

Curriculum Vitae

Youngmi Hur

Current Position: Professor in Department of Mathematics, Yonsei University
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Research Interests

1. Applied and Computational Harmonic Analysis
2. Multi-dimensional Data Representation Methodologies and Signal and Image Processing
3. Applications of the Developed Wavelet Related Theory and Algorithms to Other Fields

Awards and Honors

2011-2014 Grant from NSF (sole PI, Computational Mathematics, Division of Mathematical Sciences)
"Alternatives to the tensor product in wavelet construction and beyond" [NSF DMS-1115870]
May 2006 John A. Nohel Prize from Mathematics Department, University of Wisconsin - Madison
May 2005 Elizabeth Hirschfelder Fellowship for Graduate Women in Mathematics, Physics and Chemistry
from Mathematics Department, University of Wisconsin - Madison
May 2001 Elizabeth Hirschfelder Fellowship for Graduate Women in Mathematics, Physics and Chemistry
from Mathematics Department, University of Wisconsin - Madison

Employment

Mar. 2014 - Present Full Professor (2022-Present), Associate Professor (2014-2021)
Department of Mathematics, Yonsei University
July 2008 - Feb. 2019 Assistant Research Professor (2014-2018), Assistant Professor (2008-2013)
Department of Applied Mathematics and Statistics, Johns Hopkins University
July 2006 - June 2008 C.L.E. Moore Instructor
Department of Mathematics, Massachusetts Institute of Technology

Education

Sep. 1999 - June 2006 Ph.D. in Mathematics, University of Wisconsin - Madison
Thesis: *Novel methodologies for effective wavelet constructions in high dimensions*
Mar. 1997 - June 1999 M.S. in Mathematics, Korea Advanced Institute of Science and Technology, Korea
Thesis: *Elliptic curves over finite fields and order-counting*
Mar. 1993 - Feb. 1997 B.S. in Mathematics, Korea Advanced Institute of Science and Technology, Korea

Publications

A. Publications

1. DESIGN OF WAVELET FILTER BANKS FOR ANY DILATION USING EXTENDED LAPLACIAN PYRAMID MATRICES
Y. Hur and S. Kim
Accepted to the Bulletin of the Korean Mathematical Society

2. SIMPLIFYING FORMAL PROOF-GENERATING MODELS WITH CHATGPT AND BASIC SEARCHING TECHNIQUES
S. Han, T. Hur, Y. Hur, K. S. Lee, M. Lee, and H. Lim
Accepted to the Computing Conference 2025
3. WAVELET SERIES EXPANSION IN HARDY SPACES WITH APPROXIMATE DUALS
Y. Hur and H. Lim
Analysis Mathematica, Vol. 50, No. 2, 2024, pp. 563–595
4. INVERTIBILITY OF CIRCULANT MATRICES OF ARBITRARY SIZE
J-O. Choi and Y. Hur
Linear and Multilinear Algebra, Vol. 70. No. 21, 2022, pp. 7057–7074
5. MULTIVARIATE TIGHT WAVELET FRAMES WITH FEW GENERATORS AND HIGH VANISHING MOMENTS
Y. Hur, Z. Lubberts and K. A. Okoudjou
International Journal of Wavelets, Multiresolution and Information Processing, Vol. 20, Issue 5, September 2022, Article No. 225009 (27 pages)
6. TIGHT WAVELET FILTER BANKS WITH PRESCRIBED DIRECTIONS
Y. Hur
International Journal of Wavelets, Multiresolution and Information Processing, Vol. 20, Issue 4, July 2022, Article No. 225008 (20 pages)
7. LAPLACIAN PYRAMID-LIKE AUTOENCODER
S. Han, T. Hur, and Y. Hur
Intelligent Computing: Proceedings of the 2022 Computing Conference, Volume 2, pp. 59–78.
Part of the Lecture Notes in Networks and Systems book series (LNNS, volume 507). Springer International Publishing
(Available online with DOI 10.1007/978-3-031-10464-0_5)
8. DEEP SCATTERING NETWORK WITH MAX-POOLING
T. Ki and Y. Hur
Proceedings of the 2021 Data Compression Conference, 2021, pp. 348–348
9. INTERPOLATORY TIGHT WAVELET FRAMES WITH PRIME DILATION
Y. Hur and Z. Lubberts
Applied and Computational Harmonic Analysis, Vol. 49, Issue 3, Nov. 2020, pp. 897–915
10. UNDERSTANDING THE SCATTERING TRANSFORM USING UNIVARIATE SIGNALS
Y. Hur and H. Lim
Proceedings of the 11th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI), 2018, pp. 1–7
11. NEW CONSTRUCTIONS OF NONSEPARABLE TIGHT WAVELET FRAMES
Y. Hur and Z. Lubberts
Linear Algebra and its Applications, Vol. 534, Dec. 2017, pp. 13–35
12. USE OF QUILLEN-SUSLIN THEOREM FOR LAURENT POLYNOMIALS IN WAVELET FILTER BANK DESIGN
Y. Hur
Book chapter of Excursions in Harmonic Analysis, Volume 5 (R. Balan, J. J. Benedetto, W. Czaja, M. Dellatorre, and K. A. Okoudjou, Eds.), Birkhäuser (published in June 2017), pp. 303–313
13. PRIME COSET SUM: A SYSTEMATIC METHOD FOR DESIGNING MULTI-D WAVELET FILTER BANKS WITH FAST ALGORITHMS
Y. Hur and F. Zheng
IEEE Transactions on Information Theory, Vol. 62, No. 11, Nov. 2016, pp. 6580–6593
14. IDENTIFICATION OF CANCER-DRIVER GENES IN FOCAL GENOMIC ALTERATIONS FROM WHOLE GENOME SEQUENCING DATA
H. Jang, Y. Hur, and H. Lee
Scientific Reports, May 2016, 6:25582
15. SCALABLE FILTER BANKS
Y. Hur and K. A. Okoudjou
Proceedings of SPIE Vol. 9597, Wavelets and Sparsity XVI, 95970Q, 2015, pp. 1–6

16. MONITORING NONLINEAR PROFILES ADAPTIVELY WITH A WAVELET-BASED DISTRIBUTION-FREE CUSUM CHART
H. Wang, S.-H. Kim, X. Huo, Y. Hur, and J. R. Wilson
International Journal of Production Research, Vol. 53, No. 15, 2015, pp. 4648–4667
17. SCALING LAPLACIAN PYRAMIDS
Y. Hur and K. A. Okoudjou
SIAM Journal on Matrix Analysis and Applications, Vol. 36, No. 1, 2015, pp. 348–365
18. MULTI-D WAVELET FILTER BANK DESIGN USING QUILLEN-SUSLIN THEOREM FOR LAURENT POLYNOMIALS
Y. Hur, H. Park, and F. Zheng
IEEE Transactions on Signal Processing, Vol. 62, No. 20, Oct. 2014, pp. 5348–5358
19. THE DESIGN OF NON-REDUNDANT DIRECTIONAL WAVELET FILTER BANK USING 1-D NEVILLE FILTERS
Y. Hur and F. Zheng
Proceedings of the 10th International Conference on Sampling Theory and Applications, 2013, pp. 216–219
20. COSET SUM: AN ALTERNATIVE TO THE TENSOR PRODUCT IN WAVELET CONSTRUCTION
Y. Hur and F. Zheng
IEEE Transactions on Information Theory, Vol. 59, No. 6, June 2013, pp. 3554–3571
21. MONITORING NONLINEAR PROFILES USING A WAVELET-BASED DISTRIBUTION-FREE CUSUM CHART
J. Lee, Y. Hur, S.-H. Kim, and J. R. Wilson
International Journal of Production Research, Vol. 50, No. 22, Nov. 2012, pp. 6574–6594
22. COMMITTEE ALGORITHM: AN EASY WAY TO CONSTRUCT WAVELET FILTER BANKS
Y. Hur
Proceedings of the 37th International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2012, pp. 3485–3488
23. HIGH-PERFORMANCE VERY LOCAL RIESZ WAVELET BASES OF $L_2(\mathbf{R}^n)$
Y. Hur and A. Ron
SIAM Journal on Mathematical Analysis, Vol. 44, No. 4, July. 2012, pp. 2237–2265
24. DESIGNING THIN WAVELET FILTERS
Y. Hur and F. Zheng
Proceedings of the 45th Asilomar Conference on Signals, Systems and Computers, 2011, pp. 2019–2024
25. WAVELET-BASED IDENTIFICATION OF DNA FOCAL GENOMIC ABERRATIONS FROM SINGLE NUCLEOTIDE POLY-MORPHISM ARRAYS
Y. Hur and H. Lee
BMC Bioinformatics, Vol. 12, No. 146, May 2011
26. EFFORTLESS CRITICAL REPRESENTATION OF LAPLACIAN PYRAMID
Y. Hur
IEEE Transactions on Signal Processing, Vol. 58, No. 11, Nov. 2010, pp. 5584–5596
27. L-CAMP: EXTREMELY LOCAL HIGH-PERFORMANCE WAVELET REPRESENTATIONS IN HIGH SPATIAL DIMENSION
Y. Hur and A. Ron
IEEE Transactions on Information Theory, Vol. 54, No. 5, May 2008, pp. 2196–2209
28. NEW CONSTRUCTIONS OF PIECEWISE-CONSTANT WAVELETS
Y. Hur and A. Ron
ETNA, Special Volume on Constructive Function Theory 25, 2006, pp. 138–157

B. Works in Progress

1. Provable wavelet-based neural approximation (with H. Lim and M. Lim)
2. New tight wavelet frame constructions sharing responsibility (with H. Lim)
3. Detail loss in super-resolution models based on the Laplacian pyramid and repeated upscaling and downscaling process (with S. Han)
4. Applications of wavelets in the quantum field theory for the strong interaction (with H. Lee)

Teaching

- Instructor at Yonsei (after 2014)

Spring	2025	MAT3104-01 Analysis (1) MAT2102-02 Linear Algebra (1) MAT1016 Calculus and Vector Analysis (1) (Honor Class)
Fall	2024	MAT3104-01 Analysis (1)
Fall	2023	MAT3104-02 Analysis (1) MAT2014 Mathematics and Programming
Spring	2023	MAT8830-01 Topics in Numerical Analysis I MAT3104-02 Analysis (1)
Fall	2022	MAT8800-01 Topics in Applied Mathematics 1 MAT3104-01 Analysis (1)
Spring	2022	MAT8830-01 Topics in Numerical Analysis I MAT3104-02 Analysis (1)
Fall	2021	MAT8400-01 Special Topics in Analysis 1 MAT2105-01 Scientific Computing
Spring	2021	MAT8830-01 Topics in Numerical Analysis I MAT2016-12 Engineering Mathematics (3)
Fall	2019	MAT3984-01 Fourier Analysis and Its Applications MAT3104-01 Analysis (1)
Spring	2019	MAT8830-01 Topics in Numerical Analysis I MAT2421-01 Ordinary Differential Equations
Fall	2018	MAT6450-01 Real Analysis II MAT3104-01 Analysis (1)
Spring	2018	MAT8400-01 Topics in Analysis I MAT2421-01 Ordinary Differential Equations
Fall	2017	MAT6450-01 Real Analysis II MAT3104-01 Analysis (1)
Spring	2017	MAT6400-01 Real Analysis I MAT3104-02 Analysis (1)
Fall	2016	MAT8830-01 Topics in Numerical Analysis I MAT3104-02 Analysis (1)
Spring	2016	MAT8400-01 Topics in Analysis I MAT2421-01 Ordinary Differential Equations
Fall	2015	MAT8830-01 Topics in Numerical Analysis I MAT3104-02 Analysis (1)
Spring	2015	MAT8400-01 Topics in Analysis I MAT3104-02 Analysis (1)
Fall	2014	MAT8800-01 Topics in Applied Mathematics I MAT4106-01 Topics in Mathematics (2)
Spring	2014	MAT8400-01 Topics in Analysis I MAT4105-01 Topics in Mathematics (1)

- Instructor at JHU and MIT (before 2014)

Fall	2013 (JHU)	550.692 Matrix Analysis and Linear Algebra 550.385 Scientific Computing: Linear Algebra
Spring	2013 (JHU)	550.291 Linear Algebra and Differential Equations
Fall	2012 (JHU)	550.692 Matrix Analysis and Linear Algebra 550.385 Scientific Computing: Linear Algebra
Spring	2012 (JHU)	550.291 Linear Algebra and Differential Equations
Fall	2011 (JHU)	550.692 Matrix Analysis and Linear Algebra 550.385 Scientific Computing: Linear Algebra

Spring 2011 (JHU) 550.291 Linear Algebra and Differential Equations
 Spring 2010 (JHU) 550.484 Introduction to Wavelet and Fourier Analysis
 Fall 2009 (JHU) 550.385 Scientific Computing: Linear Algebra
 Spring 2009 (JHU) 550.291 Linear Algebra and Differential Equations
 Fall 2008 (JHU) 550.385 Scientific Computing: Linear Algebra
 Spring 2008 (MIT) 18.034 Differential Equations

- Teaching Assistant

Fall 2006 - Fall 2007 (MIT) 18.02 Multivariable Calculus
 18.03 Differential Equations
 Summer 1999 - Spring 2006 (UW) MA114 Algebra and Trigonometry
 MA217 Calculus with Algebra and Trigonometry II
 MA221 Calculus and Analytic Geometry
 MA272 Topics in Elementary Calculus
 CS514 Numerical Analysis
 CS515 Intro to Splines and Wavelets
 Spring 1997 - Spring 1999 (KAIST) MA101 Calculus I
 MA102 Calculus II
 MA111 Intro to Linear Algebra
 MA202 Applied Mathematical Analysis
 MA210 Intro to Number Theory

Community Service

- Referee

Advances in Mathematics
 Applied and Computational Harmonic Analysis (ACHA)
 Communications on Pure and Applied Analysis (CPAA)
 IEEE Transactions on Information Theory
 IEEE Transactions on Signal Processing
 Journal of Korean Mathematical Society
 Journal of Mathematical Analysis and Applications
 Linear Algebra and Its Applications (LAA)
 Mathematical Reviews
 Mediterranean Journal of Mathematics
 Natural Sciences and Engineering Research Council (NSERC) of Canada
 Selecta Mathematica
 Signal Processing

- Students in Yonsei:

Sang Jun Han (Ph. D. in Yonsei; current)
 Myung-Yoon Lee (Ph. D. in Yonsei; current)
 Sang Kyung Lee (Ph. D. in Yonsei; current)
 Sung Joo Kim (completed coursework, left the program in 2025)
 Hyojae Lim (Ph. D. in Yonsei; Graduated in 2024) [Now in RICAM, Austria]
 Thesis: *Modern approaches to wavelet frames*
 Jeong Yeon Park (Masters in Yonsei; Graduated in 2023) [Now in Stony Brook University, USA]
 Thesis: *Error analysis with Bernstein polynomials and sigma-delta quantization*
 Tae Kyung Ki (Masters in Yonsei; Graduated in 2021) [Now in an AI company, Korea]
 Thesis: *Deep scattering transform with max-pooling*
 Myung Kyu Kim (Masters in Yonsei; Graduated in 2019) [Now in an AI company, Korea]

Thesis: *Comparison of Laplacian pyramid based and conventional CNN algorithms for noisy images*
Hoe Sung Ryu (Masters in Yonsei; Graduated in 2019) [Now in Korea University, Korea]
Thesis: *Unsupervised learning on graphs via Haar scattering*
Chahwan Song (Masters in Yonsei; Graduated in 2018) [Now in National University of Singapore, Singapore]
Thesis: *Signal processing using wavelets on graphs: theory and applications*
Jinki Song (Masters in Yonsei; Graduated in 2018)
Thesis: *Laplacian pyramid algorithm and its variants in 2 dimension*
Kangwhan Kim (Masters in Yonsei; Graduated in 2017)
Thesis: *Connection coefficients using Daubechies and Symmlet wavelets: theory and algorithms*
Jisu Hwang (Masters in Yonsei; Graduated in 2016) [Now in a government-funded organization, Korea]
Thesis: *Performance analysis of scalable Laplacian pyramids*

- Undergraduate Intern Students in Yonsei:

Y.-J. Jeon (Dec. 2021 - Feb. 2022)
Y. B. Kang (Dec. 2021 - Feb. 2022)

- Students in JHU:

Z. Lubberts (Ph. D. in JHU; Graduated in 2019) [Now in University of Virginia, USA]
Thesis: *Generating tight wavelet frames from sums of squares representations*
F. Zheng (Ph. D. in JHU; Graduated in 2014)
Thesis: *Algebraic approaches for constructing multi-D wavelets*

- Postdoctoral Researcher:

C. Farnsworth (Postdoctoral Research Fellow; Finished in 2018) [Now in Texas State University, USA]

- Society Memberships

Institute of Electrical and Electronics Engineers (IEEE)
Korean Mathematical Society (KMS)
Korean Society for Industrial and Applied Mathematics (KSIAM)
Korean Women in Mathematical Sciences (KWMS)
Society for Industrial and Applied Mathematics (SIAM)

- Committees in Yonsei

2024 Spring Ph. D. Thesis Committee for J. Oh (Math, Yonsei)
Master's Thesis Committee for H. Namgung (Math, Yonsei)
2023 Fall Master's Thesis Committee for C. Carty (Math, Yonsei)
2023 Spring Ph. D. Thesis Committee for S.-Y. Baek (Math, Yonsei)
Ph. D. Thesis Committee for Y. Kim (Math, Yonsei)
Ph. D. Thesis Committee for D. Yang (Math, Yonsei)
Master's Thesis Committee for D. Go (Math, Yonsei)
2022 Fall Ph. D. Thesis Committee for J. Seok (Math, Yonsei)
2022 Spring Ph. D. Thesis Committee for H.-G. Kim (Math, Yonsei)
Ph. D. Thesis Committee for T. Lee (Math, Yonsei)
2021 Fall Ph. D. Thesis Committee for J. Suh (CSE, Yonsei)
Master's Thesis Committee for J. Choi (Math, Yonsei)
Master's Thesis Committee for B. Kim (Math, Yonsei)
Master's Thesis Committee for J. Im (Math, Yonsei)
2021 Spring Ph. D. Thesis Committee for Y. Lee (CSE, Yonsei)

Masters Thesis Committee for M. Kim (CSE, Yonsei)
 Masters Thesis Committee for J. Jeon (Math, Yonsei)
 2020 Spring Ph. D. Thesis Committee for Y. Hwang (CSE, Yonsei)
 2019 Fall Ph. D. Thesis Committee for J. Jang (CSE, Yonsei)
 2018 Fall KWMS (Korean Women in Mathematical Sciences) Board Member
 2018 Spring KWMS (Korean Women in Mathematical Sciences) Board Member
 Master's Thesis Committee for H. Oh (Math, Yonsei)
 Master's Thesis Committee for S. Yang (Math, Yonsei)
 Master's Thesis Committee for K. Baek (Math, Yonsei)
 2017 Fall KWMS (Korean Women in Mathematical Sciences) Board Member
 Master's Thesis Committee for Y. Shin (Math, Yonsei)
 2017 Spring KWMS (Korean Women in Mathematical Sciences) Board Member
 Ph. D. Thesis Committee for H. Jang (School of Information and Communications, GIST)
 Ph. D. Thesis Committee for E. Koo (Math, Yonsei)
 Master's Thesis Committee for D. H. Kang (Math, Yonsei)
 2016 Fall Ph. D. Thesis Committee for J. Kim (Math, Yonsei)
 Ph. D. Thesis Committee for S. Phoui (Math, Yonsei)
 Master's Thesis Committee for I. Kim (Math, Yonsei)
 Master's Thesis Committee for J. Park (Math, Yonsei)
 2016 Spring Master's Thesis Committee for S. D. Lee (Math, Yonsei)
 2015 Fall Ph. D. Thesis Committee for B. J. Kim (Math, Yonsei)
 2015 Spring Ph. D. Thesis Committee for J. Lee (Math, Yonsei)
 Ph. D. Thesis Committee for J. Kim (CSE, Yonsei)
 Ph. D. Thesis Committee for W.J. Lee (Math, Yonsei)
 Ph. D. Thesis Committee for H. Wang (ISyE, Georgia Tech, USA)
 Master's Thesis Committee for J. Y. Kim (Math, Yonsei)
 Master's Thesis Committee for S. P. Shin (Math, Yonsei)
 2014 Fall Ph. D. Dissertation Proposal Committee for H. Jang (School of Information and Communications, GIST)
 Ph. D. Thesis Committee for M. Yoon (Math, Yonsei)
 Master's Thesis Committee for N.-O. Sohn (Math, Yonsei)
 Master's Thesis Committee for Y. Lee (Math, Yonsei)

- Committees in JHU

2009 - 2014	Master of Science in Engineering Management Committee
2012 - 2014	Communications Committee, AMS
2011 - 2012	Admissions Committee, AMS
2008 - 2011	Academic Affairs Committee, AMS
2011, 2013	AMS Chair Selection Committee, AMS
2013	GBO Committee for Yuanming Suo (ECE) Jaymin Patel (BME) Matthew Stehman (Civil Engineering)
2011	Ph. D. Thesis Committee for Joongsup (Jay) Lee (ISyE, Georgia Tech)
2011	GBO Committee for Vince Lyzinski (AMS)
2010	GBO Committee for Sriram Ganapathy (ECE)

Selected Meetings / Presentations

- AI for Mathematics Workshop on Formalization, KIAS, Seoul, Korea, Dec. 2024
- KMS Spring Meeting, Daejeon Convention Center & KAIST, Daejeon, Korea, April. 2024
Wavelet Filters and Coefficients: Theory and Applications
- Mathematical Image Processing: Techniques & Applications, Yonsei University, Seoul, Korea (invited), Dec. 2023
Wavelet Filters and Coefficients: Theory and Applications

- KMS Special Conference with 2022 Fields Medalists, Seoul National University, Seoul, Korea, Oct. 2023
Tight Wavelet Filter Banks with Prescribed Directions
- AAAI Conference on Artificial Intelligence (AAAI-23) (only for [Technical Program - Virtual]), Feb. 2023
- Leaders Forum for Next Generation Women Mathematical Science Major, Chosun University, Korea, Oct. 2022
- Computing Conference 2022 (Online), July 2022
- SIAM Annual Meeting (Online), July 2022
- International Congress of Mathematicians (ICM) 2022 (Online), July 2022
- 1st Workshop on Interdisciplinary Applications of Harmonic Analysis (Online), Feb. 2022
Recent Progress in Wavelet Constructions
- KSIAM Annual Meeting (Online), Dec. 2021
- KMS Annual Meeting (Online), Oct. 2021
Invertibility of Circulant Matrices and Wavelets
- SIAM Annual Meeting (Online), July 2021
- KSIAM Spring Conference (Online), June 2021
- DCC 2021 (Online), Mar. 2021
Deep Scattering Network with Max-pooling
- NeurIPS 2020 (Online), Dec. 2020
- KSIAM Annual Meeting (Online), Nov. 2020
- DeepMath 2020 (Online), Nov. 2020
- KMS Annual Meeting (Online), Oct. 2020
- KMS Spring Meeting (Online), July 2020
- Symposium for AI and University-Level Mathematics (Online), June 2020
- Seminar, KIAS, Seoul, Korea, Apr. 2019
SOS Methods in Wavelet Construction
- February Fourier Talks, College Park, MD, Feb. 2019
- KWMS International Conference, KIAS, Seoul, Korea, June 2018
- KMS Spring Meeting, Kyung Hee University, Seoul, Korea, Apr. 2018
- February Fourier Talks, College Park, MD, Feb. 2018
- SIAM Conference on Applied Algebraic Geometry, Georgia Tech, Atlanta, USA (invited), July-August 2017
Algebraic Geometry in Wavelet Construction
- KWMS International Conference, POSTECH, Pohang, Korea, June 2017
Wavelet Constructions and Algebraic Geometry
- Seminar, Department of Mathematics, Ajou University, Suwon, Korea, Mar. 2017
Wavelets: Challenges and Solutions in Multi-D Construction
- February Fourier Talks, College Park, MD, Feb. 2017
- Seminar, Department of Mathematical Sciences, KAIST, Daejeon, Korea, Dec. 2016
Wavelets: Basics, Challenges, and New Methods of Construction

- Seminar, Department of Information and Communications, GIST, Gwangju, Korea, June 2016
Wavelets: Basic Concepts and Multi-D Constructions
- February Fourier Talks, College Park, MD, Feb. 2016
- Seminar, Department of Mathematics, Korea University, Seoul, Korea, Apr. 2015
Multi-D wavelet construction: Introduction and new approaches
- Seminar, Department of Mathematical Sciences, Seoul National University, Seoul, Korea, Apr. 2015
Multi-D wavelet construction: Introduction and new approaches
- KWMS Career Leaders Forum, KIAS, Seoul, Korea, Nov. 2014
- KMS Annual Meeting, Yonsei University, Seoul, Korea, Oct. 2014
- Idiot's Guide Seminar, KIAS, Seoul, Korea, Oct. 2014
Basics of Multidimensional Wavelet Constructions
- International Workshop on Computational Mathematics, Yonsei University, Seoul, Korea, Aug. 2014
Introduction to Multi-D Wavelet Constructions
- Optimization and Algebraic Geometry, NIMS, Daejeon, Korea (invited), June 2014
Wavelet construction using Algebraic Geometry
- Seminar, Department of Mathematics, Yonsei University, Seoul, Korea, May 2014
Multi-D wavelet construction: Introduction and challenges
- February Fourier Talks, College Park, MD (invited), Feb. 2014
Multi-D wavelet construction using Quillen-Suslin theorem for Laurent polynomials
- Joint Mathematics Meetings, Baltimore, MD, Jan. 2014
Multi-D wavelet FB design using Quillen-Suslin Theorem for Laurent polynomials
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Apr. 2013
Multi-D wavelet FB design using unimodular completion over Laurent polynomial rings
- Workshop on "Phaseless Reconstruction", College Park, MD, Feb. 2013
- February Fourier Talks, College Park, MD, Feb. 2013
- Seminar, The Norbert Wiener Center, College Park, MD, Dec. 2012
A new alternative for constructing multivariate wavelets
- SIAM Conference on Applied Linear Algebra, Valencia, Spain, June 2012
A new alternative to the tensor product in wavelet construction
- Colloquium, Department of Mathematics, POSTECH, Pohang, Korea, May 2012
Beyond tensor product in wavelet construction
- Seminar, Department of Mathematical Sciences, KAIST, Daejeon, Korea, May 2012
A new alternative to tensor product in constructing wavelets
- D. W. Weeks Lecture Series, MIT, Cambridge, MA (invited), Apr. 2012
Searching for new alternatives to tensor product in wavelet construction
- IEEE International Conference on Acoustics, Speech, and Signal Processing, Kyoto, Japan, Mar. 2012
Committee algorithm: an easy way to construct wavelet filter banks
- Spring AMS Eastern Sectional Meeting, Washington, DC, Mar. 2012
- February Fourier Talks, College Park, MD, Feb. 2012
- Joint Mathematics Meetings, Boston, MA, Jan. 2012

- Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, Nov. 2011
Designing Thin Wavelet Filters
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Mar. 2011
Coset Sum: an alternative to tensor product in wavelet construction
- February Fourier Talks, College Park, MD, Feb. 2011
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Nov. 2009
How to make Laplacian pyramid non-redundant with no effort
- Annual Probability and Statistics Day at UMBC, Baltimore, MD (invited), Apr. 2009
Wavelet-based control charts for general multivariate process
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Apr. 2009
Design of nonseparable n -D biorthogonal wavelet filter banks
- Seminar, Department of Information and Communications, GIST, Gwangju, Korea, Dec. 2008
Wavelet-based control charts for general multivariate process
- US-Korea Conference on Science, Technology, and Entrepreneurship, San Diego, CA (invited), Aug. 2008
New construction of biorthogonal wavelets in high dimensions
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Dec. 2007
Wavelet-based control charts for general multivariate process
- Seminar, Mathematics Department, Brown University, Providence, RI, Oct. 2007
New wavelet constructions in high dimensions
- Seminar, School of Industrial and Systems Engineering, Georgia Tech, Atlanta, GA, Mar. 2007
Novel methodologies for effective wavelet constructions in high dimensions
- Seminar, Department of Mathematics, Harvard University, Cambridge, MA, Dec. 2006
Novel methodologies for effective wavelet constructions in high dimensions
- Seminar, Department of Mathematics, MIT, Cambridge, MA, Sep. 2006
Novel methodologies for effective wavelet constructions in high dimensions
- Seminar, Department of Applied Mathematics and Statistics, JHU, Baltimore, MD, Mar. 2006
Effective wavelet-based representations in high dimensions
- International Workshop on Wavelet Frames, Daejeon, Korea (invited), Nov. 2005
Multivariate wavelet representations, Lecture II
- Workshop on Signal Processing with Adaptive Sparse Structured Representations, Rennes, France, Nov. 2005
L-CAMP: Extremely local wavelets in high-D
- Workshop on Sparse Representations in Redundant Systems, College Park, MD, May 2005
- International Conference in Approximation Theory, Gatlinburg, TN, May 2004
CAP representations (in view of function space characterizations)

Presentations by my students/postdoc on collaborative works

- KMS Spring Meeting, Daejeon Convention Center & KAIST, Daejeon, Korea, April. 2024
Formal proof generation models: Initial stages of applying large language models and search techniques by Sangjun Han
- KMS Spring Meeting, Daejeon Convention Center, Daejeon, Korea, April 2023
Wavelet series expansion in Hardy spaces with approximate duals by Hyojae Lim

- Leaders Forum for Next Generation Women Mathematical Science Major, Chosun University, Korea, Oct. 2022
Model development of formal language suitable for mathematical proof by Myung-Yoon Lee and Hyojae Lim
- Computing Conference 2022 (Online), July 2022
Laplacian pyramid-like autoencoder by Sangjun Han
- KSIAM Annual Meeting, Dec. 2021
Laplacian pyramid-like autoencoder by Sangjun Han
- 11th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI), Beijing Institute of Technology (Zhongguancun Campus), Beijing, China, Oct 2018
Understanding the scattering transform using univariate signals by Hyojae Lim
- KSIAM Spring Conference, KAIST, Daejeon, Korea, May 2018
Sums of squares and wavelet frame generators by C. Farnsworth
- SIAM Conference on Applied Algebraic Geometry, Georgia Tech, Atlanta, USA (invited), July-August 2017
A rectangular relaxation for multi-D filter bank design using Laurent polynomials by C. Farnsworth
- AWM workshop at the Joint Mathematics Meetings, Baltimore, MD, Jan. 2014
The design of non-redundant directional wavelet filter bank using 1-D Neville filters by F. Zheng
- 10th International Conference on Sampling Theory and Applications, Bremen, Germany, July 2013
The design of non-redundant directional wavelet filter bank using 1-D Neville filters by F. Zheng
- Conference of the International Linear Algebra Society, Providence, RI, June 2013
A new algebraic approach to the construction of multidimensional wavelet filter banks by F. Zheng
- International Conference on Wavelets and Applications, St. Petersburg, Russia, July 2012
Coset Sum: an alternative to the tensor product to construct multidimensional wavelets by F. Zheng
- SIAM Conference on Imaging Science, Philadelphia, PA, May 2012
Compressing aerial images using a critical representation of Laplacian pyramid by F. Zheng
- Joint Mathematics Meetings, Boston, MA, Jan. 2012
Coset sum: an alternative to the tensor product in wavelet construction by F. Zheng