CURRICULUM VITAE

Sung Yell Song, Associate Professor of Mathematics
February 28, 2020

Contents

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Sung Yell Song

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1 Education and Professional Experience

1.1 Education

Ph.D.	1987	in Mathematics. The Ohio State University, Columbus, Ohio (Thesis Advisor: Dr. Eiichi Bannai)
M.S.	1983	in Mathematics. The 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
07/2016 - 06/2019	Director of Graduate Education in Mathematics and Applied Mathematics
06/2002 - 08/2002	Research Visit, Combinatorial & Computational Mathematics Center, Korea
06/2000 - 08/2001	Visiting Professor at POSTECH, Pohang, Korea
08/1988 - 07/1994	Assistant Professor at Iowa State University
07/1987 - 07/1988	Lecturer at the Ohio State University, Columbus, OH 43201
07/1981 - 06/1987	Graduate Teaching Associate at the Ohio State University, Columbus, OH 43201
08/1974 - 08/1977	Instructor at Korea Naval Academy (Navy Officer, LTJG), Jinhae, Korea

1.3 Professional affiliations

- Information Assurance Center at Iowa State University (04 – Present)
- National Academic Advisors Association (2014 – 16)
- Executive board member of the Combinatorial & Computational Mathematics Center, Pohang University of Science and Technology, Korea (1999 – 2008)
- American Mathematical Society (1983 – Present)
- Mathematical Association of America (02 – 09)
- International Linear Algebra Society (1999 – Present)
- Korean-American Scientists and Engineers Association (KSEA) (1988 – 2019)
  – Councilor and membership/database director of KSEA (06–09).
  – KSEA National Mathematics Contest Exam Committee (04 – 09 (07 Chair), 14–15, 16–18).
- Korean-American Mathematical Scientists Association (1988 – Present, President (2015 – 17))
- Korean Education Foundation at Iowa State University: Secretary/treasurer (1990 – 2016).

1.4 Journal editorship

- Editor-in-Chief of *Journal of Applied Mathematics and Computing* (2007 – Present).
- Executive Associate Editor of *Journal of Applied Mathematics and Computing* (1997 – 2007).
- Member of the Editorial Board of *ISRN Discrete Mathematics* (2012 – 14).

1.5 Honors and awards

- The 2013 McNair Faculty Mentor of the Year named by the ISU Graduate College McNair Program.
- The Vinograde Award for Excellence in Teaching of Graduate Students presented by the ISU Mathematics Graduate Student Organization in 2005 and 2017.

2 Research Activities

2.1 Fields of research interests

Combinatorics and Algebraic Combinatorics, in particular, theory of association schemes and related topics, including, distance-regular graphs, classical groups and geometries, permutation groups, algebraic codes, combinatorial designs, difference sets and families, and their statistical applications. Research focuses on the characterization and classification of various combinatorial structures.

2.2 Publications

Refereed journal articles

1. (with B. Brimkov, K. Duna, L. Hogben, K. Lorenzen, C. Reinhart and M. Yarrow) Graphs that are cospectral for the distance Laplacian, To appear in *Electronic Journal of Linear Algebra*, 2020. (arXiv:1812.05734v1. 18pp.)

2. (with K. Kim and B. Xu) Investigations on association schemes with elementary abelian thin residue, *Discrete Mathematics* **340** (2017), 2813–2821.

3. (with A. Abiad, B. Brimkov, A. Erey, L. Leshock, X. Martinez-Rivera, S. O and J. Williford) On the Wiener index, distance cospectrality and transmission regular graphs, *Discrete Applied Mathematics* **230** (2017), 1–10.

4. (with B. Xu and S. Zhou) Combinatorial extensions of Terwilliger algebras and wreath products of association schemes. *Discrete Mathematics*, **340** (2017), 892–905.

5. (with K. Nowak and O. Olmez) A family of partial geometric designs from three-class association schemes. *Journal of Combinatorial Designs*, **24** (2016), no. 12, 533–552.

6. (with K. Nowak and O. Olmez) Partial geometric difference families. *Journal of Combinatorial Designs*, **24** (2016), 112–131.

7. (with L. Jorgensen, G. Jones and M. Klin) Normally regular digraphs, association schemes, and related combinatorial structures. *Seminaire Lotharingien de Combinatoire*, vol. **71** (2013/14), Art. B71c, 39 pp. (on-line version available at http://www.mat.univie.ac.at/~slc)

8. (with O. Olmez) Some families of directed strongly regular graphs obtained from certain finite incidence structures. *Graphs and Combinatorics*, **30** (2014), no.6, 1529–1549.

9. (with A. E. Brouwer and O. Olmez) Directed strongly regular graphs from $1\frac{1}{2}$-designs, *European Journal of Combinatorics* 33 (2012), 1174 – 1177.

10. (with G. Bhattacharyya and R. Tanaka) Terwilliger algebras of wreath products of one-class association schemes, *Journal of Algebraic Combinatorics*: Vol. **31** No. 3 (2010), 455 – 466.

11. (with S.-G. Lee and J. 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.

12. (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.

13. (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.

14. (with S. Bang) On Generalized Semidirect Product of Association Schemes, *Discrete Mathematics* **303** (2005), 5-16.

15. (with S. Bang and M. Hirasaka) Semidirect Products of Association Schemes, *Journal of Algebraic Combinatorics* **22** No.1 (2005), 23-38.

16. Fusion Relations in Products of Association Schemes, *Graphs and Combinatorics*, **18** (2002) 3, 655-665.

17. (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.

18. (with K. Driessel, K. See, and J. Stufken) Polygonal Designs: Some Existence and Nonexistence Results, *Journal of Statistical Planning and Inference*, **77** (1999) 155-166.

19. (with K. See) Association Schemes of Small Order, *Journal of Statistical Planning and Inference* **73** (1998), 225-271.

20. (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.

21. Commutative Association Schemes Whose Symmetrizations Have Two Classes, *Journal of Algebraic Combinatorics* **5** (1996), 47-55.

22. Class 3 Association Schemes Whose Symmetrizations have Two Classes, *Journal of Combinatorial Theory* A **70** (1995), No. 1, 1-29.

23. (with E. Bannai) Character Tables of Fission Schemes and Fusion Schemes, *Europ. J. Combinatorics* **14** (1993), 385-396.

24. (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.

25. (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.

26. (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.

27. (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.

28. (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.

29. (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.

30. (with E.Bannai) On the Character Table of the Association Scheme $Sp(4, q)/Sz(q)$, *Graphs and Combinatorics*, **5** (1989), 291-293.

31. (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.

32. 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.

33. Products of Distance Regular Graphs, *Utilitas Mathematica* **29**, (1986) 173-175.

Book entries

34. (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.

35. (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)]

36. (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. (Published Online: 15 SEP 2006, DOI: 10.1002/9780470057339.)

37. 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.

38. 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]

Conference or workshop proceedings

39. (with H. Tanaka) Group-Case Commutative Association Schemes and Their Character Tables. In: A. Munemasa (Ed.) *Proceedings of Algebraic Combinatorics*: An International Conference in Honor of Eiichi Bannai, held in Sendai, Japan in June 26–30, 2006. pp. 204 – 213. (arXiv:0809.0748v1)

40. (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.

41. (with S. Bang & M. Hirasaka) Semidirect Product of Association Schemes. In: S-G. Lee & M. Y. Sohn (Eds.), *Proceedings of Com^{2}MaC Symposium on Combinatorics, Graph Theory, Algorithms and Matrix Theory*, 2001, pp. 55-70.

42. (with K. See) Certain Combinatorial Block Designs and Spatially Constrained Sampling. In: S. G. Lee & M. Y. Sohn (Eds.), *Proceedings of Com^{2}MaC Symposium on Combinatorics, Graph Theory, Algorithms and Matrix Theory*, 2001, pp. 127-140.

43. Delsarte's Theory on Codes. In: *Proceedings of Com^{2}MaC Workshop on Codes, Designs and Cryptography*, Hyun Kwang Kim(Ed.), January, 1999, 149-227.

44. 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.

Other publications

45. (with Chin-Hong Park) Preface. Summary of the contributions of the 2010 Conference on Algebraic and Geometric Combinatorics, held in Kyeongju, Korea in July 2010. *Journal of Applied Mathematics and Computing* 40 (2012), No. 1–2, 1 – 3.

46. What is happening in Mathematics, Report on Science and Technology Research Trends. Korean-American Scientists and Engineers Association, January 2009, 57 – 60.

47. Reflections on Applied and Pure Mathematics Symposium at US-Korea Conference. Symposium held in San Diego, CA, in August 17 – 19, 2008, KSEA Letters, **37** (2008) No.1, 12.

48. (with Sejeong Bang, Mitsugu Hirasaka, Hyun K. Kim, and Jack H. Koolen) Preface for the special issue of Discrete Mathematics covering the 2004 Com^{2}MaC Conference on Association Schemes, Codes and Designs. *Discrete Math.* 308 (2008), no. 14. p. 1.

49. (with Eiichi Bannai, Akihiro Munemasa, and Paul Terwilliger) Preface for the special issue of Discrete Mathematics covering the 2000 Com^{2}MaC Conference on Association Schemes, Codes and Designs. *Discrete Math.* 264 (2003), no. 1-3. p. 1.

50. The Character Tables of Certain Association Schemes, Ph.D. dissertation, The Ohio State University, Columbus, Ohio, 1987 (Advisor: Dr. Eiichi Bannai).

2.3 Talks presented

* Supported in part by non-ISU funding.

Meeting or conference talks

1. January, 2020, Special Session on Algebraic combinatorics and its applications at the JMM in Denver, CO. Title of talk: *Character tables of the association schemes coming from the action of the groups $GU_n(q)$ on n-dimensional vectors over $GF(q^2)$.* Abstract only. (Could not attend the meeting for personal reason.)

2. September, 2019, Special Session on Association Schemes and Related Topics, at the Central Sectional Meeting of American Mathematical Society held in September 14–15, at University of Wisconsin, Madison, WI. Title of talk: *Schurian association schemes from classical geometries.*

3. March, 2018, Special Session on Association Schemes and Finite Geometry at the Central Sectional Meeting of American Mathematical Society held in March 16–18, at the Ohio State University. Title of talk: *Character tables of group-case commutative association schemes.*

4. * November, 2017, International Workshop on Bannai–Ito Theory, held at Zhejiang University in Hangzhou, China (11/23–26/2017). Title of talk: *Association schemes and partial geometric designs.*

5. July, 2017, International Linear Algebra Society Annual Meeting held in Ames, IA. Talk presented in the Mini-Symposium on Linear Algebra Aspect of Association Schemes. Title of talk: *Partial geometric designs from association schemes.*

6. October 2016, Special Session on Algebraic Combinatorics at the Western Sectional Meeting of American Mathematical Society held in October 8-9, 2016, in University of Colorado at Denver. Title of talk: Partial geometric designs over finite fields

7. October 2015, Special session on "Algebraic Methods Common to Association Schemes, Hopf Algebras, Tensor Categories, Finite Geometry, and Related Areas," at the AMS Central Section Meeting #1112, held in Oct. 3–4, 2015, Loyola University, Chicago, IL. *A family of q-analog partially balanced t-designs over $GF(q)$.*

8. * June 2015, at the Curriculum Development Workshop on Graduation Education in Cryptography and Information Security held at the Center for Applications of Mathematical Principles, National Institute of Mathematical Sciences, Daejeon, Korea. *Graduate degree programs in information assurance in the US.*

9. * August, 2014, Mathematics and Statistics Symposium at the US-Korea Conference, held in San Francisco, CA, in August 6–9, 2014. *Partial geometric designs and difference families.*

10. * June, 2014, NSF-funded International conference on "Modern Trends in Algebraic Graph Theory" held in Villanova University in June 2–5, 2014, Villanova, PA. *One-and-half difference families and three-class association schemes.*

11. March, 2014, Special session on "Algebraic Methods in Graph Theory and Combinatorics," at the AMS-Southeastern Section Meeting #1097, held in March 21–23 in Knoxville, TE. *Cyclotomic association schemes, difference sets and $1\frac{1}{2}$-difference families.*

12. September, 2013, Korean-American Scientists Association, Central Iowa Section meeting held on September 21, 2013 at Iowa State University. *Error correcting codes: Finding a liar.*

13. * August, 2013, Mathematics Symposium at the 2013 US-Korea Conference, held in East Rutherford, New Jersey. (08/07 – 08/09/2013) *Association schemes coming from cyclotomic classes.*

14. April, 2013, Friday Special Workshop held with Special Session on Algebraic and Geometric Combinatorics, at the #1090 AMS Central Section Meeting held in Ames, Iowa, April 26-28. *Construction of almost difference sets in finite field*

15. September, 2012, MIGHTY LIII (Midwest Graph Theory Conference), held in Ames IA. *On wreath product of distance-regular graphs and association schemes.*

16. October, 2011, Special Session on Association Schemes and Related Topics at the 1074th AMS Central Section Meeting, Lincoln, NE. *Directed strongly regular graphs and* $1\frac{1}{2}$*-designs.*

17. * August, 2010, Pure and Applied Science Symposium at the US-Korea Conference, held in Bellevue, Washington, August 11 - 15, 2010. *What does the character table of a scheme tell us about the scheme?.*

18. * July, 2010, Algebraic and Geometric Combinatorics Conference 2010 held in Keongju, Korea, July 12 – 16, 2010. *Some directed strongly regular graphs coming from finite incidence structures.*

19. * July, 2009, Mathematics Symposium on Fundamentals and Applications at the US-Korea Conference, held in Raleigh, North Carolina, July 16 - 19, 2009. *Algebraic Approaches to the Characterization of Regular Directed Graphs.*

20. April, 2009, Special Session on Algebraic Graphs and Association Schemes at the 1050th AMS Eastern Section Meeting, Worcester, MA. *The* $\mathcal{T}$*-Algebra of the Wreath Product of Association Schemes.*

21. * 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.*

22. 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.*

23. * 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*.

24. 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.*

25. * 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).

26. * December 2006, 2006 Korean Computer Scientists and Engineers Association Symposium held in Tempe, Arizona, in December 15-16. *Cryptographically secure identification schemes*.

27. * 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*.

28. * 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.*

29. 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.*

30. 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* $(64, 28, 12, 12)$.

31. * July, 2004, 2004 Com^{2}MaC Conference on Association Schemes, Codes and Designs, held in Busan, Korea, in July 19 - 23, 2004. *Polygonal Designs: Some existence and non-existence results.*

32. 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.*

33. 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.*

34. 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.*

35. * July, 2002, International Conference on Graphs and Combinatorics held at POSTECH, Korea in July 8 - 10. *Products in Graphs and Association Schemes.*

36. 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).

37. Sept. 2001, Special Session on Coding Theory and Designs at the 969th AMS Central Section Meeting, Columbus, Ohio. *Products of Association Schemes.*

38. * June, 2001, Hungarian-Korean Mathematics Conference, Renyi Institute of Hungarian Academy of Science, Budafest, Hungary, *Spanning Time for Abstract Biological Codes.*

39. * March, 2001, Symposium on Algebraic Combinatorics, Operater Algebra and Spin Models, Kyushu University, Japan, *Classification and Characterization of Association Schemes.*

40. * October 2000, Korean Math Society Meeting on Mathematics in the New Millennium, Seoul, Korea, *Association Schemes and Codes.*

41. * October 2000, International Workshop on Combinatorics - 12th Franco-Japanese Conference, Yamagata, Japan. *Commutative Association Schemes Whose Symmetrizations Have Two Classes.*

42. * September 2000, Korean Applied and Computational Mathematics Society Annual Meeting, Sunmoon Univ., Korea, *Graphs, Codes and Designs.*

43. * 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.*

44. * July 2000, Combinatorial and Computational Mathematics Conference on Association Schemes, Codes and Designs, POSTECH, Korea. *Calculation of the Spanning Time for Abstract Biological Codes.*

45. * June 2000, Korean Math Society Honam Regional Conference, Jeonbug National Univ., Korea, *Algebras and Codes.*

46. * 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.*

47. March 1999, Special Session on Combinatorial Designs at the 941st AMS Central Section Meeting, Urbana, Illinois. *On Algebraic Designs in Association Schemes.*

48. * 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.*

49. 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.*

50. August 1998, The Workshop on Coding Theory, Cryptography and Computer Security, Lethbridge, Canada. *Designs and Codes in Association Schemes.*

51. * May 1998, The 24th Ohio State-Denison Math Conference, Granville, Ohio. *Association Schemes Coming from the Actions of Classical Groups Acting on Finite Geometries.*

52. November 1996, The 11th Midwestern Conference on Combinatorics, Cryptography and Computing, Las Vegas, Nevada, *Classification of Association Schemes of Small Order.*

53. * July 1996, The 13th Algebraic Combinatorics Symposium, Hokkaido, Japan, *The Subconstituent Algebra for the Wreath Product of Association Schemes.*

54. * June 1996, 1996 Korean Scientists and Engineers Conference, Seoul, Korea, *Designs, Graphs and Association Schemes.*

55. * June 1996, The 3rd Combinatorics and Theoretical Computer Science Conference, POSTECH, Pohang, Korea, *An Algebraic Method in Graph Theory.*

56. May 1996, International Conference on Modern Algebra and Its Applications, Nashville, Tennessee, *The Terwilliger Algebra of a Group Case Association Scheme.*

57. * May 1996, The 23rd Ohio State-Denison Math Conference, Granville, Ohio, *The Subconstituent Algebra of a Distance-Regular Graph.*

58. February 1996, Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Baton Rouge, Louisiana, *On The Existence of Partially Balanced Incomplete Block Designs.*

59. October 1995, The 10th Midwestern Conference on Combinatorics and Computing, Carbondale, Illinois, *New Association Schemes from Old.*

60. 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.*

61. October 1994, The 9th Midwestern Conference on Combinatorics and Computing, Lincoln, Nebraska, *Schur Rings Coming from Doubly-Regular* $(m, 2)$*-Team Tournaments.*

62. January 1994, Conference on Algebraic Combinatorics: Association Schemes and Representation Theory, Oberwolfach, Germany, *Character tables of Commutative Association Schemes and Their Fusions and Fissions.*

63. * November 1993, International Conference on Algebraic Combinatorics, Fukuoka, Japan, *Symmetrizable Commutative Association Schemes of Class Four.*

64. October 1993, The 886th AMS Meeting, The Special Session on Algebraic Combinatorics, College Station, Texas, *Symmetric Pseudocyclic Association Schemes.*

65. May 1993, Shanghai Conference: Designs, Codes and Finite Geometries, Shanghai, P. R. China, *Fission Schemes of Pseudocyclic Association Schemes.*

66. October 1992, The 876th AMS meeting, the Special Session on Combinatorics and Graph Theory, Dayton, Ohio, *Symmetrizable Commutative Fission Schemes.*

67. * May 1992, The 21st Ohio State-Denison Conference, Granville, Ohio, *Posets Related to Fusion Schemes.*

68. October 1991, Sixth Midwestern Conference on Combinatorics, Cryptography, and Computing, Lincoln, Nebraska, *Commutative Fission Schemes of Rank Three Symmetric Schemes.*

69. * August 1991, International Conference on Algebraic Combinatorics, Vladimir, former USSR, *Character Tables of Fusion Schemes and Fission Schemes.*

70. * September 1990, International Meeting on Algebraic Combinatorics, Kyushu University, Japan, *Recovering the Character Table of an Association Scheme from Its Fusion Table.*

71. * 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.*

72. * August 1990, The Fifth Korea Institute of Technology Mathematics Workshop, Korea Institute of Technology, Korea, *Commutative Association Schemes and Related Algebra.*

73. * 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.*

74. * 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* $PSL(2, q)$.

75. * May 1986, Ohio State - Denison Mathematics Conference, Granville, Ohio, *Products of the Distance Regular Graphs.*

Special lectures given at other institutions

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. Dec. 4, 2018. Grinnell College, give a talk on *What is Combinatorics?* and short presentation / Q&A on *Graduate Study in Math and ISU Math/Applied Math Graduate program* during their Mathematics and Statistics Seminar.

2. * June 2015, two talks given at the Center for Applications of Mathematical Principles, National Institute of Mathematical Sciences, Daejeon, Korea.
   (i) June 25, *Tips for writing journal papers*
   (ii) June 26, *Partial geometric designs and directed strongly regular graphs.*

3. * 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.*

4. * April, 2009, Eastern Kentucky University, *Wreath Products of Association Schemes.*

5. * July 2006, SoongSil University, Seoul, Korea, *Topics in Algebraic Combinatorics.*

6. * July, 2006, Seoul National University, Seoul, Korea, *Subconstituent Algebras of Commutative Association Schemes.*

7. * April 2001, Korea Advanced Institute of Science and Technology. Dae-Jeon, Korea, *Algebraic Codes and Graphs.*

8. * March 2001, Kanazawa Univ., Kanazawa, Japan, *Products of Graphs and Association Schemes.*

9. * December 2000, Changwon National Univ., Changwon, Korea, *Error-Correcting Codes.*

10. * November 2000, Seoul National Univ., Seoul, Korea, *Codes and Association Schemes.*

11. * November 2000, Cheonnam National Univ., Kwangju, Korea, *Links between Algebraic Graphs and Codes.*

12. November 2000, POSTECH. *Links between Graphs, Codes and Association Schemes.*

13. * November 2000, Ajou Univ., Suwon, Korea, *Error-Correcting Codes: Finding a Liar.*

14. * November 2000, Catholic Univ., Daegu, Korea, *Error-Correcting Codes.*

15. * October 2000, Kangnung National Univ., Kangnung, Korea, *Error-Correcting Codes.*

16. * January 1999, Seoul National University, Seoul, Korea. *Delsarte's Approach to Algebraic Coding.*

17. * January 1999, Korean Institute of Science and Technology. *Designs and Codes in Association Schemes.*

18. * June 1996, Seoul National University, *The Subconstituent Algebra of a Distance-Regular Graph.*

19. * June 1994, Seoul National University, Seoul, Korea, *Spin Models and Link Invariants.*

20. * April 1992, Ohio State University, Columbus, Ohio, *Fission Schemes and Graph Decompositions.*

21. * 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.*

22. * 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.*

23. * September 1987, Wright State University, Dayton, Ohio, *The Paige's Simple Moufang Loops and $PSL(2, q)$.*

Departmental colloquium talks presented

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.

Departmental research group seminar talks presented

Regularly participate and present my work once or twice a year either at the weekly departmental Algebra/Combinatorics seminar or at Discrete Mathematics seminar.

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

1. November 2017. Foreign Travel Grant Award from Iowa State University ($590)
2. August 2013. Travel support received to attend The 2013 Young Mathematicians Conference held in Columbus, OH (08/09–08/11/2013) for playing the role as an conference mentor, abstract reviewer and judge for the best presentation award.
3. June 2012. Departmental Faculty Summer Research Support (approximately $4,000).
4. June 2007. Foreign Travel Grant Award from Iowa State University ($1,086)
5. 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)
6. 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)
7. Summers 2004, 2005, 2009, 2011 and 2013. Incentives to faculty mentors from NSF-ISU Summer Mathematics Research Experience for Undergraduate Program (from NSF grant DMS-0353880 via Justin Peters and Leslie Hogben as PIs) ($10,000= 5× $2,000/per Summer).
8. 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)
9. July 2004. Travel support from Combinatorial and Computational Mathematics Center to organize the 2004 Com^{2}MaC Conference on Association Schemes, Codes, and Designs, Busan, Korea, ($1,500)
10. July, 2004. Funding to hold an international conference, "The 2004 Com^{2}MaC Conference on Association Schemes, Codes, and Designs," which was held in July 19-23, in Busan, Korea, ($20,000 from Korean Science & Engineering Foundation).
11. 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).
12. 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).
13. August 2000 - May 2001. University Faculty Development Assignments for the academic year 2000 - 2001. (Visit Math Dept. POSTECH, Pohang, Korea)
14. July, 2000. Funding to hold an international conference, "The 2000 Com^{2}MaC 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).
15. January 1999. Travel support for holding a workshop. Received from KOSEF via Combinatorial and Computational Mathematics Center to visit Com^{2}MaC, Pohang Institute of Science and Technology, Pohang, Korea, (total $3,000, during the period of 1999-2000).

16. Summer 1992. Faculty Incentive Grant from ISU Liberal Arts and Science Research Institute; Summer Research Award ($4,000).

17. Summer 1991. Foreign Travel Grant Award from Iowa State University ($1,700)

18. Summer 1989. University Research Grant from Iowa state University ($640)

19. Summer 1989. Science and Humanity Research Institute Grant from Iowa State University($3,000).

2.5 Ph.D. dissertation supervised or co-supervised*

(†: a current student; !: at Pohang Univ. of Sci. & Tech. in Korea.)

Name (Current affiliation)	Conferred Yr. (Anticipated)	Title of Thesis
Nathaniel Benjamin † (ISU)	current (May 2022)	Schurian association schemes coming from classical geometries
Ted Tranel † (ISU)	current (May 2021)	Partial geometric designs and partial geometries
Robert Lazar (DOD)	Dec, 2017	Association schemes and designs in symplectic vector spaces over finite fields
Darren Rasberry* (w/ Dr. Irvin Hentzel) (Mercy Coll. of Health Sci.)	May 2017	On minimal support solutions of underdetermined systems of linear equations
Kathleen Nowak (Pacific NW Nat'l Lab.)	May 2015	Partial geometric designs and difference families
Oktay Olmez (Ankara U. Turkey)	Aug. 2012	On highly regular digraphs
Gargi Bhattacharyya (Occidental Coll.)	Aug. 2008	Terwilliger algebras of wreath products of association schemes
Joo Hyung Kim* (w/ Dr. Ling Long) (Wonkwang U. Korea)	Aug. 2005	Classification of small class association schemes obtained from certain combinatorial objects
Mandi Maxwell* (w/ Dr. Cliff Bergman) (Christian Trinity Coll.)	May 2005	Almost perfect nonlinear functions and related combinatorial structures
Sejeong Bang* ! (w/ Dr. Jinho Kwak) (Yeongnam U. Korea)	Aug. 2002	An algebraic description of the structure of association schemes