

# Wei Sun

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## Education

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| 2003-2007 | George Mason University, Fairfax, VA<br>Ph.D. in Information Technology – GPA 3.86/4.0<br>Department of Systems Engineering & Operations Research |
| 2001-2003 | George Mason University, Fairfax, VA<br>M.S. in Operations Research – GPA 4.0/4.0<br>Department of Systems Engineering & Operations Research      |
| 1987-1991 | Zhejiang University, Hangzhou, China<br>B.S. in Electrical Engineering – GPA 3.6/4.0<br>Department of Electrical Engineering                      |

## Research Experience

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| 2009 - Present | Research Assistant Professor of the Center of Excellence in C4I, George Mason University                      |
| 2007 - 2009    | Department of Enterprise Optimization, United Airlines, Inc.  |
| 2002 - 2007    | Graduate Research Assistant, Department of Systems Engineering & Operations Research, George Mason University |

## Honors and Awards

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| 2011        | Outstanding Reviewer, IEEE Transaction on Automatic Control  |
| 2007        | AAAI-2007 Scholarship and Travel Award   |
| 2003 - 2007 | Ph.D. Fellowship, the Volgenau School of Information Technology and Engineering, George Mason University |
| 2003        | Academic Excellence, Department of Systems Engineering & Operations Research, George Mason University    |
| 1991        | Excellent Bachelor Thesis, Department of Electrical Engineering, Zhejiang University                     |

## Selected Research Projects

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2011 - Present	DAGGRE (Decomposition-Based Information Elicitation and Aggregation) forecasting about \$2.2 million funded by IARPA ACE (Aggregative Contingent Estimation) program
2009 - Present	PROGNOS (Probabilistic Ontologies for Net-Centric Operation Systems) funded by Office of Naval Research (ONR)
2008 - 2009	Demand forecasting for airlines revenue management
2005 - 2007	Efficient inference algorithm development for hybrid Bayesian networks
2004 - 2005	Non-linear filtering methods comparison and estimation in dynamic Bayesian networks
2003 - 2004	Performance evaluation for Bayesian networks
2002 - 2003	Monte Carlo simulation and Gaussian mixture model in Bayesian inference

## Publications

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### A. Journals & Conference Proceedings

- A1. Wei Sun, K.C. Chang, "Scalable Inference for Hybrid Bayesian Networks", **under review**, *IEEE Transactions on Aerospace and Electronic Systems*, 2012.
- A2. Wei Sun, K.C. Chang, "Message Passing for Hybrid Bayesian Networks: Representation, Propagation and Integration", under review, *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 45, No. 4, pp.1525-1537, October, 2009.
- A3. Wei Sun, Robin Hanson, Kathryn B. Laskey, Charles Twardy, "Probability and Asset Updating using Bayesian Networks for Combinatorial Prediction Market", **under review**, *the 26<sup>th</sup> Conference on Artificial Intelligence (AAAI-12)*, 2012.
- A4. Wei Sun, K.C. Chang, "Study of the Most Probable Explanation in Hybrid Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80500T, 2011.
- A5. Wei Sun, Cheol Young Park, and R. Carvalho, "A New Research Tool for Hybrid Bayesian Networks using Script Language", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80501Q, 2011.
- A6. Q. Song, F. Lin, W. Sun, and K.C. Chang, "Learning Bayesian Network Structure using Cloud-based Adaptive Immune Genetic Algorithm" *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80500S, 2011.
- A7. Wei Sun, K.C. Chang, and Kathryn B. Laskey, "Scalable Inference for Hybrid Bayesian Networks with Full Density Estimation", *Proceedings of the 13<sup>th</sup> International Conference on Information Fusion (FUSION 2010)*, 2010.

- A8. P.C.G. Costa, K.C. Chang, K. Laskey, T. Levitt, and W. Sun, "High-Level Fusion: Issues in Developing a Formal Theory", *Proceedings of the 13<sup>th</sup> International Conference on Information Fusion (FUSION 2010)*, 2010.
- A9. K.C. Chang, Wei Sun, "Scalable Fusion with Mixture Distributions in Sensor Networks", *Proceedings of the 11<sup>th</sup> International Conference on Control Automation Robotics & Vision (ICARCV 2010)*, pp. 1251 - 1256, 2010.
- A10. Wei Sun, K.C. Chang, "Direct Message Passing for Hybrid Bayesian Networks and Performance Analysis", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 7697, pp. 76970S, 2010.
- A11. Feng Lin, Wei Sun, and K.C. Chang, "The Convergence Analysis of Parallel Genetic Algorithm based on Allied Strategy", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 7697, pp. 76970P, 2010.
- A12. Wei Sun, K.C. Chang, "Hybrid Message Passing for Mixed Bayesian Networks", *Proceedings of the 10<sup>th</sup> International Conference on Information Fusion (FUSION 2007)*, pp.1300 - 1307, Quebec, Canada, 2007.
- A13. Wei Sun, K.C. Chang, "Unscented Message Passing for Arbitrary Continuous Variables in Bayesian Networks", *Proceedings of the 22<sup>th</sup> Conference on Artificial Intelligence (AAAI-07)*, Vancouver, Canada, 2007.
- A14. Wei Sun, K.C. Chang, "Probabilistic Inference using Linear Gaussian Importance Sampling for Hybrid Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5809, No.1, pp. 322 - 329, 2005.
- A15. K.C. Chang, W. Sun, "Performance Modeling for Dynamic Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5429, No.1, pp. 384 - 391, 2004.
- A16. K.C. Chang, W. Sun, "Comparing Probabilistic Inference for Mixed Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5096, No.1, pp. 346 - 353, 2003.

**B. Book Chapters**

- B1 Wei Sun, K.C. Chang, "Chapter 14: Efficient Inference in General Bayesian Networks for Classification", *Advanced Topics and Applications in Integrated Tracking, Classification, and Sensor Management (Mahendra Mallick, Vikram Krishnamurthy, Ba-Ngu Vo)*, Wiley-IEEE Press, Edition 1 (August 2012), ISBN-10: 0470639059, ISBN-13: 978-0470639054.
- B2 Wei Sun, K.C. Chang, "Chapter 2: Probabilistic Inference for Hybrid Bayesian Networks", *Bayesian Networks (Wichian Premchaiswadi)*, InTech - Open Access Publisher, April 2012, ISBN: 979-953-307-769-6.

## **Presentations at Conferences**

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- C1 Wei Sun, K.C. Chang, "Study of the Most Probable Explanation in Hybrid Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80500T, 2011.
- C2 Wei Sun, Cheol Young Park, and R. Carvalho, "A New Research Tool for Hybrid Bayesian Networks using Script Language", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80501Q, 2011.
- C3 Q. Song, F. Lin, W. Sun, and K.C. Chang, "Learning Bayesian Network Structure using Cloud-based Adaptive Immune Genetic Algorithm" *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 8050, pp. 80500S, 2011.
- C4 Wei Sun, K.C. Chang, "Direct Message Passing for Hybrid Bayesian Networks and Performance Analysis", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 7697, pp. 76970S, 2010.
- C5 Wei Sun, K.C. Chang, "Hybrid Message Passing for Mixed Bayesian Networks", *Proceedings of the 10<sup>th</sup> International Conference on Information Fusion (FUSION 2007)*, pp.1300 - 1307, Quebec, Canada, 2007.
- C6 Wei Sun, K.C. Chang, "Unscented Message Passing for Arbitrary Continuous Variables in Bayesian Networks", *Proceedings of the 22<sup>th</sup> Conference on Artificial Intelligence (AAAI-07)*, Vancouver, Canada, 2007.
- C7 Wei Sun, K.C. Chang, "Probabilistic Inference using Linear Gaussian Importance Sampling for Hybrid Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5809, No.1, pp. 322 - 329, 2005.
- C8 K.C. Chang, W. Sun, "Performance Modeling for Dynamic Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5429, No.1, pp. 384 - 391, 2004.
- C9 K.C. Chang, W. Sun, "Comparing Probabilistic Inference for Mixed Bayesian Networks", *Proceedings of the SPIE - The International Society for Optical Engineering*, Vol. 5096, No.1, pp. 346 - 353, 2003.

## **Regular Reviewer for**

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- IEEE Transactions on Automatic Control
- IEEE Transactions on Systems, Man, and Cybernetics
- IET (Institution of Engineering and Technology) Radar, Sonar, and Navigation
- Journal of Systems Engineering and Electronics

## **Open-source Code Committer**

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- Bayesian Networks Toolbox (BNT) for Matlab - <http://code.google.com/p/bnt/> (more than 10,210 downloads from May 2010 to Jan. 2012).

## **Professional Affiliations**

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- Member, Institute for Operations Research and Management Science (INFORMS)