

# CURRICULUM VITAE

*Dr. Patrick Shen-pei WANG, IAPR Fellow and Professor*

Office:

College of Computer & Info. Science  
Northeastern University  
360 Huntington Avenue  
Boston, MA 02115, USA  
(617)373-3711, fax(617)373-5121

Home:

7 Ledgeawn Avenue  
Lexington, MA 02420, USA  
pwang@ccs.neu.edu  
(617) 281-5345 (H)  
<http://www.ccs.neu.edu/home/pwang>

## EDUCATION

Ph.D. 1978 Oregon State University, Computer Science  
M.S. 1974 Georgia Tech, Information and Computer Science  
M.S. 1971 National Taiwan University, Electrical Engineering  
B.S. 1968 National Chiao Tung University, Electronic Engineering

## PROFESSIONAL EXPERIENCE

1983- Tenured Professor, College of Computer & Information Science, Northeastern University  
1985-1986 Acting Director of Graduate School (equivalent to Associate Dean of the College)  
2007- Zijiang Visiting Chair, ECNU, Shanghai, China  
2006-2007 iCORE (Informatics Circle of Research Excellence) Visiting Prof. U. Calgary, Canada  
1989- Research Consultant, Image Processing Labs, MIT Sloan School  
1996 Fall Otto-von-Guericke Distinguished Guest Professor of Magdeburg U., Germany  
1999 Honorary Advisor Professor of Xia-Men University, China  
2002, 2004 Honorary Advisor Professor of Guangxi N. U. (Guilin), and Chuanda, China  
1996 Summer Visiting Scholar, Panasonic MITL, Princeton  
1994 Fall Visiting Professor, Technical University of Wien, Austria  
1991 Summer Visiting Professor, University of Paris VII and XIII, France  
1989-1990 Visiting Scientist, Artificial Intelligence Laboratory,  
Massachusetts Institute of Technology  
1985- Adjunct Faculty of Computer Science, Harvard University Extension School  
1984 Summer Visiting Professor of Computer Science and Engineering,  
1989 Winter National Taiwan University  
1982-1983 Adjunct Associate Professor of Computer Science, Boston University  
1982-1983 Software Engineering Specialist, Project Leader, Wang Laboratories  
1980-1982 Senior Member of Technical Staff, Project Leader, GTE Laboratories  
1976-1980 Assistant Professor, Computer and Information Science, University of Oregon  
1979-Summer Visiting Associate Research Fellow, Institute of Information Science,  
Academia Sinica  
1976-Summer Senior Instructor, ICS, Georgia Tech and Georgia State University  
1975-1976 System Analyst, Fulton National Bank and Southern Bell

## FIELDS OF SPECIALIZATION AND INTEREST

Pattern Analysis and Machine Intelligence, Vision, Image and Document Understanding, OCR  
PC, Mac, SunSparc Unix/Windows NT Workstations, X-Window, WWW Programming,  
Internet Homepage Design, HTML, Multi-media, Virtual Reality, 3D Graphics

## Some Detailed Descriptions of Experience:

- 8/2006 - 8/2007, iCORE (Informatics Circle of Research Excellence) Visiting Professor, Univ. Calgary, Canada, \$160,000 Grant  
Doing research on Biometrics and Pattern Recognition using Artificial Intelligence Techniques. Fundamental research focused on the "measurement" and "learning" for similarity comparison and pattern matching of various digital images, as well as applications to Facial Analysis and Recognition, and Handwriting Alphanumeric Characters.
- 1983 - present: At Northeastern U., teaching and research in imaging, AI, pattern recognition, 3D graphics, internet webpage design. Have advised several grad students Ph.D. thesis, including Hui-Jen Lin, now an associate professor at Tam Kang University, and Matthew Ma, now as senior project leader at Princeton's Panasonic Lab. Also serve as outside Ph.D. committee reader for Isao Kamae of Harvard HSPH, now as associate professor and medical doctor at the Kyoto Hospital of Japan, as well as several Ph.D. students of HKBU from 1999-2006. Publication record includes over 120 technical papers, 20 books, 3 USA/Germany patents, and some other grants.
- 1999 - 2005: the PI of an industrial grant, supported several Ph.D. students, doing medical imaging, using internet on PC-based systems, for analyzing, understanding, interpreting various MRI image data, segmentation, resolution enhancement, skeletonization, feature extraction, and classification. This can help doctors diagnose for various serious illness, such as brain cancer, lung cancer, stomach abnormal cells detection, colon cancer diagnosis etc. Our research can help doctors diagnose on-line through web, with fast speed, and more than 87% accuracy rate so far (still improving). The goal is for 99% accuracy rate. Notice that this grant was originally at the level of \$ 1/2 million dollars for three years. Unfortunately, due to the budget crises and the stock market downturn of the sponsoring company, it was reduced to about 42% i.e. around \$211,016 of its original commitment.
- 9/1990 - 2004: at MIT Sloan School, as consultant of OCR (optical character recognition) project, in applications to bank check analysis and recognition. I help create an OCR Lab, in MIT Sloan School's PROFIT Center (Productivity from Information Technology), including a PC based system with scanner, that can scan bank checks and determine "courtesy amount" on the upper right corner, which is the most important portion of a check that really counts. It includes machine printed fonts, as well as handprinted/handwritten alpha-numerals. For more than 5,000 checks tested in the database. Our research results got USA patent and were published in well-known Int. Journals, including Journal of Electronic Imaging, Int. J. of Pattern Recognition, Journal of Digital Signal Processing, and IJPRAI(Int. Journal of Pattern Recognition and Artificial Intelligence) (please refer to Publication details).
- 9/1989 (August)- 9/1990 (March): at MIT AI Lab, doing advanced research in 3D object recognition and stereo computer vision, multi-media vision/animation. Applied to industrial parts inspection, such as pairs of scissors, hammers, boxes, etc.
- 9/1986 - 9/1996: at Harvard Univ. Extension School, Adjunct Faculty, mainly teaching grad computer science course for industry/business professionals, including A.I., Pattern recognition, Logic Programming, PROLOG, Automata Theory, and Knowledge Engineering.
- 1/1980 - 9/1981: at GTE Lab, Senior Technicla Staff, doing OCR (optical character recognition) with applications to telephone communication. Leading a team of about 5 professionals,

built a PC system to analyze and recognize English characters. Prototype's accurate rate was about 89%, with large database of about 65,000 real samples.

- 9/1981 - 9/1983: Wang Labs, Senior Software Specialist, Lead a group of 3 or 4 senior engineers, establish an imaging system that can scan images, enhance high resolution, and automatically integrated into office system, as part of a large "Office Automation" System. Also done OCR work similar to the experience as in the GTE Lab. One of my three patents was granted by the USA and Germany bureau during this period.

## **PUBLICATIONS - International Journals and Book Chapters**

- "Dynamic structural statistical model based online signature verification", Y. Chen, X.Q. Ding, P.S.P. Wang, *IJDCE*, accepted, to appear, July 2009
- "Classifier Combination And Its Application In Iris Recognition", X.H. Feng, X.Q. Ding, Y.S. Wu, P.S.P. Wang, *IJPRAI*, Vol. 22, No. 3 (2008) 617-638
- "noniterative 3d Face Reconstruction Based On Photometric Stereo", Sang-Woong Lee, P.S.P. Wang, S.N. Yanushkevich, Seong-Whan Lee, *IJPRAI*, Vol.22, No.3 (2008) 389-410
- "Performance Comparisons Of Facial Expression Recognition In Jaffe Database", F. Y. Shih, C.F. Chuang, P. S. P. Wang, *IJPRAI*, Vol. 22, No. 3 (2008) 445-459
- "Extracting Faces And Facial Features From Color Images", *IJPRAI*, F. Shih, S.X. Cheng, C.F. Chuang, P.S.P.Wang, *IJPRAI*, Vol. 22, No. 3 (2008) 515-534
- "Facial Metamorphosis Using Geometrical Methods For Biometric Applications", Y. Luo, M. L. Gavrilova, P.S.P.Wang,, *IJPRAI*, Vol. 22, No. 3 (2008) 555-584
- "Pattern Recognition and Artificial Intelligence in Biometrics - EDITORIAL", S.N. Yanushkevich, D. Hurley, and P.S.P. Wang, *IJPRAI*, Vol. 22, No. 3 (2008) 367-369
- "Introduction to Synthesis in Biometrics", with S. Yanushkevich, V. Shmerko, A. Stoica and S. Srihari, in *Image Pattern Recognition - Synthesis and Analysis in Biometrics*, co-ed with S. Yanushkevich, M. Gavrilova and S. Srihari, WSP, 2007, 5-29
- "Nontensor-Product-Wavelet-Based Facial Feature Representation", with X. You, Q. Chen and D. Zhang, in *Image Pattern Recognition - Synthesis and Analysis in Biometrics*, co-ed with S. Yanushkevich, M. Gavrilova and S. Srihari, WSP, 2007, 207-224
- "Some Concerns on the Measurement for Biometric Analysis and Applications", in *Image Pattern Recognition - Synthesis and Analysis in Biometrics*, co-ed with S. Yanushkevich, M. Gavrilova and S. Srihari, WSP, 2007, 321-337
- "Context-based Image Retrieval Trained by ADABOOST for Mobile Application", H.J.Lin, Y.T.Kao, F.W.Yang, and P.S.Wang, *IJPRAI*, v20, n4, (2006) 525-541
- "Parallel Contextual Array Grammars with Trajectories", with P. H. Chandra, C. Martin-Vide, K. G. Subramanian, and D. L. Van, in *Handbook of Pattern Recognition and Computer Vision* WSP, 2005 (co-ed with C.H. Chen), 55-70
- "Handwritten Bank Check Recognition of Courtesy Amounts", *International Journal of Image and Graphics (IJIG)*, by WSP, (with A.Gupta and R. Palacios), v4 n2, 2004, 203-222.

- “From Pixels to True XML Structure In Digital Document Images”, with Matthew Ma and Katherine Guo, *IJPRAI*, v18, n6, (2004), 1057-1069
- “Feedback based architecture for reading courtesy amounts on checks”, *Journal of Electronic Imaging*, by *SPIE*, (with A.Gupta and R. Palacios) 12(1) 194-202, 2003
- “Multimodal Interface for Human-Machine Communication”, *Advances of Human-Machine Communication, MPAI Series*, (with P.Yuen and Y.Tang) v.48, 9-11, 2002, *WSP Pub*
- “3D Articulated Object Understanding, Learning, and Recognition From 2D Images”, *Multi-spectral Image Processing and Pattern Recognition*, (ed. J.Shen, P.Wang and T.Zhang), WSP, 2001, 5-16
- “Articulated Object Analysis, Learning, and Recognition from 2D Images”, *IJPRAI* v14, n7, 863-873, 2000
- “A Formal Parallel Model for 3D Object Pattern Generation & Representation”, in *Handbook of Pattern Recognition and Computer Vision*, 2nd ed, (co-edited by C.H.Chen, L.F.Pau, and P.S.Wang), WSP, 1999, 183-203
- “High Level Visualization, Representation, Understanding, and Recognition of 3D Articulated Objects” *The Encyclopedia of Microcomputers*, (ed. A. Kent, J. Williams), Marcel Dekker Pub. Co., New York, 1999, 189-211
- “A Knowledge Based Segmentation Algorithm for Enhanced Recognition of Handwritten Courtesy Amount”, (with A.Agarwal, A.Gupta, and K.Hussein), in *Int. J. of Pattern Recognition*, v32 n2, 1999 305-316
- “Parallel Matching of 3D Articulated Object Recognition”, in *IJPRAI*, v13 n4, 1999, 431-443
- “Analysis, Learning, and Recognition of Articulated Line Drawing Images”, *Int. J. CSIM (Computer Science and Information Management), Special Issue on Image Recognition*, v1 n2, 1998 2-21
- “Intriguing Aspects of Oriental Languages”, *Int. J. of Pattern Recognition and Artificial Intelligence (IJPRAI)*, (with C. Suen, S. Mori, H. Rim), v12 n1, 1998, 5-29
- “Ink Matching of Cursive Chinese Handwritten Annotations”, (with D. Lopresti, M. Ma, and J. Crisman”, *IJPRAI*, v12 n1, 1998, 119-141
- “Bank Check Analysis and Recognition by Computers”, (with A.Agarwal, A.Gupta, and K.Hussein), in *Handbook of Character Recognition and Document Image Analysis*, WSP, 1997, 623-651
- “Block Detection and Recognition of Courtesy Amounts of Checks”, *I.J. of Electronic Imaging*, (with Agarwal,Hussein,Gupta), v5n2, 214-224 1996
- “3D Object Perception Using Gradient Descent”, (with L.Baird), *Int. Journal of Mathematical Imaging and Vision (IJMIV)*, 5, 111-117, 1995
- “A Knowledge-based Segmentation Algorithm for Enhanced Recognition of Handwritten Courtesy Amounts”, (with Agarwal,Hussein,Gupta), in *Shapes, Structure and Pattern Recognition*, (ed. D.Dori And A.Bruckstein), WSP, 1995, 360-371

- “Analysis and Design of Parallel Thinning Algorithms - A Generic Approach”, (with Y.Y.Zhang), *IJPRAI*, v9 n9, 1995, 735-752
- “3D Line Image Analysis - A Heuristic Parallel Approach”, *Int. J. of Information Science*, 81/3-4, 155-175, 1994
- “A Heuristic Approach for 3D Articulated Line-Drawing Object Pattern Representation and Recognition”, *Advances in Imaging Technologies* (ed by Edward Dougherty), Marcel Dekker, 1994, 197-221
- “Learning, Representation, Understanding and Recognition of Words - An Intelligent Approach”, in *Fund. in Handwriting Recog.*, S.Impedovo(ed), Springer-Verlag, 81-112, 1994
- “3D Line Drawing Image Analysis and Recognition”, *Progress in Image Analysis and processing III*, S.Impedovo(ed), WSP, 14-21, 1994
- “An Adaptive Modular Neural Network with Application to Unconstrained Character Recognition”, (with L.Mui, A.Agarwal, A.Gupta), *IJPRAI Special Issue on Document Image Analysis(DIA)*, 1994, 1189-1204
- “A New Parallel Thinning Methodology” (with Y.Zhang), *IJPRAI*, v8n5,1994,999-1011
- “3D Sequential/Parallel Universal Array Grammars for Polyhedral Object Pattern Analysis”, *IJPRAI*, v8n2, 1994, 563-576
- “Parallel Object Representation and Recognition”, *Int. J. of Parallel Processing Letters(PPL)*, v3n3, 1993, 279-290
- “A Grammatical Model for 3D Object Pattern Analysis”, *Handbook of Pattern Recognition and Computer Vision*, (ed by C.H.Chen, L.Pau and P.Wang), WSP, 1993, 211-231
- “Algorithms for Thinning and Rethickening Digital Patterns”, (with M. Nage and A. Gupta), *Journal of Digital Signal Processing*, Academic Press, v3n2, 97-102 (1993)
- “A Thinning Algorithm Based on the Force Between Charged Particles”, (with A.Arumugam, T.Radhakrishnan, C.Y.Suen), *IJPRAI* v7n5, 1993, 987-1008
- “An Integrated Architecture for Recognition of Totally Unconstrained Handwritten Numerals”, (with A.Gupta,M.Nage,A.Liu and S.Ayyadurai), *IJPRAI* v7 n4, 1993, 757-774
- “Analytical comparison of Thinning Algor.”, (with Y.Zhang), *IJPRAI*, v7n5, 1993, 1227-1246
- “A Neural Net Based Hybrid Approach to Handwritten Numeral Recognition”, *From Pixels to Features III -Frontiers in Handwritten Recognition* (with M.V.Nage and A.Gupta), (ed by S.Impedovo and J.C.Simon), Elsevier Science Pub. Co., Nort- Holland, 1992, 145-154
- “3D object representation by array grammars”, *IJPRAI*, v6 n2, 1992, 227-240
- “An Improved Structural Approach for Automated Recognition of Handprinted Characters” (with A. Gupta), *Int. J. of Pattern Recognition and Artificial Intelligence (IJPRAI)* v5, no 1&2, 1991, pp97-122
- “An Algorithm for Inferring Context-Free Array Grammars”, (with X.W.Dai), in *Syntactic and Structural Pattern Recognition - Theory and Applications*, ed. by H. Bunke and A. Sanfeliu, WSP, 1990, 197-236

- “Chinese Characters and Artificial Intelligence”, in *Encyclopedia of Computer Science and Technology*, ed. by A. Kent and J. Williams, Marcel Dekker, New York, 1990, 37-59
- “A Fast and Flexible Thinning Algorithm”, *IEEE Tran. on Computers*, v38, n5, 741-745 (1989), (with Y.Zhang)
- “Pushdown Array Recognizers”, *Int. Journal of Pattern Recognition and Artificial Intelligence*, v3 n3,4 (1989), (with H.J.Lin)
- “A New Approach to Array Grammatical Inference”, *Aspects of Computer Science*, Narashiham (Ed), World Scientific Pub. Co. (1989), (with H.J.Lin)
- “Knowledge Pattern Representation of Chinese Characters”, *Int. J. of Pattern Recognition and Artificial Intelligence*, v2 n1, 161-179 (1988)
- “A Comment on “A Fast Parallel Algorithm for Thinning Digital Patterns,” *CACM* v. 29 n. 3 (1986), 239-242, also in Proc IEEE CVPR85, (preliminary version) (with H. Lu)
- “A New Character Recognition Scheme with Lower Ambiguity and Higher Recognizability”, *J. Pattern Recognition Letters* 3, 431-436 (1985)
- “An Application of Array Grammars to Clustering Analysis for Syntactic Pattern”, *J. Pattern Recognition* vol. 17, no. 4, pp. 441-451, (1984)
- “Hierarchical Structures and Complexities of Isometric patterns” *IEEE-PAMI*, Vol. 5 No. 1, January, (1983), 92-99
- “Parallel Context-Free Array Grammar Normal Forms,” *Computer Graphics and Image Processing*, 15, (1981), 296-300
- “Finite-Turn Repetitive Checking Automata and Sequential/Parallel Matrix Languages,” *IEEE Computers*, vol. 30, no.5, May (1981) 366-370
- “Some New Results on Isotonic Array Grammars,” *Information Processing Letters*, vol. 10, no. 3 (1980), 129-131
- “A Chomsky Hierarchy of Isotonic Array Grammars and Languages,” *Computer Graphics and Image Processing*, vol. 8, (1978), 144-152 (with C. Cook)
- “Recursiveness of Monotonic Array Grammars and a Hierarchy for Array Languages,” *Information Processing Letters*, May, (1976), 24-26 (with W. Grosky)
- “Sequential/Parallel Matrix Array Language,” *J. of Cybernetics*, Vol. 5.4 (1975), 19-36
- “New Decade Counter Using a Shift Register,” *J. of Electronic Engineering*, England, 6 (1972), 29 (with S. Chang and C. Lieu)

#### **PUBLICATIONS - Conference Proceedings and Technical Reports**

- “Metric Learning: A General Dimension Reduction Framework for Classification and Visualization”, C.Y. Lu, G.C. Feng, J.M. Jiang and P.S.P. Wang, *Proc. IAPR-ICPR2008*, Tampa, Florida, USA, December 8-11, 2008 (accepted, to appear)

- “A Scene-Based Video Watermarking Technique Using SVMs”, S.H. Yen, C.J. Wang, M.C. Chang, P. S.P. Wang, H.W. Chang, *Proc. IAPR-ICPR2008*, Tampa, Florida, USA, December 8-11, 2008 (accepted, to appear)
- “An Image Watermarking Scheme using Non-tensor Wavelets”, with Q.He, X.You, Y.Y.Tang, *IEEE-ICWAPR2007*, Beijing China, 350-355, Nov 2-4, 2007
- “Biometrics Technologies and Applications”, with Svetlana Yanushkevich, *Proc. AIA2007*, Innsbruck, Austria, 226-233, February, 2007
- “Face Representation By Using Non-tensor Product Wavelets”, X.G.You, D.Zhang, Q.H.Chen, P.S.Wang, and Y.Y.Tang, *Proc. ICPR2006*, 503-506, Hong Kong, China, August 2006
- “Texture Image Retrieval Using Novel Non-Separable Filter Banks Based on Centrally Symmetric Matrices”, Z. He, X. You, Y. Y. Tang, P.S. Wang and Y. Xue, *Proc. ICPR2006*, 161-164, Hong Kong, China, August 2006
- “Robust Clustering Based on Winner-Population Markov Chain”, F.-W. Yang, H.-J. Lin, P. S. P. Wang and H.-H. Wu, *Proc. ICPR2006*, 589-592, Hong Kong, China, August 2006
- “A Practical Approach to 3D Object Recognition Using Linear Combination and Gaussian Elimination”, with Mark Fung-A-Fat, Proc. Int. Conference on Computing, Communications and Control Technologies, Austin, Texas, August 14-17, 2004, 405-409
- “Some New Development of 3D Object Visualization and Recognition Using Graphic Representations, and Applications”, *Proc. Int. Workshop on Biometric Technologies 2004*, University of Calgary, Canada, June 22-23, 2004, 69-80
- “Recent Development of PR/CV via Internet”, for OCS’02, Guangzhou, China (slides presentation)
- “Articuated Object Recognition using Web Technology”, WI01, Maebashi, Japan, Springer-Verlag, October, 2001, 61-74
- “Object Oriented 3D Recognition in Virtual Environment”, (with M Yi), *Proc. Int. Conf. on Pattern Recognition (ICPR) 2000*, Barcelona, Spain, IEEE Computer Society Press, v3, 995-998
- “A New Method of Color Image Segmentation Based on Intensity and Hue Clustering”, (with C Zhang), *ICPR’2000*, Barcelona, Spain
- “Studies of Radical Model for Retrieval of Cursive Chinese Handwritten Annotations”, (with C. Zhang, M. Ma), *Proc. IAPR-SSPR’2000*, Spinger-Verlag, Alicante, Spain
- “An Improved Method For Identifying Radicals from Cursive Handwritten Characters”, *Proc. ICCLC’2000*, Chicago, July 2000 (with Matthew Ma and Chi Zhang)
- “Ink character matching for on-line classification”, with M. Ma, *Proc. IAPR-ICDAR’99*, India, 1999
- “A New Technique for Ink Matching of Handwritten Words”, (with M. Ma), *Int. Workshop on ICPR-Structural and Syntactic Pattern Recognition*, Sydney, Australia, August, 1998, 292-301

- “3D Object Recognition in Virtual Environment”, *Int. Conf. on Visual Interface*, Vancouver, B.C., Canada, June, 1998, 205-212
- “Semantic Matching of Free-format Chinese Handwriting”, (with M. Ma, D. Lopresti, and J. Crisman), in ICCPOL97 (Int. Conf. on Computer Processing of Oriental Languages), April, Hong Kong, 1997
- “3D Object Recovery from 2D Images: A New Approach”, SPIE’96, v. 2904 *Robotics and Computer Vision*, Boston, November 1996, pp 138-145 (with E. Brown)
- “A Parallel Thinning Algorithm with Two-Subiteration that generates One-Pixel-Wide Skeletons”, ICPR’96, Wien, August 1996, pp457-461 (with Y.Zhang)
- “3D Articulated Object Recognition - A Case Study”, SPIE’96, v. 2904 *Robotics and Computer Vision*, Boston, November 1996, pp14-24 (with B. Liu)
- “Block Detection and Recognition of Bank Checks”, (with Argawal, Gupta, Hussein), *Int. Conf. on Document Analysis and Recognition ICDAR’95*, Montreal, 748-751, 1995
- “A New Thinning Algorithm” (with C.L.Lee), *Proc. ICPR94*, Jerusalem, 1994, 546-548
- “Design of Parallel Thinning Algorithms” (with Y.Zhang), *Proc. 3rd Int. Workshop on Parallel Image Analysis*, College Park, 1994, 183-194
- “Distance recovery of 3D Objects from Stereo Images by Hough Transform”, *SPIE Robotics and Computer Vision*, (with A. Parent) v2354, 348-356, 1994
- “Visuali. and Underst. of 3D Objects”, *SPIE Robo. & Comp. Visi.*, v2353, 10-21, 1994
- “Machine Visualization, Understanding and Interpretation of Polyhedral Line-Drawings in Document Analysis”, *IEEE-ICDAR’93*, Tsukuba, Japan, October 1993, 882-885
- “Recognizing 3D Articulated Line-Drawing Objects”, *SPIE Robotics and Computer Vision*, v2056 (ed by D. Casasent), 1993, 120-131
- “3D Articulated Object Recognition - A Parallel Approach”, *SPIE Int. Robotics and Computer Vision*, v1825 (ed by D. Casasent), 1992, 11-22
- “A Neural Net Based System for Recognition of Totally Unconstrained Handwritten Numerals”, *Proc. ICARCV’92*, (with M.V.Nage, A.Liu and A.Gupta), Singapore, 1992, cv22.11-cv22.14
- “An Improved Algorithm for Thinning Binary Digital Patterns”, (with M.V.Nage and A.Gupta), *Proc. ICPR’92*, Hague, Netherlands, (1992) 386-389
- “A parallel matching algorithm for 3d object recognition”, *Proc. SSPR’92*, Bern, Switzerland (1992), 411-420
- “Character Segmentation Techniques for Handwritten Text - A Survey”, (with C. Dunn), *Proc. ICPR’92*, 577-580 (1992)
- “Analysis of Thinning Algorithms”, (with Y. Zhang), *Proc. ICPR’92*, (1992) 763-766
- “A Formal Parallel Model for 3-D Object Pattern Representation”, *2nd Int. Colloquium on Parallel Image Analysis*, Japan, (1992)

- “3-D Parallel Array Grammars and Object Recognition”, Proc. of Int. Colloquium on Parallel Image Processing”, Paris, 1991, pp263-270
- “A Hybrid Approach to Handwritten Numeral Recognition” (with M.V.Nagendrapasad and A.Gupta), Proc. of Int. Workshop on Frontiers in Handwriting Recognition (IWFHR-91), Chateau de Bonas, France 1991, pp101-110
- “Handwritten digit recognition using neural networks” (with A. Bischoff), SPIE Conf on Intelligent Robotics and Computer Vision, 1991, 436-447
- “3-D Object Recognition using Gradient Descent and Array Grammars”(with L. Baird), SPIE Conf on Intelligent Robotics and Computer Vision, 1991, 711-719
- “Object Representation by 3-D Array Grammars”, Proc. SSPR’90, 1990
- “A New Approach for Chinese Handwriting Recognition”, Proc. Int. Conf. on Electronic Imaging, Pasadena, 373-379 (1989)
- “On-Line Chinese Characters Recognition”, 6th IGC Int. Conf. on Electronic Imaging , Boston, 209-214 (1988)
- “A Top-Down Approach For Two-Dimensional Grammatical Inference”, IAPR Syntactical and Structural Pattern Recognition Workshop, Nancy, France 200-212 (1988), (with H.J.Lin)
- “An Application of Syntactic Pattern Recognition to Sports”, IEEE Workshop on Languages for Automation, 196-201 (1988), (with L. Gray)
- “Pushdown Array Automata and C-F A.L.”, Proc. ICS’88, (1988), (with H.J.Lin)
- “A Max. Algo. for Thinning Digi. Patterns” Proc. ICPR’88, Rome, (1988), (with Y.Zhang)
- “An Improved Thinning Algorithm” Proc. ICPR’88, Rome, Italy (1988), (with Y.Zhang)
- “Artificial Intelligence in Chinese Characters” Proc ICCA’87, pp 85-88, Chicago (1987)
- “A More Natural Approach for Recognition of Line-drawing Patterns” SPIE Image Pattern Recognition v 755, pp 141-160, (1987) (with Y. Zhang) submitted to AAAI’89
- “Decomposition and Recognition of Handprinted Chinese Characters,” Proc. ICCA ‘86, Singapore (1986), pp. 131-135 (with Y. Zhang)
- “A Grammatical Inference Algorithm for Digitized Array Patterns, ”Proc. ICPR ‘86, Paris (1986) pp. 129-131 (with X-W Dai)
- “A Serial/Parallel Fast Thinning Algorithm,” Cybernetics and Systems ‘86 (Wien, Austria), 909-915 (1986), with Y.Zhang
- “Improved Fast Parallel Thinning Algorithm” NEACP 139-142(1985)(with Hui,Fleming)
- “A Pumping Lemma of Context - Free Isometric Languages,” Proc. NEACP Conference 85, pp. 120-126 (1985) (with H. Lin)
- “Syntactic Pattern Recognition and Inference in Music, ” Proc. NEACP Conf. 85, 150-153 (1985) (with M.Francis)

- “An Improved Fast Parallel Thinning Algorithm for Digital Patterns,” Proc. IEEE-CVPR 85, San Francisco, (1985), 364-367 (with H. Lu)
- “On Hierarchical Structures of Isometric Grammars - Generation and parsing, ” Computer Language Structure Proc. Taipei 5-1-18 (1983).
- “On Ambiguity of Progr. Lang. ” Computer Lang. Structure Proc. Taipei 5-1-18 (1983).
- “Optical Character Recognition and office Automation,” Proc. Int. Conf. on Advanced Automation, Taipei, China, pp. 17-21, (1983)
- “An Application of Array Grammars to Clustering Analysis for Syntactic Pattern”, Proc. of IEEE Conf. on Pattern Recognition and Image Processing, Dallas, TX, 27-30, 1982
- “A New Character Recognition Scheme with Lower Ambiguity and Higher Recognizability ,” Proc. Int. Conf. on Pattern Recognition, vol. 1, Munich, West Germany, (1982), 37-39
- “On the Degrees of Recognizability, Learnability and Ambiguity of Handwritten Symbols,” Proceedings of ICS 82- Vol. 1, (1982), 403-410
- “A New Hierarchy for Two-Dimensional Isometric Arrays,” Proceedings of IEEE Conf. on Pattern Recognition and Image Processing, Las Vegas, (1982) 34-36
- “Chinese Character Represen. by Sequential/Parallel Array Grammers,” Proc. IEEE Computer Arch, for Pattern Ana. & Image DB Mangmnt, Hot Springs,(1981) 329-332
- “Machine Recognition of Handwritten Text for the Advanced Workstation” GTE-TR-PW-81-31 (1981), (with Y. Litvin)
- “2D Pattern Anal. - A Seq/Parallel Appr.” NSF Workshop Report on SSPR, (1981) 42-44.
- “Generation and Parsing of Isometric Parallel Context-Free Array Patterns,” Proc. 5th European Meeting on Cybernetics and Systems Research, Vienna, Austria, April 8-11, (1980)
- “Hierarchical Structures and Complexities of Isometric Patterns,” Proc. of the 5th Intern. Conf. on Pattern Recognition, Miami Beach, FL, (1980), 819-821
- “A Syntactic Representation of 2D Patterns,” Proc. of ICPR80, Miami,(1980) 985-987
- “Parallel Context-Free Array Languages,” Proc. of 14th Annual Conf. on Information Sciences and Systems, Princeton University, March 26-28 (1980)
- “2D Pattern Gener. and Classi. using Array Grammars, TR-003, IIS, Academia Sinica (1979)
- “On Syntactic Pattern Recognition, TR 79-002, Institute of Information Science, Academia Sinica, Taipei, China, (1979)
- “A Sequential/Parallel Approach to Chinese Character Generation and Classification,” Proc. of Intern. Computer Symp. ‘78, Taipei, China, (1978), 618-625
- “A Note on 2D Language Hierarchies,” Proc. of ICS’77, Taipei,(1977), 65-71
- “Parallel Pattern Processing in Tessellation Space,” Proc. of Intern. Computer Symp. ‘77, Taipei, China, (1977), 139-146

- “Recognition of 2D Patterns,” Proc. of ACM-NC’77 Seattle, 1977),484-489
- “Formal Prop. of Seq./Para. Matrix Grammars,” Proc. of ACM-NC’76, Houston (1976) 12-16
- “A Language for 2D Digital Picture Proc.,” Proc. of ACM SIG-PLAN/SIGGRAPH Symp. on Graphic languages’ Miami Beach, (1976) 106-112 (with W. Grosky)
- “A Synt. Method to Chinese Character Proc.,” Proc. ICS’75, Taipei, (1975) 149-154
- “The Relation Between Uniformly Structured Tessellation Automata and Parallel Array Grammars,” Proc. of the IEEE ISUSAL 75, Tokyo, Japan (1975) 97-102 (with W. Grosky)
- “SIMPARG - Simultaneous Parallel Array Grammars, ” Proc. of the Conf. on Parallel Processing, Syracuse Univ. (1975), 171 (with W. Grosky)

## BOOKS

- *Image Pattern Recognition – Synthesis and Analysis in Biometrics*, WSP, (co-ed with S. Yanushkevich, M. Gavrilova and S. Srihari), 2007
- *Handbook of Pattern Recognition and Computer Vision* WSP, 2005 (co-ed with C.H. Chen)
- *Multimodal Interface for Human-Machine Communication*, (ed. with P.Yuen and Y.Tang), WSP, 2002
- *Agent Engineering*, (ed. with J.Liu,N.Zhong,Y.Tang), WSP, 2001
- *Multispectral Image Processing and Pattern Recognition*, (ed. with J.Shen, T.X.Zhang), WSP, 2001
- *Handbook of Pattern Recog. & Comp. Vision, v2*, (ed with C.Chen and L.Pau), WSP, 1999
- *Advanced Aspects of Oriental Language Recognition and Processing*, (ed with S.W.Lee and Y.Y.Tang), WSP, 1998
- *Parallel Image Analysis: Tools and Models*,(ed with S. Miguet and A. Montanvert), France, 1998 WSP
- *Automatic Bankcheck Processing*, (ed with S. Impedovo and H. Bunke), WSP, 1997
- *Handbook of Character Recog. and Document Image Analysis*, (ed with H. Bunke), WSP, 1997
- *Advances in Structural and Syntactical Pattern Recognition*, (ed with P. Petra and A. Rosenfeld), Springer-Verlag, Berlin, 1996
- *Parallel Image Analysis*, (ed with A.Rosenfeld, K.Inoue, M.Nivat and L.Davis), WSP, 1995
- *Advances in Document Image Analysis*, (ed with H. Bunke and H. Baird), WSP, 1994
- *Advances in Pattern Recognition using Neural Network*, (ed with I. Gyuon), WSP, (1994)
- *Thinning Methodologies for Pattern Recognition*, (ed with C.Y.Suen), WSP, (1994)
- *Handbook of Pattern Recog. & Comp. Vision*, (ed with C.Chen and L. Pau), WSP, (1993)

- *Parallel Image Processing*, (ed with A. Nakaruma, K. Inoue, M. Nivat and A. Saoudi), Springer Verlag, Berlin, (1992)
- *Parallel Digital Image Analysis*, (ed with A. Saoudi and M. Nivat), WSP, (1992)
- *Character and Handwriting Recognition - Expanding Frontiers*, (ed) WSP, (1991)
- *Array Grammars, Patterns and Recognizers*, (ed) World Scientific Pub. Co. (1989)
- *Intelligent Chinese Language Pattern and Speech Processing*,(ed) WSP Co. (1988)
- *Intelligent Systems, Imaging Technology and Software Engineering*, (ed) Sungkang (1984)
- *Computer Vision, Image Proc., Communications - Systems & Appl.*, (ed). WSP (1986)

## PATENTS

A New Dual Level Pattern Recognition System - Europe Patent, Munich, EP-58,684(1984)

Dual Level Pattern Recognition System - A New OCR Technique-US Patent PN:4,521,909 (1985)

System and Method for Character Recognition with Normalization (with A.Gupta, M.Nage)-US Patent PN:08,063,251(1997)

## RESEARCH ACTIVITIES/GRANTS

- Advances of Biometrics and Pattern Recognition, iCORE (Informatics Circle of Research Excellence), Canada, iCORE-RT733324-2006, \$160,000, 2006-2007
- 3D articulated object understanding and recog. in multi-media virtual environment, 2007-2009 (being revised)
- New Technologies for Medical Imaging, *Mediol.com* 1999-2001
- Handwriting recognition - A New Combinatorial Approach, TW-1997-1999
- Document Image Analysis in Multi-Media Environment, Matsushita Panasonic MITL, Princeton, (96-6-97-4), 1996-1997
- Application of OCR to Check Analysis, MIT Sloan School (GB-R-302994), 1994-1996
- A New Approach for Handwriting Recognition MIT Sloan School (GC-R-241253), 1990-1994
- Intelligent Pattern Recognition and Applications, TU Wien, 94-1025, 1994
- Enhancing International Image and Reputation of NU, NUFDR 3-74710, 1994
- IIS of Academia Sinica, and NTU, Multi-dimensional image analysis, 1992
- A Formal Model for Pattern Representation, Summer 1991, University of Paris VII #91-07
- CCL/ITRI and NCTU, OCR and Document Recognition, 1991
- A Formal Parallel Model for Pattern Representation, U. of Paris VII, 1991 #91-07
- A Fast Serial and Parallel Thinning Algorithm, 1986, Northeastern University #7664

- Towards a Theory of Sequential/Parallel Array Languages, 1979-1980, NSF MCS80-03290
- Information Dissemination in Communication/Computer Networks, NSF ENG79-02960, August 1979 - January 1982 (with S. Hedetniemi, A. Farley, S. Mitchell and A. Proskurowski)
- A New Syntactic Method for 2D Digital Pattern Processing, NSF MCS77-15976, 1978-1980

#### **Ph.D. STUDENTS PRODUCED (and several MS students)**

- H.J.Lin, *On 2D Pattern Languages and Applications to Recognition*, NU, 1992 (Now Associate Professor of Tungkang Univ., Taiwan, ROC)
- Isao Kamae, *Formaliz. of Clinical Algor. by Automata & Decision Anal.*, Harvard U., 1994 (Now Medical Doctor of Kyoto Univ Hospital, Japan)
- Matthew Ma, *Application of Imaging Technique to Multi-Media Processing*, NU 1998 (Now senior research project leader at Panasonic, Princeton, USA)
- and several other MS students

#### **OTHER PUBLICATIONS (NON-TECHNICAL)**

- *Harvard Meditation Melody*, (Taiwan Provincial Better Publication Award, 1999), Chiu-Ko, Jiang-Hsin Pub. Co., Taipei 1999
- "Mom, I Love You", (WJ Mother's Day Essay Competition Award), July 1999
- "Pushkin and Wang Jie-Ru", Asian Weekly, July 1999
- "From Madison Bridge to Titanic", Asian Weekly, December 1998
- "Watching Hong Kong Returning to her Mother Dragon's Bosom", Chiao Bao, July, 1997
- "Music in poems, poems in music", June, World Journal, 1997
- "One Word Difference" 3rd Prize Winner of World Journal Prose Competition, June 1996
- "Visit of Jerusalem - The Holy City" Youth Daily, January 16-17, 1995
- "Jasmine Flower and Ode To Joy", Central Daily News, November, 1993
- "When Sunset Light ALL Over the Sky", World Journal, May, 1993
- "Atomic Bomb, Peace Park, and One Beautiful Day", Alliance Daily, February, 1993
- "On the death of Latinization of Chinese Words", World Journal, January, 1993
- "On Professors' Pleasure and Pains", Daily Central News, February, 1992
- "Beautiful the Music", World Journal Weekly, January, 1992
- " "Ode to Joy" Suite", World Journal Weekly, November, 1991
- "Chinese Culture Back to Her Original Look", World Journal Weekly, November, 1991
- "From Newton to Minsky", World Journal Weekly, August, 1991

- “Feather and Mountain”, China Times Weekly, March, 1991
- “On Oscar Wilde’s poem “Requiescat” ”, World Journal, June, 1988
- “On Jacques-Louis David’s painting “Napoleon’s Coronation”, America Central Daily, 1988
- “ “The Lady of Camelias” and Alexander Dumas II”, America Central Daily, 1988
- “Appreciation of Mozart’s “Coronation” in the snow”, World Journal, May, 1988
- “On Information Age Education”, Central Daily News (Overseas), March, 1988
- “On Mixing Chinese Language with English”, Centre Daily News(USA), March, 1988
- “In Search of Beethoven’s Footsteps - A Recollection of Wien’s Spring Tour,” Central Daily News, San Francisco, August 10-11 (1986)
- “Revisit Puccini’s opera ‘Turandot’ ” World Journal, New York, April, 15 (1984)
- “The Relation Between Puccini’s ‘Turandot’ and a Chinese Folk Song ‘A Jasmine Flower’ ”, Sunday Times, no. 52, San Francisco, CA, (1978). Also selected by Chiao Tung Univ. Alumui Monthly, V. 278, (Oct. 1979),29-37
- “Image of God - Through Analysis of a Chinese Art Song ‘Rosy Clouds at Dusk All Over the Sky by Hwang You-Di’ ”, Among Friends Monthly v. 101, March, (1971), 27-29
- “The Meaning of Life and Source of Joy”, Among Friends Monthly, v. 90, Nov. (1971), 14-19
- “Analysis of ‘The Chorus of Pilgrims’ from Wagner’s Opera ‘Tannhauser’ ”. Among Friends Monthly, v.86, March, (1969), 17-19

#### **CONFERENCE and PROFESSIONAL PRESENTATIONS(Since 1984)**

- “Intelligent Pattern Recognition and Applications to Biometrics”, IEEE-ICMLC2008, Kunming, China, and IEEE-ISI2008, Taipei, Taiwan, R.O.C.
- “Recent Development of Pattern Recognition and Applications”, eForensics2008, Adelaide, Australia, IEEE-SMC2007, Montreal, Canada, IEEE-BIBE2007, Harvard Medical, IEEE-IAS2007, Manchester, UK, and AIA2007, Innsbruck, Austria.
- “Biometrics and Pattern Recognition”, Microsoft, Tsinghua U., Beijing, HB U., Wuhan HUST, ECNU, SHJTU, Shanghai, China, August - September, 2006
- ICPR2006, “Face Recognition and Wavelet Techniques”, August 2006, Hong Kong, China
- High Tech Exchange Conference, “PR Applications”, Ningbo, China, June 2005
- BT 2004, “Some concerns on Pattern Recognition of Biometrics”, Calgary, Canada, June 2004
- CLCS ICCLP’2002, “Intelligent Knowlwdge Representation of Chinese Words”, Feng Chia Univ., Taiwan, ROC, July 2002
- IEEE WI’01 (Web Intelligence), Maebashi, Japan, October, 2001
- IAPR ICPR’00, Bcelona, Spain, 2000

- CLCS ICCPOL'00, Chicago, 2000
- IAPR ICDAR'99 (Int. Conf. on Document Analysis and Recognition), Bangalore, India
- ACM-SAC'99 (Int. Symposium on Applied Computing), San Antonio, Tx, 1999
- IEEE-ICMI'99 (Int. Conf. on Multi-Modal Interface), Hong Kong, 1999
- IAPR-SSPR'99 (Int. Workshop on Structural/Syntactic P.R.), Sydney, Australia, 1998
- IEEE-VI (Int. Conf. on Vision Interface), Vancouver, Canada, 1998
- SPIE-ICMI (Int. Conf. on Multispectral Imaging), Wuhan, China, 1998
- IWPIA (Int. Workshop on Parallel Image Analysis), Hiroshima, Japan, October 1997
- ICCPOL (Int. Conf. on Computer Processing of Oriental Languages), Hong Kong, April 1997
- SPIE Int. Conf. on Computer Vision and Intelligent Technologies, Boston, November, 1996
- IAPR Int. Conf. on Pattern Recognition, Wien, Austria, September, 1996
- IAPR Int. Workshop of S.S.P.R., Leipzig, Germany, August, 1996
- Int. J. Conf. on Information Sciences, Durham, Invited Speaker & Commit. member, 1994
- Int. Con. on Automation, Robotics & Computer Vision, Singapore, Invited Speaker, 1994
- Int. Workshop on Structural/Syntactic Pattern Recognition, Naharia, Israel, Invited Speaker and Committee member, October 1994
- Int. Conference on Information Science, Seoul, Korea, Invited Speaker, October, 1993
- NATO-APR Handwriting Recognition, Invited Speaker, Chateau de Bonas, August, 1993
- 7th Int. Conf. on Image Analysis and Processing, Bari, September, 1993
- Int. Colloquium on Parallel Image Analysis, June, 1991, Paris (also Co-Chair), and Ube, Japan, (also Co-Chair), December 1992
- Int. Conference on Artificial Intelligence Applications, February, 1991, Miami(Tutorial)
- Int. Conference on Computer Processing of Chinese and Oriental Languages, August 1991, Taipei, Taiwan, ROC, and Tutorial Speaker, Miami, December, 1992
- Int. Workshop on Frontiers of Handwriting Recognition, 1991, Toulouse, France
- Int. Conference on Pattern Recognition(ICPR), Atlantic City, June 1990, Tutorial Speaker, and Hague, (also Committee Member), September, 1992
- Int. Conf. on Automation, Robotics and Vision, Singapore, 1990, 1992 (also Committee Member and Session Chair)
- Int. Conference on Electronic Imaging, 1989, 1990, 1991, USA (Tutorial Speaker)
- ICPR'88, Rome Italy, November, 1988 (also Committee member), and ICPR'86, Paris, November, 1986 (also Session Chair)

- IEEE Workshop on Languages for Automation, Washington DC, 1988 (Committee member)
- 1988 Int. Conference on Computer Processing of Chinese and Oriental Languages Toronto, Canada, September, 1988, (also Committee member)
- NEACP CST'87, Boston, November, 1987 (also Conference Chair)
- Int. Conference on Chinese and Oriental Language Computing, Illinois Institute of Technology, Chicago, June, 1987 (also Program Chair)
- Int. Workshop, GRA-GRA, Virginia, December, 1986
- ICC'86 Singapore, August, 1986 (also Session Chair)
- IEEE-CVPR'86, Miami, 1986 (also Session Chair), San Francisco, 1985 (also Session Chair)
- ESC'86, Wien, April 1986
- NEACP-CST'85, Boston, November 1985 (also Technical Program Chairman)
- ICC'85, San Francisco, February, 1985 (also Session Chairman)
- ICPR'84, Montreal, Canada, August, 1984 (Text processing technical committee)

#### **INVITED LECTURES (Universities)(Since 1984)**

- Department of EECS, UCLA, Los Angeles, May 2005
- Ningbo U. China, summer 2005
- Tsinghua U., Sichuan U., Xiamen U., Taiwan U., Chiao Tung U., China, summer 2004
- Xiamen U., China, summer 2002
- Tsinghua U., Beida, Academia Sinica, Shandong U., China, summer 2001
- Jiao Tong U., Zhong Shan U., China, December 2000
- Institute of Information Science, Academia Sinica, Taipei, Taiwan, September 1999, 1997
- National Xia-Men University, Xia-Men, China, August 1998
- Dept. of Computer Science, National Tsing Hua University, December, 1997, Summer 1984
- Dept. of Computer Science, HKUST, HKBU, CUHK, Hong Kong, September 1999, April 1997
- Dept. of Information Engineering, National Taiwan University, Taipei, Taiwan, December 1996, 1997
- ISG, University of Magdeburg, Germany, October, 1996
- MITL Lab, Matsushita Panasonic, Princeton, September, 1996
- Dept. of Computer Science, Chiao-Tung University, Shanghai, Xian, Beijing, June, 1996
- National Chiao Tung University, Hsin-Chu, October, 1996, 1995, 1994, 1989, 1991, 1984

- ISS, National University of Singapore, November, 1994
- Technical University of Wien, Austria, October, 1994
- AI Lab, MIT, February, 1991, April, 1993
- Tsing Hua University, Beijing, September, 1993
- Hiroshima University, Japan, December 1992
- Tamkang University, Taipei, 1992
- Department of Computer Science and LITP, University of Paris VII and XIII, Summer, 1991
- Institute of Information Science, Academia Sinica, Taipei, Summer 1990
- Department of Information Engineering and Department of Electrical Engineering, National Taiwan University, Winter 1988 and Summer 1990
- Department of Electrical Engineering, National Cheng Kung University, Winter 1988
- Department of Computer Science, Singapore University, August 1986
- Department of Computer Science, Concordia University, Canada, May 1986
- Computer Science Departments, Jiao Tong U. (Beijing, Ermei and Shanghai), 1986
- Department of Electrical Engineering and Computer Science, Clarkson U., N.Y., 1984
- Department of Information Engineering and Computer Science , National Taiwan U., 1984

#### **INVITED LECTURES (Industries)(Since 1984)**

- III (Institute of Information Industry), Taipei, Taiwan, 2004, 2003, 1999, 1997, 1995
- Advanced Technology Center, ITRI, Summer 2004, 1990 and 1989
- Graphicon, Berlin, November, 1996
- Panasonic MITL, Princeton, September, 1996
- Center for AI Research, KAIST, Seoul, Korea, October, 1993
- ACER Inc., Taipei, 1992
- Wang Lab, Taipei, Winter 1988
- AVCO Research Labs, Boston, Winter 1986
- RCA, Princeton, June 14, 1985
- MIT Lincoln Labs, June 7, 1985

## AWARDS and OTHER RESEARCH - RELATED ACTIVITIES(Since 1984)

- Conf. General Co-chair, **IAPR 18th Int. Conf. on Pattern Recognition**, August 2006, Hong Kong
- Program committee member, IAPR-MLDM 2003, 2005, Leipzig, Germany, July 2005, 2003
- Invited DSST panelist for the Princeton testing Center, June 2004
- Invited NSF panelist for the HCI program, March 2004
- **Editor-in-Charge** “*International Journal of Pattern Recognition and Artificial intelligence*” and “*MPAI Book Series*”, World Scientific Pub. Co. (since 1987)
- **Fellow** of IAPR (Int. Asso. of Pattern Recognition) since 1994
- **Board member**, CLCS (Chinese Language Computer Society) USA, (since 2005)
- **Board member**, NEACP (New England Association of Chinese Professionals), Boston, USA (since 2005)
- **Honorary Advisor Professor of Sichuan U. (Chengdu), China**, since 2004
- **Honorary Advisor Professor of Guangxi N. U. (Guilin), China**, since 2002
- **Honorary Advisor Professor of Xia-Men University, China**, since 1999
- Program Co-Chair, CLSS International Conference, Taichung, Taiwan, ROC June 2002
- Conf, Co-chair, **IEEE/ACM Int. Conf. on Multimodal Interface**, Hong Kong, 1999
- Keynote Speaker, **SPIE Int. Symposium of Multispectral Image Processing**, Wu Han, China, 1998
- Keynote Speaker, **III ROC Information Month**, December, Taipei, Taiwan, 1997
- **Otto-von-Guericke Distinguished Guest Professor of Magdeburg U., Germany**, 1996
- Bronze Medal Winner, **North America Chinese Writers’ Association Prose Contest**, 1996
- **Co-chair**, ICCPOL97, Hong Kong, IAPR SSPR96, Leipzig, Germany, 1996
- **Chairman**, IAPR-SSPR TC-2, 1992 - 1996
- Committee Member, IEEE-ICDAR’95, Montreal, 1995, IEEE-PIA’95, Lyon, 1995
- Italy Image Processing Society Bronze Medal, Bari, Italy, September, 1993
- NEACP Speaker’s Appreciation Certificate, Boston, November 1993
- CLSCBC Speech Contest General Judge Certificate, Lexington, June, 1993
- Professional Contribution Award, Electronic Imaging, Boston, 1991
- Who’s Who in Marquis Computer Graphics, Science and Technology, Science and Engineering, Overseas Distinguished Chinese Scientists/Engineers, 1986-1998

- Chinese Writing Award, Overseas Chinese Alliance, 1994, 1993, 1992, 1991 and 1987
- Service Award, Chinese Language Computer Society (Washington D.C.), 1987
- Service Award, Industrial Technology and Research Institute (R.O.C.), 1986 and 1984
- Best Master Thesis Award, Ministry of Education, 1971
- Program Co-Chair, International Colloquium on Parallel Image Analysis, Paris, France, 1991 and Ube, Japan, 1992
- International Conference on Computer Processing of Oriental Languages (ICCPOL), Hawaii, 1995, South Korea, 1993, Florida, 1992
- Technical Committee Member, International Workshop on Frontiers in Handwriting Recognition, Toulouse, France, 1991
- Technical and International Advisory Committee Member, International conference on Automation, Robotics and Computer Vision, Singapore, 1990 and 1992
- Program Committee Member, ICPR'88, IEEE Workshop on LFA'88, ICCV'88
- Conference Chair, NEACP 1987 Academic & Professional Conf., Boston Nov'14 (1987)
- Reviewer of Books: A.I. IEEE-Computer Society Press, 1994, 1995, Chinese Computing-MIT Press, 1986, Compiler Construction-PWS Pub, 1986, Expert Systems-Prentice Hall (1985)
- Reviewer of Journals: *IEEE-PAMI*, *IEEE-Computer*, *CACM*, *ACM-TMS*, *IJPRAI*, *Computer Graphics and Image Processing*, *Information Processing Letters*, *Information Sciences*
- NSF Research Proposal Reviewer, Division of Mathematical and Computer Science
- Reviewer of Int. Conferences: IAPR-ICPR, IAPR-SSPR, ICDAR, PIA, PIP, ICCOLC
- Off-Campus Thesis and Grants Reviewers: Hong Kong, S'pore, Canada, MIT, Harvard U.

## COURSES TAUGHT

HU:	Harvard University	GIT:	Georgia Institute of Technology
NU:	Northeastern University	NTU:	National Taiwan University
BU:	Boston University	NCTU:	National Chiao Tung University
UO:	University of Oregon		

COM 3410	Artificial Intelligence Foundations (NU)
COM 1310	File Structures (NU)
KCOM 5112	Knowledge Engineering (NU) and (HU)
CAS 208	Introduction to Logic Programming (HU)
CS 250	Formal Languages and Automata (HU), (NU) and (NTU)
MA 594	Artificial Intelligence (BU) and (NU)
CS 573	Pattern Recognition (UO), (NU), (NCTU), (HU) and (NTU)
CS 525-526	Compiler Construction (UO) and (NU)
CS 524	Structures of Programming Languages (UO) and (NU)
CS 421	FORTRAN in an Operating Environment (UO)

CS 413	Advanced Data Structures (UO)
CS 411	Algorithm Analysis and Design (UO) and (NU)
ICS 3115	Numerical Analysis (GIT)
EE 201	Logical Design of Digital Computers (NTU)

## **PROFESSIONAL SOCIETIES**

- Fellow, International Association for Pattern Recognition (IAPR)
- Founding President, Association of Chinese-American Professors in N.E. (since 1994)
- AAAI ; ACM: SIGPLAN, SIGACT, SIGSOF, SIGGRAPH
- IEEE Fellow Nominee, Computer Society - Senior Member ; Pattern Recognition Society
- CLCS (The Chinese Language Computer Society) - Life Member, Governing Board Member and Newsletter Editor(Washington D.C.), 1983-1989
- President of NEACP, 1985-1987

## **HOBBIES AND PERSONAL DATA**

Classical music, sports, (tennis, ping pong, and basketball), and wei-chi(also known as “go” in Japanese). Have been a tenor in National Taiwan University Chorus, Boston Melodia Chorus, Boston Chinese Bible Church Choir, and Cambridge Chinese Choral Society (CCCS). Height 5’ 10” , weight 147 lbs., excellent health.

Citizenship: U.S.A.