

# YOUJIAN (EUGENE) LIU

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## BIOGRAPHY

Dr. Youjian Liu received the Ph.D. and M.S. degrees in Electrical Engineering from The Ohio State University in 2001 and 1998 respectively, the M.S. degree from Peking University in 1996, and the B.E degree from Beijing University of Aeronautics and Astronautics in 1993. Since August 2002, he has been an Assistant Professor and then an Associate Professor with Department of Electrical and Computer Engineering, University of Colorado at Boulder. From January 2001 to August 2002, he worked on 3G mobile communication systems as a Member of Technical Staff in Wireless Advanced Technology Laboratory, Lucent Technologies, Bell Labs Innovations, Whippany, New Jersey. His research interests include intelligent wireless communications, network communications, information theory, and coding theory. He has regularly served as reviewer and Member of Technical Committee for all major IEEE journals and conferences on communications. He is a recipient of the 2005 Junior Faculty Development Award at University of Colorado.

## EDUCATION

- 1998-2001            **Ph.D., Electrical Engineering, March 2001**  
*The Ohio State University, Columbus, Ohio*  
**Research Area:** Space-Time Wireless Communications  
**Advisor:** Michael P. Fitz and Oscar Y. Takeshita  
**Major Field:** Communication and Signal Processing  
**Minor Field:** Mathematics, Control Theory
- 1996-1998            **M.S., Electrical Engineering, March 1998**  
*The Ohio State University, Columbus, Ohio*  
**Research Area:** Wireless Communications  
**Advisor:** Michael P. Fitz
- 1993-1996            **M.S., Electronics, July 1996**  
*Beijing (Peking) University, Beijing China*  
**Research Area:** Radio Propagation and RF Technology  
**Advisor:** Changqing Wang
- 1989-1993            **B.E., Electrical Engineering, July 1993**  
*Beijing University of Aeronautics and Astronautics, Beijing China*  
**Research Area:** Radio Propagation and RF Technology

**Advisor:** Baofa Wang

## **AWARDS AND HONORS**

- 2005 Junior Faculty Development Award, University of Colorado at Boulder  
2001 Outstanding Paper by a Graduate Student, Second Prize, Department of Electrical Engineering, The Ohio State University, for "Full Rate Space-Time Turbo Codes", *IEEE Journal on Selected Areas in Communications*, May 2001  
1999-Present Member, The National Honor Society of Phi Kappa Phi  
1996-1997 University Fellowship, The Ohio State University

## **WORK EXPERIENCE**

- 08/02-Present **Associate Professor**, Assistant Professor (02-09), *Department of Electrical and Computer Engineering, University of Colorado at Boulder*  
Research Interests:
- Cooperative communications in wireless networks
  - Software defined radio
  - Information rate and design of MIMO systems with feedback
  - Space-time coding
  - Capacity approaching error control coding
  - Communication algorithms suitable for VLSI implementation
- 01/01-08/02 **Member of Technical Staff**, *Wireless Advanced Technologies Lab, Bell Labs, Lucent Technologies, New Jersey*
- Investigated smart antenna technologies for HDR systems
  - Investigated the transmit diversity and smart antenna techniques for third generation and fourth generation wide band wireless communications
  - Proposed iterative demodulation and decoding for BLAST type systems with arbitrary number of receive antennas
  - Investigated Optimal rate allocation for superposition coding to maximize throughput of fading channels
  - Participated in data rate assignment research for CDMA 2000 HDR systems
- 09/96-12/00 **Graduate Research Associate**, *The Ohio State University, Columbus Ohio*
- Studied iterative equalization and detection for multiple antenna systems
  - Developed theory for frequency diversity achieving space-time codes in frequency selective fading channels
  - Designed space-time turbo codes
  - Designed new space-time trellis codes
  - Developed an algebraic rank theory for space-time coding
  - Researched on lowering turbo code error floors by transmitting pilot information bits
  - Researched on turbo encoding and decoding with Hybrid ARQ in AWGN channels and fading channels

- Analyzed performance of optimal MAP multiuser detection for asynchronous CDMA system
  - Tutored master students in the implementation of turbo coding and space-time for a wireless testbed
  - Participated in the implementation of symbol timing and phase synchronization for a wireless testbed
- 06/99-09/99      **Intern, Lucent Technologies, Whippany, New Jersey**
- Built simulation blocks of S-functions in Simulink for turbo codes
  - Simulated performance of turbo codes for CDMA 2000
  - Studied CDMA 2000 standard
  - Studied CDMA system simulator
- 09/93-07/96      **Graduate Research Associate, Beijing University, Beijing China**
- Worked on hybrid ray tracing and FDTD methods in the analysis of radio wave scattering
  - Designed and implemented a tunable power source to control the frequency of a tunable laser diode which is the key component of a WDM optical communication system
- 09/91-07/93      **Research Associate, Beijing University of Aeronautics and Astronautics, Beijing China**
- Wrote a program for GPS tracking system
  - Characterized radio scattering of aircrafts in resonant size using Conjugate Gradient - Fast Fourier Transform algorithm
  - Analyzed RCS of target support in the microwave anechoic chamber employing Moment Method

## PUBLICATIONS

### Peer-Reviewed Journal Papers (Submitted):

- [1] M. Zhou, Z. Feng, X. Huang, and Y. Liu, "Maximum A Posteriori Probability (MAP) Joint Fine Frequency Offset and Channel Estimation for MIMO Systems with Channels of Arbitrary Correlation," *IEEE Trans Signal Processing*, revised, 2020. [Online]. Available: <https://arxiv.org/abs/1905.03808>

### Peer-Reviewed Journal Papers (Accepted/Published):

- [1] W. Yang, T. Huang, J. Zeng, L. Chen, S. Mishra, and Y. Liu, "Utilizing Players' Playtime Records for Churn Prediction: Mining Playtime Regularity," *IEEE Transactions on Games*, early access, Sep. 18<sup>th</sup>, 2020. [Online]. Available: <https://doi.org/10.1109/TG.2020.3024829>
- [2] M. Zhou, X. Huang, Z. Feng, and Y. Liu, "Coarse Frequency Offset Estimation in MIMO Systems Using Neural Networks: A Solution with Higher Compatibility," *IEEE Access*, vol. 7, pp. 121565–121573, 2019.

- [3] M. Zhou, Z. Feng, Y. Liu, and X. Huang, "An Efficient Algorithm and Hardware Architecture for Maximum-Likelihood Based Carrier Frequency Offset Estimation in MIMO Systems," *IEEE Access*, vol. 6, pp. 50 105–50 116, 2018.
- [4] P. Madhusudhanan, J. G. Restrepo, Y. Liu, and T. X. Brown, "Analysis of Downlink Connectivity Models in a Heterogeneous Cellular Network via Stochastic Geometry," *IEEE Transactions on Wireless Communications*, vol. 15, no. 6, pp. 3895–3907, Jun. 2016.
- [5] P. Madhusudhanan, J. G. Restrepoy, Y. Liu, T. X. Brown, and K. Baker, "Downlink performance analysis for a generalized shotgun cellular system," *IEEE Trans. Wireless Commun.*, vol. 13, no. 12, pp. 6684–6696, Dec 2014. [Online]. Available: <http://arxiv.org/abs/1002.3943>, <http://dx.doi.org/10.1109/TWC.2014.2362516>
- [6] P. Madhusudhanan, Y. Liu, and T. X. Brown, "On primary user coverage probabilities and faulty cognitive radios," *IEEE Trans. Wireless Commun.*, vol. 13, no. 11, pp. 6207–6218, Nov. 2014. [Online]. Available: <http://dx.doi.org/10.1109/TWC.2014.2358558>
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- [8] P. Madhusudhanan, J. G. Restrepoy, Y. Liu, T. X. Brown, and K. R. Baker, "[Stochastic ordering based carrier-to-interference ratio analysis for the shotgun cellular systems](#)," *IEEE Wireless Communication Letters*, vol. 1, no. 6, pp. 565 –568, Dec. 2012. [Online]. Available: <http://arxiv.org/abs/1110.3280v1>
- [9] V. Aggarwal, Y. Liu, and A. Sabharwal, "[Sum-capacity of interference channels with a local view: Impact of distributed decisions](#)," *IEEE Trans. Info. Theory*, Vol.58, no. 3, pp. 1630-1659, Mar. 2012. [Online]. Available: <http://arxiv.org/abs/0910.3494>
- [10] A. Liu, Y. Liu, H. Xiang, and W. Luo, "[Polite water-filling for weighted sum-rate maximization in B-MAC networks under multiple linear constraints](#)," *IEEE Trans. Signal Processing*, vol. 60, no. 2, pp. 834-847, Feb. 2012. [Online]. Available: <http://arxiv.org/abs/1007.0982>
- [11] A. Liu, Y. Liu, H. Xiang, and W. Luo, "[MIMO B-MAC interference network optimization under rate constraints by polite water-filling and duality](#)," *IEEE Trans. Signal Processing*, vol. 59, no. 1, pp. 263 –276, Jan. 2011. [Online]. Available: <http://arxiv.org/abs/1007.0982>
- [12] W. Dai, Y. Liu, V. K. N. Lau, and B. Rider, "[On the information rate of MIMO systems with finite rate channel state feedback using power on/off strategy](#)," *IEEE Trans. Information Theory*, vol. 55, no. 11, pp. 5032-5047, Nov. 2009. [Online]. Available: <http://arxiv.org/abs/cs.IT/0603040>.
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- [14] W. Dai, Y. Liu, and B. Rider, "[The effect of finite rate feedback on CDMA signature optimization and MIMO beamforming vector selection](#)," *IEEE Trans. Information Theory*, vol. 55, no. 8, pp. 3651-3669, Aug. 2009. [Online]. Available: <http://arxiv.org/abs/cs.IT/0612078>.
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- [18] W. Dai, Y. Liu, B. Rider, and W. Gao, "[How many users should be turned on in a multi-antenna broadcast channel?](#)" *IEEE J. Select. Areas Commun. (JSAC), special issue on Exploiting Limited Feedback in Tomorrow's Wireless Communication Networks*, vol. 26, no. 8, pp. 1526–1535, Oct. 2008. [Online]. Available: <http://arxiv.org/abs/0805.1442>
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- [28] Y. Liu, M. P. Fitz and O. Y. Takeshita, "[Full Rate Space-Time Turbo Codes](#)", *IEEE Journal on Selected Area of Communications, special issue on "The Turbo Principal: From Theory to Practice"*, Vol: 19, No. 5, pp. 969 –980, May 2001.
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**Peer-Reviewed Conference Papers (Accepted/Published):**

- [1] Wanshan Yang, Zhe Feng, Lijun Chen, Weiyu Xu, and Youjian Eugene Liu, "Channel Reciprocity in FDD Multiuser MIMO Systems by Super-resolution," in IEEE International Conference on Communications, Accepted, Montreal, Canada, Jun. 2021.
- [2] W. Yang, T. Huang, J. Zeng, L. Chen, S. Mishra, and Y. E. Liu, "Correlation Between Personality and Social Interactions in Online Strategy Games," in 2020 IEEE Conference on Games (CoG), Aug. 2020, pp. 756–759. [Online]. Available: <https://doi.org/10.1109/CoG47356.2020.9231956>
- [3] Z. Liu, H. Wang, B. Waggoner, Y. Liu, and L. Chen, "A Smoothed Analysis of Online Lasso for the Sparse Linear Contextual Bandit Problem," in Thirty-Seventh International Conference on Machine Learning (ICML 2020), Workshop on Real World Experiment Design and Active Learning, Jul. 2020, pp. 1–16. [Online]. Available: <https://realworldml.github.io/accepted/>
- [4] M. Zhou, Z. Feng, X. Huang, and Y. Liu, "MAP Joint Frequency and Channel Estimation for MIMO Systems with Spatial Correlation," in IEEE Global Communications Conference (GLOBECOM), Dec. 2019.
- [5] W. Yang, T. Huang, J. Zeng, Y. Tang, L. Chen, S. Mishra, and Y. E. Liu, "Purchase Prediction in Free Online Games via Survival Analysis," in 2019 IEEE International Conference on Big Data (Big Data), Dec. 2019.
- [6] W. Yang, T. Huang, J. Zeng, G. Yang, J. Cai, L. Chen, S. Mishra, and Y. E. Liu, "Mining Player In-game Time Spending Regularity for Churn Prediction in Free Online Games," in 2019 IEEE Conference on Games (CoG), Aug. 2019.
- [7] W. Yang, G. Yang, T. Huang, L. Chen, and Y. E. Liu, "Whales, Dolphins, or Minnows? Towards the Player Clustering in Free Online Games Based on Purchasing Behavior via Data Mining Technique," in *IEEE International Conference on Big Data (Big Data)*, Dec. 2018, pp. 4101–4108.
- [8] W. Yang, L. Chen, and Y. Liu, "Three-dimensional Super-resolution with Nonuniform Cutoff Frequencies," in *52nd Asilomar Conference on Signals, Systems, and Computers*, Oct. 2018.
- [9] W. Yang, L. Chen, and Y. E. Liu, "Super-Resolution for Achieving Frequency Division Duplex (FDD) Channel Reciprocity," in *IEEE 19th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, Jun. 2018.
- [10] M. Zhou, Y. Liu, T. Xia, and X. Huang, "An efficient and scalable hardware architecture for singular value decomposition towards massive MIMO communications," in *2017 IEEE 60th International Midwest Symposium on Circuits and Systems (MWSCAS)*, Aug. 2017, pp. 667–670.
- [11] M. Zhou, X. Huang, Y. Zhou, X. Li, and Y. Liu, "An FPGA prototype of dual link algorithm for MIMO interference network," in *2017 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, Mar. 2017, pp. 3669–3673.
- [12] Z. Feng, X. Li, V. Palacios, P. Mathys, Y. Liu, M. Zhou, X. Huang, and X. Cai, "Software Defined Radio Implementation of the Dual Link Algorithm in TDD Mode using USRP

- E310,” *Proceedings of the 6th Annual GNU Radio Conference (GRCon)*, vol. 1, no. 1, 2016. [Online]. Available: <http://pubs.gnuradio.org/index.php/grcon/issue/archive>
- [13] X. Li, Y. E. Liu, and X. Huang, “TDD Channel Calibration for MIMO Interference Networks,” in *IEEE 82nd Vehicular Technology Conference (VTC Fall)*, Sep. 2015, pp. 1–2.
- [14] X. Li, S. You, L. Chen, A. Liu, and Y. Liu, “A new algorithm for the weighted sum rate maximization in MIMO interference networks,” in *IEEE Wireless Communications and Networking Conference (WCNC)*, Mar. 2015, pp. 147–152.
- [15] S. You, L. Chen, and Y. Liu, “Convex-concave procedure for weighted sum rate maximization in a MIMO interference network,” in *Proc. IEEE Global Telecommunications Conference (Globecom)*, San Diego, CA, USA, Dec. 2014.
- [16] P. Madhusudhanan, J. Restrepo, Y. Liu, and T. Brown, “Downlink analysis for a heterogeneous cellular network,” in *12th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks (WiOpt)*, May 2014, pp. 717–724. [Online]. Available: <http://dx.doi.org/10.1109/WIOPT.2014.6850370>
- [17] P. Madhusudhanan, X. Li, Y. Liu, and T. Brown, “Stochastic geometric modeling and interference analysis for massive mimo systems,” in *11th International Symposium on Modeling Optimization in Mobile, Ad Hoc Wireless Networks (WiOpt)*, May 2013, pp. 15–22. [Online]. Available: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6576406&isnumber=6576384>
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- [22] A. Liu, Y. Liu, V. Lau, H. Xiang, and W. Luo, “Distributed polite water-filling for optimization of mimo b-mac interference networks,” in *18th Asia-Pacific Conference on Communications (APCC)*, Oct. 2012, pp. 384–389. [Online]. Available: <http://dx.doi.org/10.1109/APCC.2012.6388166>
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- [25] P. Madhusudhanan, T. X. Brown, and Y. E. Liu, "On the interference due to cooperative cognitive radios in the presence of multiple low-power primary users," in *Proc. Allerton Conf. on Commun., Control, and Computing*, Sep. 2011.
- [26] A. Liu, Y. Liu, V. K. N. Lau, H. Xiang, and W. Luo, "Polite water-filling for weighted sum-rate maximization in MIMO B-MAC networks under multiple linear constraints," in *Proc. IEEE Int. Symp. on Info. Theory (ISIT)*, July 2011.
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- [41] W. Dai, B. Rider, and Y. Liu, "[Volume growth and general rate quantization on Grassmann manifolds](#)," in *Proc. IEEE Global Telecommunications Conference (Globecom)*, Washington D.C., USA, Nov. 2007, pp. 1441-1445.
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- [43] Y. Liu, B. Xu, and M. Varanasi, "On discrete memoryless relay channels with designable transmitter side information," in *IEEE Conference on Information Sciences and Systems (CISS)*, Baltimore, MD, USA, Mar. 14-16, 2007, pp. 414-418.
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- [58] K. N. Lau, Y. Liu, and T.-A. Chen, "[Optimal partial feedback design for MIMO block fading channels with causal noiseless feedback](#)," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, p. 65, Yokohama, Japan, June 2003.
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- [66] (Session Chair) Y. Liu, M. P. Fitz, and O. Y. Takeshita, "[QPSK Space-Time Turbo Codes](#)", in *Proc. International Conference on Communications (ICC 2000)*, New Orleans, Louisiana, USA, pp. 292-296, June 2000.
- [67] (Invited Paper) Y. Liu, M. P. Fitz, Oscar Y. Takeshita, and Zhongxian Han "[A Rank Criterion for QAM Space-Time Codes with Application to Turbo Coding](#)", in *Proc. of First IEEE Sensor Array and Multichannel Signal Processing Workshop*, Cambridge, Massachusetts, USA, pp. 193-197, March 2000.
- [68] Y. Liu and M. P. Fitz, "[Space-Time Turbo Codes](#)", in *Proc. 37th Annual Allerton Conf. on Communication, Control, and Computing*, Monticello, Illinois, USA, pp. 897-898, September 1999.

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- [70] Y. Liu and B. Wang, "Research on Characteristics of Electromagnetic Scattering of Complex Aircraft," in *Proc. Annual Radar Conference*, 1993.

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### Patents:

- [1] L. Chen, X. Li, and Y. Liu, "Maximizing efficiency of multi-user communications networks," U.S. Patent US9538483 B2, Jan., 2017, international Classification H04B17/391, H04W52/34, H04W52/24; Cooperative Classification H04B17/391, H04W52/243, H04W52/346. [Online]. Available: <http://www.google.com/patents/US9538483>
- [2] K. N. Lau, Y. Liu, M. H. Meyers, and S. W. Sanders, "Methods of controlling data rate in wireless communications systems," U.S. Patent US7583637 B2, Sep., 2009, U.S. Classification 370/332, 455/69, 455/522; International Classification H04B1/707, H04W4/00, H04L12/56, H04L1/00; Cooperative Classification H04L47/29, H04L1/0002, H04W28/22, H04L47/10, H04L47/14, H04B2201/70703, H04W24/00, H04L1/0007. [Online]. Available: <http://www.google.com/patents/US7583637>
- [3] J.-T. Liu, Y. Liu, and A. Rudrapatna, "Method of determining transmit power for transmit eigenbeams in a multiple-input multiple-output communications system," U.S. Patent US7242727 B2, Jul., 2007, u.S. Classification 375/295, 455/522; International Classification H04B7/00, H04B7/005, H04B7/04, H04L27/04; Cooperative Classification H04B7/0417, H04W52/34, H04B7/0408, H04W52/42, H04W52/26, H04B7/0443, H04B7/0632; European Classification H04B7/04B, H04B7/04M1, H04W52/42, H04B7/06C1F1Q. [Online]. Available: <http://www.google.com/patents/US7242727>

### Technical Reports:

- [1] A. Liu, Y. Liu, H. Xiang, and W. Luo, "[Technical report: Polite water-filling for weighted sum-rate maximization in MIMO B-MAC networks under multiple linear constraints.](#)" *Peking University and University of Colorado at Boulder Joint Technical Report*, Dec 2010.
- [2] A. Liu, Y. Liu, H. Xiang, and W. Luo, "Technical report: MIMO B-MAC interference network optimization under rate constraints by polite water-filling and duality," *Peking University and University of Colorado at Boulder Joint Technical Report*, Jun 2010. [Online]. Available: <http://arxiv4.library.cornell.edu/abs/1006.5445>
- [3] W. Dai, B. Rider, and Y. Liu, "Joint beamforming for multiaccess MIMO systems with finite rate feedback," *Technical Report, University of Colorado at Boulder*, pp. 1–22, April 16th, 2008. [Online]. Available: <http://arxiv.org/abs/0804.0441>
- [4] Y. Liu, T. Chen, M. H. Meyers, J. Liu, "Detection for BLAST Systems with Arbitrary Number of Receive Antennas", *Internal Technical Memorandum*, Lucent Technologies, Nov. 2001.

- [5] T. Chen, Y. Liu, V. Lau, M. H. Meyers, "A Mobile Speed Estimation Method for Power Control Systems over Rayleigh and Rician Fading Channels", *Internal Technical Memorandum*, Lucent Technologies, Nov. 2001.
- [6] M. Lu, G. Li, Y. Liu, M. H. Meyers, "Data Rate Assignment for CDMA 2000 High Rate Packet Data System", *Internal Technical Memorandum*, Lucent Technologies, Sep. 2001.

**Other Presentations:**

- [1] Y. Liu, "Wireless communications with limited feedback," in 7 Presentations, The Hong Kong University of Science and Technology, City University of Hong Kong, Zhejiang University, Shanghai Jiaotong University, Fudan University, Beihang University, Peking University, Mar. 2008.
- [2] Y. Liu, "Capacity and performance analysis for communications with finite rate feedback," in Presentation, Colorado State University, Sep. 2007.
- [3] Y. Liu, "Wireless Communications with Finite-Rate Feedback," in Presentation, *Georgia Institute of Technology*, March 2006.
- [4] Y. Liu, "State-of-the-art and the future research on MIMO technologies," in Presentation, *Thomson Electronics*, Princeton, New Jersey, USA, May 2005.
- [5] Y. Liu, "The impact of feedback on communication systems: Capacity and complexity," in Presentation, *University of Southern California*, May 2005.
- [6] Y. Liu, "The impact of feedback on communication systems: Capacity and complexity," in Presentation, *University of California at Los Angeles*, May 2005.
- [7] Y. Liu, "The impact of feedback on communication systems: Capacity and complexity," in Presentation, Engineering Lecture Series, Webcasted to *Qualcomm Inc.* worldwide, video stored in Qualcomm Library, San Diego, California, USA, May 2005.
- [8] Y. Liu, "Tutorial and research on MIMO communications," in Presentation, *TAIYO YUDEN Co.*, San Diego, California, USA, May 2005.
- [9] Y. Liu, "The impact of feedback on communication systems: Capacity and complexity," in Presentation, *University of California at San Diego*, May 2005.
- [10] Y. Liu, "On the design tradeoff in adaptive space-time coding," in *IEEE Communication Theory Workshop*, invited talk, Mesa, Arizona, April 2003.

**Thesis:**

- [1] Y. Liu, "An Algebraic Space-Time Coding Theory and Its Applications," *Ph.D. Dissertation*, The Ohio State University, 2001.
- [2] Y. Liu, "Hybrid Methods to Solve Electromagnetic Scattering Problems of Complex Cavity," *M.S. Thesis*, Beijing University, 1996.
- [3] Y. Liu, "Analysis of Radio Propagation and Scattering Employing the Conjugate Gradient - Fast Fourier Transformation Algorithm," *B.E. Thesis*, Beijing University of Aeronautics and Astronautics, 1993.

**GRANTS AND FELLOWSHIPS**

**Awarded:**

- [1] NSF-ECCS, \$190,000, 8/1/2014~7/31/2019.
- [2] NSF-IIP-PFI, \$106,875, 6/1/14~11/30/15.
- [3] Thomson Inc./Corporate Research, \$156,139, Gift, Youjian Liu (PI), "Improving Performance of MIMO Communication Systems with Finite-Rate Feedback", 01/2006-01/2011.
- [4] NSF-ECCS, \$449,992 (total), \$220,095 (CU-share), Youjian Liu (PI, \$110,109, *0.65 Summer Month*), "Collaborative Research: A Universal Cooperative Communication System-on-Chip," 08/15/2007-08/14/2011, in collaboration with Oregon State University (\$104,541) and Worcester Polytechnic Institute (\$125,356).
- [5] NSF-CISE, \$350,000, Youjian Liu (Co-PI, \$140,000, *1 Summer Month*), "Multi-antenna Communications with Finite-Rate Feedback," 09/01/2007-08/31/2011.
- [6] U.S. Department of Education, Graduate Assistance in Areas of National Need (GAANN) Fellowship, \$1,097,829, Youjian Liu (Co-PI, Associate Director), "Interdisciplinary Graduate Program in Disaster-Tolerant and Interoperable Communications (D-TIC:GAANN)," 8/15/06- 8/14/11.

## TEACHING

### Courses Taught

- ECEN5002 Machine Learning for Engineers
- ECEN5692 Principal of Digital Communications
- ECEN5622 Information Theory and Coding
- ECEN5002 Advanced Topics of Error Control Coding
- ECEN5612 Noise and Random Processes
- ECEN4242 Communication Theory
- ECEN4632 Introduction to Digital Filtering
- ECEN3810 Introduction to Probability
- ECEN3300 Linear Systems

### Student Mentoring

- Current Students
  1. Zhe Feng, Ph.D. student (Principle Advisor)
  2. Wanshan Yang, Ph.D. student (Co-Advisor)
  3. Zhiyuan Liu, Ph.D. student (Co-Advisor)
- Former Students
  4. Camille Noufi, B.S. NSF REU student
  5. Anvesh Reddy Yalla, M.S. Thesis student
  6. Karthik Kalyani Vijaya kumar, M.S. Independent Study student
  7. Andrew Jones, NSF REU student, B.S., 2016
  8. Victor Palacios, NSF REU student, B.S., 2016
  9. Neal DeBuhr, NSF REU student, B.S., 2016
  10. Xing Li, Ph.D., Spring 2016, Qualcomm Inc.
  11. Prasanna Madhusudhanan, M.S., Ph.D., Fall 2013, Qualcomm Inc.
  12. Jun Xiao, M.S. 2010, LSI Logic

13. An Liu, Ph.D. Fall 2006 – 2010, visiting student from Peking University, starting 10/08 at CU (Co-advisor during 06/08 – 10/08, Principal Advisor during 10/2008 – 10/2009)
  14. Bin Xu, M.S., 2008, Echostar Corp.
  15. Wei Dai, Ph.D., 2007, faculty with Imperial College London
  16. Mike Lipney, M.S. project, Fall 2003 - Summer 2005, now with Sun Microsystems Inc. (Principal Advisor)
  17. Vijay Nagarajan, M.S. thesis, Fall 2002 - Summer 2004, now with Broadcom Corp. (Principal Advisor)
  18. Marko Bundalo, undergraduate student, Independent Study, F06, S07
- Student Consultation
    - Chia-Ching Lin, Chih-Cheng Hsiao, Graduate student of Interdisciplinary Telecommunication Program, on Capstone project, Fall 2007.
    - Sri Teja Basava, Nadja Memic, Francis Yi, Stephen Karcher, Undergraduate student, ECE, on Capstone project, Fall 2007.
    - Peter Klein, Undergraduate student of Dept. of Aerospace Engineering, Reed Solomon codes of a satellite down link for Colorado Space Grant Consortium, 2004

### **Other Education Activities**

- Provided learning opportunities for students from researchers worldwide
  - Co-organized an international "Workshop on Random Matrix Theory and Wireless Communications," Chautauqua Park, Boulder, Colorado, July 14-17, 2008. Slides available at [http://math.colorado.edu/~Ebrider/RMT\\_workshop/rmt\\_workshop.html](http://math.colorado.edu/~Ebrider/RMT_workshop/rmt_workshop.html)
  - Organized 5 technical seminars on communications with speakers from both academia and industry
- Associate Director, Fellowship Program of Graduate Assistance in Areas of National Need (GAANN)
- Member of Graduate Study Committee, ECE, F06-present

### **PROFESSIONAL SERVICE**

2017-2018	Local Arrangement Chair of the IEEE International Symposium on Information Theory, Vail, Colorado, June 2018.
2015-current	Member of Technical Program Committees of IEEE Global Telecommunications Conference (Globecom), IEEE International Conference on Communications (ICC), IEEE WCNC, each year
2014	Member of Technical Program Committee of IEEE Global Telecommunications Conference (Globecom 2014), Wireless Communication Symposium, Wireless Networking Symposium, Cognitive Radio and Networks Symposium, Ad Hoc and Sensor Networking Symposium
2014	Member of Technical Program Committee for IEEE Wireless Communication and Networking Conference (WCNC 2015)

- 2014 Member of Technical Program Committee of IEEE International Conference on Communications (ICC 2015), Adhoc and Sensor Networking (AHSN) Symposium
- 2014 Technical co-Chair, IEEE/CIC International Conference on Communications in China (ICCC 2014), Signal Processing for Communications Symposium
- 2013 Member of Technical Program Committee of IEEE Global Telecommunications Conference (Globecom 2013), Wireless Networks Symposium
- 2013 Member of Technical Program Committee of IEEE Global Telecommunications Conference (Globecom 2013), Cognitive Radio Networks Symposium
- 2013 Member of Technical Program Committee for IEEE Wireless Communication and Networking Conference (WCNC 2014)
- 2013 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2014), Ad-hoc and Sensor Networking (AHSN) Symposium
- 2012 Member of Technical Program Committee of IEEE Global Telecommunications Conference (Globecom 2012), Wireless Communication Symposium
- 2012 Member of Technical Program Committee for IEEE Wireless Communication and Networking Conference (WCNC)
- 2012 Member of Technical Program Committee of IEEE International Conference on Communications (ICC 2013)
- 2011 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2012), Ad-hoc and Sensor Networking (AHSN) Symposium
- 2011 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2012), Wireless Networking (WN) Symposium
- 2011 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2011), Wireless Communication Symposium
- 2011 *Member of Technical Program Committee* for IEEE Vehicular Technology Conference (VTC 2012-Spring), Transmission Technologies Track
- 2010 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2011) Wireless Communications Symposium, Wireless Networking Symposium
- 2010 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2010), Wireless Communication Symposium
- 2010 *Member of Technical Program Committee* for IEEE Vehicular Technology Conference (VTC2011-Spring), Cognitive Radio and Cooperative Communications Track
- 2009 *Member of Technical Program Committee* of IEEE Vehicular Technology Conference (VTC2010-Spring), Cognitive Radio and Cooperative Communications Track
- 2009 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2009), Wireless Communication Symposium
- 2009 *Member of Technical Program Committee* for International Conference on Wireless Communications and Mobile Computing (IWCMC 2009), MIMO Systems Symposium
- 2008 *Member of Technical Program Committee* for IEEE International Conference on Communications (ICC 2009), Wireless Communication Symposium
- 2008 *Review Panelist*, NSF-CISE-CCF, SING program

- 2008 **Session Chair**, Two-way relay networks, IEEE International Conference on Communications (ICC) 2008
- 2008 **Session Chair**, Adaptive Modulation, IEEE International Conference on Communications (ICC) 2008
- 2008 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2008) Communication Theory Symposium (10 papers)
- 2008 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2008) Wireless Communications Symposium (13 papers)
- 2008 *Member of Technical Program Committee* for IEEE International Conference on Communications (ICC 2008), CoopNet Workshop
- 2008 *Member of Technical Program Committee* for IEEE International Conference on Communications (ICC 2008), Wireless Communication Symposium
- 2007 **Session Chair**, Relay Channels, Asilomar Conference on Signals, Systems and Computers 2007.
- 2007 **Session Chair**, Precoding for MIMO, Asilomar Conference on Signals, Systems and Computers 2007.
- 2007 *Member of Technical Program Committee* for IEEE International Conference on Communications (ICC 2007)
- 2007 *Member of Technical Program Committee* for IEEE Vehicular Technology Conference (VTC) Fall 2007
- 2006 *Member of Technical Program Committee* of 2006 International Workshop on Wireless Ad-hoc and Sensor Networks
- 2006 *Member of Technical Program Committee* of 2006 IEEE International Workshop on Information Theory, Chengdu
- 2006 *Member of Technical Program Committee* of 2006 International Conference on Communications and Networking in China
- 2005 *Member of Technical Program Committee* of IEEE Global Telecommunications Conference (Globecom 2005)
- 2005 *Member of Technical Program Committee* for IEEE Vehicular Technology Conference (VTC) Fall 2005
- 2005 *Member of Technical Program Committee* of the Symposium on Cooperative Networks in IEEE WirelessCom 2005
- 04-05 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2005)
- 2004 *Member of Technical Program Committee* of Wireless Communication Track, International Conference on Communications, Circuits and Systems (ICCCAS) Chengdu, Sichuan, China, June 27-29, 2004
- 2004 *Member of Technical Program Committee* of MIMO Technologies, IEEE Radio and Wireless Conference 2004
- 03-04 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2004)
- 10/02 *Member of Technical Program Committee* of IEEE International Conference on Communications (ICC 2003)
- 10/02 Reviewer of 2003 IEEE International Conference on Communications (ICC 2003), 10 papers



10/02 Reviewer of 2003 IEEE Wireless Communications and Networking Conference (WCNC 2003), 10 papers

07/02 Reviewer of a NSF proposal

06/02 *Member of Technical Program Committee* of 2002 IEEE International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS 2002)

04/02 Review organizer of 2002 IEEE Global Telecommunications Conference (Globecom 2002)

06/00 *Session Chair*, Space-Time Coding, IEEE International Conference on Communications (ICC) 2000

1998-Present Regular reviewer for most IEEE journals and conferences related to communications and signal processing

1998-Present Member of Institute of Electrical and Electronics Engineers (IEEE)