Center for

Wireless and Microwave Information Systems

Department of Electrical Engineering
University of South Florida

Annual Report 2008

Center Director – Dr. Thomas Weller

Members: Dr. Huseyin Arslan, Dr. Charles Baylis, Dr. Lawrence Dunleavy, Dr. Jing Wang

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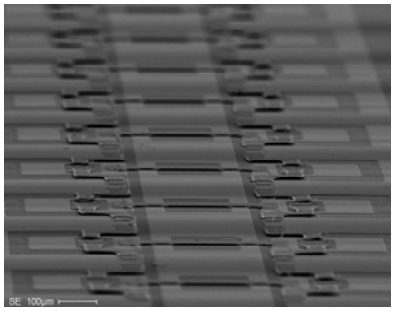
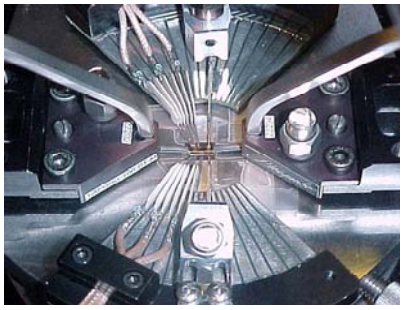
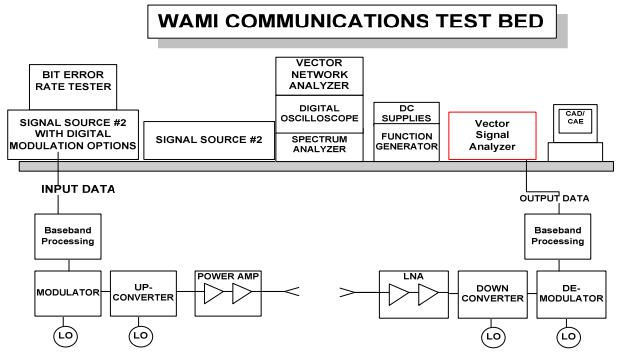






The Center for Wireless and Microwave Information Systems conducts research across a broad range of technical areas that include device modeling and characterization, RF micro electromechanical systems, advanced materials and nanoscale devices, active antennas, cognitive radio and next generation wireless architectures. Research projects focus on basic scientific development as well as applications such as biomedical sensing, communications, robotics and transportation. Active collaborations are pursued with multiple industry and university partners as well as several centers at the University of South Florida.

In 2007/08 the Center will support 35 MS and PhD students and 5-7 undergraduate students. Center faculty submitted 45 research proposals in the past year; of these 23 proposals were funded including 7 from government agencies. The WAMI faculty had more than 60 publications in journals, conferences and book chapters.

Newsworthy Notes

- Approximately ten years to the date since the first offering of the Wireless Circuits and Systems Design Laboratory (the "WAMI" Lab) the WAMI Center will launch "WAMI Lab 2." The new course, entitled Wireless Communications Laboratory is being developed by Dr. Arslan and will be offered for the first time in Spring 2008. Support for the new course was provided through an education grant from the National Science Foundation (NSF), the University of South Florida (USF), and Agilent Technologies. Agilent provided a very generous equipment and software discount that allowed the NSF/USF support to be nearly tripled in value. The total value of the new instrumentation in this laboratory is over $500K, and will provide our students with a

unique opportunity to gain hands-on experience with truly state-of-the-art resources. In the past 10 years over 1,000 students have learned about wireless communications in the WAMI Lab, and we look forward to the great addition that WAMI Lab 2 brings to our educational program.

- The 11th annual WAMI Advisory Board meeting will be held on April 17-18, 2008. We look forward to another successful meeting, with a more than 30 expected attendees. Following the 2007 format, there will be a half-day Industry/University Wireless Forum on the second day of the event.

- The date is set for the 10th annual Wireless and Microwave Technology Conference. The conference will be held on Sand Key on April 20-21, 2009. Paper abstracts are due September 15, 2008.

- In 2007 the WAMI Advisory Board members contributed $65,000 to the WAMI Foundation Account, providing much needed discretionary funding to support various center activities. These funds are primarily used for equipment repair/replacement and faculty and student conference travel support. Contributors included Raytheon ($30K), ITT ($20K) and Harris ($15K).

- A new research thrust area of the WAMI Center has been launched, broadening the already existing interest in active device/circuit modeling and characterization to include investigation of active circuit design techniques. The newly formed RF Active Circuits and Measurements (RACAM) Research Group, under Dr. Charles Baylis, is performing research in areas related to the RF/microwave active circuit design cycle (design, modeling, and characterization techniques).

- In addition, Dr. Wang and his MEMS Transducers Research Group have been focusing on development of MEMS devices and technologies to reduce the sizes and enhance the performance of the RF passives as well as sensors and actuators. Dr. Wang's group has recently purchased an Atomic Layer Deposition (ALD) tool and is currently in the process of setting it up. ALD is a chemical vapor deposition technique based on sequential self-terminating gas–solid reactions, thus enabling deposition of uniform, conformal, and pin-hole free inorganic material layers with well-controlled thickness down to the nanometer range. Such a process is crucial for both RF MEMS and RFIC's.

- The Center has a new logo! Many thanks to Bill Graves (Trak Microwave) for his creative insight, and the design specialist that he assigned to turn his idea into a professional-looking graphic.

- In 2007 the Center began development of a new website. The new format will be more functional than the previous design and provide much easier access to information on the research and education aspects of the program. It will also feature an on-line reservation system for our instrumentation, making sure that students have as much time in the labs as possible!

Research Highlights – Current & Recent Projects

- **Functional Magnetic Polymer Nanocomposite Films for Tunable RF Device Applications,** P.I. T. Weller, Co-P.I. H. Srikanth and J. Wang, Granting Agency: National Science Foundation. Development of nanocomposite polymer substrates for microwave applications.

- **Non-Linear Device Applications of Nano-Patterned Barium Strontium Titanate Thin Films,** P.I. T. Weller, Co-P.I. A. Kumar and M. Smith (Raytheon), Granting Agency: The National Science Foundation (ECS 0601536. Basic research on the fabrication and characterization of miniaturized non-linear BST microwave devices.

- **Low Cost Omni Antenna**, P.I. T. Weller, Granting Agency: Raytheon. Design of a 4-6 GHz low cost steerable omni-directional antenna.

- **Compact Reconfigurable Channel Emulator**, P.I.: Thomas Weller, Granting Agency: Goodrich. Development a laboratory-scale instrument for characterization of wireless sensor networks.

- **Radiometric Sensors as Non-invasive Approach to Health Monitoring**, P.I. T. Weller, Granting Agency: Raytheon. Analysis and modeling of the dielectric properties of human tissue.

- **NIRT: Nanocrystalline Thin Film Diamond for MEMS and Biomedical Applications**, P.I. Ashok Kumar, Co-PIs: T. Weller, S. Bhansali, and I. Oleynik, Granting Agency: The National Science Foundation. Diamond thin films will be developed for use in high-power, high-reliability RF MEMS phase shifters.

- **Communication System and Network Design for Unmanned Systems: A Feasibility Study for Autonomous Underwater Vehicles.** Kimon Valavanis and Huseyin Arslan, Research and feasibility student for developing AUV and communication of the AUV with each other using underwater acoustic

- **Interference Cancellation and Avoidance for OFDM based Future Generation Wireless Cellular Communications Systems**. Huseyin Arslan, Understanding and handling various interference sources in 4-G cellular systems

- **Introducing Advanced Signal Analysis tools to Spectrum Analyzers,** Huseyin Arslan, Enhancing the spectrum analyzer functionality significantly by introducing advanced time-frequency analysis

- **Managing and Handling Co-channel Interference in Multi-carrier Signaling Based Broadband Wireless Communication Systems,** Huseyin Arslan, Introducing cognitive networks and adaptive techniques to manage interference in cellular networks

- **Research and Development of Software Defined Radio Test-bed and Mobile WiMAX OFDMA Transceivers,** Huseyin Arslan, Research and development of software defined radio test-bed and using this platform for developing enhanced mobile WiMAX transceivers.

- **Ultra-wideband Channel Modeling for Disaster and Emergency Rescue,** Huseyin Arslan, Modeling ultra wideband communication channel in disaster environments.

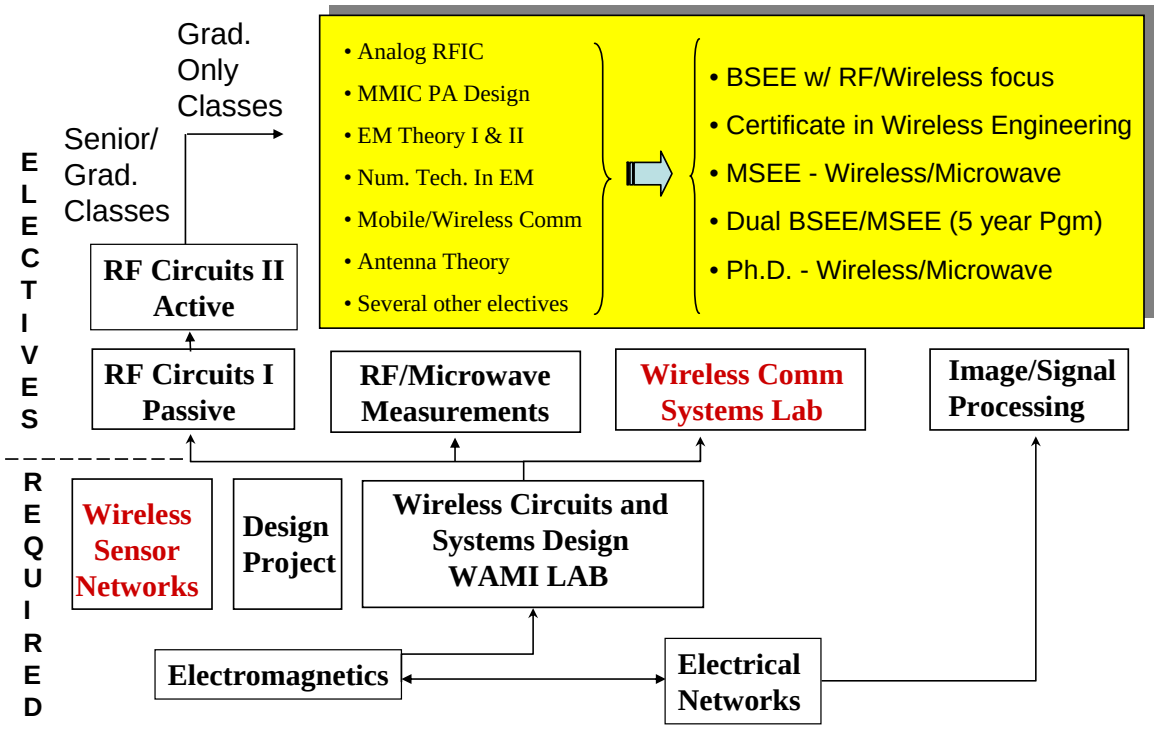
- **Prediction of Phase Noise in Amplifiers and Frequency Multipliers,** Co-PI and Lead Researcher: C. Baylis, PI: L. Dunleavy. Granting Agency: TRAK Microwave Corporation and Florida High Tech Corridor. Development of a link between modeling of flicker noise and prediction of phase noise through design and measurement of amplifiers and frequency multipliers.

- **Nonlinear Modeling for Improved Power Amplifier Design,** PI: C. Baylis, Co-PI: J. Wang. Granting Agency: Modelithics, Inc. and Florida High Tech Corridor. Research and training grant for development of active electrothermal modeling and characterization techniques for nonlinear transistors, as well as modeling and characterization techniques for passive components.

- **Solar-Cell-Microarray-Powered Ultra-High-Q Ultra-High-Frequency (UHF) Nanoprecision Resonator with SWNT as a Platform for Multi-Agent Sensing**, PI: J. Wang, FMMD Seed Grant: Development of a solar-powered microarray of ultra-high-sensitive resonant mass sensors with distinctive binding sites for targeted species as a portable platform for identification of biological/chemical molecular assays.

Selected Curriculum Activities

The WAMI faculty continues to advance the educational opportunities provided to undergraduate and graduate students in USF's Electrical Engineering Department. The Wireless Communications Laboratory, being developed by Dr. Arslan, will be offered for the first time in Spring 2008. A new course, Wireless Sensor Systems Design, is under development and will be offered for the first time in Fall 2008. The sensors course is a collaborative effort between USF (Dr. Weller) and Northern Arizona University, the University of Vermont and the University of Hawaii. Funding to develop both courses was obtained through competitive Course, Curriculum and Laboratory Improvement grants from The National Science Foundation. The curriculum summary shown in the figure below illustrates how these two new courses fit into the overall WAMI program.



Course Syllabus

Course No. & Title: EEL 4936/EEL 6936 Wireless Communication Systems Lab

Term & Meeting Info: *Spring 2008*

Instructor Info:
Dr. Hüseyin Arslan;
E-mail Address: arslan@eng.usf.edu
Office: ENB 361
Phone: (813) 974-3940
Office Hours: Tuesday-Thursday, 1:45 – 2:45 p.m.

Catalog Description:
An extensive hands-on introduction to digital communications and wireless communication systems; involving testing, modeling, simulation, and measurements of the performance of digital communication systems at both sub -system and complete system levels. Not available on an S/U basis.

Semesters Offered: Spring Each Year

Prerequisites: Introduction to Communication Systems or equivalent.

Suggested Co-requisites: WAMI lab, DSP/FPGA labs, Personal & Mobile Communication, Advanced Topics on Wireless Communications.

Courses that require this course as a direct prerequisite: None

Level: *Senior level undergraduate and graduate*
Credits: 3 **Class Duration**: 1 Hour and 45 minutes lecture + 4 hours lab

Text Info: *Instructor will provide the required documents.*
You are not granted permission to sell notes or tapes of class lectures.

Reference (supplemental reading): *Related reading material will be provided via web postings and handouts.*

Wireless Communications Lab syllabus

!! New Course Announcement !!

EEL 4935 WIRELESS SENSOR NETWORK DESIGN

1ST OFFERING FALL 2008

This is a new senior-level elective being developed and taught collaboratively by multiple universities. The course will focus on system-level perspectives of real-world, wireless sensor networks. Preparation for the capstone senior design project is emphasized. There is one 1-hour in-class lecture each week, and students are also expected to review two hours of on-line material each week.

Credit Hours: 3
Pre-Requisites: EEL 4471 – Electromagnetics
Web-based Tutorial Modules (contact instructor)

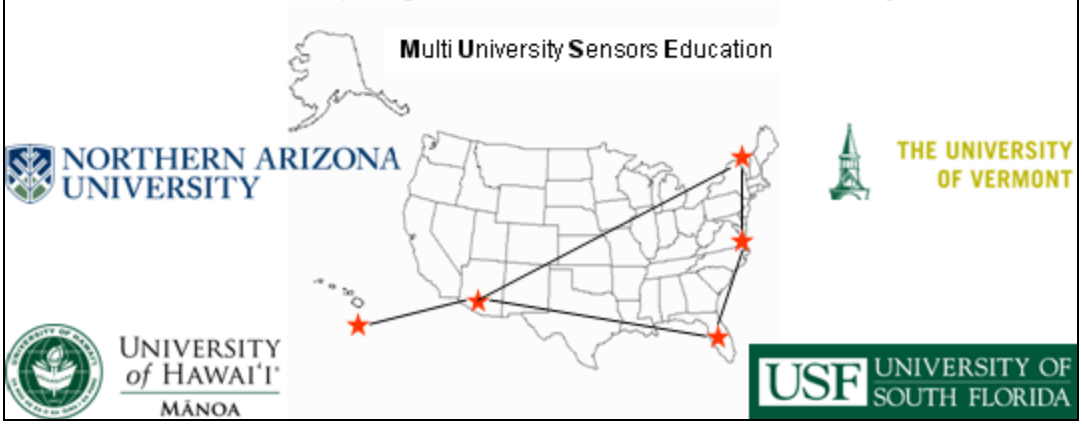
Contact: Dr. Tom Weller, weller@eng.usf.edu
Web Site: www.tbd.123

❖ **Course Topics**

- Sensors/Transducers
- A/D Conversion
- Wireless Interface
- Digital Communications
- Networks
- Embedded Computing

❖ **Course Features**

- Web-based Lectures
- Team Presentations
- Case Studies
- Snr. Project Preparation
- University Collaboration
- Introductory Tutorials



Course Announcement for Wireless Sensor Systems Design

Professional Activities

- **2008 Radio and Wireless Symposium** – This conference was held in Orlando in January 2008 as a joint-event with the Wireless and Microwave Technology Conference (WAMIcon). Several regular members of the WAMIcon Steering Committee, including WAMI faculty members, participating in conference organization.

- **Microwave and Wireless Technology Conference 2009 –** The 10th annual conference will be held April 20-21, 2009 in Sand Key, Florida. The WAMI Center faculty continues to play a key role in organizing this IEEE MTT-sponsored event. However, there is now a strong supporting cast of outside participants that are helping to make this conference a mainstay among the annual international microwave conferences.

- **WAMI 2008 Advisory Board Meeting –** The 11th meeting of the WAMI Center's External Advisory Board will be held in April 2008. Approximately 30 attendees are expected, representing more than 20 companies, universities and government agencies.

- **2014 International Microwave Symposium –** Drs. Dunleavy and Weller are chair and co-chair, respectively, for the IEEE MTT Society's flagship conference that will be held in Tampa in 2014. While the event is still several years away, planning is already in progress!

Recent Publications – 2007

1. A. Kumar, S. Manavalan, V. Gurumurthy, S. Jeedigunta and T. Weller, "*Dielectric and structural properties of Pulsed Laser Deposited and sputtered Barium Strontium Titanate thin films* ", Materials Science and Engineering: B, Volume 139, Issues 2-3, 15 May 2007, Pages 177-185.
2. S. Natarajan, T. Weller and D. Hoff, "3-D Micro Coaxial Transmission Lines with Integrated MEM Capacitors," Microwave and Wireless Components Letters, IEEE, Volume 17, Issue 12, Dec. 2007 Page(s):858 - 860.
3. Saravana Natarajan, Thomas M. Weller and David P. Fries, "Sensitivity Tunable Inductive Fluid Conductivity Sensor based on RF Phase Detection", Sensors Journal, IEEE, Volume 7, Issue 9, Sept. 2007 Page(s):1300 - 1301.
4. R. Heindl, et al., "Multi-functional Ferrimagnetic-Ferroelectric Thin Films for Microwave Applications," Applied Physics Letters, 252507, 2007.
5. R. Heindl, et al., "Structure, magnetism and tunable microwave properties of PLD-grown Barium Ferrite/Barium Strontium Titanate bi-layer films," J. Appl. Phys. 101, 09M503 (2007).
6. T. Ketterl and T. Weller, "Reflectenna: A Quasi Passive On-Off Keyed Microwave Telemetry System for Remote Sensor Applications," IEE Proc. Microwaves, Antennas & Propagation, Vol. 1, Issue 4, August 2007, pp. 843-846.
7. E. Maxwell, T. Weller and J. Harrow, "Mathematical Reformulation of the Ideal Gaussian for Ultra-Wideband Radar Systems," *accepted for publication in the FEF Journal of Interdisciplinary Research*, April 2007.
8. B. Lakshminarayanan and T. Weller, "Optimization of Impedance-Matched True-Time-Delay Phase Shifters," *IEEE Trans MTT*, Vol. 55, No. 2, pp. 335-342, February 2007.
9. S. Melais, et al., "Origami Packaging – Novel Printed Antenna Technology for Ad-hoc Sensor Applications," 40th International Symposium on Microelectronics, October 2007.
10. J.Kusterer, S.Balachandran, T.M.Weller, E.Kohn, "Nanodiamond microbridges for RF applications", 2nd International industrial diamond conference, Rome, April 2007.
11. S. Presas and T. Weller, "High Efficiency Diode Doubler with Conjugate Matched Antennas," Microwave Conference, 2007. European 9-12 Oct. 2007 Page(s):250 – 253.
12. B. Zivanovic, et al., "The Effect of Alignment Tolerance on Multilayer Air Cavity Microstrip Patches," 2007 International AP-S, July 2007.
13. Q. Bonds, et al., "An Ultra-Wideband (UWB) Pulse Dispersion Study for Antennas in Sensor Network Applications," 2007 International AP-S, July 2007.
14. S. Balachandran, et al., "Thermally Actuated Nanocrystalline Diamond Micro-Bridges for Microwave and High Power RF Applications," 2007 International Microwave Symposium, June 2007.
15. V. Gurumurthy, et al., "Effect of nanocrystalline diamond interlayer for BST varactors," 2007 MRS Conference, December 2007, Boston, MA.
16. A. Kumar, et al., "NANOCRYSTALLINE DIAMOND FILMS FOR MEMS APPLICATIONS," invited talk, I-MRS Conference, India (Bangalore, Oct. 07).
17. S. Balanchandran, et al, "Thermal, mechanical and microwave characteristics of nanocrystalline diamond bridges," 2007 MRS Conference, submitted 6/2007.

18. Y. Emirov, S. Baylis and T. Weller, “The Use of End-Point Current Monitor for FIB Milling Depth Control in Multilayer Nano-Devices,” Florida Chapter of the American Vacuum Society Meeting, March 2007.
19. H. Arslan and H. Celebi, "Software Defined Radio Architectures for Cognitive Radios ", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
20. H. Arslan and S. Yarkan, "Enabling Cognitive Radio Through Sensing, Awareness, and Measurements", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007. [BiBTeX Entry]
21. H. Arslan and T. Yucek, "Spectrum Sensing for Cognitive Radio Applications", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
22. H. Arslan and H. Celebi, "Location Information Management Systems for Cognitive Wireless Networks", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
23. H. Arslan, H. A. Mahmoud and T. Yucek, "OFDM for Cognitive Radio: Merits and Challenges", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
24. H. Arslan and M.E. Sahin, "UWB Cognitive Radio", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
25. H. Arslan and S. Ahmed, "Applications of Cognitive Radio", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007.
26. H. Arslan and S. Yarkan, "Cross-layer Adaptation and Optimization for Cognitive Radio", Book Chapter, Cognitive Radio, Software Defined Radio, and Adaptive Wireless Systems, Springer, ISBN: 978-1402055416, Ed: Huseyin Arslan, 2007. [BiBTeX Entry]
27. H. Arslan and M.E. Sahin, "UWB-based Cognitive Radio Networks", Book Chapter, Cognitive Wireless Communication Networks, Springer, Eds: Vijay K. Bhargava and Ekram Hossain, 2007, to appear.
28. I. Guvenc and H. Arslan and S. Gezici and H. Kobayashi, "Adaptation of two types of processing gains for UWB impulse radio wireless sensor networks ", IEE proceedings on (new name IET) Communications, pp. 1280-1288, number 6, vol. 1, December 2007.
29. M. K. Ozdemir, H. Arslan, "Channel Estimation for Wireless OFDM Systems", IEEE Communications Surveys & Tutorials, Page(s): 18-48, Volume: 9, Issue: 2, Second Quarter 2007.
30. H. Celebi, H. Arslan, "Cognitive Positioning Systems", IEEE Trans. on Wireless Communications, vol. 6, no. 12, pp.4475-4483, Dec. 2007.
31. H. Celebi, H. Arslan, "Cross-Modulation Interference and Mitigation Technique for Ultrawideband PPM Signaling ", IEEE Trans. on Vehicular Technology, 2008, to appear.
32. H. Celebi, H. Arslan, "Ranging Accuracy in Dynamic Spectrum Access Networks", IEEE Communications Letters, vol. 11, no. 5, pp. 405-407, May 2007.

33. T. Yücek and H. Arslan, "Carrier Frequency Offset Compensation with Successive Cancellation in Uplink OFDMA Systems", IEEE Transactions on Wireless Communications, Volume 6, Issue 10, October 2007 Page(s):3546 - 3551.
34. H. Arslan, "Multi-access Interference Cancellation Receiver for Time-Hopping Ultra-wideband Communication", Wireless Personal Communications Journal (Springer), vol. 42, no. 4, pp. 479-490, Sep. 2007.
35. H. Celebi, H. Arslan, "Utilization of Location Information in Cognitive Wireless Networks", IEEE Wireless Communications Magazine-Special Issue on Cognitive Wireless Networks, vol. 14, no. 4, pp. 6-13, Aug. 2007.
36. T. Yücek and H. Arslan, "MMSE Noise Plus Interference Power Estimation in Adaptive OFDM Systems", IEEE Transactions on Vehicular Technology, Volume 56, Issue 6, Part 2, Nov. 2007 Page(s):3857 - 3863 .
37. S. Yarkan and H. Arslan, "Exploiting Location Awareness Toward Improved Wireless System Design in Cognitive Radio", IEEE Communications Magazine, vol. 46, no. 1, pp. 128-136, January 2008[BiBTeX Entry]
38. I. Guvenc and H. Arslan, "A Review on Multiple Access Interference Cancellation and Avoidance for IR-UWB", Signal Processing Journal (by Elsevier). Volume 87, Issue 4, Apr. 2007, pp. 623 - 653.
39. M. E. Sahin, I. Guvenc, and H. Arslan, "Joint Parameter Estimation for UWB Energy Detectors Using OOK", Wireless Personal Communications Journal (Springer), vol. 40, no. 4, pp. 579-591, Mar. 2007.
40. T. Yücek and H. Arslan, "Dispersion and Delay Spread Estimation for Adaptive OFDM Systems," IEEE Transactions on Vehicular Technology, to appear, 2007.
41. H. Arslan, "A Wireless Communication Systems Laboratory Course: Connecting the pieces together through SDR capable modern instruments, " Microwaves & RF magazine," October 2007 issue, (also available online "http://mwrf.com/Articles/Print.cfm?ArticleID=17222").
42. I Guvenc and H. Arslan, "On the Transceiver Types of IR-UWB Systems at Sub-Nyquist Sampling Rates," To appear in Wireless Personal Communications Journal, Springer.
43. S. Ahmed and H. Arslan, "Inter-symbol Interference in High Data Rate Transmit Reference UWB Transceivers", to appear in Proc. IEEE International Conference on Ultra-Wideband (ICUWB), Singapore, Sep. 2007.
44. M.E. Sahin, S. Ahmed, H. Arslan, "The Roles of Ultra Wideband in Cognitive Networks", to appear in Proc. IEEE International Conference on Ultra-Wideband (ICUWB), Singapore, Sep. 2007 (Invited Paper).
45. H. A. Mahmoud, H. Arslan, "Spectrum Shaping of OFDM-based Cognitive Radio Signals," accepted for publication in IEEE Radio and Wireless Symposium (RWS) incorporating WAMICON, Orlando, Florida, January 22-24, 2008.
46. S. Ahmed and H. Arslan, "IFI and ISI in High Data Rate UWB Coherent Transceivers," accepted for publication in IEEE Radio and Wireless Symposium (RWS) incorporating WAMICON, Orlando, Florida, January 22-24, 2008.
47. T. Yücek and H. Arslan, "Feature Suppression for Physical-layer Security in OFDM Systems," accepted for publication in IEEE Military Communications Conference (MILCOM 2007), Orlando, Florida, October 29-31, 2007.

48. S. Yarkan and H. Arslan "Statistical Wireless Channel Propagation Characteristics in Underground Mines at 900MHz," accepted for publication in IEEE Military Communications Conference (MILCOM 2007), Orlando, Florida, October 29-31, 2007.
49. M.E. Sahin, H. Arslan, and D. Singh, "Reception and Measurement of WiMax MIMO Signals with a Single Receiver", Accepted for publication in IEEE Vehic. Technol. Conf. (VTC), Baltimore, MD, Oct. 2007.
50. S. Yarkan and H. Arslan "Binary Time Series Approach to Spectrum Prediction for Cognitive Radio," in Proc. of 66th IEEE Vehic. Technol. Conf. (VTC-2007 Fall), Baltimore, MD, pp.1563-1567, Sept. 30- Oct. 3 2007. [BiBTeX Entry]
51. H. Celebi and H. Arslan, "Adaptive Positioning Systems for Cognitive Radios", IEEE Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySpan), p.78-84, 17-20 April, 2007, Dublin, Ireland.
52. H. Arslan, "A Wireless Communication Systems Laboratory Course", 2nd International Conference on Engineering Education & Training, April 9-11, 2007, Kuwait.
53. Q. Bonds, T. Weller, H. Arslan, "An Ultra-Wideband (UWB) Pulse Dispersion Study for Antennas in Sensor Network Applications," in IEEE International Symposium on Antennas and Propagation, Honolulu, Hawaii, June 10-15 2007.
54. T. Yücek, M. K. Ozdemir, H. Arslan, and F. E. Retnasothie, "A Comparative Study of Initial Downlink Channel Estimation Algorithms for Mobile WiMAX", IEEE Mobile WiMAX Symposium, Orlando, FL, March 2007.
55. T. Yücek and H. Arslan, OFDM Signal Identification and Transmission Parameter Estimation for Cognitive Radio Applications, accepted for publication IEEE Global Communications Conference (Globecom), Washington, D.C., November 2007.
56. H. Arslan, "Testing and Measurement of Cognitive radio and Software Defined Radio Systems," Accepted for publication in 2007 SDR Forum Technical Conference, Denver, CO.
57. H. Arslan, "Teaching SDR through a laboratory based course with modern measurement and test instruments," Accepted for publication in 2007 SDR Forum Technical Conference, Denver, CO.
58. C. Baylis, L. Dunleavy, and S. Lardizabal, “Efficient Load-Pull Measurement Using a Sequential Search Algorithm,” IEEE Topical Symposium on Power Amplifiers for Wireless Communications, Long Beach, California, January 2007.
59. L. Dunleavy and C. Baylis, “Meeting the Challenges in High-Power Device Modeling,” presentation in IEEE MTT-S International Microwave Symposium Workshop: “Challenges of High Power Device Characterization and Modeling,” Honolulu, Hawaii, June 2007.
60. C. Baylis and L. Dunleavy, “Thermal Time Constant Measurement of High-Power Silicon MOSFET,” Automatic RF Techniques Group (ARFTG) Conference, Tempe, Arizona, November 2007.
61. S.J. DuPont, C. Siyambalapitiya, C. Bello, J. Wang, P.G. Stroot, and R.G. Toomey, “High Aspect Ratio “Smart” Polymer Patterns for Size-Exclusion Separations” MRS Spring Meeting, 2008, San Francisco, CA, March 24 -28.
62. C. L. Frewina, C. Locke, J. Wang, P. Spagnol, S. E. Saddow, “Single crystal 3C-SiC growth using a poly-Si seed layer,” submitted to Applied Physics Letter, Feb. 2008.

63. J. Wang, L. Yang, S. Pietrangelo, Z. Ren and C.T.-C. Nguyen, "RF MEMS Resonators: Getting the Right Frequency and *Q* (invited)," in IEEE Compound Semiconductor Integrated Circuit Symposium 2007 (CSIC 2007), Portland, OR, Oct. 14-17, 2007, pp. 1-4.

64. Y. Lin, Jing Wang, S. Pietrangelo, Z. Ren, and C. T.-C. Nguyen, "Effect of electrode configuration on the frequency and quality factor repeatability of RF micromechanical disk resonators," in the 14th Int. Conf. on Solid-State Sensors & Actuators, Lyon, France, June 11-14, 2007, pp. 2461-2464.