

# Curriculum Vitae

Name: Hong-Yeop Song

## Current Work Address:

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## Education

- Ph.D. University of Southern California, Los Angeles, CA, Dec 1991.  
Thesis Title: On Aspects of Tuscan Squares
- MSEE University of Southern California, Los Angeles, CA, May 1986.
- BSEE Yonsei University, Seoul, Korea, Feb 1984.

## Employment History

- Professor, [Yonsei University](http://www.yonsei.ac.kr), Seoul, Korea, Sept 1995 – Current.
- Visiting Professor, [University of Waterloo](http://www.uwaterloo.ca), Canada, March 2002 – Feb 2003.
- Senior Engineer, [Qualcomm Inc.](http://www.qualcomm.com), San Diego, CA, April 1994 – Aug 1995.
- Research Associate, [Communication Sciences Institute, USC](http://www.usc.edu), Los Angeles, Jan 1992 – March 1994.

## Research Interest in General

- Pseudo-random Sequences, Cyclic Difference Sets and related Mathematics
- Sequence Designs for DS/FH Spread Spectrum Communication Systems
- Error Correcting Codes for reliable communication and storage
- CDMA/OFDMA and Mobile Communications
- Streamciphers and Crypto Algorithms

## Research Lab: [Communication Signal Design Lab](http://coding.yonsei.ac.kr) (<http://coding.yonsei.ac.kr>)

- 1 Professor (myself)
- 1 Post-doc Research Associate (2015.6-2017.5)
- 2 MS-program students and 5 PHD-program students

## Graduate Students and Post-Docs Supervising

- Current: 2 MS-program students, 5 PHD-program students, 1 post-doc
- Supervised 41 MS and 8 PHD Thesis's
- Supervised 3 post-docs

## Funded Research Projects

### ▪ ▪ Engineering Development Projects (Selected)

- Security of GNSS Signals (AGENCY FOR DEFENCE DEV, 2013-2020)
- Error-Correcting Codes for Military Networks (AGENCY FOR DEFENCE DEV, 2013-2020)
- Low-Density Codes over Binary Erasure Channels (ETRI, 2008)
- Efficiently Encoded LDPC Codes (SAMSUNG ELECTRONICS, 2002-2007)
- Analysis and Design of Channel Codes for DVD (LG ELECTRONICS, 2001)
- Design of Frequency-Hopping Codes (AGENCY FOR DEFENCE DEV, 2002-2004)
- Waveform Design for FH Communication (SAMSUNG THALES, 2003-2004)
- Design of RS Codec for DVCR (SAMSUNG ELECTRONICS, 1999-2000)

### ▪ ▪ Pure and Fundamental Research Projects (Selected)

- Reliable Storage codes for Cloud (NRF, 2013-2016)

- Network Coding and related area (NRF, 2009-2011)
- Design and Analysis of Boolean Functions for Optimal Algebraic Immunity (KIISC, 2008)
- Sequences for Communication and Cryptography (KOSEF, 2003-2006)
- Study on Poly-phase Power Residue Sequences (KRF, 2003-2004)
- Hamming Correlation of De Bruijn Sequences (KRF, 1999-2000)
- Theory and Application of Binary-Mapped RS Codes (IITA, 1998-2000)
- Cyclic Hadamard Matrices and their Applications (KOSEF, 1997-1999)
- Binary Sequences with Ideal Autocorrelation (IITA, 1997-1998)

### Publication Summary

- IEEE Journals: 22
- Non-IEEE Journals: 30
- Book Editing: 4
- Book Translation into Korean: 3
- IEEE Conferences: 39
- Non-IEEE Conferences: 47
- Invited talks: 3
- Domestic Journals: 52
- Domestic Conferences: 125

### Patents

- 11 international patents including 1 pending:
  - ✓ Design of quasi-orthogonal signals for CDMA communications
  - ✓ Design of Nonlinear Boolean Function for Encryption Algorithm.
  - ✓ Method for encoding/decoding concatenated LDGM code
  - ✓ Design of Interleaver on Parallel-Structured Turbo Codes Using Interleaver of Short Length
  - ✓ Method of constructing QC-LDPC codes using qth-order power residue
  - ✓ Design of locally recoverable codes with low joint locality
- 13 domestic patents including 3 pending

### Awards

- Best Paper Award, 2015 Korean Institute of Communications and Information Sciences
- Special Contribution Award, 2011 IEEE Mid-West Symposium on Circuits and Systems
- Best Paper Award, 2003 Joint Conference on Communications and Information
- Special Contribution Award, 2000 Korean Institute of Communications and Information Sciences

### Technical Activity for International Society and Professional Service

- Member (1988) and Senior Member, [IEEE](#) (2007)
- Member, [IEEE Information Theory Society](#) (since 1995)
- Member, [IEEE Communications Society](#) (since 1995)
- Member, [IEEE Vehicular Technology Society](#) (since 1995)
- Member, [Mathematical Association of America](#) (since 1992)
- Member of [Organizing Committee](#): SETA2004, ISITA2006, ISIT 2009
- Member of [Technical Program Committee](#): ISIT 2014, ANTS 2014, AAEC2009, AAEC2007, SETA, IWSDA, APCC
- Co-chair of [Technical Program Committee](#): APCC 2010
- Co-chair of [Technical Program Committee](#): IWSDA 2009
- Principal Organizer: [2007 Sequences, Subsequences and Consequences](#), Los Angeles, USA
- General Co-chair, [2015 IEEE Information Theory Workshop](#), Jeju, Korea

### Technical Activity for Domestic Society and Professional Service

- Life Member, [Institute of Electronic and Information Engineers](#), IEIE Korea (since 1995)
- Life Member, [Korea Institute of Information Security and Cryptology](#), KIISC (since 1995)
- Life Member, [Korean Institute of Communications and Information Sciences](#), KICS (since 1995)
- Member, [Korean Mathematical Society](#), KMS (since 2008)

- Technical Member, [Mobile Communications Group](#), KICS (since 1998)
- Technical Member, [Coding and Information Theory Group](#), KICS (since 1997)
- Technical Member, [Crypto Group](#), KMS (since 2008)
- Technical Member, [Crypto Group](#), KIISC (since 2007)
- Technical Member, [Communications Group](#), IEIE Korea (since 1997)
- TPC Chair, [Joint Conference of Communications and Information](#) (JCCI 2013)
- Founding Member, [IEEE Information Theory Society, Seoul Chapter](#) (since 1996)
- Chair, [IEEE Information Theory Society Seoul Chapter](#) (since 2009)
- Editor-in-chief, [Trans of Korea Institute of Information Security and Cryptology](#), KIISC (2012 - 2012)
- General Chair, [Winter Conference of KIISC](#) (2009)
- Vice chair, [Organizing Committee](#), JCCI (2016)
- Member, [Steering Committee](#), JCCI (since 2006)
- Chair, [School of Electrical and Electronic Engineering](#), Yonsei University (2010-2011)
- Invited speaker, [Dept. of Mathematics, Sogang University](#), 2015
- Invited Plenary speaker, Fall Conference of [Korean Society of Mathematics History](#), 2013
- Invited speaker, epsilon seminar, [Dept. of Mathematics, Seoul National University](#), 2011

## PHD Supervised

①	Yeonsik Jeong (2001),	Professor,	Dept CS, SungKongHoe University
②	Jeong-Heon Kim (2002),	Research Staff,	Samsung Electronics
③	Yu-Chang Eun (2004),	Research Staff,	Samsung Electronics
④	Min-Ho Shin (2005),	Research Staff,	Samsung Electronics
⑤	Young-Joon Kim (2009),	Research Staff,	Samsung Electronics
⑥	Yun-Pyo Hong (2009),	Research Staff,	Samsung Electronics
⑦	Seok-Yong Jin (2011),	Research Staff,	Samsung Electronics
⑧	Ki-Hyeon Park (2016),	Technical Staff,	Korea Telecom

## Post-Docs

①	Su-Jeong Choi (2004),	Professor,	Dept Math, Dong-A University
②	Ki-Moon Lee (2007-2008)		
③	Jung Youl Park (2011),	Research Staff,	National Security Research Institute

## Comprehensive Publication List

### □ [IEEE Transactions on Information Theory](#) (14)

[1] **Hong-Yeop Song**, Irving S. Reed, and Solomon W. Golomb, "On the Non-periodic Cyclic Equivalence Classes of Reed-Solomon Codes," *IEEE Transactions on Information Theory*, vol. 39, no. 4, pp. 1431-1434, July 1993.

[2] **Hong-Yeop Song** and Solomon W. Golomb, "Some New Constructions for Simplex Codes," *IEEE Transactions on Information Theory*, vol. 40, no. 2, pp. 504-507, March 1994.

[3] **Hong-Yeop Song** and Solomon W. Golomb, "On the Existence of cyclic Hadamard difference sets," *IEEE Transactions on Information Theory*, vol. 40, no. 4, pp. 1266-1268, July 1994.

[4] Jong-Seon No, Hwan-Keun Lee, Habong Chung, **Hong-Yeop Song**, and Kyeongcheol Yang, "Trace Representation of Legendre Sequences of Mersenne Prime Period," *IEEE Transactions on Information Theory*, vol. 42, no. 6, pp. 2254-2255, November 1996.

- [5] Jong-Seon No, Habong Chung, Kyeongcheol Yang, and **Hong-Yeop Song**, "New Construction for Families of Binary Sequences with Optimal Correlation Properties," *IEEE Transactions on Information Theory*, vol. 43, no. 5, pp. 1596-1602, September 1997.
- [6] Jong-Seon No, Habong Chung, **Hong-Yeop Song**, Kyeongcheol Yang, Jung-Do Lee, and Tor Helleseth, "New Construction for Binary Sequences of period  $p^m-1$  with Optimal Autocorrelation Using  $(z+1)^d + az^d+b$ ," *IEEE Transactions on Information Theory*, vol. 47, no. 4, pp. 1638-1644, May 2001.
- [7] Jeong-Heon Kim and **Hong-Yeop Song**, "On the Linear Complexity of Hall's sextic residue sequences," *IEEE Transactions on Information Theory*, vol. 47, no. 5, pp. 2094-2096, June 2001.
- [8] Yu-Chang Eun, Seok-Yong Jin, Yun-Pyo Hong, and **Hong-Yeop Song**, "Frequency Hopping Sequences with Optimal Partial Autocorrelation Property," *IEEE Transactions on Information Theory*, vol. 50, no. 10, pp. 2438-2442, October 2004.
- [9] Young-Joon Kim and **Hong-Yeop Song**, "Crosscorrelation of Sidel'nikov Sequences and Their Constant Multiples," *IEEE Transactions on Information Theory*, vol. 53, no. 3, pp. 1220-1224, March 2007.
- [10] Guang Gong, Solomon W. Golomb, and **Hong-Yeop Song**, "A Note on Low Correlation Zone Signal Sets," *IEEE Transactions on Information Theory*, vol. 53, no. 7, pp. 2575-2581, July 2007.
- [11] Zonduo Dai, Guang Gong, **Hong-Yeop Song**, Dingfeng Ye, "Trace representation and linear complexity of binary  $e$ -th power residue sequences of period  $p$ ," *IEEE Transactions on Information Theory*, vol.57, no.3, pp. 1530-1547, March 2011.
- [12] Dae San Kim, Hi-Joon Chae, **Hong-Yeop Song**, "A generalization of the Family of  $p$ -ary Decimated Sequences with Low Correlation," *IEEE Transactions on Information Theory*, vol.57, no.11, pp. 7614-7617, November 2011.
- [13] Young-Tae Kim, Dae San Kim, **Hong-Yeop Song**, "New  $M$ -ary Sequence Families With Low Correlation From the Array Structure of Sidelnikov Sequences", *IEEE Transactions on Information Theory* , vol.61, no.1, pp.655-670, January, 2015.
- [14] Ki-Hyeon Park, **Hong-Yeop Song**, Dae San Kim and Solomon W. Golomb, "Optimal Families of Perfect Polyphase Sequences from the Array Structure of Fermat-Quotient Sequences," *IEEE Transactions on Information Theory* , vol.62, no.2, pp.1076-1086, Feb., 2016.

#### □ Other IEEE Journals (8)

- [1] Hyun Meen Jung, Yongkyu Kim, Seunghyeon Rhee, **Hong-Yeop Song**, and Kyu Tae Park, "HD-VCR Codec for Studio Application using Quadtree Structured Binary Symbols in Wavelet Transform Domain," *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 6, no. 5, pp. 506-513, October 1996.
- [2] Seunghyeon Rhee, Yong Je Kim, Jun Geun Jeon, **Hong-Yeop Song**, and Kyu Tae Park, "A New Quantizer Selection Scheme for Digital VCR," *IEEE Transactions on Consumer Electronics*, vol. 43, no. 3, pp. 879-885, August 1997.
- [3] Byung Hwan Jun, Chang Soo Kim, **Hong-Yeop Song**, and Jaihie Kim, "A New Criterion in Selection and Discretization of Attributes for the Generation of Decision Trees," *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 19, no. 12, pp. 1371-1375, December 1997.

[4] Min-Ho Shin, Joon-Sung Kim, and **Hong-Yeop Song**, "Generalization of Tanner's Minimum Distance Bounds for LDPC Codes," *IEEE Communications Letters*, vol. 9, no. 3, pp. 240-242, March 2005.

[5] Joon-Sung Kim and **Hong-Yeop Song**, "Concatenated LDGM Codes with Single Decoder," *IEEE Communications Letters*, vol. 10, no. 4, pp. 287-289, April 2006.

[6] Sung-Ha Kim, Joon-Sung Kim, Dae-Son Kim, and **Hong-Yeop Song**, "LDPC Code Construction with Low Error Floor Based on the IPEG Algorithm," *IEEE Communications Letters*, vol. 11, no. 7, pp. 607-609, July 2007.

[7] Dae-Son Kim, Hyun-Young Oh, and **Hong-Yeop Song**, "Collision-free Interleaver composed of a Latin Square Matrix for Parallel-architecture Turbo Codes," *IEEE Communications Letters*, vol. 12, Issue 3, pp. 203-205, March 2008.

[8] Wonwoo Park, Sunghoon Jung, **Hong-Yeop Song**, Chungyong Lee, "The Global Optimality of the MIMO Cooperative System with Source and Relay Precoders for Capacity Maximization," *IEEE Transactions on Communications*, vol.60, no.10, pp.2886-2892, October, 2012.

#### □ IET Electronics Letters (4)

[1] Eun Jeong Yim, Dong Ku Kim, and Hong-Yeop Song, "MIMO Iterative Decoding of Serial Concatenation using Space-Time Trellis codes," *IEE Electronic Letters*, vol. 38, no. 4, pp. 190-191, February 2002.

[2] Sung-Eun Park, Min-Ho Shin, Hong-Yeop Song, and Dong Ku Kim, "Product Distance Profile of Product Distance Codes for STTC with Delay Diversity," *IEE Electronic Letters*, vol. 38, no. 14, pp.720, July 2002.

[3] Yun-Pyo Hong, Seok-Yong Jin, and Hong-Yeop Song, "Coded N-ary PPM UWB Impulse Radio with Chaotic Time Hopping and Polarity Randomisation," *IET Electronics Letters*, vol. 44, no. 19, pp. 1146-1147, Sep. 11, 2008.

[4] Jung-Hyun Kim, Mi-Young Nam, and Hong-Yeop Song, "Variable-to-Check Residual Belief Propagation for LDPC Codes," *IET Electronics Letters*, vol.45, no. 2, pp. 117-118, January 2009.

#### □ IEICE Trans on Funds of Electronics, Comm and Comp Sciences (6)

[1] Young-Joon Kim, Yun-Pyo Hong, and Hong-Yeop Song, "Autocorrelation of Some Quaternary Cyclotomic Sequences of Length  $2p$ ," *IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences*, vol. E91-A, no. 12, pp. 3679-3684, December 2008.

[2] Seok-Yong Jin, Hong-Yeop Song, "Binary Sequence Pairs with Two-Level Correlation and Cyclic Difference Pairs", *IEICE Transactions on Fundamentals of Electronics, Communications, and Computer systems*, vol. E93-A, no. 11, pp. 2266-2271, November 2010.

[3] Seok-Yong Jin, Young-Joon Kim, Hong-Yeop Song, "Autocorrelation of New Generalized Cyclotomic Sequences of Period  $p^n$ ", *IEICE Transactions on Fundamentals of Electronics, Communications, and Computer systems*, vol. E93-A, no.11, pp. 2345-2348 November 2010.

[4] Ki-Hyeon Park, Hong-Yeop Song, "Some Properties of Binary Matrices and Quasi-Orthogonal Signals Based on Hadamard Equivalence", *IEICE Transactions on*

Fundamentals of electronics, Communications and Computer Sciences, vol.E95-A, no.11, pp.1862-1872, November, 2012.

[5] Jung Youl Park, Hong-Yeop Song, "A New Construction of Permutation Arrays," IEICE Transactions on Fundamentals of electronics, Communications and Computer Sciences, vol.E95-A, no.11, pp.1855-1861, November, 2012.

[6] Young-Tae Kim, Min Kyu Song, Dae San Kim, Hong-Yeop Song, "Properties and Crosscorrelation of Decimated Sidelnikov Sequence", IEICE Transactions on Fundamentals of electronics, Communications and Computer Sciences, vol.E97-A, no.12, pp.2562-2566, December, 2014.

#### □ Journal of Communications and Networks (2)

[1] Jeong-Heon Kim and Hong-Yeop Song, "Existence of Cyclic Hadamard Difference Sets and its Relation to Binary Sequences with Ideal Autocorrelation," Journal of Communications and Networks, vol. 1, no. 1, pp. 14-18, March 1999.

[2] Jong-Seon No and Hong-Yeop Song, "Expanding Generalized Hadamard Matrices over  $G_m$  by Substituting Several Generalized Hadamard Matrices over  $G$ ," Journal of Communications and Networks, vol. 3, no. 4, pp. 361-364, December 2001.

#### □ Mathematics Journals (7)

[1] Hong-Yeop Song, Solomon W. Golomb, and Herbert Taylor, "Progressions in Every Two-coloration of  $Z_n$ ," *Journal of Combinatorial Theory, Series A*, vol. 61, no. 2, pp. 211-221, November 1992.

[2] Hong-Yeop Song and Solomon W. Golomb, "A Conjecture on the Existence of Cyclic Hadamard Difference Sets," *Journal of Statistical Planning and Inferences*, vol. 62, pp. 39-41, July 1997.

[3] Hong-Yeop Song, "On the Existence of Circular Florentine Arrays," *Computers & Mathematics with Applications*, vol. 39, no. 11, pp. 31-35, June 2000.

[4] Hong-Yeop Song and Jun Bok Lee, "On  $(n,k)$ -sequences," *Discrete Applied Mathematics*, vol. 105, no. 1-3, pp. 183-192, October 2000.

[5] Jeong-Heon Kim and Hong-Yeop Song, "Trace Representation of Legendre Sequences," *Designs, Codes and Cryptography*, vol. 24, Issue 3, pp. 343-348, December 2001.

[6] Guang Gong and Hong-Yeop Song, "Two-tuple balance of non-binary sequences with ideal two-level autocorrelation," *Discrete Applied Mathematics*, vol. 154, pp. 2590-2598, 2006.

[7] Zongduo Dai, Guang Gong, and Hong-Yeop Song, "A Trace Representation of Binary Jacobi Sequences," *Discrete Mathematics*, Elsevier, vol. 309, Issue 6, pp. 1517-1527, April 2009.

#### □ Lecture Notes on Computer Sciences (6)

- [1] Yu-Chang Eun, Hong-Yeop Song, and Gohar M. Kyureghyan, "One-Error Linear Complexity over  $F_p$  of Sidelnikov Sequences," Tor Hellesteth et. al. (Eds.), *Sequences and Their Applications – SETA 2004*, LNCS vol. 3486, pp. 154-165, 2005.
- [2] Yun-Pyo Hong and Hong-Yeop Song, "Frequency/Time Hopping Sequences with Large Linear Complexities," Ø. Ytrehus (Ed.). *Workshop on Coding and Cryptography*, LNCS vol. 3969, pp. 386-396, 2006.
- [3] Seok-Yong Jin, Jong-Min Baek, and Hong-Yeop Song, "Improved Rijndael-like S-Box and Its Transform Domain Analysis," Guang Gong et. al. (Eds.), *Sequences and Their Applications – SETA 2006*, LNCS vol. 4086, pp. 153-167, 2006.
- [4] Young-Joon Kim, Seok-Yong Jin, and Hong-Yeop Song, "Linear complexity and Autocorrelation of Prime Cube Sequences," Serdar Boztas et. al. (Eds.), *Applied Algebra, Algebraic Algorithms and Error-Correcting Codes*, LNCS vol. 4851, pp. 188-197, 2007.
- [5] Sung-Jun Yoon and Hong-Yeop Song, "Existence of Modular Sonar Sequences of Twin-Prime Product Length," Solomon W. Golomb et. al. (Eds.), *Sequences, Subsequences, and Consequences*, LNCS vol. 4893, pp.184-191, December 2007.
- [6] Ki-Hyeon Park and Hong-Yeop Song, "A Probabilistic Approach on Estimating the Number of Modular Sonar Sequences," Solomon W. Golomb et. al. (Eds.), *Sequences and Their Applications – SETA 2008*, LNCS vol. 5203, pp.42-50, 2008.

#### □ Book Chapter Contributions (5)

- [1] Hong-Yeop Song and Solomon W. Golomb, "Generalized Welch-Costas sequences and their application to Vatican arrays," *Finite Fields: Theory, Algorithms and Applications*, edited by Gary L. Mullen and PeterJau-Shyong Shiue, pp. 341-351, American Mathematical Society, Series Name: Contemporary Mathematics, vol. 168, 1994.
- [2] Hong-Yeop Song and Jeffrey H. Dinitz, "Tuscan Squares," Part IV, Chapter 48, *The CRC Handbook of Combinatorial Designs*, edited by Charles J. Colbourn and Jeffrey H. Dinitz, CRC Press, pp. 480-484, 1996.
- [3] Hong-Yeop Song, "Feedback Shift Register Sequences," *Encyclopedia of Telecommunications*, edited by J. G. Proakis, John Wiley & Sons, New York, December 2002.
- [4] Jeong-Heon Kim, Hong-Yeop Song and Guang Gong, "Trace Representation of Hall's Sextic Residue Sequences of Period  $p=7 \pmod{8}$ ," *Mathematical Properties of Sequences and Other Combinatorial Structures*, edited by Jong-Seon No, Hong-Yeop Song, Tor Hellesteth, and Vijay Kumar, Kluwer Academic Publishing, New York, February 2003.
- [5] Wensong Chu, Solomon W. Golomb and Hong-Yeop Song, "Tuscan Squares," *The CRC Handbook of Combinatorial Designs*, 2nd Edition, edited by Charles J. Colbourn and Jeffrey H. Dinitz, pp. 652-657, CRC Press, 2006.

#### □ Book Editing (4)

- [1] *Mathematical Properties of Sequences and Other Combinatorial Structures*, edited by Jong-Seon No, **Hong-Yeop Song**, Tor Hellesteth and Vijay Kumar, Kluwer Academic Publishing, New York, February 2003.

[2] Lecture Notes in Computer Science, vol. 3486, Proceedings of SETA'04, edited by Tor Helleseth, Dilip Sarwate, Kyeongcheol Yang and **Hong-Yeop Song**, Springer-Verlag, Amsterdam, Netherland, March 2005.

[3] Lecture Notes in Computer Science, vol. 4086, *Proceedings of SETA'06*, edited by Guang Gong, Tor Helleseth, **Hong-Yeop Song** and Kyeongcheol Yang, Springer-Verlag, Amsterdam, Netherland, September 2006.

[4] Lecture Notes in computer Science, vol. 4893, *Sequences, Subsequences, and Consequences*, edited by Solomon W. Golomb, Guang Gong, Tor Helleseth and **Hong-Yeop Song**, Springer-Verlag, Amsterdam, Netherland, December 2007.

#### □ Book Translation into Korean (3)

[1] Yates and Goodman, Probability, Random Variables and Random Processes, John Wiley & Sons, 2005.

[2] Steven J. Leon, Linear Algebra with Applications, Pearson, 2007.

[3] Yates and Goodman, Probability, Random Variables and Random Processes, Third edition, John Wiley & Sons (Asia) Pte Ltd, 2015.

#### □ Proceedings of IEEE International Symposium on Information Theory (19)

[1] Hong-Yeop Song and Solomon W. Golomb, "Two-dimensional Patterns with Optimal Auto- and Cross-Correlation Functions," ISIT 1994, Technical University of Trondheim, Norway, June 27- July 1, 1994.

[2] Jong-Seon No, Hwan-Keun Lee, Habong Chung, Kyeongcheol Yang, and Hong-Yeop Song, "On the Classification of Binary Sequences of Period  $2n - 1$  with Ideal Autocorrelation," ISIT 1997, pp 42, Ulm, Germany, June 29 - July 4, 1997.

[3] Chang Hyun Eo, Hong-Yeop Song, and Kyu Tae Park, "On  $(n,k)$ -sequences : properties and application to coding," ISIT 1998, Boston, Massachusetts, USA, August 16-21, 1998.

[4] Jong-Seon No and Hong-Yeop Song, "Generalization of Sylvester-Type Hadamard Matrices," ISIT 2000, Sorrento, Italy, June 25-30, 2000.

[5] Jong-Seon No, Habong Chung, Hong-Yeop Song, Kyeongcheol Yang, Jung-Do Lee, and Tor Helleseth, "Balanced and Almost Balanced Binary Sequences of period  $p^m - 1$  with Optimal Autocorrelation Using the Polynomial  $(z+1)^d + az^d + b$  over  $GF(p^m)$ ," ISIT 2000, Sorrento, Italy, June 25-30, 2000.

[6] Yun-Pyo Hong, Yu-Chang Eun, Jeong-Heon Kim, and Hong-Yeop Song, "Linear Complexity of Sequences over Arbitrary Symbols and Constructions of Sequences over  $GF(p^k)$  whose Characteristic Polynomial is over  $GF(p)$ ," ISIT 2002, Palais de Beaulieu, Lausanne, Switzerland, June 30 - July 5, 2002.

[7] Min-Ho Shin, Sung-Eun Park, and Hong-Yeop Song, "Product Distance Profile and Super-optimality of Product Distance Codes for STTC with Delay Diversity," ISIT 2002, Palais de Beaulieu, Lausanne, Switzerland, June 30 - July 5, 2002.

[8] Guang Gong and Hong-Yeop Song, "Two-tuple balance of non-binary sequences with ideal two-level autocorrelation," ISIT 2003, Yokohama, Japan, June 29 - July 4, 2003.



- [9] Zongduo Dai, Guang Gong, and Hong-Yeop Song, "Trace representation of binary  $e$ -th residue sequences of period  $p$ ," ISIT 2003, Yokohama, Japan, June 29 - July 4, 2003.
- [10] Zongduo Dai, Guang Gong, and Hong-Yeop Song, "Trace Representation of Binary Jacobi Sequences," ISIT 2003, Yokohama, Japan, June 29 - July 4, 2003.
- [11] Yu-Chang Eun, Dae-Sun Kim, and Hong-Yeop Song, "Iterative Decoding of Dual-K Convolutional Codes," ISIT 2003, Yokohama, Japan, June 29 - July 4, 2003.
- [12] Yu-Chang Eun, Seok-Yong Jin, Yun-Pyo Hong, and Hong-Yeop Song, "Frequency Hopping Sequences with Optimal Partial Autocorrelation Property," ISIT 2004, Chicago, Illinois, USA, June 27 - July 2, 2004.
- [13] Min-Ho Shin, Joon-Sung Kim, and Hong-Yeop Song, "Minimum Distance Bounds of Irregular QC-LDPC Codes and their Applications," ISIT 2004, Chicago, Illinois, USA, June 27 - July 2, 2004.
- [14] Young-Joon Kim, Hong-Yeop Song, Guang Gong, and Habong Chung, "Crosscorrelation of  $q$ -ary power residue sequences of period  $p$ ," ISIT 2006, Seattle, Washington, USA, July 9-14, 2006.
- [15] Seok-Yong Jin and Hong-Yeop Song, "Note on a Pair of Binary Sequences with Ideal Two-Level Crosscorrelation," ISIT 2008, Toronto, Ontario, Canada, July 6-11, 2008.
- [16] Young-Joon Kim and Hong-Yeop Song, "Linear Complexity of Prime  $n$ -square Sequences," ISIT 2008, Toronto, Ontario, Canada, July 6-11, 2008.
- [17] Ki-Hyeon Park and Hong-Yeop Song, "Quasi-Hadamard Matrix," ISIT 2010, Austin, Texas, USA, June 13-18, 2010.
- [18] Jin Soo Park, Ki-Hyeon Park and Hong-Yeop Song, "Rate Allocation for Component Codes of Plotkin-Type UEP Codes", ISIT 2012, MIT, Massachusetts, USA, July 1-6, 2012.
- [19] Ki-Hyeon Park, Hong-Yeop Song, Dae San Kim, "Families of Perfect Polyphase Sequences from the Array Structure of Fermat-Quotient Sequences and Frank-Zadoff Sequences", ISIT 2015, Hong-Kong, June 14-19, 2015.

#### □ Proceedings of other IEEE Conferences (20)

- [1] Jong-Seon No, Hwan-Keun Lee, Habong Chung, Hong-Yeop Song, and Kyeongcheol Yang, "On the Legendre Sequences of Mersenne Prime Period," [IEEE International Symposium on Information Theory and Its Application](#), pp.834-836, Victoria, B.C., Canada, September 17-20, 1996.
- [2] Jong-Seon No, Habong Chung, Kyeongcheol Yang, and Hong-Yeop Song, "On the Construction of Binary Sequences with Ideal Autocorrelation Property," [IEEE International Symposium on Information Theory and Its Application](#), pp. 837-840, Victoria, B.C., Canada, September 17-20, 1996.
- [3] Jong-Seon No, Habong Chung, Kyeongcheol Yang, and Hong-Yeop Song, "A New Family of Binary Sequences with Optimal Correlation Properties," [IEEE International Symposium on Information Theory and Its Application](#), pp 841-844, Victoria, B.C., Canada, September 17-20, 1996.
- [4] Seunghyeon Rhee, Yong Je Kim, Jun Geun Jeon, Hong-Yeop Song, and Kyu Tae Park, "A New Quantizer Selection Scheme for Digital VCR," [IEEE International Conference on Consumer Electronics](#), pp. 132-133, Chicago, USA, June 11-13, 1997.

- [5] Chan-Hyung Park, Hong-Yeop Song, and Kyu Tae Park, "Existence and Classification of Hadamard Matrices," [IEEE International Conference on Signal Processing](#), Beijing, China, 1998.
- [6] Yu-Chang Eun, Jang-Wook Moon, and Hong-Yeop Song, "Multiuser Detection of FH/MFSK System combined with Soft Limiter," [IEEE Vehicular Technology Conference](#), spring 2000, Hotel Pacific, Tokyo, Japan, May 15-18, 2000.
- [7] Jong-Seon No and Hong-Yeop Song, "Expanding generalized Hadamard matrices over  $G_m$  by using generalized Hadamard matrices over  $G$ ," [IEEE International Symposium on Information Theory and Its Applications](#), Sheraton Waikiki Hotel, Honolulu, Hawaii, November 5-8, 2000.
- [8] Jeong-Heon Kim, Minho Shin, and Hong-Yeop Song, "Trace Representation of Legendre Sequences," [IEEE International Symposium on Information Theory and Its Applications](#), Sheraton Waikiki Hotel, Honolulu, Hawaii, November 5-8, 2000.
- [9] Seong-Bok Park, Kwang-Eog Lee, Young-Kyun Choi, Yu-Chang Eun, and Hong-Yeop Song, "Some Good Frequency Hopping Sequences with Arbitrary Number of Slots," [IEEE Military Communication Conference \(MILCOM 2001\)](#), McLean, VA, October 28-31, 2001.
- [10] Yun-Pyo Hong and Hong-Yeop Song, "Line Spectrum Analysis of Impulse Radio UWB Systems Using a Pulse Position Modulation," [IEEE International Conference on Communications](#), COEX Convention Center, Seoul, Korea, May 16-20, 2005.
- [11] Dae-Son Kim, Young-Joon Kim, and Hong-Yeop Song, "Reduced Memory Turbo MAP Decoding Algorithm for Non-binary Orthogonal Signaling," [IEEE Vehicular Technology Conference](#), spring 2005, Stockholm, Sweden, May 30 - June 1, 2005.
- [12] Joon-Sung Kim and Hong-Yeop Song, "Concatenated LDGM Codes with Reduced Decoder Complexity," [IEEE Vehicular Technology Conference](#), spring 2006, Melbourne, Australia, May 7-10, 2006.
- [13] Young-Joon Kim, Dae-Son Kim, and Hong-Yeop Song, "Short and Efficient Frequency Hopping Sequences," [IEEE International Symposium on Information Theory and Its Applications](#), COEX, Seoul, Korea, October 29 - November 1, 2006.
- [14] Dae-Son Kim, Dong-Seung Kwon and Hong-Yeop Song, "Multi-Axes Modulation for MC-CDMA Systems," [IEEE Singapore International Conference on Communication Systems](#), October 30 - November 2, 2006.
- [15] Joon-Sung Kim and Hong-Yeop Song, "Reduced Complexity Decoding Algorithm of LDPC codes Using Node Elimination," [IEEE Singapore International Conference on Communication Systems](#), October 30 - November 2, 2006.
- [16] Sung-Ha Kim, Joon-Sung Kim, Dae-Son Kim and Hong-Yeop Song, "Modification on the IPEG Algorithm for Constructing LDPC codes with Low Error Floor," [IEEE Vehicular Technology Conference](#), spring 2007, Dublin, Ireland, April 23-25, 2007.
- [17] Hyun-Young Oh, Dae-Son Kim, Joon-Sung Kim and Hong-Yeop Song, "Collision-free Interleavers using Latin Squares for Parallel Decoding of Turbo Codes," [IEEE Vehicular Technology Conference](#), spring 2007, Dublin, Ireland, April 23-25, 2007.
- [18] Ki-Moon Lee, Hayder Radha, Beom-Jin Kim and Hong-Yeop Song, "Kovalenko's Full-Rank Limit and Overheads as Lower Bounds of Error-Performances of LDPC and LT Codes over Binary Erasure Channels," [IEEE International Symposium on Information Theory and its Applications](#), The Langham Hotel, Auckland, New Zealand, December 7-10, 2008.
- [19] Jung-Hyun Kim, Mi-Young Nam and Hong-Yeop Song, "Variable-to-Check Residual Belief Propagation for Informed Dynamic Scheduling of LDPC Codes," [IEEE International](#)

[Symposium on Information Theory and its Applications](#), The Langham Hotel, Auckland, New Zealand, December 7-10, 2008.

[20] Jung-Hyun Kim, Mi-Young Nam, and Hong-Yeop Song, "Optimal Binary Locally Repairable Codes with Joint Information Locality," [IEEE Information Theory Workshop](#), Jeju, Korea, Oct. 11-15, 2015.

#### □ Presentations in Sequences and Their Applications (4)

[1] Jeong-Heon Kim and Hong-Yeop Song, "Characteristic Polynomial and Linear Complexity of Hall's sextic residue sequences," Sequences and Their Applications - SETA 2001, Bergen, Norway, May 13-17, 2001.

[2] Yu-Chang Eun and Hong-Yeop Song, "One-Error Linear Complexity over  $F_p$  of S-LCE Sequences," Sequences and Their Applications - SETA 2004, SEOUL, KOREA, October 24-28, 2004.

[3] Seok-Yong Jin, Jong-Min Baek, and Hong-Yeop Song, "Improved Rijndael-like S-Box and Its Transform Domain Analysis," Sequences and Their Applications - SETA 2006, Beijing, China, September 24-28, 2006.

[4] Ki-Hyeon Park and Hong-Yeop Song, "A probabilistic approach on estimating the number of modular sonar sequences," Sequences and Their Applications - SETA 2008, Lexington, Kentucky, USA, September 14-18, 2008.

#### □ Presentations in International Workshop on Signal Design and its Applications in Communications (12)

[1] Young-Joon Kim, Yun-Pyo Hong and Hong-Yeop Song, "Autocorrelation of Some Quaternary Cyclotomic Sequences of Length  $2p$ ," IWSDA 2007, Chengdu, China, September 23-27, 2007.

[2] Yun-Pyo Hong, Seok-Yong Jin and Hong-Yeop Song, "High Security Frequency/Time Hopping Sequence Generators," IWSDA 2007, Chengdu, China, September 23-27, 2007.

[3] Yun-Pyo Hong, Seok-Yong Jin and Hong-Yeop Song, "Coded N-ary PPM UWB Impulse Radio with Chaotic Time Hopping and Polarity Randomization," IWSDA 2007, Chengdu, China, September 23-27, 2007.

[4] Ju Young Kim and Hong-Yeop Song, "A Nonlinear Boolean Function with Good Algebraic Immunity," IWSDA 2007, Chengdu, China, September 23-27, 2007.

[5] Jung-Hyun Kim and Hong-Yeop Song, "Reduced Complexity-and-latency Variable-to-Check Residual Belief Propagation Decoding Algorithms for LDPC Codes," IWSDA 2009, Fukuoka, Japan, October 19-23, 2009.

[6] Ki-Hyeon Park and Hong-Yeop Song, "A Note on Classification of Binary Signal Set in the View of Hadamard Equivalence," IWSDA 2009, Fukuoka, Japan, October 19-23, 2009.

[7] Ki-Hyeon Park and Hong-Yeop Song, "Classification, Construction and Search of General Quasi-orthogonal Binary Signal Sets," IWSDA 2011, Guilin, China, October 10-14, 2011.

[8] Jung Youl Park and Hong-Yeop Song, "An Extended Construction of Permutation Arrays with a Polynomial-time Sampling Algorithm," IWSDA 2011, Guilin, China, October 10-14, 2011.

[9] Jung-Hyun Kim, Hong-Yeop Song, Jihyung Kim, Kwangjae Lim, Dong Seung Kwon, "Distributed Frequency Synchronization for OFDMA-based Wireless Mesh Network", IWSDA 2013, Tokyo, Japan, October 27 - November 1, 2013.

[10] Young-Tae Kim, Ki-Hyeon Park, Hong-Yeop Song, Dae San Kim, "Properties and Crosscorrelation of Decimated Sidelnikov Sequences", IWSDA 2013, Tokyo, Japan, October 27 - November 1, 2013.

[11] Young-Tae Kim, Dae San Kim, Hong-Yeop Song, "Some Properties of 2-Dimensional Array Structure of Sidelnikov Sequences of Period  $q^d-1$ ", IWSDA 2013, Tokyo, Japan, October 27 - November 1, 2013.

[12] Mi-Young Nam, Jung-Hyun Kim, and Hong-Yeop Song, "Locally Repairable Fractional Repetition Codes," IWSDA 2015, Bengaluru, India, Sep. 13-18, 2015.

#### □ Presentations in Information Theory and Applications Workshop, San Diego (4)

[1] Hong-Yeop Song, Dae San Kim, "Recent development on M-ary sequence family construction using Sidelnikov sequences", 2013 Information Theory and Applications Workshop (ITA2013), Catamaran Hotel, San Diego, California, USA, Feb. 10~15, 2013.

[2] Hong-Yeop Song, Dae San Kim, "Constructions for favorable sequences family using Sidelnikov sequences", 2014 Information Theory and Applications Workshop (ITA2014), Catamaran Hotel, San Diego, California, USA, Feb. 9-14, 2014.

[3] Jung-Hyun Kim, Hong-Yeop Song, "Generalized locality of locally repairable codes for wireless distributed storage systems", 2015 Information Theory and Applications Workshop (ITA2015), Scripps Seaside Forum, La Jolla, California, Feb. 1-6, 2015.

[4] Ki-Hyeon Park, Hong-Yeop Song, Dae San Kim and Solomon W. Golomb, "The p-ary Fermat-quotient Sequences of period  $p^2$  has the PERFECT autocorrelation," 2016 Information Theory and Applications Workshop(ITA2016), Scripps Seaside Forum, La Jolla, California, Sunday 1/31 – Friday 2/5, 2016.

#### □ Proceedings of Asia-Pacific Conference on Communications (4)

[1] Hwan-Keun Lee, Jong-Seon No, Habong Chung, Kyeongcheol Yang, Jeong-Heon Kim, and Hong-Yeop Song, "Trace function representation of hall's sextic residue sequences and some new sequences with ideal autocorrelation," APCC '97, pp. 536-540, Australia, Dec 7-10, 1997.

[2] Jeong-Heon Kim and Hong-Yeop Song, "On The Existence of Cyclic Hadamard Difference Sets," APCC/OECC '99, Beijing, China, October 18-22, 1999.

[3] Ki-Hyeon Park and Hong-Yeop Song, "Hadamard Equivalence of Binary Matrices," APCC 2009, Shanghai, China, October 8-10, 2009.

[4] Jin Soo Park, Min Kyu Song, and Hong-Yeop Song, "Combined Optimization Scheme for Degree Distributions of LDPC Codes", APCC 2013, Bali Island, Indonesia, August 29-31, 2013.

#### □ Presentations in other (peer-reviewed) International Conferences (6)

- [1] Hong-Yeop Song and Solomon W. Golomb, "Generalized Welch-Costas Sequences," [The Second International Conference on Finite Fields : Theory, Applications and Algorithms](#), UNLV, Las Vegas, NV, August 17-21, 1993.
- [2] Zongduo Dai, Guang Gong, and Hong-Yeop Song, "Trace representation and linear complexity of binary  $e$ -th residue sequences," [International Workshop on Coding and Cryptography\(WCC 2003\)](#), Versailles, France, March 24-28, 2003.
- [3] Yun-Pyo Hong and Hong-Yeop Song, "Frequency/Time Hopping Sequences with Large Linear Complexities," [International Workshop on Coding and Cryptography \(WCC 2005\)](#), Radisson SAS Royal Hotel, Bergen, Norway, March 14-18, 2005.
- [4] Guang Gong, Solomon W. Golomb, and Hong-Yeop Song, "A Note on Low Correlation Zone Signal Sets", [The 40th Annual Conference of Information Sciences and Systems \(CISS\)](#), Princeton University, Department of Electrical Engineering and Technical Co-Sponsorship With IEEE Information Theory Society, March 22-24, 2006.
- [5] Young-Joon Kim, Seok-Yong Jin, and Hong-Yeop Song, "Linear Complexity and Autocorrelation of Prime Cube Sequences," [Applied Algebra, Algebraic Algorithms, and Error Correcting Codes \(AAECC-17\)](#), Bangalore, India, December 16-20, 2007.
- [6] Jung-Hyun Kim, Seon-Yeong Park, Ju Young Kim, Young-Joon Kim and Hong-Yeop Song, "Joint LDPC Codes for Multi-User Relay Channel," [NETCOD2008](#), Hong Kong, January 3-4, 2008.

#### □ Presentations in other International Conferences (17)

- [1] Hong-Yeop Song, "On the Existence of Circular Florentine Arrays," GolombFest(60) for Professor S. W. Golomb in his 60th birthday, Oxnard, California, May 30- June 1, 1992.
- [2] Hong-Yeop Song, "Total Number of Tuscan Squares of order  $n$ ," The R. C. Bose Memorial Conference on Statistical Design and related Combinatorics, Colorado State University, in Fort Collins, Colorado, June 7-11, 1995.
- [3] Hong-Yeop Song, "Existence of Cyclic Hadamard Difference Sets and its Relation to Binary Sequences with Ideal Autocorrelation," 1998 Mathematical Theory of Networks and Systems (invited), Padova, Italy, July 6-10, 1998.
- [4] Min-Ho Shin, Jong-Seon No, and Hong-Yeop Song, "Hadamard Matrices from the Multiplication Table of Finite Fields," 2000 International Conference on Electronics, Information and Communications, Shenyang, China, Aug 8-12, 2000.
- [5] Jinwoo Jeong and Hong-Yeop Song, "Some New Improved Signcryption Schemes," 2001 Workshop on Information Security Applications (WISA), Grand Intercontinental Hotel, Seoul, Korea, September 13-14, 2001.
- [6] Min-Ho Shin, Hong-Yeop Song, and Dong Ku Kim, "Trellis Structure and Performance Analysis of Space-Time Trellis Codes from Optimal Product Distance Codes," 2001 CDMA International Conference, Sheraton Walker Hill Hotel & Towers, Seoul, Korea, October 30 - November 2, 2001.
- [7] Eun Jeong Yim, Dong Ku Kim, and Hong-Yeop Song, "MIMO Iterative Decoding of Serial Concatenated Code with Space-Time Trellis codes for High Rate Transmission," 2001 CDMA International Conference, Sheraton Walker Hill Hotel & Towers, Seoul, Korea, October 30 - November 2, 2001.
- [8] Jeong-Heon Kim and Hong-Yeop Song, "Trace Function Representation of Hall's Sextic Residue Sequences," Golombfest(70) for Professor S. W. Golomb in his 70th birthday, University of Southern California, May 29 - June 1, 2002.

[9] Sung-Jun Yoon and Hong-Yeop Song, "Existence of Modular Sonar Sequences of Twin-Prime Product Length," Workshop on Sequences, Subsequences and Consequences (GolombFest75), University of Southern California, USA, May 31 - June 2, 2007.

[10] Ju Young Kim and Hong-Yeop Song, "A Study on the Algebraic Immunity of Nonlinear Boolean Function in Cryptosystem," 1st Korea Information and Communication Society International Workshop on Information and Communications, Yanji, China, August 23-24, 2007.

[11] Seon-Young Park, Ju Young Kim and Hong-Yeop Song, "New DH Protocol Based on Distance-bounding Technique for Peer-to-peer Wireless Network," Hellesteth Symposium, University of Bergen, Bergen, Norway, November 21-22, 2007.

[12] Hong-Yeop Song, "Choi's orthogonal latin squares is at least 67 years earlier than Euler's," 2008 Global KMS Conference (invited), international Convention Center, Jeju, Korea, October. 23-25, 2008.

[13] Ki-Hyeon Park and Hong-Yeop Song, "Hadamard Equivalence on Binary Matrices - New Combinatorial Problem", 2009 Joint Meeting of KMS and AMS, Special Session of Combinatorial Matrix Theory, Ewha Woman's University, Seoul, Korea, Dec. 16 to 20, 2009.

[14] Hong-Yeop Song, "History and recent results on the design of M-ary sequence families using Sidelnikov sequences", The 2012 KIAS International Conference on Coding Theory and Applications, KIAS, Seoul, Korea, November 15~17, 2012.

[15] Jung-Hyun Kim, Jin Soo Park, Ki-Hyeon Park, Inseon Kim, Mi-Young Nam, Hong-Yeop Song, "Reliability Comparison of Various Regenerating Codes for Cloud Services", International Conference on ICT Convergence 2013 (ICTC2013), Jeju Island, Korea, October 13-16, 2013.

[16] Ki-Hyeon Park, Jin Soo Park, Jung-Hyun Kim, Inseon Kim, Hong-Yeop Song, "Performance Comparison of LDPC Convolutional Codes for Memory Size and Encoder Block Size", International Conference on ICT Convergence 2013 (ICTC2013), Jeju Island, Korea, October 13-16, 2013.

[17] Jung-Hyun Kim, Mi-Young Nam, and Hong-Yeop Song, "Binary Locally Repairable Codes from Complete Multipartite Graphs," International Conference on ICT Convergence 2015 (ICTC2015), Jeju Island, Korea, October 28-30, 2015.

#### □ International Patents (11)

[1] Jae-Min Ahn, Ha-Bong Chung, Hee-Won Kang, Je-Woo Kim, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, and Soon-Young Yoon, "TRANSMITTER IN MOBILE COMMUNICATION SYSTEM, BAND SPREAD SIGNAL DEVICE AND METHOD FOR GENERATING BAND SPREAD SIGNAL," JP02947796, 1999-07-02.

[2] Jae-Min Ahn, Soon-Young Yoon, Hee-Won Kang, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, Ha-Bong Chung, Je-Woo Kim, "SYSTEM AND METHOD FOR GENERATING BAND SPREAD SIGNAL IN CDMA MOBILE COMMUNICATION SYSTEM," JP03054402, 2000-04-07.

[3] Jae-Min Ahn, Soon-Young Yoon, Hee-Won Kang, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, Ha-Bong Chung, Je-Woo Kim, "DEVICE AND METHOD FOR GENERATING SPREAD SPECTRUM SIGNAL USING PSEUDO-ORTHOGONAL CODE IN CDMA MOBILE COMMUNICATIONS SYSTEM," US06385187, 2002-05-07.

[4] Soon-Young Yoon, Jae-Min Ahn, Hee-Won Kang, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, Ha-Bong Chung, Je-Woo Kim, "SPREAD SPECTRUM SIGNAL

GENERATING DEVICE AND METHOD IN TRANSMITTER OF MOBILE COMMUNICATIONS SYSTEM,” US06396868, 2002-05-28.

[5] Ha-Bong Chung, Je-Woo Kim, Jae-Min Ahn, Hee-Won Kang, Soon-Young Yoon, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, “DEVICE AND METHOD FOR GENERATING SPREAD SPECTRUM SIGNAL USING PSEUDO-ORTHOGONAL CODE IN CDMA MOBILE COMMUNICATIONS SYSTEM,” CA2245196, 2003-05-06.

[6] Soon-Young Yoon, Jae-Min Ahn, Hee-Won Kang, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, Ha-Bong Chung, Je-Woo Kim, “SPREAD SPECTRUM SIGNAL GENERATING DEVICE AND METHOD,” EP00903871, 2004-06-30.

[7] Soon-Young Yoon, Jae-Min Ahn, Hee-Won Kang, Young-Ky Kim, Jong-Seon No, **Hong-Yeop Song**, Ha-Bong Chung, Je-Woo Kim, “PSEUDO-ORTHOGONAL CODE GENERATING METHOD AND DEVICE,” EP00898393, 2005-05-11.

[8] Seoung-Bum Suh, **Hong-Yeop Song**, Min-Ho Shin, Joon-Sung Kim, “METHOD AND APPARATUS FOR DECODING A LOW DENSITY PARITY CHECK (LDPC) CODE IN A COMMUNICATION SYSTEM,” EP01482643, 2006-07-19.

[9] Sul-Ki Bae, Seung-Hee Han, Jong-Hyeuk Lee, **Hong-Yeop Song**, Dae-Son Kim, Joon-Sung Kim, “METHOD AND APPARATUS FOR PARALLEL STRUCTURED LATIN SQUARE INTERLEAVING IN COMMUNICATION SYSTEM,” US08201030, 2012-06-12.

[10] Dong Seung Kwon, Choongil Yeh, Min Sik Seo, Young Seog Song, Byung-Jae Kwak, Ji Hung Kim, Wooram Shin, **Hong-Yeop Song**, Jung-Hyun Kim, Mi-Young Nam, “METHOD FOR DECODING USING DYNAMIC SCHEDULING SCHEME FOR LOW DENSITY PARITY CHECK CODES AND APPARATUS THEREOF,” US08347172, 2013-01-01.

[11] **Hong-Yeop Song** and Jung-Hyun Kim, “Method and Apparatus of Recovering and Encoding for Data Recovery in Storage System,” US Patent, pending.

- Domestic Journal Papers (52)
- Domestic Conference Presentations (125)
- Domestic Patent (13)

#### Personal

- Date of Birth            January 3, 1962
- Marital Status        Married
- Hobby                    Trekking/Hiking
- Citizenship            Republic of Korea

## <Significance and impact of selected publications>

- Binary sequences, their existence, linear complexity, and applications to communications and cryptography
  - **Hong-Yeop Song** and Solomon W. Golomb, "On the Existence of cyclic Hadamard difference sets," *IEEE Transactions on Information Theory*, vol. 40, no. 4, pp. 1266-1268, July 1994. (Google scholar citation 41)

This paper is a result of an investigation of a conjecture on the existence of cyclic Hadamard different sets and its characteristic (binary) sequences of period  $v$ . The conjecture says that they exist if and only if  $v$  is an integer congruent 3 mod 4 such that (1)  $v$  is a prime, (2)  $v$  is a product of twin primes or (3) one less than a power of 2. It is interesting to note that the above three types of integers have this common property, though they look completely unrelated. This conjecture has been formulated by L.D. Baumert in the early 60<sup>th</sup>, and the result in this paper gives the only non-trivial progress after 30 years.

These sequences are important in communications and cryptography since they have the ideal 2-level autocorrelation that plays an essential role for the performance of many systems and that can be a basis for constructing sequence families with good cross correlation.

- Jong-Seon No, Habong Chung, **Hong-Yeop Song**, Kyeongcheol Yang, Jung-Do Lee, and Tor Helleseth, "New Construction for Binary Sequences of period  $p^m-1$  with Optimal Autocorrelation Using  $(z+1)^d + az^d+b$ ," *IEEE Transactions on Information Theory*, vol. 47, no. 4, pp. 1638-1644, May 2001.

This paper gives a new and generalized construction for binary sequence families with optimum autocorrelation using the polynomial  $(z+1)^d + az^d+b$ .

- Jeong-Heon Kim and **Hong-Yeop Song**, "Trace Representation of Legendre Sequences," *Designs, Codes and Cryptography*, vol. 24, Issue 3, pp. 343-348, December 2001.

Legendre sequences is an important example of cyclic Hadamard difference set sequences with the ideal 2-level autocorrelation. This is a first result of an effort of investigating the true nature of such sequences. This paper determines its trace representation over finite fields (and hence its linear complexity again) and hence relates them with sequences from linear feedback shift register.



- **Hong-Yeop Song**, "Feedback Shift Register Sequences," *Encyclopedia of Telecommunications*, edited by J. G. Proakis, John Wiley & Sons, New York, December 2002.

This is a fine tutorial contribution describing the feedback shift register sequences, both linear and non-linear, including binary m-sequences and related examples, for mainly the field engineers, without mathematical rigor as much as possible. It gives, as an example, a full picture of branchless 4-stage linear and non-linear feedback shift register sequences, some of which are m-sequences, modified-deBruijn sequences and many others with good randomness properties.

- Zongduo Dai, Guang Gong, and **Hong-Yeop Song**, "A Trace Representation of Binary Jacobi Sequences," *Discrete Mathematics*, Elsevier, vol. 309, Issue 6, pp. 1517-1527, April 2009.

Twin-prime sequences is an important example of cyclic Hadamard difference set sequences with the ideal 2-level autocorrelation. Jacobi sequences is a generalized version of this, of period  $pq$  for two distinct primes  $p$  and  $q$ . This is a result also of an effort of investigating the true nature of cyclic Hadamard difference set sequences. This paper determines its trace representation over finite fields (and hence its linear complexity again) and hence relates them with sequences from linear feedback shift registers.

- Zongduo Dai, Guang Gong, **Hong-Yeop Song**, Dingfeng Ye, "Trace representation and linear complexity of binary  $e$ -th power residue sequences of period  $p$ ," *IEEE Transactions on Information Theory*, vol.57, no.3, pp. 1530-1547, March 2011.

In this paper, trace representations of characteristic sequences of all cyclic difference sets coming from  $e$ th power residues ( $e = 4; 6; 8; 10; 12$ ) are determined. In this process the trace representation of Legendre sequences (rediscovered) and Hall's sequences are obtained. Linear complexity of all the 6th power residue sequences is obtained. The paper concludes with many interesting open problems. The techniques developed in this paper has now been the basis for analyzing sequences with low correlation in many other papers.

Binary sequences from cyclic difference sets have many interesting applications in communication and cryptography. They also have rich algebraic properties, thus motivating mathematicians and engineers to study them. Many binary sequences such as Hadamard sequences, m-sequences, GMW sequences, quadratic residue difference set (Legendre) sequences, Hall's residue difference set sequences, twin prime difference set sequences, hyper-oval difference set sequences, etc. are well known and have been studied by many authors. Linear complexity and trace representation of many of these sequences have been determined in several cases by several other researchers.

- Non-binary sequences, constructions of families, properties, and applications

- **Hong-Yeop Song**, Irving S. Reed, and Solomon W. Golomb, "On the Non-periodic Cyclic Equivalence Classes of Reed-Solomon Codes," *IEEE Transactions on Information Theory*, vol. 39, no. 4, pp. 1431-1434, July 1993.

This is a final results on the investigation of Reed-Solomon codes for their use as frequency-hopping sequences after "k-th order near orthogonal codes" by Reed (1971 IT Trans) and "The systematic selection of cyclically equivalent codes" by Reed and Wolverson (1972 IT Trans). The result of this paper gives a full picture of the FHSS sequence families constructed from (non-binary) Reed-Solomon codes: family size, hamming correlation bound and when it can be achieved, and easy and systematic constructions. This paper opens a new insight in the research of algebraic coding theory and many others have applied some similar techniques to various other algebraic codes, such as BCH codes. Summary of this work has also been reported in a book titled Reed-Solomon Codes and Their Applications by Wicker and Bhargava (1994, IEEE Press)

- **Hong-Yeop Song** and Jeffrey H. Dinitz, "Tuscan Squares," Part IV, Chapter 48, *The CRC Handbook of Combinatorial Designs*, edited by Charles J. Colbourn and Jeffrey H. Dinitz, CRC Press, pp. 480-484, 1996.

This paper reports the current standing on the existence and constructions for various Tuscan squares including Florentine squares, which are important sources of constructing optimum frequency-hopping sequences and other good hamming correlation sequence families. Furthermore, this paper describes various relations with other combinatorial designs, for example, the set of mutually orthogonal latin squares.

- Yu-Chang Eun, Seok-Yong Jin, Yun-Pyo Hong, and **Hong-Yeop Song**, "Frequency Hopping Sequences with Optimal Partial Autocorrelation Property," *IEEE Transactions on Information Theory*, vol. 50, no. 10, pp. 2438-2442, October 2004.

Ideal hamming correlation property plays an important role in the design of frequency-hopping (FH) sequences for frequency-hopping spread-spectrum communications. In reality, partial correlation becomes much more important than the full-period correlation. This paper gives a new construction for FH sequences with not only ideal hamming correlation but also ideal PARTIAL correlation. The technique used in this paper have been generalized by many others later for rich constructions later.

- Guang Gong and **Hong-Yeop Song**, "Two-tuple balance of non-binary sequences with ideal two-level autocorrelation," *Discrete Applied Mathematics*, vol. 154, pp. 2590-2598, 2006.

Array structure, first observed by G. Gong, gives a rich insight into the true nature of various sequences with favorable correlation property. This paper is the result of investigating various relations of symbol balance, two-tuple balance, and cyclic array structure of  $q$ -ary sequences of period  $q^n-1$ . This gives a full picture of the set of all the balanced  $q$ -ary sequences of period  $q^n-1$  with these properties.

- Young-Joon Kim and **Hong-Yeop Song**, "Crosscorrelation of Sidel'nikov Sequences and Their Constant Multiples," *IEEE Transactions on Information Theory*, vol. 53, no. 3, pp. 1220-1224, March 2007

This paper opens a new direction of using Sidelnikov sequences for constructing families of sequences with good (optimum) cross correlation. The result in this paper gives some insights on similar techniques so that some subsequent results are published by many others later, some of which are "New families of  $M$ -ary sequences with low correlation constructed from sidelnikov sequences" by Kim et al (1998, IT Trans), "New  $M$ -ary sequence families with low correlation and large size" by Han and Yang (1999, IT Trans), and "New construction of  $M$ -ary sequence families from the structure of sidelnikov sequences" by Yu and Gong (2010, IT Trans).

- Young-Tae Kim, Dae San Kim and **Hong-Yeop Song**, "New  $M$ -ary Sequence Families With Low Correlation From the Array Structure of Sidelnikov Sequences", *IEEE Transactions on Information Theory*, vol.61, no.1, pp.655-670, January, 2015.

This paper fully generalizes the result of "New construction of  $M$ -ary sequence families from the structure of sidelnikov sequences" by Yu and Gong (2010, IT Trans). It give design engineers a much wider spectrum of choice for designing a sequence families with low correlation and large size.

- Ki-Hyeon Park, **Hong-Yeop Song**, Dae San Kim and Solomon W. Golomb, "Optimal Families of Perfect Polyphase Sequences from the Array Structure of Fermat-Quotient Sequences," *IEEE Transactions on Information Theory*, vol.62, no.2, pp.1076-1086, Feb., 2016.

This paper for the first time observed that the derived  $p$ -ary sequences of period  $p^2$  from Fermat quotients have PERFECT autocorrelation and can be used to construct families with optimum cross correlation. This is only a non-trivial and important result after the discovery of Frank-Zadoff sequences (1962) and its use for constructing optimum families by Suehiro (1988), not surprisingly in a similar manner. This paper essentially exhaustively determined all the PERFECT  $p$ -ary sequences of period  $p^2$  and that can be

used to construct optimum families, including (rediscovering) Frank-Zadoff sequences and many new examples.

Fermat quotients have been an important source of pure number-theoretic insights for long time and thus have been studied even in relation with Wieferich primes. Both binary and non-binary sequences derived from Fermat quotients have been studied by many mathematicians and engineers in terms of their randomness properties. The sequences in this paper can be used in multi-user communications including CDMA mobile communications and GNSS satellite communications for ranging and navigation for low probability of intercept design.