, 707–716.
21. MR1840389 (2002f:05166) Miyamoto, Izumi. Computing isomorphisms of association schemes and its applications. *Computer algebra and mechanized reasoning (St. Andrews, 2000)*. *J. Symbolic Comput.* 32 (2001), no. 1-2, 133–141.
22. MR1826951 (2002a:05258) Curtin, Brian; Nomura, Kazumasa. Spin models and strongly hyper-self-dual Bose-Mesner algebras. *J. Algebraic Combin.* 13 (2001), no. 2, 173–186.
23. MR1780871 (2001k:20149) Johnson, Kenneth W. Loop characters. *Loops'99 (Prague)*. *Comment. Math. Univ. Carolin.* 41 (2000), no. 2, 271–281.
24. MR1769193 (2001k:05210) Hiraki, Akira. Retracing argument for distance-regular graphs. *J. Combin. Theory Ser. B* 79 (2000), no. 2, 211–220.
25. MR1730822 (2001b:05228) Curtin, Brian. The local structure of a bipartite distance-regular graph. *European J. Combin.* 20 (1999), no. 8, 739–758.
26. MR1689601 (2000h:05241) Martin, William J. Designs in product association schemes. *Des. Codes Cryptogr.* 16 (1999), no. 3, 271–289.
27. MR1669608 (99m:05135) Hemmeter, Joe; Woldar, Andrew. The complete list of maximal cliques of $\text{Quad}(n, q)$, q even. *European J. Combin.* 20 (1999), no. 1, 81–85.

28. MR1698069 (2000h:05242) Tomiyama, Masato. Weakly Q -polynomial distance-regular graphs. Algebraic combinatorics (Japanese) (Kyoto, 1998). Sūrikaiseikikenkyūsho Kōkyūroku No. 1063 (1998), 104–110.
29. MR1645652 (99m:05170) Hanaki, A.; Miyamoto, I. Classification of association schemes with 18 and 19 vertices. Korean J. Comput. Appl. Math. 5 (1998), no. 3, 543–551.
30. MR1631759 (99h:05126) Bending, T. D.; Fon-Der-Flaass, D. Crooked functions, bent functions, and distance regular graphs. Electron. J. Combin. 5 (1998), Research Paper 34, 14 pp. (electronic).
31. MR1612657 (99f:05127) Rassy, M.; Zieschang, P.-H. Basic structure theory of association schemes. Math. Z. 227 (1998), no. 3, 391–402.
32. MR1607957 (99b:05145) Tomiyama, Masato; Yamazaki, Norio. Characterization of the group association scheme of the symmetric group. European J. Combin. 19 (1998), no. 2, 237–255.
33. MR1437000 (98c:05169) Araya, Makoto; Hiraki, Akira; Jurišić, Aleksandar. Distance-regular graphs with $b_2 = 1$ and antipodal covers. European J. Combin. 18 (1997), no. 3, 243–248.
34. MR1447927 (98g:05160) Suzuki, Hiroshi. Strongly closed subgraphs of a distance-regular graph with geometric girth five. Kyushu J. Math. 50 (1996), no. 2, 371–384.
35. MR1439253 (98h:05185) Zieschang, Paul-Hermann. An algebraic approach to association schemes. Lecture Notes in Mathematics, 1628. Springer-Verlag, Berlin, 1996. xii+189 pp. ISBN: 3-540-61400-1
36. MR1415286 (97i:05135) Goldbach, R. W.; Claasen, H. L. Feasibility conditions for non-symmetric 3-class association schemes. Discrete Math. 159 (1996), no. 1-3, 111–118.
37. MR1341474 (97b:05172) Chihara, L.; Stanton, D. A matrix equation for association schemes. Graphs Combin. 11 (1995), no. 2, 103–108.
38. MR1339700 (96m:05199) Bannai, Eiichi; Munemasa, Akihiro. The Terwilliger algebras of group association schemes. Kyushu J. Math. 49 (1995), no. 1, 93–102.
39. MR1319161 (96e:05019) Calderbank, A. R. Algebraic invariants for codes and designs. Extremal problems for finite sets (Visegrád, 1991), 157–185, Bolyai Soc. Math. Stud., 3, Jnos Bolyai Math. Soc., Budapest, 1994.
40. MR1296667 (96b:05145) Koolen, Jacobus Hendricus. Euclidean representations and substructures of distance-regular graphs. Dissertation, Technische Universiteit Eindhoven, Eindhoven, 1994. Technische Universiteit Eindhoven, Eindhoven, 1994. x+122 pp. ISBN: 90-386-0104-2
41. MR1273607 (95b:05171) Nomura, K. An application of intersection diagrams of high rank. Graph theory and applications (Hakone, 1990). Discrete Math. 127 (1994), no. 1-3, 259–264.
42. MR1241504 (94f:05148) Bannai, Eiichi. Association schemes and fusion algebras (an introduction). J. Algebraic Combin. 2 (1993), no. 4, 327–344.
43. MR1236220 (94g:05105) Bannai, Eiichi. Algebraic combinatorics—recent topics in association schemes. (Japanese) Sūgaku 45 (1993), no. 1, 55–75.
44. MR1223697 (94e:05270) Nomura, K. Some inequalities in distance-regular graphs. J. Combin. Theory Ser. B 58 (1993), no. 2, 243–247.
45. MR1188927 (93j:05172) Seidel, J. J. Introduction to association schemes. Sminaire Lotharingien de Combinatoire (Thurnau, 1991), 77–91, Publ. Inst. Rech. Math. Av., 476, Univ. Louis Pasteur, Strasbourg, 1992.
46. MR1164762 (93e:05103) Muzychuk, M. E. Subschemes of the Johnson scheme. European J. Combin. 13 (1992), no. 3, 187–193.

4.4 Other professional services

- Organizing (as the Symposium Chair) the Mathematics Symposium on Fundamentals and Applications in the US-Korea Scientists and Engineers Conference, which will be held in July 16 – 19, 2009, Raleigh, North Carolina.
- Organized (as the Symposium Chair) the US-Korea Applied and Pure Mathematics Symposium in the US-Korea Scientists and Engineers Conference, which was held in August 14-17, 2008, San Diego, California.
- Organized (jointly with P. Terwilliger) the Special Session on Algebraic Combinatorics in the 1030th AMS Central Section Meeting, October 5-6, 2007, Chicago, Illinois.
- Organized (jointly with Mitsugu Hirasaka, Tatsuro Ito, Kaneko Masanobu, Izumi Miyamoto, and Akihiro Munemasa) an international conference on Algebraic Combinatorics in celebration of Eiichi Bannai's 60th birthday, which will be held in Sendai, Japan, in June 26 - 30, 2006.
- Organized (jointly with P. Terwilliger) the Special Session on Association Schemes and Related Topics in the 1011th AMS Central Section Meeting, October 21-23, 2005, Lincoln, Nebraska.
- Served as a member of the Mathematical Science Review Board for Korea Research Foundation (KRF); Review the research grant proposals submitted to KRF. (Reviewed 16 proposals in 2004.)
- Served on Mathematics Division Competition and Evaluation Committee of Korean-American University Professors Association. (2003 - Present)
- Served as a co-chair of the Organizing Committee of the International Conference on Association Schemes, Codes and Designs, which will be held at the Combinatorial and Computational Mathematics Center, Pohang, Korea, July 19-23, 2004.
- Served as a member of the Organizing Committee of the East Asian Conference on Algebra and Combinatorics held in Fukuoka, Japan, in November 13 - 17, 2003.
- Organized jointly with S. Hong, H. Kim, and A. Munemasa the International Conference on Association Schemes, Codes and Designs held at the Combinatorial and Computational Mathematics Center, Pohang, Korea, July 3-7, 2000.
- Served as a member of the program committee for the Workshop on Codes, Cryptography, and Computing held at the Combinatorial and Computational Mathematics Center, Pohang, Korea, January 8-11, 1999.
- Organized the Special Session on Algebraic Combinatorics in the 935th AMS Central Section Meeting, September 12-13, 1998, Chicago, Illinois.
- Organized jointly with P. Terwilliger the Special Session on Algebraic Combinatorics in the 886th AMS Central Section Meeting, October 22-23, 1993, College Station, Texas.
- Serving as a Councilor and Member of the Directors Committee of Korean-American Scientists and Engineers Association (2006-2009).
- Serving on the National Mathematics Contest Exam Committee for Korean-American Scientists and Engineers Association (2004 – 2009, 2007(Chair)).

4.5 Institutional services at ISU

Department

Served at various departmental committees including:

- DEO Advisory Committee (90-91, 03-04, 06-07(Chair), 07-08)
- Lecture Committee (01-04)
- Promotion and Tenure Committee (97, 05(Chair))
- Untenured Faculty Review Committee (96-97, 01-02, 06-07, 07-08 (Chair), 08-09)
- Faculty Search Committee (89-90, 94-95, 02-03)
- Graduate Study Committee (Admission Subcommittee) (91-94, 03-06 (04-05 Chair))
- Undergraduate Committee (99-00)
- Ad Hoc Committee (Review Graduate Program)(98)
- Awards, Endowment & Development Committee (96-99)
- Algebra Qualifying Examination Committee (89-91, 94-95, 96-99, 04-06)

College

Served at

- LAS Representative Assembly (95-96)
- Minority Student Services Advisory Board (97-99)
- Minority Student Affairs Council (98-99)
- Academic Standards and Admissions Committee (01-04, 04-07 (Chair 05-07))

University

Went on to graduate college recruiting trip to Puerto Rico September 8 - 13, San Juan, Puerto Rico.

Disability Conference held in U. of Northern Iowa, April 1 – 2, 2009.

REU and EGAP Alliance conference held in U of Iowa July 29-30(?), 2009

Served on Graduate Council (09-12)

Served on Faculty Senate Academic Standard and Admission Committee (05-07)

University community

Served or serving as the

- Faculty advisor for:
 - Kumdo Club (96-99, 01-03)
 - Korean Student Association (90-92, 93-95, 01-02),
 - Korean Catholic Student Association (97-99, 01-present*).
- Secretary and treasurer of Korean Education Foundation at Iowa State University (90-99, 01-present*)