

# Wei Wu

1801 S. Lakeshore Blvd., Apt 293  
Austin, TX 78741, USA  
E-mail: [wwu@ece.utexas.edu](mailto:wwu@ece.utexas.edu)

Cell: (512) 689-7903  
Office: (512) 232-2754  
<http://www.ece.utexas.edu/~wwu>

- RESEARCH INTERESTS
- ◇ Applications of Markov decision processes (MDP), Stochastic approximation (SA) in telecommunication networks, controlled diffusions with jumps and Markov switching.
  - ◇ Network information theory, feedback communications, collaborative communications.
  - ◇ Control of networked embedded systems, distributed control/detection/estimation, coordination and consensus problems in multi-agent systems.
  - ◇ Control of hybrid systems, switching systems, control and reconfiguration of stochastic systems under safety constraints.
- EDUCATION
- ◇ **The University of Texas at Austin**, Austin, TX.  
Ph.D. in Department of Electrical and Computer Engineering, expected graduation: 2007.  
Dissertation: *On the Interaction of Information Theory, Queueing Theory and Control – Applications in Communication Network*  
Advisor: Prof. Ari Arapostathis
  - ◇ **Tsinghua University**, Beijing, China.  
M.Sc. in Electronic Engineering, July 2002.  
Thesis title: *Network Resource Allocation Optimization and TCP-AQM Congestion Control*.  
Advisor: Prof. Xiuming, Shan
  - ◇ **Tsinghua University**, Beijing, China.  
B.Sc. in Applied Physics, July 1999.
- HONORS AND AWARDS
- ◇ Hemphill-Gilmore Endowed Fellowship (as prestigious University Continuing Fellowship), The University of Texas at Austin for the academic year 2006-2007.
  - ◇ TxTEC Scholarship of the College of Engineering, The University of Texas at Austin for the academic year 2002-2003, 2003-2004.
  - ◇ Best Master Graduate of Tsinghua University, 2002
  - ◇ Best M.S. degree Thesis of Tsinghua University, 2002
  - ◇ Best Graduate Honors of Tsinghua University, 1999
  - ◇ Beijing Tri-A Student Honor, Beijing, 1998
  - ◇ First Class Fellowship of Tsinghua University, 1998
  - ◇ Fellowship of Academic Excellence, Tsinghua University, Beijing, 1997
  - ◇ Winner of the China-USA mathematics invitational contest in 1994, 1995
  - ◇ The first class Award in Chinese Mathematics Olympics in 1993, 1994
- RESEARCH EXPERIENCE
- ◇ **Research Assistant**, advised by Prof. Ari Arapostathis, Wireless Networking and Communications Group, the University of Texas at Austin, Austin, TX (06/2003 - present)
    - Optimal sensor querying in sensor networks
    - Reconfiguration of shipboard power systems
    - Scheduling of wireless networks under heavy traffic limit
    - Feedback strategies in Gaussian interference networks

- Multi-user channel capacity with channel state side information and feedback
- Safety control in stochastic discrete event systems
- ◇ **Research staff**, Nortel Networks Architecture Laboratory, Network Research Center, Tsinghua University, Beijing, China (08/2001 - 08/2002)
- ◇ **Research Assistant**, Complex Engineering System Laboratory Department of Electronic Engineering, Tsinghua University, Beijing, China (09/1999 - 08/2002)
  - Congestion control in computer networks using control theory and optimization theory, especially in the area of Active Queue Management and slowly responsive congestion control algorithms
  - Wireless resource allocation and scheduling by a time-scale decomposition approach through user utility optimization
  - QoS guarantee in DiffServ-networks

- TEACHING EXPERIENCE
- ◇ Contributed to writing a couple of grant proposals for NSF and ONR and presented research results in review meetings.
  - ◇ Teaching Assistant, *EE380N Stochastic Control*, The University of Texas at Austin (Fall 2006).
  - ◇ Guest lecturer on interference channel and feedback capacity, *EE381V Channel Coding*, The University of Texas at Austin (Fall 2006).
  - ◇ Teaching Assistant, *EE351K Probability and Random Processes*, The University of Texas at Austin (Spring 2003).

- ACADEMIC SERVICES
- ◇ **IEEE Student member.**
  - ◇ **Reviewer.** IEEE trans. on Automatic Control, IEEE trans. on Wireless Communications, Journal of optimization and applications, IEEE communication letters, IEEE transactions on Vehicular Technology, IEEE Journal on Selected Area in Communications, IEEE INFOCOM, IEEE GlobeCom, IEEE Control and Decision Conference, American Control Conference, IEEE Symposium on Information Theory

PUBLICATION  $\diamond$  **Journal Publication**

1. Wei Wu, Ari Arapostathis, “Optimal Sensor Querying: General Markovian and LQG Models with Controlled Observations”, submitted to IEEE trans. on Automatic Control.
2. Wei Wu, Sriram Vishwanath, Ari Arapostathis, “Capacity of a Class of Cognitive Radio Channels: Interference Channels with Degraded Message Sets”, submitted to IEEE trans. on Information theory.
3. Wei Wu, Sriram Vishwanath, Ari Arapostathis, “On the Capacity of Multiple Access Channels with State Information and Feedback”, submitted to IEEE trans. on Information Theory.
4. Wei Wu, Ari Arapostathis, Sanjay Shakkottai, “Optimal Power Allocation for a Time-Varying Channel under Heavy Traffic Approximation”, IEEE trans. on Automatic control, vol. 51, no. 4, pp. 580-594, April, 2006.
5. Wei Wu, Yong Ren, Xiuming Shan, “Providing Proportional Loss Rate and Loss Rate Bounds For Adaptive Traffic: A New Relative DiffServ Model”, IEICE Transactions on Communications, no. 1, 2002

 $\diamond$  **Conference Publication**

1. Wei Wu, Ari Arapostathis, “Markov Decision Processes with Controlled Observations and the Sensor Querying Problem”, submitted to European Control Conference 2007.
2. Kent Davey, Raul Longoria, William Shutt, Johnson Carroll, Keerthi Nagaraj, Jerad Park, Tom Rosenwinkel, Wei Wu, Ari Arapostathis, “Reconfiguration in Shipboard Power Systems”, submitted to American Control Conference 2007.
3. Wei Wu, Ari Arapostathis, “Optimal Sensor Querying in Kalman Filtering”, Proceedings of 44th Allerton conference on Communication, Control, and Computing, Monticello, IL, Sep., 2006.
4. Wei Wu, Kent Davey, Ari Arapostathis, “Dynamic Optimal Generation Scheduling of Shipboard Power Systems”, ESRDC controls workshop, Purdue University, West Lafayette, IN, Aug., 2006
5. Wei Wu, Sriram Vishwanath, Ari Arapostathis, “Capacity Results for Multiple Access Channels with Transmitter State and Feedback”, Proceedings of 2006 International Symposium on Information Theory (ISIT 2006), Seattle, WA, July, 2006.
6. Wei Wu, Sriram Vishwanath, Ari Arapostathis, “On the Capacity of Gaussian Weak Interference Channels with Degraded Message sets”, Proceedings of 40th Annual Conference on Information Sciences and Systems (CISS 2006), Princeton, NJ, March, 2006
7. Wei Wu, Sriram Vishwanath, Ari Arapostathis, “Gaussian Interference Network with Feedback: Duality, Sum-rate and Dynamic Team Problem”, Proceedings of 43rd Allerton conference on Communication, Control, and Computing, Monticello, IL, Sep., 2005
8. Wei Wu, Ari Arapostathis, “Optimal Control of Stochastic Systems with Penalty on the Observations - General Models and Applications”, Proceedings of 2005 American control conference (ACC 2005), Portland, OR, June, 2005
9. Wei Wu, Ari Arapostathis, Sanjay Shakkottai, “Wireless Scheduling in the Heavy-traffic Regime: An Ergodic Control Approach”, 6th SIAM conference on control and its applications, New Orleans, LA, June, 2005 (invited)
10. Wei Wu, Ari Arapostathis, Ratnesh Kumar, “On Non-Stationary Policies and Maximal Invariant Safe Sets of Controlled Markov Chains”, Proceedings of the 43th IEEE conference on Decision and Control (CDC 2004), Paradise Island, December, 2004
11. Wei Wu, Ari Arapostathis, Sanjay Shakkottai, “Optimal Power Allocation for a Wireless Channel under Heavy Traffic Approximation”, the 38th Annual Conference on Information Sciences and Systems (CISS 2004), Princeton, NJ, March, 2004

12. Wei Wu, Hao Lin, Yong Ren, Xiuming Shan, "Service Guarantee and Utility Optimization in Wireless Multimedia Networks: A Time-scale Decomposition Approach", Proceedings of IEEE Vehicular Technology Conference (VTC spring 2002), Birmingham, AL, May, 2002
13. Hao Lin, Wei Wu, Yong Ren, Xiuming Shan, "A Time-scale Decomposition Approach to Optimize Wireless Packet Resource Allocation and Scheduling", Proceedings of IEEE Wireless Communication and Networking Conference (WCNC 2002), Orlando, FL, March, 2002
14. Wei Wu, Yong Ren, Xiuming Shan, "Analysis on Adjustment-based TCP-Friendly Congestion Control: Fairness and Stability", Proceedings of the 26th IEEE Conference on Local Computer Networks (LCN'2001), Tampa, FL, Nov. 2001
15. Wei Wu, Yong Ren, Xiuming Shan, "A Self-Configuring PI Controller for Active Queue Management", Proceedings of the 7th Asia-Pacific Communication Conference (APCC'2001), Tokyo, Japan, September, 2001
16. Wei Wu, Yong Ren, Xiuming Shan, "Modeling Dynamical Behaviors of AQM-TCP Joint System Using Markov Chains", Proceedings of the 7th Asia-Pacific Communication Conference (APCC'2001), Tokyo, Japan, September, 2001
17. Wei Wu, Yong Ren, Xiuming Shan, "Stability Analysis and Parameter Selection of RED", Proceedings of the 7th Asia-Pacific Communication Conference (APCC'2001), Tokyo, Japan, September, 2001
18. Wei Wu, Yong Ren, Xiuming Shan, "Stability Analysis on Active Queue Management Algorithms in Routers", Proceedings of Modeling and Simulations Conference of Telecommunication Systems (MASCOTS'2001), Cincinnati, OH, August, 2001
19. Wei Wu, Yong Ren, Xiuming Shan, "Forwarding the Balance between Absolute and Relative: A New Differentiated Services Model For Adaptive Traffic", Proceedings of 2001 IEEE Workshop on High Performance Switching and Routing (HPSR'2001), Dallas, TX, May, 2001
20. Wei Wu, Jian Yuan, Xiuming Shan and Yong Ren, "Exploring Collective Behaviors with Short-Range Correlation between Routers", Proceedings of ICCT of the 16th World Computer Congress, Beijing, China, August, 2000

- REFERENCE ◇ **Dr. Ari Arapostathis.** Professor, Texas Atomic Energy Research Foundation Centennial Fellowship in Electrical Engineering, The University of Texas at Austin.  
Dept. of Electrical and Computer Engineering, The University of Texas at Austin  
1 University Station C0803, Austin, TX 78712-0240, USA  
Phone: +1-512-471-3265, Fax: +1-512-471-7746  
Email: ari@ece.utexas.edu
- ◇ **Dr. Sriram Vishwanath.** Assistant Professor, Department of Electrical and Computer Engineering, The University of Texas at Austin.  
Dept. of Electrical and Computer Engineering, The University of Texas at Austin  
1 University Station C0803, Austin, TX 78712-0240, USA  
Phone: +1-512-471-1190, Fax: +1-512-471-6512  
Email: sriram@ece.utexas.edu
- ◇ **Dr. Sanjay Shakkottai.** Assistant Professor, Department of Electrical and Computer Engineering, The University of Texas at Austin.  
Dept. of Electrical and Computer Engineering, The University of Texas at Austin  
1 University Station C0803, Austin, TX 78712-0240, USA  
Phone: +1-512-471-5376, Fax: +1-512-471-6512  
Email: shakkott@ece.utexas.edu
- ◇ **Dr. Gustavo De Veciana.** Professor, Director of Wireless Networking and Communication Group, General Motors Foundation Centennial Fellowship in Electrical Engineering, The University of Texas at Austin.  
Dept. of Electrical and Computer Engineering, The University of Texas at Austin  
1 University Station C0803, Austin, TX 78712-0240, USA  
Phone: +1-512-471-1573, Fax: +1-512-471-6512  
Email: gustavo@ece.utexas.edu