

# Zoltan Safar

1361 A. V. Williams Bldg.  
Department of Electrical and Computer Engineering  
University of Maryland  
College Park, MD 20742, USA  
Phone: (+1) 301-405-5779  
E-mail: zsafar@umd.edu

## Education

- **Ph.D. in Electrical and Computer Engineering**, Department of Electrical and Computer Engineering, University of Maryland, College Park, MD, USA (09/97 – 08/03)  
*Dissertation title: “Efficient Coding and Decoding Methods for Multi-Antenna Wireless Communication Systems”. Received M.S. in Electrical and Computer Engineering in August 2001.*
- **University Diploma in Electrical Engineering** (with honors), Department of Electrical Engineering, Technical University of Budapest, Budapest, Hungary (09/91 – 07/96)  
*Thesis title: “Parallel Implementation of Neural Networks”*

## Awards and Honors

- **Invention of the Year Award**, (together with W. Su and K. J. R. Liu) for the invention “Coding Techniques for Maximum Achievable Diversity in Space, Time and Frequency for Broadband Wireless Communication”, Given by the Office of Technology Commercialization, University of Maryland, MD, USA, 2004.
- **Outstanding Systems Engineering Graduate Student Award**, Given by the Director of the Institute for Systems Research, University of Maryland, MD, USA, 2003.  
(Awarded to one graduate student each year.)
- **Graduate Student Service Award**, “In recognition of exceptional service to the Department of Electrical and Computer Engineering”, Given by the Chairman of the ECE Department, University of Maryland, MD, USA, 2002. (Awarded to one graduate student each year.)
- **Distinguished Teaching Assistant**, Given by the Center for Teaching Excellence, University of Maryland, MD, USA, 1998-99.
- **National Scholarship of Hungary**, Given by the Secretary of Education, Hungary, 1995-96.

## Experience

- **Director**, MS in Telecommunications Program, Department of Electrical and Computer Engineering, University of Maryland, College Park, MD, USA (10/10 – Present)  
*Managing the MS program and its staff consisting of two associate directors and a coordinator. Ensuring instructional staffing and quality of instruction, overseeing admissions, planning program curriculum and schedule of classes, developing and maintaining external relations, designing and teaching graduate-level courses.*

- **Principal Technologist**, Origin Wireless Inc., Greenbelt, MD, USA (04/13 – Present)  
*Providing research and development expertise to the company related to wireless communications, signal processing, algorithm development, system architecture design and implementation. Building simulation models and system components using Matlab, C++ and Python.*
- **Senior Software Engineer**, Internal Systems, Bloomberg L.P., New York, NY, USA (02/10 – 09/10)  
*Designed and implemented software systems for monitoring, configuration and maintenance of the company's private communication network. Developed service-oriented applications for the Bloomberg Terminal using JavaScript, C++ and SQL languages.*
- **Senior Engineer**, Samsung Design Center, Samsung Electro-Mechanics America, Inc., Atlanta, GA, USA (09/07 – 09/09)  
*Designed physical-layer receiver algorithms for a proprietary cognitive radio system. Implemented a link-level floating-point and fixed-point C/C++ simulator for algorithm development and performance evaluation, and supported software design and hardware implementation.*
- **Senior Design Engineer**, Modem System Design, Technology Platforms, Nokia, Copenhagen, Denmark (03/05 – 08/07)  
*Developed physical-layer transceiver algorithms for 3GPP next-generation (EUTRAN/3.9G/LTE) cellular wireless communication systems, implemented and tested them in Co-Centric System Studio (CCSS) simulation environment, and supported Nokia's standardization efforts.*
- **Assistant Professor**, Department of Innovation, IT University of Copenhagen, Copenhagen, Denmark (09/03 – 02/05)  
*Taught a computer networking course, supervised student projects, Master's theses and a Ph.D. student. Conducted research in wireless communications and signal processing.*
- **Graduate Research Assistant**, Department of Electrical and Computer Engineering, University of Maryland, College Park, MD, USA (06/99 – 08/03)  
*Researched methods for efficient data transmission over wireless channels using space-time and space-frequency codes.*
- **Graduate Teaching Assistant**, Department of Electrical and Computer Engineering, University of Maryland, College Park, MD, USA (09/97 – 06/99)  
*Led recitation sessions in computer architecture, analog electronics and numerical methods. Graded homework, projects and exams.*
- **Embedded Software Engineer**, AGE Co., Budapest, Hungary (09/96 – 08/97)  
*Implemented and tested the link layer of industrial communication network protocols such as Modbus and Siemens for embedded microcontrollers using C and assembly languages. Developed interfaces between the link-layer and the higher-layer data structures.*

## Professional Activities

- **Editorial Board Member, SigPort**, IEEE Signal Processing Society (02/15 – Present)  
*Helping to identify and tackle technical and infrastructure issues with SigPort.*
- **Associate Editor**, IEEE Signal Processing Letters (07/11 – 09/15)  
*Handled submissions, reviews and making decisions on the submitted manuscripts.*
- **Technical Program Committee Member**  
*Handled the reviews of submitted papers to conferences such as IEEE Wireless Communications and Networking Conference (WCNC), International Wireless Communications and Mobile Computing Conference (IWCMC), and International Conference on Computer Communications and Networks.*

- **Reviewer**

*Reviewed manuscripts submitted to the following journals:*

IEEE Transactions on Vehicular Technology, IEEE Transactions on Communications, IEEE Transactions on Signal Processing, IEEE Transactions on Information Theory, IEEE Transactions on Wireless Communications, IEEE Communications Letters, IEEE Journal on Selected Areas in Communications, EURASIP Journal on Applied Signal Processing, IEEE Signal Processing Magazine, IEEE Transactions on Multimedia.

*and conferences:*

IEEE Global Communications Conference, IEEE International Symposium on Personal, Indoor and Mobile Radio Communications, IEEE International Symposium on Information Theory, IEEE Vehicular Technology Conference, IEEE International Conference on Communications, IEEE Wireless Communications and Networking Conference.

## Patents

- W. Su, Z. Safar and K. J. R. Liu, “Systems and Methods for Coding in Broadband Wireless Communication Systems to Achieve Maximum Diversity in Space, Time and Frequency”, USA Patent, No. 7,720,168, May 2010.
- Z. Safar, “A Method and Apparatus for Transmitter Timing Adjustment”, USA Patent No. 8,031,586, October 2011.
- K. Jensen, M. Heikkila, U. Parts, J. Heiskala and Z. Safar, “Multipoint Data Transmission”, USA Patent No. 8,908,611, December 2014.
- H. Ma, Y. Han, Y. Chen, Z. Safar, F. Han, and K. J. R. Liu, “Handshaking Protocol for Time-Reversal System”, USA Patent Application No. 14/183648, February 2014.

## Publications

### Book Chapter:

- W. Su, Z. Safar and K.J.R. Liu, “Exploiting Diversity in MIMO-OFDM Systems for Broadband Wireless Communications”, in Eds. S. Ahson and M. Ilyas, *WiMAX Handbook*, CRC Press, September 2007.

### Journals:

1. Z. Safar and K.J.R. Liu, “Systematic Design of Space-Time Trellis Codes for Diversity and Coding Advantages”, *EURASIP Journal on Applied Signal Processing, Special Issue on Space-Time Coding and its Applications*, Vol. 2002, No. 3, pp. 221-235, March 2002.
2. W. Su, Z. Safar, M. Olfat and K.J.R. Liu, “Obtaining Full-Diversity Space-Frequency Codes from Space-Time Codes via Mapping”, *IEEE Transactions on Signal Processing*, Vol. 51, No. 11, pp. 2905-2916, November 2003.
3. W. Su, Z. Safar and K.J.R. Liu, “Diversity Analysis of Space-Time Modulation over Time-Correlated Rayleigh Fading Channels”, *IEEE Transactions on Information Theory*, Vol. 50, No. 8, pp. 1832-1839, August 2004.
4. Z. Safar and K.J.R. Liu, “Systematic Space-Time Trellis Code Construction for Correlated Rayleigh Fading Channels”, *IEEE Transactions on Information Theory*, Vol. 50, No. 11, pp. 2855 – 2865, November 2004.
5. W. Su, Z. Safar and K.J.R. Liu, “Full-Rate Full-Diversity Space-Frequency Codes with Optimum Coding Advantage”, *IEEE Transactions on Information Theory*, Vol. 51, No 1, pp. 229-249, January 2005.

6. W. Su, Z. Safar and K.J.R. Liu, "Space-Time-Frequency Coding for Maximum Achievable Diversity: Performance Analysis and Code Design", *IEEE Transactions on Wireless Communications*, Vol. 4, No. 4, pp. 1847-1857, July 2005.
7. Z. Safar, W. Su and K.J.R. Liu, "A Fast Sphere Decoding Algorithm for Space-Frequency Block Codes", *EURASIP Journal on Applied Signal Processing, Special Issue on Implementation Aspects and Testbeds for MIMO Systems*, Vol. 2006, pp. 1-14, 2006.
8. J. Chen, Z. Safar and J. Sorensen, "Multimodal Wireless Networks: Communication and Surveillance on the Same Infrastructure", *IEEE Transactions on Information Forensics and Security*, Vol. 2, No. 3, pp. 468-484, September 2007.
9. W. Su, Z. Safar and K.J.R. Liu, "Orthogonal Space-Time Block Codes with Sphere Packing", *IEEE Transactions on Information Theory*, Vol. 55, No. 4, pp. 1627-1639, April 2009.
10. F. Han, Z. Safar and K.J.R. Liu, "Energy-Efficient Base-Station Cooperative Operation with Guaranteed QoS", *IEEE Transactions on Communications*, Vol. 61, No. 8, pp. 3505-3517, August 2013.
11. Y. Chen, F. Han, Y.H. Yang, H. Ma, Y. Han, C.X. Jiang, H.Q. Lai, D. Claffey, Z. Safar, and K.J.R. Liu, "Time-Reversal Wireless Paradigm for Green Internet of Things: An Overview", *IEEE Internet of Things Journal*, Vol. 1, No. 1, pp.81-98, Feb 2014.
12. Y. Chen, W.S. Lin, F. Han, Y.H. Yang, Z. Safar, and K.J.R. Liu, "Incentive Compatible Demand Response Games for Distributed Load Prediction in Smart Grids", *APSIPA Transactions on Signal and Information Processing (invited paper)*, Vol. 3, DOI:10.1017/ATSIP.2014.8, September 2014.
13. Y. Chen, B.B. Wang, Y. Han, H.Q. Lai, Z. Safar, and K.J.R. Liu, "Why Time-Reversal for Future 5G Wireless?", *IEEE Signal Processing Magazine*, Vol. 33, No. 2, pp. 17-26, March 2016.

### Conferences:

1. Z. Safar and K.J.R. Liu, "Design of Space-Time Trellis Codes for Full Spatial Diversity", *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vol. 4, pp. 2465-2468, May 2001.
2. Z. Safar and K.J.R. Liu, "Systematic Space-Time Trellis Code Design for an Arbitrary Number of Transmit Antennas", *IEEE Vehicular Technology Conference (VTC)*, Vol. 1, pp. 8-12, October 2001.
3. Z. Safar and K.J.R. Liu, "Space-Time Trellis Code Construction for Fast Fading Channels", *IEEE International Conference on Communications (ICC)*, Vol. 1, pp. 563-567, April 2002.
4. Z. Safar and K.J.R. Liu, "Space-Time Correlation of MIMO Flat Rayleigh Fading Channels", *European Signal Processing Conference (EUSIPCO)*, Vol. 3, pp. 323-326, September 2002.
5. Z. Safar and K.J.R. Liu, "Variable Rate Space-Time Trellis Codes", *IEEE Vehicular Technology Conference (VTC)*, Vol. 1, pp. 406-409, September 2002.
6. W. Su, Z. Safar, M. Olfat and K.J.R. Liu, "A Full-Diversity Space-Frequency Code Construction Method for Broadband OFDM Systems", *Conference on Information Sciences and Systems (CISS)*, March 2003.
7. Z. Safar and K.J.R. Liu, "Performance Analysis of Space-Time Codes over Correlated Rayleigh Fading Channels", *IEEE International Conference on Communications (ICC)*, Vol. 5, pp. 3185-3189, May 2003.
8. W. Su, Z. Safar and K.J.R. Liu, "Space-Time Signal Design for Time-Correlated Rayleigh Fading Channels", *IEEE International Conference on Communications (ICC)*, Vol. 5, pp. 3175-3179, May 2003.

9. Z. Safar, W. Su and K.J.R. Liu, "Performance Analysis of Space-Time Modulation over Time-Correlated Rayleigh Fading Channels", *IEEE International Symposium on Information Theory (ISIT)*, p. 240, June 2003.
10. W. Su, Z. Safar, M. Olfat and K.J.R. Liu, "Full-Diversity Space-Frequency Codes for MIMO-OFDM Systems", *IEEE International Symposium on Information Theory (ISIT)*, p. 325, June 2003.
11. Z. Safar, W. Su and K.J.R. Liu, "Fast Sphere Decoding of Space-Frequency Block Codes via Nearest Neighbor Signal Point Search", *European Wireless Conference (EW)*, February 2004.
12. W. Su, Z. Safar and K.J.R. Liu, "Diversity Analysis of Space-Time-Frequency Coded Broadband OFDM Systems", *European Wireless Conference (EW)*, February 2004.
13. W. Su, Z. Safar and K.J.R. Liu, "Systematic Design of Space-Frequency Codes with Full Rate and Full Diversity", *IEEE Wireless Communications and Networking Conference (WCNC)*, Vol. 3, pp. 1436-1441, March 2004.
14. W. Yu, Z. Safar and K.J.R. Liu, "Real-Time Image Transmission over Heterogeneous Wireless Networks", *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vol. 4, pp. 593-596, May 2004.
15. Z. Safar, W. Su and K.J.R. Liu, "A Fast Sphere Decoding Framework for Space-Frequency Block Codes", *IEEE International Conference on Communications (ICC)*, Vol. 5, pp. 2591-2595, June 2004.
16. J. Sorensen, K. Kristoffersen, A. Cervera, M. Schiotz, T. Lyng, Z. Safar and L. Birkedal, "An Infrastructure for Context Dependent Mobile Communication", *IEEE International Workshop on Multimedia Signal Processing (MMSP)*, September 2004.
17. J. Sorensen, Z. Safar, J. Chen, K. Kristoffersen and M. Schiotz, "Indoor Surveillance with Multimodal Wireless Networks", *IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*, pp. 242-245, December 2004.
18. Z. Safar, J. Sorensen, J. Chen and K. Kristoffersen, "Multimodal Wireless Networks: Distributed Surveillance with Multiple Nodes", *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Vol. 4, pp. 853-856, March 2005.
19. J. Chen, Z. Safar, J. Sorensen and K. Kristoffersen, "An RF-Based Surveillance System Using Commercial Off-The-Shelf Wireless LAN Components", *European Signal Processing Conference (EUSIPCO)*, September 2005.
20. J. Chen, J. Sorensen, Z. Safar and K. Kristoffersen, "A Low-Cost and Robust Multimodal Wireless Network with Adaptive Estimator and GLRT Detector", *European Signal Processing Conference (EUSIPCO)*, September 2006.
21. J. Chen and Z. Safar, "Indoor Surveillance with Multimodal Wireless Networks: Multi-Cycle Detection and Performance Analysis", *IEEE Wireless Communications and Networking Conference (WCNC)*, pp. 1241-1246, March 2007.
22. F. Han, Z. Safar, W. Lin, Y. Chen and K. J. R. Liu, "Energy-Efficient Cellular Network Operation via Base Station Cooperation", *IEEE International Conference on Communications (ICC)*, pp. 5885-5889, June 2012.
23. Y. Chen, W. Lin, F. Han, Y.-H. Yang, Z. Safar and K. J. R. Liu, "A Cheat-Proof Game Theoretic Demand Response Scheme for Smart Grids", *IEEE International Conference on Communications (ICC)*, pp. 3401-3405, June 2012.