

Mo Chen

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OBJECTIVE Seeking research and development position in digital signal/image processing and communication or related areas

- SUMMARY**
- **Versatile individual with extensive background in digital signal/image/video processing and communication (especially on data compression, image processing and analysis and wireless communication);**
 - **Proven ability to deliver high-quality DSP algorithms and software/hardware (Matlab, C/C++ and TI DSP Chip) in a fast-paced environment.**

- EDUCATION**
- **Ph.D.** in Electrical Engineering at State University of New York at Binghamton, Nov. 2005 , **GPA** 4.0/4.0
Concentration: lossy data compression algorithms, digital image and video processing, and wireless communication.
Dissertation: Data compression for multiple inference tasks in wireless sensor network;
 - **M.S.** in Electrical Engineering with honor at Shandong University, P.R.China, July. 2001, **GPA** 88/100
Concentration: Video compression algorithms such as MPEG1/2/4 and H.261/H.263
Thesis topic: Implementation of real-time auto/video streams for teaching applications;
 - **B.S.** in Electrical Engineering with honor at Shandong University, P.R.China, July, 1998, **GPA** 88/100

WORK EXPERIENCE
(06/2003-06/2004)

Engineer at Diamond Visionics Company, Binghamton, NY

- **Wireless binocular simulator for military training**
Designed an embedded, real-time video compression algorithm and FPGA realization, developing 802.11a Linux driver for PowerPC (CurfCube 405EP) and the wireless communication interface (C++/Matlab)
- **Image Processing Algorithms For Run-Time Terrain Development**
Applied and modified various image processing/analysis algorithms to improve the efficiency and visual effects of DVC world wide database system (Matlab/C++)
- **Programmed Flight simulator with Open Scene Graph (C++)**
- **Prepared and wrote proposals for Small Business Innovation Research (SBIR)** on such topics as, new video compression frameworks for object tracking and recognition, recovery of 3-D structure from motion, etc.

RESEARCH
EXPERIENCE

Air Force Research Laboratory, Rome, NY

- **Data compression for multi-sensor signal exploitation (05/2005 - now):** Doctoral Research; Proposed the new theories and optimized data compression frameworks for single/multiple inferences tasks in wireless sensor networks (**Matlab**)
- **Real-time tracking of objects in UAV video imagery (10/2003-10/2005)**
Designed some new and efficient image processing/analysis algorithms for real-time tracking of objects in either normal or MPEG compressed UAV video (**C++/ Matlab**)
- **Array-transmission based physical-layer security techniques for wireless networks (06/2004 - 05/2005):** Designed new digital signal processing algorithms to achieve perfect security and computational security in wireless networks by using space-time transmissions with proper randomization (**C++/ TI DSP Chip / COMBLOCK platform**)

Booz Allen Hamilton Inc. McLean. VA

- **Data Compression for TDOA-based emitter location (09/2003 - 09/2004)**
Designed new lossy operational compression algorithms for the emitter location based on Time difference of arrival (TDOA); New algorithms tremendously outperform traditional compression algorithm (**Matlab**)
- **Multipath Mitigation for TDOA-based emitter location (05/2002 - 05/2003)** Explored and designed digital signal algorithms to mitigate TDOA location errors caused by multi-path propagation of signals (**Matlab**)

Multimedia Research Lab, Shandong University, Shandong, China

- **Real-time video codec research (06/2000 - 06/2001)** Researched on the video compression algorithms such as MPEG 1/2/4 and H.261/H.263; Developed a hybrid and efficient real-time auto/video broadcast system for educational applications(**C++**)

TEACHING
EXPERIENCE

State University of New York at Binghamton

- **Instructor:**
 - (1) Spring 2005, EE302-Signal Processing
(lecture, core course, class size – 66 students)
 - (2) Summer 2004, EE260-Electrical Circuit
(lecture, core course, class size – 10 students)
- **Courses Taught as a TA:**
EE523-Data Compression, EE260-Electrical Circuit,
EE292-Electrical Phenomena, EE302-Signal Processing.
WTSN 111/112, Exploiting Engineering

AWARDS

- Graduate Assistantship (TA/RA), Department of ECE, State University of New York at Binghamton, (09/2001- 05/2003), (06/2004-present)
- Binghamton University graduate school fellowships (2001-2002 academic year, 2002-2003 academic year and 2005 spring)
- Award of Excellent Graduate of Shandong University, (1998/2001)

PUBLICATIONS

Journal Papers:

- [1] **M. Chen** and M. L. Fowler, "Data compression trade-offs for multiple estimates with application to emitter location" submitted to *IEEE Signal Processing*.
- [2] M. L. Fowler and **M. Chen**, "Fisher-information-based data compression for estimation using two sensors," *IEEE Trans. Aerospace and Electronic Systems*, July, 2005.
- [3] X. Li, **M. Chen** and W. Liu, "Application of STBC-encoded cooperative transmissions in wireless sensor networks," *IEEE Signal Processing Letters*, vol. 12, no. 2, Feb. 2005.
- [4] **M. Chen**, S. Zhang and M. A. Karim, "Modification of standard image compression methods for correlation-based pattern recognition," *Opt. Eng.* 43(8), August 2004

Conference Papers:

- [1] **M. Chen** and M. L. Fowler, "Data Compression for Simultaneous/Sequential Inference Tasks in Sensor Networks ," invited to IEEE International Conference on Acoustic, Speech and Signal Processing (ICASSP'2006), Toulouse, France, May. 2006
- [2] Shuqun Zhang and **M. Chen** "Preprocessing and compression of digital holographic images," Proc. SPIE Vol. 5909, p. 637-647, Applications of Digital Image Processing XXVIII; 2005
- [3] Shuqun Zhang and **M. Chen** "Target detection and tracking in airborne video imagery using statistical snake and mean-shift," Proc. SPIE Vol. 5909, p. 629-636, Applications of Digital Image Processing XXVIII; 2005
- [4] X. Li, F. Ng, J.-H. Hwu and **M. Chen**, "Channel equalization for STBC-encoded cooperative transmissions with asynchronous transmitters," in *Proceedings of the 39th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, Oct. 30-Nov. 2, 2005
- [5] F. Ng, J.-H. Hwu, **M. Chen** and X. Li, "Asynchronous space-time cooperative communications in sensor and robotic networks," *the 2005 IEEE International Conference on Mechatronics and Automation (IEEE ICMA'2005)*, Niagara Falls, Ontario, Canada, July 29-August 1, 2005.
- [6] X. Li, **M. Chen** and E. P. Ratazzi, "Array-transmission based physical-layer security techniques for wireless sensor networks," *the 2005 IEEE International Conference on Mechatronics and Automation (IEEE ICMA'2005)*, Niagara Falls, Ontario, Canada, July 29-August 1, 2005.
- [7] X. Li, **M. Chen** and E. P. Ratazzi, "Space-time transmissions for wireless secret-key agreement with information-theoretic secrecy", *the 6th IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC'05)*, The Italian Academy at Columbia University, New York, June 5-8, 2005
- [8] **M. Chen** and M. L. Fowler, "Geometry-adaptive data compression for TDOA/FDOA location," *Proceedings of the IEEE International Conference on Acoustic, Speech and Signal Processing (ICASSP'2005)*, Philadelphia, PA, Mar. 18-23, 2005.

- [9] W. Liu, X. Li and **M. Chen**, "Energy efficiency of MIMO transmissions in wireless sensor networks with diversity and multiplexing gains," *Proceedings of the IEEE International Conference on Acoustic, Speech and Signal Processing (ICASSP'2005)*, Philadelphia, PA, Mar. 18-23, 2005.
- [10] X. Li, **M. Chen** and E. P. Ratazzi, "A randomized space-time transmission scheme for secret-key agreement," *the 39th Annual Conference on Information Sciences and Systems (CISS'2005)*, Johns Hopkins University, Mar. 16-18, 2005.
- [11] X. Li, **M. Chen** and W. Liu "Cooperative transmissions in wireless sensor networks with imperfect synchronization," in *Proceedings of the 38th Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, Nov. 2004
- [12] **M. Chen** and M. L. Fowler, "Data compression trade-offs in sensor networks," in *Mathematics and Applications of Data/Image Coding, Compression, and Encryption VI*, Mark S. Schmalz, Editor, Proceedings of SPIE, Denver, Colorado, August 2 – 6, 2004.
- [13] **M. Chen** and X. Li, "Transmitter-based channel equalization and MUI suppression for UWB systems," In *Proceedings of the 6th International Conference on Modern Problems of Radio Engineering, Telecommunications and Computer Science (TCSET'2004)*, Lviv-Slavsko, Ukraine, February 24-28, 2004
- [14] **M. Chen** and M. L. Fowler, "Data Compression trade-offs for multiple inferences in sensor networks," *the 38th Annual Conference on Information Sciences and Systems (CISS'2004)*, Princeton University, March 17-19, 2004.
- [15] **M. Chen**, M.L. Fowler and S. Zhang, "Standards-compatible compression for automated image recognition in sensor networks," in *Mathematics and Applications of Data/Image Coding, Compression, and Encryption VI*, Mark S. Schmalz, Editor, Proceedings of SPIE, Vol. 5208, San Diego, CA, August 5 – 7, 2003
- [16] **M. Chen** and M. L. Fowler, "Non-MSE data compression for emitter location for radar pulse trains," in *Mathematics and Applications of Data/Image Coding, Compression, and Encryption VI*, Mark S. Schmalz, Editor, Proceedings of SPIE, Vol. 5208, San Diego, CA, August 5 – 7, 2003
- [17] **M. Chen** and M.L. Fowler, "Optimizing non-MSE distortion for data compression in emitter location systems," *the 37th Conference on Information Sciences and Systems (CISS'2003)*, Johns Hopkins University, March 12-14, 2003.
- [18] **M. Chen** and M. L. Fowler, "The Importance of Data Compression for Energy Efficiency in Sensor Networks," *the 37th Conference on Information Sciences and Systems (CISS' 2003)*, Johns Hopkins University, March 12-14, 2003
- [19] M. L. Fowler and **M. Chen**, "Integer Optimization Methods for Non-MSE Data Compression for Emitter Location," in *Mathematics and Applications of Data/Image Coding, Compression, and Encryption V*, Mark S. Schmalz, Editor, Proceedings of SPIE, Vol. 4793, Seattle, WA, July 8 – 11, 2002.