

# 王 勇

## 科研简历

### 个人信息

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## 简介

王勇是中国科学院(CAS) 数学与系统科学研究院(AMSS) 应用数学所副研究员。他在1999 年从内蒙古大学数学系的数学物理专业本科学位, 在2002 年从大连理工大学应用数学系获得运筹学与控制论硕士学位, 2005 年从中国科学院数学与系统科学研究院获得运筹学与控制论专业的理学博士学位。2005年到2007年在国家信息中心、日本大阪产业大学电子情报通信系从事博士后研究工作。并于2007年9月到2008年9月在波士顿大学生物信息学计划从事访问研究。2010年10月到2011年4月任日本产业技术综合研究所计算生物研究中心特别研究员。他目前的研究兴趣是最优化理论与算法、生物信息学和系统生物学。

## 教育情况

2002 ~ 2005      博士      运筹学与控制论,  
中国科学院数学与系统科学研究院应用数学所.  
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1995 ~ 1999      本科      数学物理,  
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博士论文题目:      基于人工神经网络的蛋白质结构预测与分类研究

## 研究经历

2010. 3 ~ 目前 副研究员, 中国科学院数学与系统科学研究院应用数学研究所.
- 2010.10 ~ 2011.4 特别研究员, 日本产业技术综合研究所(AIST)计算生物研究中心(CBRC).
2007. 9 ~ 2008. 9, 访问学者, 美国波士顿大学生物信息学研究中心.
2007. 6 ~ 2010. 3 助理研究员, 中国科学院数学与系统科学研究院应用数学研究所.
2005. 6 ~ 2007. 6 日本文部省奖学金资助博士后, 日本大阪市大阪产业大学电子情报通信系.
- 2005.5 ~ 2005.10 博士后, 国家信息中心.

## 科研项目

- 2005 ~ 2007  
运筹学方法在若干生物信息学重要问题研究中的应用  
批准号. 10471141  
中国国家自然科学基金委员会(NSFC)
- 2005 ~ 2007  
基于复杂系统观点和方法论的电子政务管理研究  
批准号. 2005038334  
中国国家博士后基金委员会
- 2006 ~ 2008  
生物信息学中的单体型推断模型与算法研究  
批准号. 60503004  
中国国家自然科学基金委员会(NSFC)
- 2006 ~ 2008  
生物信息学中的若干重要问题研究  
中国科学院基础局
- 2007 ~ 2009  
基于三维结构和高通量数据的蛋白质功能标注与预测研究  
NSFC-JSPS 合作研究项目, 批准号. 10711140116  
国家自然科学基金委员会(NSFC) 日本学术振兴会(JSPS)
- 2006 ~ 2008  
商业银行数据挖掘网格系统的研究与应用  
批准号. 70602034  
中国国家自然科学基金委员会(NSFC)
- 2007 ~ 2009  
复杂网络中模块结构探测的理论与算法研究  
批准号. 10701080  
中国国家自然科学基金委员会(NSFC)
- 2009 ~ 2011  
基因调控网络重建中的优化模型和算法研究  
批准号. 10801131  
中国国家自然科学基金委员会(NSFC)
- 2009 ~ 2011  
最优化方法在信息技术中的应用  
批准号. kjcx-yw-s7  
中国科学院创新方向性项目

- 2009 ~ 2011      **生物分子网络中功能模块探测问题的数学模型及算法**  
批准号. 1092011  
北京市自然科学基金资助项目
- 2010 ~ 2012      **基于条件随机场的生物信息学研究**  
批准号. 60970091  
中国国家自然科学基金委员会(NSFC)
- 2011 ~ 2012      **基因调控网络重建的数据集成方法研究**  
教育部留学回国人员科研启动基金
- 2012 ~ 2016      **复杂网络的最优化方法及在系统生物学的应用**  
批准号. 11131009  
中国国家自然科学基金委员会(NSFC)
- 2012 ~ 2015      **诱导多能干细胞的生物信息学研究**  
批准号. 61171007  
中国国家自然科学基金委员会(NSFC)

## 研究兴趣

- 最优化理论与算法
- 生物信息学
- 系统生物学
- 机器学习
- 运筹学理论与应用

## 发表物— 著作或章节

1. **Computational Systems Biology.** Luonan Chen, Xiang-Sun Zhang, Ling-Yun Wu, and **Yong Wang** (eds.). Proceedings of The 5th IEEE International Conference on Systems Biology (ISB 2011), Zhuhai, 2011.
2. **Operations Research and its Applications.** Xiang-Sun Zhang, De-Gang Liu, Ling-Yun Wu, and **Yong Wang** (eds.). Lecture Notes in Operations Research 14, World Publishing Corporation, Beijing, 2011.

3. **Computational Systems Biology.** Luonan Chen, Xiang-Sun Zhang, Bairong Shen, Ling-Yun Wu, and **Yong Wang** (eds.). Lecture Notes in Operations Research 13, World Publishing Corporation, Beijing, 2010.
4. **Operations Research and its Applications.** Xiang-Sun Zhang, De-Gang Liu, Ling-Yun Wu, and **Yong Wang** (eds.). Lecture Notes in Operations Research 12, World Publishing Corporation, Beijing, 2010.
5. **Yong Wang**, Rui-Sheng Wang, Trupti Joshi, Dong Xu, Xiang-Sun Zhang, Luonan Chen, and Yu Xia. **A Linear Programming Framework for Inferring Gene Regulatory Networks by Integrating Heterogeneous Data**, Computational Methodologies in Gene Regulatory Networks, Sanjoy Das, Doina Caragea, W. H. Hsu, Stephen M. Welch (eds.), IGI Global, 2009.
6. **Optimization and Systems Biology.** Xiang-Sun Zhang, Luonan Chen, Ling-Yun Wu and **Yong Wang** (eds.). Lecture Notes in Operations Research 11, World Publishing Corporation, Beijing, 2009.
7. **Optimization and Systems Biology.** Xiang-Sun Zhang, Luonan Chen, Ling-Yun Wu, and **Yong Wang** (eds.). Lecture Notes in Operations Research 9, Proceedings of the Second International Symposium of Optimization and Systems Biology, Lijiang, China, October 31– November 2, 2008. World Publishing Corporation, Beijing, 2008. (ISTP)
8. **Operations Research and its Applications.** Xiang-Sun Zhang, De-Gang Liu, and **Yong Wang** (eds.). Lecture Notes in Operations Research 8, Proceedings of the Seventh International Symposium of Operations Research and its Application, Lijiang, China, October 31– November 2, 2008. World Publishing Corporation, Beijing, 2008. (ISTP)
9. **Optimization and Systems Biology**, Lecture Notes in Operations Research 7 Edited by Xiang-Sun Zhang, Luonan Chen, Ling-Yun Wu, and **Yong Wang**. Proceedings of the First International Symposium of Optimization and Systems Biology, Beijing, China, 8-10 August, 2007. World Publishing Corporation, Beijing, 2007. (ISTP)
10. **Operations Research 50 周年纪念特刊中文译本** 主编: 章祥荪, 刘德刚, 章璟, 吴凌云, **王勇**. 运筹与管理, 增刊, Vol. 13, 2004.

发表物— 期刊论文

1. Ruoying Chen, Wenjing Chen, Sixiao Yang, Di Wu, **Yong Wang**, Yingjie Tian, and Yong Shi. **Rigorous assessment and integration of the sequence and structure based features to predict hot spots.** *BMC Bioinformatics*, in press.
2. Xiang-Sun Zhang, Zhenping Li, Rui-Sheng Wang, **Yong Wang**. **A combinatorial model and algorithm for globally searching community structure in complex networks.** *Journal of Combinatorial Optimization*, in press,
3. Zhi-Ping Liu, **Yong Wang**. Xiang-Sun Zhang, Luonan Chen. **Network-based analysis of complex diseases,** *IET Systems Biology*, in press.
4. Ji-Guang Wang, Qiang Huang, Zhi-Ping Liu, **Yong Wang**, Ling-Yun Wu, Xiang-Sun Zhang, and Luonan Chen. **NOA: a novel network ontology analysis method,** *Nucleic Acids Research*, in press.
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19. Xiang-Sun Zhang, Rui-Sheng Wang, **Yong Wang**, Ji-Guang Wang, Yu-Qing Qiu, Lin Wang, and Luonan Chen. **Modularity optimization in community detection of complex networks.** *Europhysics Letters*, 87, 38002, 2009.
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- Transactions on Computational Biology and Bioinformatics.*, Vol. 6, No. 4, pp. 583-593, 2009.
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DOI: 10.1016/j.neucom.2007.12.043
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  31. Zhi-Ping Liu, Ling-Yun Wu, **Yong Wang**, Xiang-Sun Zhang, and Luonan Chen, **Protein cavity clustering based on community structure of pocket similarity network**, *International Journal of Bioinformatics Research and Applications*, Vol. 4, No. 4, pp. 445–460, 2008.

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Software: CDIinfer (<http://intelligent.eic.osaka-sandai.ac.jp/chenen/CDIinfer.htm>)
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Software: TRNinfer (<http://intelligent.eic.osaka-sandai.ac.jp/chenen/TRNinfer.htm>)
34. **Yong Wang**, Ling-Yun Wu, Luonan Chen, and Xiang-Sun Zhang. **Supervised classification of protein structures based on convex hull representation.** *International Journal of Bioinformatics Research and Applications*, Vol. **3**, No. 2, pp. 123–144, 2007.
35. 陈洛南, **王勇**, 费敏锐, 刘曾荣, 从理工科视角探索系统生物学, 科技导报, Vol. 25, No. 10: 5–9, 2007.
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Software: MNAligner (<http://zhangroup.aporc.org/bioinfo/mnaligner/>)
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39. Yu-zhen Guo, En-min Feng, and **Yong Wang**. **Optimal HP configurations of proteins by combining local search with elastic net algorithm,** *Journal of Biochemical and Biophysical Methods*, 70 (3), pp. 335-340, 2007.
40. Yong Shi, Xinyang Zhang, Jia Wan, **Yong Wang**, Wei Yin, Zhiwei Cao, and Yajun Guo. **Predicting the distance between antibody's interface residue and antigen and antigen class by support vector machine.** *Neural Comput & Applic*, Vol. **16**, No. 4-5, pp. 481–490, 2007.

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Software: GRNInfer (<http://zhangroup.aporc.org/bioinfo/grninfer/>)
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Software: SAMO (<http://zhangroup.aporc.org/bioinfo/samo/>)
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Software: APM (<http://zhangroup.aporc.org/bioinfo/apm/>)
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54. 戴家权, **王勇**, 冯恩民. 油气资源勘探与开发的不确定性分析及最优策略研究, 系统工程理论与实践, Vol. 24, No. 1, pp. 35–40, 2004.
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#### 发表物— 会议论文

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4. Yu-Shu Liu, Chung-Hsiao Chao, Hao-Teng Chang, **Yong Wang**, Margaret Dah-Tsyr Chang, Tun-Wen Pai. **Comparative Genomics Revealed a Novel DNA-Binding Regulatory Protein Involved in Homologous Recombination in Bacteria**. Proceedings of The 5th IEEE International Conference on Systems Biology (ISB 2011), 137–143, 2011.
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6. Xianwen Ren, **Yong Wang**, Luonan Chen, Xiang-Sun Zhang. **A Linear Programming Model for Identifying Non-Redundant Biomarkers Based on Gene Expression Profiles**. Proceedings of The 5th IEEE International Conference on Systems Biology (ISB 2011), 249–254, 2011.
7. **Yong Wang**, Jiguang Wang, Chen Chen, Xiang-Sun Zhang. **A Regularized Optimization Model for Community Identification in Complex Networks**, Lecture Notes in Operations Research, 14, pp. 147–156, World Publishing Corporation, Beijing, 2011.
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9. **Yong Wang**, Katsuhisa Horimoto, Luonan Chen. **An Integrated Pipeline for Gene Regulatory Network Inference**. Proceedings of The 30th Chinese Control Conference (CCC), pp. 6593–6598, Yantai, 2011.

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11. Jiguang Wang, **Yong Wang**, Xianwen Ren, Wei Guo, Luonan Chen. **Uncover the Transient Transcriptional Regulations by a Novel Sliding Window Correlation Strategy**. Lecture Notes in Operations Research, 12, pp. 235–242, World Publishing Corporation, Beijing, 2010.
12. **Yong Wang**, Xiang-Sun Zhang, Katsuhisa Horimoto, Luonan Chen. **System Identification Models for Gene Regulation System**. Proceedings of The 29th Chinese Control Conference (CCC), pp. 6239-6244, Beijing, 2010.
13. Ji-Guang Wang, Lin Wang, Yu-Qing Qiu, **Yong Wang**, and Xiang-Sun Zhang, **A Constrained Optimization Method for Community Detection**. Optimization and Systems Biology, Lecture Notes in Operations Research, 11, pp. 142–150, World Publishing Corporation, Beijing, 2009.
14. Biao-Bin Jiang, Ji-Guang Wang, Jing-Fa Xiao, and **Yong Wang**. **Gene Prioritization for Type 2 Diabetes in Tissue-specific Protein Interaction Networks**. Optimization and Systems Biology, Lecture Notes in Operations Research, 11, pp. 319–328, World Publishing Corporation, Beijing, 2009.
15. Zhi-Ping Liu, **Yong Wang**, Tieqiao Wen, Xiang-Sun Zhang, Weiming Xia, and Luonan Chen. **Dynamically dysfunctional protein interactions in the development of Alzheimer’s disease**. 2009 IEEE International Conference on Systems, Man, and Cybernetics.
16. **Yong Wang** and Yu Xia, **Condition specific subnetwork identification using an optimization model**, Optimization and Systems Biology, Lecture Notes in Operations Research, 9, pp. 329–336, World Publishing Corporation, Beijing, 2008.
17. Rui-Sheng Wang, **Yong Wang**, Xiang-Sun Zhang, and Luonan Chen, **Detecting community structure in complex networks by optimal rearrangement clustering**, PAKDD 2007 workshop on Data Mining in Biomedical Applications, Lecture Notes in Artificial Intelligence, 4819, pp. 119–130, 2007.
18. Zhi-Ping Liu, Ling-Yun Wu, **Yong Wang**, Xiang-Sun Zhang, and Luonan Chen. **An approach for clustering protein pockets into similar groups**. Optimization and Systems Biology, Lecture Notes in Operations Research, 7, pp. 204-212, World Publishing Corporation, Beijing, 2007.

19. **Yong Wang**, Rui-Sheng Wang, Xiang-Sun Zhang, and Luonan Chen. **Establishing protein functional linkage in a systematic way**, Optimization and Systems Biology, Lecture Notes in Operations Research, 7, pp. 75-88, World Publishing Corporation, Beijing, 2007.
20. Zikai Wu, **Yong Wang**, Enmin Feng, and Luonan Chen, **Assessing distance measures for protein structure comparison**. Optimization and Systems Biology, Lecture Notes in Operations Research, 7, pp. 324-331, World Publishing Corporation, Beijing, 2007.
21. Zhenping Li, Rui-Sheng Wang, and **Yong Wang**. **A quadratic programming model for political districting problem**. Optimization and Systems Biology, Lecture Notes in Operations Research, 7, pp. 427-435, World Publishing Corporation, Beijing, 2007.
22. **Yong Wang**, Zhen-Ping Li, Xiang-Sun Zhang, and Luonan Chen. **3D Structural Motif finding in protein structures by network alignment** D. -S. Huang (Eds.): WICB2006, 2006.
23. **Yong Wang**, Trupti Joshi, Xiang-Sun. Zhang, Dong Xu and Luonan Chen. **Supervised inference of gene regulatory networks by linear programming**. D. -S. Huang, K. Li and G. W. Irwin (Eds.): ICIC2006, Lecture Notes in Bioinformatics, Vol. 4115, pp. 551-561, 2006.
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25. **Yong Wang**, Ling-Yun Wu, Xiang-Sun Zhang, and Luonan Chen. **Automatic classification of protein structures based on convex hull representation by integrated neural network**. Lecture Notes in Computer Science, Vol. 3959 . pp. 505–514, Springer-Verlag, 2006.
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27. Zhenping Li, **Yong Wang**, Shihua Zhang, Xiang-Sun Zhang and Luonan Chen. **Alignment of protein interaction networks by integer quadratic programming**. Proceedings of the 28th IEEE EMBS Annual International Conference New York City, USA, Aug 30-Sept 3, pp. 5527–5530, 2006.



28. Xiang-Sun Zhang, Zhong-Wei Zhan, **Yong Wang**, and Ling-Yun Wu. **An attempt to explore the similarity of two proteins by their surface shapes**. Operations Research and Its Applications, Lecture Notes in Operations Research, 5, pp. 276-284, World Publishing Corporation, Beijing, 2005.
29. Ji-Hong Zhang, Ling-Yun Wu, **Yong Wang**, Zhen-Ping Li, and Xiang-Sun Zhang. **A statistical method based on Markov chain for optimal reconstruction of haplotype from genotype data with SNP**. Symposium of 7th Academic Communication Meeting of Operations Research of China. Proceedings of ORSC 2004, pp. 1268–1278, Global-Link Publishing Company, 2004.
30. 詹钟炜, **王勇**, 吴凌云, 章祥菽. **基于DEA的电子政务评估研究**. 中国运筹学会第七届学术交流会论文集, 348–354, Global-Link Publishing Company, 2004.
31. 冯恩民, 张军, 王锡禄, **王勇**, **换热网络综合问题中的布局优化**, 中国运筹学会第六届学术交流会论文集, Global-Link Publishing Company, 2004.

## 科研活动

1. Program Committee, The Second International Workshop on Integrative Data Analysis in Systems Biology (IDASB) in BIBM2011, Atlanta, Georgia, USA, Nov. 12–15, 2011.
2. Chair of Invitation Session on Systems Biology, The 30th Chinese Control Conference (CCC2011), Yantai, China, July 22–24, 2011.
3. Program Committee, ACM Conference on Bioinformatics, Computational Biology and Biomedicine (ACM BCB) on August 1–3, 2011 in Chicago, Illinois, USA.
4. Program Committee, The Seventh International Conference on Intelligent Computing (ICIC2011) on August 11–14, 2011 in Zhengzhou, China.
5. Program Committee, Workshop on Computational Proteomics in BIBM2010, HongKong, China, Dec. 18–21, 2010.
6. Program Committee, Workshop on Integrative Data Analysis in Systems Biology in BIBM2010, HongKong, China, Dec. 18–21, 2010.
7. 邀请报告, 北京生命科学论坛第八次会议, 数学与生物学交叉应用研究学术研讨会, 北京, 中国, 2010年7月16日.
8. Organizing Committee, The 9th International Symposium on Operations Research and Its Applications (ISORA 2010), Chengdu, China, Aug. 20-24, 2010.

9. Organizing Committee, The 4th International Conference on Computational Systems Biology (ISB 2010), Suzhou, China, Sept. 9–11, 2010.
10. Co-Chair of Invitation Session on Systems Biology, The 29th Chinese Control Conference(CCC2010), Beijing, China, July 29–31, 2010.
11. 邀请报告, 第二届反演问题计算方法及其应用国际会议, 北京, 中国, 2010年7月12日.
12. Program Committee, IEEE International Conference on Bioinformatics & Biomedicine (BIBM), HongKong, China, Dec. 19–22, 2010.
13. Local Organizing Committee, The 21th International Conference on Genome Informatics(GIW2010), December 16–18, 2010, Hangzhou, China.
14. invited speaker, Kavil Institute for Theoretical Physics China program on Emergent behaviour of biomolecular ensembles and networks, July 2010, Beijing, China
15. Organizing Committee, Trilateral Symposium on Systems and Synthetic Biology 2010, October 2–4, Tokyo, Japan, 2010.
16. Invited visitor, Department of Mathematics, The Chinese University of Hong Kong, 18–25 April 2010, HongKong, China.
17. Invited speaker, Sino-German Workshop on Computational systems biology approaches for cancer research and biomarker discovery, 11–15 January 2010, Hangzhou, China
18. Invited speaker, Workshop on biological network in Computational Biology Research Center of AIST, 10-11 December 2009, Tokyo, Japan
19. Program Committee, The 2010 Third International Conference on Life System Modeling and Simulation (LSMS), Shanghai, China, Sept. 17–20, 2010.
20. Program Committee, The 2009 International Conference on Optimization and Systems Biology (OSB), Zhangjiajie, China, Sept. 20–22, 2009.
21. Invited Speaker, Trilateral Symposium on Systems and Synthetic Biology 2009, August 13-15, Seoul, Korea, 2009.
22. Visiting Osaka University, Kyoto University, and Osaka Sangyo University. July 5–July 18, 2009
23. Invited Speaker, 复杂网络、生物信息学及其他科学问题研讨会, 2009年6月25日, 北京, 2008.

24. Invited Speaker, A network biology study on circadian rhythm, Westlake International conference on Personalized Medicine, May 29, 2009, HangZhou, China.
25. Program Committee, The 2009 International Conference on Intelligent Computing (ICIC), Ulsan, Korea, September 16–19, 2009.
26. Poster, Recovering Gene Regulations by Optimization Model, Asia Pacific Bioinformatics Conference (APBC2009), Beijing, China.
27. Invited Speaker, 第八届系统控制前沿科学问题研讨会–系统生物学, 2008年12月12-13日, 北京, 2008.
28. Visiting Osaka University, Kyoto University, and Osaka Sangyo University. November 17– December 7, 2008
29. Program Committee, The 2008 International Conference on Optimization and Systems Biology (OSB), Lijiang, China, October 31–November 3, 2008.
30. Program Committee, The 2008 International Conference on Intelligent Computing (ICIC), Shanghai, China, September 15–18, 2008.
31. Invited Speaker, Biological Network Comparison: Problems and Challenges, Systems Biology Summer School of Shanghai University, Aug. 10, 2007, Shanghai, China.
32. Invited Speaker, Establishing protein functional linkage in a systematic way, Systems biology workshop, Mar. 10, 2007, Suzhou, China.
33. Program Committee, The 2007 International Conference on Optimization and Systems Biology (OSB), Beijing, China, August 7–9, 2007.
34. Program Committee, The 2007 International Conference on Intelligent Computing (ICIC), Qingdao, China, August 21–24, 2007.
35. Program Committee, The 2nd International Conference on Life System Modeling and Simulation (LSMS), Shanghai, China, September 14–17, 2007.
36. Poster, Whole-Genome Functional Linkage Network Construction in the Domain Level by Probabilistic Model, GIW2006, Yokohama, Japan.
37. Invited Speaker, Inferring gene regulatory network form multiple datasets, WICB2006, Nov. 11-14,2006, Hefei, China.
38. Poster, Inferring Protein Network by Multiple Domain Interactions, ICSB2006, Yokohama, Japan.

39. Oral Speaker, Supervised inference of gene regulatory network by linear programming, ICIC2006, Kunming, China.
40. Oral Speaker, Exploring the classification of protein structures on geometric patterns by neural networks, ISSN2006, Chengdu, China.
41. Oral Speaker, Automatic classification of protein structure based on convex hull representation, TAMC2006, Beijing, China.
42. Poster, Inferring Protein Interaction Network by Boosting Algorithm, GIW2005, Yokohama, Japan.
43. Invited Speaker, Protein Structure Prediction by SOM Approach, PhD candidate research seminar of Department of Mathematics, Tsinghua University, Beijing, China.

### 期刊编委

- Associate Editor of BMC Research Notes (BioMed Central' s open access journal)
- Associate Editor of The Open Information Systems Journal

### 期刊审稿

- Bioinformatics
- Proteins: Structure, Function, and Bioinformatics
- IET Systems Biology
- BMC Systems Biology
- BMC Bioinformatics
- PLoS Computaitonal Biology
- Evolutionary Bioinformatics
- Algorithmic
- International Journal of Computer Mathematics
- Mathematical Biosciences
- IEEE/ACM Transactions on Computational Biology and Bioinformatics
- Protein Engineering, Design, and Selection

- Journal of Theoretical Biology
- Frontiers of Electrical and Electronic Engineering in China
- Molecules
- Journal of Convergence Information Technology
- 应用数学学报
- 系统科学与数学
- 运筹学报
- 运筹与管理

### 获奖情况

1997, 内蒙古大学一等奖学金.

1998, 内蒙古大学二等奖学金.

1998, 光华奖学金.

1999, 宝钢奖学金.

2004, 中国科学院管理、决策与信息系统重点实验室优秀奖

2004, 中国科学院数学与系统科学研究院院长奖学金特等奖

2008, 中国科学院数学与系统科学研究院突出科研成果奖

2010, Best Poster Award received in the 21st International Conference on Genome Informatics (GIW2010) for "An integrated gene regulatory network inference pipeline" by Yong Wang, Katsuhisa Horimoto, and Luonan Chen.