

## KUO-CHU CHANG

George Mason University  
Department of Systems Engineering and Operations Research  
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### EDUCATION

Ph. D. Electrical Engineering, the University of Connecticut, 1986.  
M.S. Electrical Engineering, the University of Connecticut, 1983.  
B.S. Communication Engineering, National Chiao-Tung University, Taiwan, 1979.

### RESEARCH INTERESTS

Dr. Chang's technical interests are mostly in the areas of Bayesian inference and decision theory, multi-source data fusion, situation assessment, and uncertainty in artificial intelligence. He has published more than 50 journal papers and book chapters and over 90 conference papers.

### PROFESSIONAL EXPERIENCE

2005-present: Professor; Dept. of Systems Eng. and Operations Research; George Mason University.  
1992-2004: Associate Professor; Dept. of Systems Eng. and Operations Research; George Mason University.

#### Courses taught:

- INFT 888/ECE 753 Distributed Estimation and Multisensor Tracking and Fusion
- SYST 685 Estimation and Tracking - Principles and Techniques
- SYST 684 Multisensor Data Fusion
- SYST 680/ECE 670/OR 683 Principles of C3I
- OR 680 Application Seminar
- SYST 611 Systems Engineering Modeling and Methodology
- SYST 798 Research Project
- SYST 500 Quantitative Foundation for Systems Eng.
- SYST 302 System Modeling
- SYST 203 System Engineering Lab.

#### Short courses taught:

- Probabilistic Inference in Bayesian Networks, BAH, Aug. 1993.
- Sensor, Data, and Information Fusion, MITRE, Oct. 1993.
- Surveillance, Tracking, and Fusion: Algorithms and Real Data Applications, UCLA Extension, Jan. 1994, 1995, 1996, 1997. (with Prof. Bar-Shalom)
- Multisensor Correlation, Fusion, and Bayesian Networks, LMCO, San Diego, August, 2005.

#### Research Projects:

- MOFUT - Modular Fusion Testbed (CECOM), PI, 1992-1994.
- BNF - Bayesnet for Fusion (ARL - ASSERT), PI, 1994-1995.
- BND - Bayesnet Development (SITE - GRA), PI, 1994-1995.
- SIAM - Situational Influence Assessment Module (SAIC), Investigator, 1993-1994.
- QSAR - Quadratic SAR Target Detection (DARPA), PI, 1993-1997.
- ATR - Automatic Target Recognition (DARPA - ASSERT), PI, 1994-1997.
- MICOR - Multiple Intelligence Correlation and Fusion (DARPA), PI, 1994-1995.
- CORUS - Contact Recognition for Undersea Surveillance (LORAL), Co-PI, 1995.
- STTR - Multisensor Track-to-Track Fusion (ROME), PI, 1995-1996.
- ABL - Automatic Bayesnet Learning (SITE - GRA), PI, 1996-1997.
- BSC - Bayesnet for Ship Classification (Martin), Co-PI, 1996-1997.
- CSM - Cooperative Sensor Management (ROME), PI, 1997.
- SUO - Small Unit Operation Situation Assessment System (Raytheon-E), PI, 1997.
- PKF - Predictive Kalman Filter for Situation Awareness (ROME), PI, 1997-1999.

BMDO - Multisensor Fusion for Single Integrated Air Picture Systems (BMDO), PI, 2000-2001.  
IET - Algorithm Development and Support for BMD (BMDO), PI, 2001.  
SPARTA – Technical Analysis and Support for Project Hercules (MDA), PI, 2002-2003.  
DTT - Dynamic Target Tracking (DARPA), PI, 2002-2004.  
IET - STTR on Distributed Sensor Fusion (ONR), PI, 2003-2004.  
SPARTA – Algorithm Development and Analysis for Project Hercules (MDA), PI, 2003-2006.  
DAC - STTR on Distributed Fusion (AFOSR), PI, 2005-2006.  
TOYON - STTR Phase I and II on Image-Based Tracking for UAV (AFOSR), PI, 2006-2009.

1998-1999: Technology Fellow (On Leave from GMU); Fair Isaac & Company.

1983-1992: Senior Research Scientist, Advanced Decision System, a division of Booz-Allen & Hamilton, Mountain View, CA.

1981-1986 Research Assistant, Dept. of Electrical Engineering and Computer Science, the University of Connecticut, Storrs, CT

#### PROFESSIONAL MEMBERSHIPS

IEEE, Senior Member, Aerospace and Electronic Systems, Control Systems Society.  
SPIE, Member

#### HONORARY MEMBERSHIPS

Eta Kappa Nu; Tau Beta Pi.

#### PROFESSIONAL SERVICE

Program Committee, AAAI, 2006.  
Program Committee, MSS National Symposium on Sensor and Data Fusion, 2003 – present.  
Program Committee, SPIE Conference on Signal Processing, Sensor Fusion, and Target Recognition, 2003 – present.  
Member of Program Committee, ISIF Fusion conference, 2003 – 2006.  
Associate Editor, *IEEE Trans. on Systems, Man, and Cybernetics*, 2002 - present.  
Editor, Large Scale Systems: *IEEE Trans. on Aerospace and Electronic Systems*, 1996 - 2006.  
Editor, Tracking/Navigation Systems: *IEEE Trans. on Aerospace and Electronic Systems*, 1993 - 1996.

#### PUBLICATIONS

##### **Journal Papers**

Wei Sun and KC Chang, “Message Passing for General Hybrid Bayesian Networks: Representation, Propagation and Integration”, submitted to *IEEE Trans. on Aerospace and Electronic Systems*, 2007.

Todd Martin and KC Chang, “Decentralized Information Fusion in Ad Hoc Communication Networks”, submitted to *IEEE Trans. on Aerospace and Electronic Systems*, 2007.

Hongda Chen and KC Chang, “A Novel Non-linear Filtering and Predication (NFP) Method for Maneuvering Target Tracking,” to appear in *IEEE Trans. on Aerospace and Electronic Systems*, 2008.

Hongda Chen and KC Chang, “KNN Particle Filters for Dynamic Hybrid Bayesian Networks,” to appear in *IEEE Trans. on Aerospace and Electronic Systems*, April, 2008.

Eswar Sivaraman and K. C. Chang, “Performance Evaluation of Multi-Sensor Classification Systems,” to appear in *IEEE Trans. on Aerospace and Electronic Systems*, Oct., 2007.

K. C. Chang, “Almost Instant Time Inference for Partially Dynamic Bayesian Networks,” *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 43, pp. 13-22, Jan., 2007.

K. C. Chang and Joe Hill, "Sensor Resource Management with Level 2 Fusion Using Markov Chain Models", *Journal of Advances in Information Fusion (JAIF)*, Vol. 1, No. 2, pp. 95-107, Dec. 2006.

K. C. Chang and Hongda Chen, "Efficient Inference Algorithms for Hybrid Dynamic Bayesian Networks," *SPIE Optical Engineering Journal*, Vol. 44, No. 7, pp. 7201-7207, July, 2005.

Brian Saulson and K.C. Chang, "Nonlinear Estimation Comparison for Ballistic Missile Tracking," *SPIE Optical Engineering Journal*, Vol. 43, Issue 6, pp. 1424-1438, June, 2004.

K. C. Chang, Zhi Tian, Shozo Mori, and Chee-Yee Chong, "Performance Evaluation for MAP Track Fusion," *IEEE Trans. on AES*, Vol. 40, No. 2, pp. 706-714, April, 2004.

Zhi Tian and K. C. Chang, "Multi-Station Data Fusion for CDMA Wireless Communications," *SPIE Optical Engineering Journal*, Vol. 42, Issue 6, pp. 1572-1582, June, 2003.

Shulin Yang and K. C. Chang, "Comparison of Score Matrices for Bayesian Network Learning," *IEEE Trans. on Systems, Man, and Cybernetics – Part A: Systems and Humans*, Vol. 32, No. 3, pp. 419-428, May, 2002.

K. C. Chang, Zhi Tian, and Rajat Saha, "Performance Evaluation of Track Fusion with Information Matrix Filter," *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 38, No. 2, pp. 455-466, April, 2002.

Shozo Mori, Bill Barker, Chee-Yee Chong, and K. C. Chang, "Track Association and Track Fusion with Non-Deterministic Target Dynamics," *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 38, No. 3, pp. 659-668, April, 2002.

K. C. Chang, Xiaoyan Yin, Rajat Saha, and Kam Lee, "Evaluating a Linear Predictive Bandwidth Conservation Algorithm," *IEEE Trans. on AES*, Vol. 36, No. 4, pp. 1407-1414, Oct., 2000.

K. C. Chang, Robert Fung, Alan Lucas, Robert Oliver, and Nina Shikaoff, "Bayesian Networks Applied to Credit Scoring," *IMA Journal of Mathematics Applied in Business and Industry*, Vol. 11, Issue 1, pp.1-18, Jan., 2000.

Chee-Yee Chong, Shozo Mori, K. C. Chang, and Bill Barker, "Architectures and Algorithms for Track Association and Fusion," *IEEE AES Systems Magazine*, Vol. 15, No. 1, pp. 5-13, Jan., 2000.

Jun Liu, K. C. Chang, and Jing Zhou, "Bayesian Networks Learning with a Hybrid Convergent Method," *IEEE Trans. on SMC*, Sept. 1999.

Rajat Saha and K. C. Chang, "Centralized Fusion of Remote Tracks," *SPIE Optical Engineering Journal*, Vol. 37, No. 2, pp. 468-476, Feb., 1998.

Shulin Yang and K. C. Chang, "Multimodel Pattern Recognition by Modular Neural Network," *SPIE Optical Engineering Journal*, Vol. 37, No. 2, pp. 650-659, Feb., 1998.

Rajat Saha and K. C. Chang, "An Efficient Algorithm for Multisensor Track Fusion," *IEEE Trans. on Aerospace and Electronics Systems*, Vol. 34, No. 1, pp. 200-210, Jan., 1998.

K. C. Chang, Rajat Saha, and Y. Bar-Shalom, "On Optimal Track-to-Track Fusion," *IEEE Trans. on Aerospace and Electronics Systems*, Vol. 33, No. 4, pp. 1271-1276, Oct., 1997.

K. C. Chang and Robert M. Fung, "Target Identification with Bayesian Networks in a Multiple Hypothesis Tracking System," *SPIE Optical Engineering Journal*, Vol. 36, No. 3, pp. 684-691, March, 1997.

Andrew Hauter, K. C. Chang, and Sherman Karp, "Polarimetric Fusion for SAR Target Classification," *Pattern Recognition*, Vol. 30, No. 5, pp. 769-775, May, 1997.

Jun Liu and K. C. Chang, "Feature-Based Target Recognition with Bayesian Networks," *SPIE Optical Engineering Journal*, Vol. 35, No. 3, pp. 701-707, March, 1996.

K. C. Chang , “Multitarget Tracking with Adaptive Detection Thresholds,” *IEEE Trans. on Aerospace and Electronics Systems*, Vol. 32, No. 1, pp. 401-406, Jan., 1996.

K. C. Chang and R. M. Fung, “Symbolic Probabilistic Inference with both Discrete and Continuous Variables,” *IEEE Trans. on Systems, Man, and Cybernetics*, Vol. 25, No. 6, pp. 910-916, June, 1995.

S. Mori, K. C. Chang, C. Y. Chong, and K. P. Dunn, “Prediction of Track Purity and Accuracy,” *IEEE Trans. on Automatic Control*, Vol. 40, No. 5, pp. 953-959, May, 1995.

K. C. Chang , “Tracking and Fusion using Multiple MTI Sensors,” *IFAC Journal for Control Engineering Practice*, Vol. 2, No. 5, pp. 889-897, Sept. 1994.

K. C. Chang, S. Mori, and C. Y. Chong, “Evaluating a Multiple Hypothesis Multitarget Tracking algorithm,” *IEEE Trans. on Aerospace and Electronics Systems*, Vol. 30, No. 2, pp. 578-590, April, 1994.

K. C. Chang, S. Mori, and C. Y. Chong, “Performance Evaluation of Track Initiation in Dense Target Environments,” *IEEE Trans. on Aerospace and Electronics Systems*, Vol. 30, No.1, pp.213-219, Jan., 1994.

Clayton Stewart, Y. Lu, K. C. Chang, and H Wechsler, “A Self Organizing Feature Map/Learning Vector Quantizer Approach for Waveform Classification,” *Pattern Recognition and Image Analysis*, Vol. 3, No. 3, pp. 253-257, Sept., 1993.

K. C. Chang and Y. Bar-Shalom, “Distributed Adaptive Estimation with Probabilistic Data Association,” *Automatica*, March, 1989.

Y. Bar-Shalom, K. C. Chang, and A. P. H. Blom, “Tracking a Maneuvering Target Using Input Estimate vs. the Interacting Multiple Model Algorithm,” *IEEE Trans. on Aerospace and Electronic Systems*, March, 1989.

Y. Bar-Shalom, K. C. Chang, and H. M. Shertukde, “Performance Evaluation of a Cascaded Logic for Track Formation in Clutter,” *IEEE Trans. on Aerospace and Electronic Systems*, Nov., 1989.

K. C. Chang and Y. Bar-Shalom, “A Simplification of the JPDAM Algorithm,” *IEEE Trans. on Automatic Control*, Oct., 1986.

K. C. Chang, C. Y. Chong, and Y. Bar-Shalom, “Joint Probabilistic Data Association in Distributed Sensor Networks,” *IEEE Trans. on Automatic Control*, Oct., 1986.

K. C. Chang and Y. Bar-Shalom, “Joint Probabilistic Data Association with Possibly Unresolved Measurements and Maneuvers,” *IEEE Trans. on Automatic Control*, July, 1984.

## **Book Chapters**

Martin Liggins and K.C. Chang, “Distributed Fusion Architectures, Algorithms and Performance within a Network Centric Architecture,” to appear in *Fusion Hand Book*, Vol. I, Edited by David Hall, 2008.

Martin Liggins and K.C. Chang, “Introduction to Particle Filtering – The Next Stage in Tracking,” to appear in *Fusion Hand Book*, Vol. I, Edited by David Hall, 2008.

C. Y. Chong, Shozo Mori, and K.C. Chang, “Distributed Fusion Architecture,” to appear in *Fusion Hand Book*, Vol. II, Edited by James Llinas, 2008.

Shozo Mori, K.C. Chang, and C.Y. Chong “Distributed Fusion Algorithms,” to appear in *Fusion Hand Book*, Vol. II, Edited by James Llinas, 2008.

Jun Liu and K. C. Chang, “Model Learning with Bayesian Networks for Target Recognition,” in a special volume on *Uncertainty Analysis in Engineering and Science*, Edited by Bilal M. Ayyub and Madan M. Gupta, 1997.

K. C. Chang and Y. Bar-Shalom, "Multisensor Tracking and Fusion with MTI Radars," in NATO AGARDograph, Edited by D. F. Liang, pp. 121 - 129. Dec., 1996.

K. C. Chang, C. Y. Chong, and Y. Bar-Shalom, "Joint Probabilistic Data Association in Distributed Sensor Networks," Multisensor Integration and Fusion for Intelligent Machines and Systems, Chapter 25, Edited by Ren Luo and Michael Kay, Ablex Publishing Corp., 1995.

K. C. Chang, C. Y. Chong, and Y. Bar-Shalom, "Distributed Estimation in Distributed Sensor Networks," Large-Scale Stochastic Systems Detection, Estimation, Stability and Control, Chapter 2, Edited by S. G. Tzafestas and K. Watanabe, Marcel Dekker, 1992.

S. Mori, K. C. Chang, and C. Y. Chong, "Performance Analysis of Optimal Data Association with Application to Multiple Target Tracking," Multitarget-Multisensor Tracking: Applications and Advances, Vol. II, Chapter 7, Edited by Y. Bar-Shalom, Artech House, 1992.

Y. Bar-Shalom, K. C. Chang, and A. P. H. Blom, "Tracking of Splitting Targets in Clutter using the Interactive Multiple Model Joint Probabilistic Data Association Filter," Multitarget-Multisensor Tracking: Applications and Advances, Vol. II, Chapter 4, Edited by Y. Bar-Shalom, Artech House, 1992.

C. Y. Chong, S. Mori, and K. C. Chang, "Distributed Multitarget Multisensor Tracking," Multitarget-Multisensor Tracking: Advanced Applications, Chapter 8, Edited by Y. Bar-Shalom, Artech House, 1990.

Y. Bar-Shalom, K. C. Chang, and A. P. H. Blom, "Automatic Track Formation in Clutter with a Recursive Algorithm," Multitarget-Multisensor Tracking: Advanced Applications, Chapter 2, Edited by Y. Bar-Shalom, Artech House, 1990.

P. B. Luh, Y. Bar-Shalom, and K. C. Chang, "Centralized and Distributed Algorithms for Multitarget-Multisensor Tracking Systems," Control and Dynamic Systems, Vol. 31, Part 1, pp. 33 - 74, Academic Press, 1989.

### **Conference Papers**

K. C. Chang and Mahendra Mallick, "Distributed fusion using video sensors on multiple unmanned aerial vehicles," in Proc. SPIE Signal and Data Processing of Small Targets, San Diego, August, 2007.

Wei Sun and K.C. Chang, "Unscented Message Passing for Arbitrary Continuous Variables in Bayesian Networks" Proc. Twenty-Second Conference on Artificial Intelligence (AAAI-07), Vancouver, British Columbia, July, 2007.

Wei Sun and K.C. Chang, "Hybrid Message Passing for Mixed Bayesian Networks" Proc. Fusion 2007, Quebec, Canada, July, 2007.

Sang Chin and K.C. Chang, "Game Theoretic Approach for Sensor Management," in Proc. NSSDF, McLean, June, 2007.

Todd Martin and K.C. Chang, "A Data Fusion Formulation for Decentralized Estimation Predictions under Communications Uncertainty," Proc. Fusion 2006, Florence, Italy, July, 2006.

Nicholas P. Anderson, Puja Valiyil, KC Chang, and Sharon Heise, "Decision Architecture for Coordinated Control of Multiple UAVs," in Proc. NSSDF, McLean, June, 2006.

Nicholas P. Anderson, Puja Valiyil, KC Chang, and Sharon Heise, "Cooperative Decision and Control of Unmanned Air Vehicles (UAVs) with Intermittent Asynchronous Communications," in Proc. 74<sup>th</sup> MORS, Colorado Spring, June, 2006.

Sang Chin, Dr. KC Chang, and Dr. Scott Laprise, "Game-theoretic Model-based Approach to Higher-level Fusion and Its Application to Sensor Resource Management," in Proc. NSSDF, McLean, June, 2006.

Hongda Chen and KC Chang, "A Non-linear Filtering and Predication (NFP) Method for Maneuvering Target Tracking," in Proc. SPIE Defense and Security Symposium, Orlando, Florida, April, 2006.

Marty Liggins and KC Chang, "Algorithm Comparison for Autonomous Distributed Fusion," in Proc. SPIE Defense and Security Symposium, Orlando, Florida, April, 2006.

Christopher A. Paganoni, KC Chang, and Michael B. Robblee, "Using Self-Organizing Maps to Determine Observation Threshold Limit Predictions in Highly Variant Data," in Proc. SPIE Defense and Security Symposium, Orlando, Florida, April, 2006.

T. M. Clemons III and KC Chang, "Estimation Filters for Missile Tracking with Airborne Laser," in Proc. SPIE Defense and Security Symposium, Orlando, Florida, April, 2006.

Eswar Sivaraman and KC Chang, "The Global Confusion Matrix: A New Approach to Evaluating the Performance of Multi-sensor Classification Systems", Proc. Fusion 2005, Philadelphia, P-24, July, 2005.

Joe Hill and KC Chang, "Sensor Resource Management with Level 2 Fusion Using Markov Chain Models", Proc. Fusion 2005, Philadelphia, P-8, July, 2005.

Hongda Chen and KC Chang, "KNN Particle Filters for Dynamic Hybrid Bayesian Networks", Proc. Fusion 2005, Philadelphia, C2-3, July, 2005.

Edwin Johnson and KC Chang, "Quality of Information for Data Fusion in Net Centric Publish and Subscribe Architectures," Proc. Fusion 2005, Philadelphia, D2-2, July, 2005.

K.C. Chang and Donghai He, "Inference with Importance Sampling for Dynamic Bayesian Networks," Proc. Fusion 2005, Philadelphia, C2-1, July, 2005.

Todd Martin and K.C. Chang, "A Generalized Data Fusion Approach for Mobil Ad Hoc Networks," Proc. Fusion 2005, Philadelphia, D2-1, July, 2005.

Ghazi AlGhamdi, Kathryn Laskey, Wright, E., Barbara, D., and Chang, KC. *Modeling Insider Behavior Using Multi-Entity Bayesian Networks*. In Proc. of the 10th Annual Command and Control Research and Technology Symposium, June, 2005.

Joe Hill, KC Chang, and San Chin, "Sensor Resource Management with Hierarchical Target Valuation", in Proc. National Symposium on Sensor Data Fusion, Monterey, CA, May, 2005.

K.C. Chang and Donghai He, "Particle Filter with Iterative Importance Sampling for Bayesian Networks Inference," in Proc. SPIE Defense and Security Symposium, Vol. #5809, p. 313-321, Orlando, Florida, April, 2005.

Wei Sun and K.C. Chang, "Probabilistic Inference using Improved Importance Sampling for Hybrid Bayesian Networks," in Proc. SPIE Defense and Security Symposium, Vol. #5809, p. 322-329, Orlando, Florida, April, 2005.

Joe Hill and K. C. Chang, "Sensor Resource Management with Hierarchical Target Valuation Models," in Proc. Fusion' 2004, Vol. II, p. 1187-1194, Stockholm, Sweden, July, 2004.

Qiao XiangDong and K. C. Chang, "Information Matrix Fusion with Feedback versus Number of Sensors," in Proc. Fusion' 2004, Vol. I, p. 686-692, Stockholm, Sweden, July, 2004.

A. C. Tang, K. C. Chang, M. T. Sutherland, and C. J. McKinney, "Predicting single-trial performance in a target detection task from high density EEG," In: 10th annual meeting of the organization for Human Brain Mapping. Budapest, Hungary, June, 2004.

Mahendra Mallick, Lucy Y. Pao, and KC Chang, "Multiple Hypothesis Tracking Based Distributed Fusion Using Decorrelated Pseudo Measurement Sequence," in Proc. Am. Control Conference, Vol. 5, p4750-4751, June, 2004.

Martin Liggins, Mark Carlotto, Mark Nebrich, Kristin O'Connor, KC Chang , and Ivan Kadar, "Long-Term Battlespace Prediction System for Time-Critical Targets," MSS National Symposium on Sensor and Data Fusion, John Hopkins, Maryland, June, 2004.

K.C. Chang, and Hongda Chen, "Efficient Inference Algorithms for Hybrid Dynamic Bayesian Networks," in Proc. SPIE Defense and Security Symposium, Vol #5429, Orlando, Florida, April, 2004.

Ivan Kadar, KC Chang, Kristin O'Connor, and Martin Liggins, "Figures-of-Merit to bridge fusion, long term prediction and dynamic sensor management," in Proc. SPIE Defense and Security Symposium, Vol #5429, Orlando, Florida, April, 2004.

K.C. Chang and Wei Sun, "Performance Model for Dynamic Bayesian Networks," in Proc. SPIE Defense and Security Symposium, Vol #5429, Orlando, Florida, April, 2004.

K.C. Chang, Eswar Sivaraman, and Martin Liggins, "Performance Modeling for Multisensor Tracking and Classification," in Proc. SPIE Defense and Security Symposium, Vol #5429, Orlando, Florida, April, 2004.

Martin Liggins and K.C. Chang, "Information Theoretics in the IMM Decision Process," in Proc. SPIE Defense and Security Symposium, Vol #5429, Orlando, Florida, April, 2004.

Mahendra Mallick, Steven Schmidt, Lucy Y. Pao, and KC Chang, "Out-of-sequence Track (OOST) Filtering using the Decorrelated Pseudo Measurement Approach," in Proc. SPIE Defense and Security Symposium, Vol #5428, Orlando, Florida, April, 2004.

Jerzy Barla, K.C. Chang, Al Williams, and Yilin Weng, "A Hybrid Bayesian Decision Tree for Classification," in Proc. PKDD workshop, September, 2003.

K. C. Chang, Martin Liggins, and Ying Song, "Fusion Performance Modeling for Distributed Tracking and Classification," in Proc. Fusion' 2003, Australia, July, 2003.

Joe Hill and K. C. Chang, "Improved Representations of Sensor Exploitation for Automatic Sensor Management," in Proc. Fusion' 2003, Australia, July, 2003.

Martin Liggins, Mark Carlotto, Mark Nebrich, Kristin O'Connor, KC Chang , and Ivan Kadar, "Model Adaptive Multi-Source Track Fusion and Prediction," MSS National Symposium on Sensor and Data Fusion, San Diego, California, June, 2003.

Martin Liggins and K. C. Chang, "Information theoretics for improved tracking and fusion performance," SPIE AeroSense, Orlando, Florida, April, 2003.

K. C. Chang and Wei Sun, "Comparing probabilistic inference for mixed Bayesian networks," SPIE AeroSense, Orlando, Florida, April, 2003.

K. C. Chang, Ying Song, and Martin Liggins, "Performance Modeling for Multisensor Data Fusion," SPIE AeroSense, Orlando, Florida, April, 2003.

Brian Saulson and K.C. Chang, "Comparison of Nonlinear Estimation for Ballistic Missile Tracking," SPIE AeroSense, Orlando, Florida, April, 2003.

K. C. Chang and Zhi Tian, "Efficient Inference Algorithm for Bayesnet with Mixed Variables," in Proc. Fusion' 2002, Washington DC, July, 2002.

K. C. Chang, Zhi Tian, Shozo Mori, and Chee-Yee Chong, "MAP Track Fusion Performance Evaluation," in Proc. Fusion' 2002, Washington DC, July, 2002.

Zhi Tian and K. C. Chang, "CDMA Wireless Communications with Multi-Station Data Fusion," in Proc. Fusion' 2001, Montreal, Canada, August, 2001.

Daniel Bray, Charles Reichley and K. C. Chang, "Bias Effects Using an Interacting Multiple Model Approach for Fixed-Sensor Passive Sonar Surveillance Target Tracking," in Proc. Fusion' 2001, Montreal, Canada, August, 2001.

- Zhi Tian and K. C. Chang, "Multi-Station Data Fusion for CDMA Wireless Networks," in Proc. YBS Workshop on Estimation, Tracking, and Fusion, Monterey, California, May, 2001.
- K. C. Chang, "Evaluating Hierarchical Track Fusion with Information Matrix Filter," in Proc. Fusion' 2000, Paris, July, 2000.
- Chee-Yee Chong, Shozo Mori, K. C. Chang, and Bill Barker "Architectures and Algorithms for Track Association and Fusion," in Proc. Fusion'99, July, 1999.
- Shozo Mori, Bill Barker, Chee-Yee Chong, and K. C. Chang, "Track Association and Track Fusion with Non-Deterministic Target Dynamics," in Proc. Fusion'99, July, 1999.
- K. C. Chang, Xiaoyan Yin, and Rajat Saha, "A Linear Predictive Bandwidth Conservation Algorithm for Situation Awareness," in Proc. CDC, Tampa, FL., Dec., 1998.
- K. C. Chang, Zhi Tian, and Rajat Saha, "Performance Evaluation of Track Fusion with Information Filter," in Proc. Fusion'98, Las Vegas, July, 1998.
- Jun Liu, K. C. Chang, and Jing Zhou, "A Hybrid Convergent Method for Learning Probabilistic Networks," in Proc. of AI-98', Vancouver, Canada, June, 1998.
- Rajat Saha, K. C. Chang, Xiaoyan Yin, and Kam Lee, "Stochastic Approximation Approach to Predictive Encoding for Bandwidth Saving in Situation Awareness," Proc. of SPIE, Orlando, April, 1998.
- Rajat Saha, K. C. Chang and M. M. Kokar, "Fusion of Synchronous Tracks," Proc. of SPIE, Orlando, April, 1997.
- Yi-Chuan Lu and K. C. Chang, "High Resolution Polarimetric SAR Target Classification with Vector Quantization," in Proc. of 1996 International Conference on Artificial Intelligence (TAAI-96), Taiwan, ROC, Dec., 1996.
- K. C. Chang, Y. Bar-Shalom, and Rajat Saha, "Performance Evaluation of Multisensor Track-to-Track Fusion," in Proc. IEEE Conference on Multisensor Fusion and Integration, Washington D. C., Dec., 1996.
- K. C. Chang and Jun Liu, "Efficient Algorithms for Learning Probabilistic Networks," in Proc. of SMC-96, Beijing, China, Oct., 1996.
- Shulin Yang and K. C. Chang, "On Score Matrices for Joint Probability of Bayesian Network Structure and Database," in Proc. of SMC-96, Beijing, China, Oct., 1996.
- Jun Liu and K. C. Chang, "Automatic Target Recognition with Bayesian Networks," Proc. of International Federation on Automatic Control, Vol. P, pp. 137-142, San Francisco, June, 1996.
- K. C. Chang and Robert M. Fung, "Target Identification with Bayesian Networks in a Multiple Hypothesis Tracking System," in Proc. of INFORMS, Washington D.C., May, 1996.
- K. C. Chang and Jun Liu, "Bayesian Probabilistic Inference for Target Recognition," Proceedings of SPIE, Orlando, April, 1996.
- Shulin Yang and K. C. Chang, "A Modular Neural Net Architecture for Automatic Target Recognition," in Proceedings of SPIE, Orlando, April, 1996.
- Andrew Hauter, K. C. Chang, and Ellen Vann, "Synthetic Aperture Radar Wavelet Feature Recognition," in Proceedings of SPIE, Orlando, April, 1996.
- Andrew Hauter and K. C. Chang, "Polarimetric Fusion for Synthetic Aperture Radar," in Proceedings of SPIE, Orlando, April, 1996.

- Jun Liu and K. C. Chang, "Feature-Based Target Recognition with Bayesian Inference," *Proceedings of The 3rd International Symposium on Uncertainty Modeling and Analysis*, College Park, Maryland, Sept., 1995.
- K. C. Chang and Xinhai Zhao, "A Greedy Assignment Algorithm and its Performance Evaluation," *Proceedings of American Control Conference*, Seattle, June, 1995.
- K. C. Chang, "Adaptive Detection Thresholds for Multitarget Tracking," *Proceedings of American Control Conference*, Seattle, June, 1995.
- Yi-Chuan Lu and K. C. Chang, "A Neural Network Approach for High Resolution Target Classification," *Proceedings of IFAC*, Orlando, Florida, April, 1995.
- K. C. Chang and Yi-Chuan Lu, "High Resolution Polarimetric SAR Target Classification Using Neural Network," *Proceedings of International Joint Conference of the Fourth IEEE/IFES*, Yokohama, Japan, March, 1995.
- K. C. Chang and Yi-Chuan Lu, "Feedback Learning: A Hybrid SOFM/LVQ Approach for Radar Target Classification," *Proceeding of 1994 International Symposium on Artificial Neural Networks*, Dec., 1994.
- K. C. Chang, "Multiple Intelligence Correlation and Fusion with Bayesian Networks," *The Seventh Joint Service Data Fusion Symposium*, John Hopkins University, Oct., 1994.
- K. C. Chang and Y. Bar-Shalom, "FUSEDAT: A Software Package for Fusion and Data Association with Multiple Sensors," *SPIE Conference*, Orlando, Florida, April, 1994.
- K. C. Chang and Clayton Stewart, "Application of Bayes Nets in Sensor Fusion," *SPIE Euro OPTO*, Oct., 1993.
- K. C. Chang and Clayton Stewart, "Information Fusion with Bayesian networks," *ARO Workshop*, June, 1993.
- K. C. Chang and Clayton Stewart, "Tracking and Fusion with Multiple MTI Sensors," *The Sixth Joint Service Data Fusion Symposium*, John Hopkins University, June, 1993.
- K. C. Chang, S. Mori, and C. Y. Chong, "Performance Evaluation for Track Initiation in Dense Target Environment," *Proc. ICSE Conference*, Kobe, Japan, Sept., 1992.
- K. C. Chang and R. M. Fung, "Symbolic Probabilistic Inference with Continuous Variables in Bayesian Networks," *Proc. Seventh Conference on Uncertainty in Artificial Intelligence*, UCLA, July 1991.
- K. C. Chang and R. M. Fung, "Symbolic Probabilistic Inference with Evidence Potential," *Proc. Seventh Conference on Uncertainty in Artificial Intelligence*, UCLA, July 1991.
- K. C. Chang, S. Mori, and C. Y. Chong, "Performance Evaluation of a Multiple-Hypothesis Multi-Target Tracking Algorithm," *Proc. IEEE Conference on Decision and Control*, Honolulu, Hawaii, Dec., 1990.
- Y. Bar-Shalom, Xiaorong Li, and K. C. Chang, "Non-Stationary Noise Identification with the Interacting Multiple Model Algorithm," *Proc. fifth IEEE International Symposium on Intelligent Control*, Philadelphia, Sept., 1990.
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