
Jeffrey H. Reed, Ph.D.

Willis G. Worcester Professor of ECE
The Bradley Department of Electrical and Computer Engineering
Director of Wireless at Virginia Tech
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Vitae

Section I: Experience & Education

Current Position:

Director of Wireless at Virginia Tech (Wireless@VT), 2005-present
Professor of the Bradley Department of Electrical and Computer Engineering, June 2002- Present
Interim Director, The Ted and Karyn Hume Center for National Security and Technology, January 2010 – May 2011
CEO and Co-Founder, Power Fingerprinting, Inc. 2011-Present
CTO and Co-Founder, Cognitive Radio Technology, 2007-present
Willis G. Worcester Professor, Bradley Dept. of Electrical and Computer Engineering, 2005-present

Professional Interest:

Research and teaching in signal processing and communication systems

Specific Research Interests

Software Radios
Smart Antennas
Interference Rejection
Wireless Networks
Cognitive Radio
Location Technology

Specific Teaching Interests

Software Radios
Digital and Analog Communications
Discrete Time and Digital Signal Processing
Cellular and Personal Communications
DSP-based Communication System Design
Adaptive Filtering

Education:

Ph.D.

Electrical and Computer Engineering, December 1987, University of California, Davis
Awarded American Electronics Fellowship for Faculty Development
Major: Statistical Signal Processing; Minor: Control Systems and Statistics
Dissertation: *Interference Rejection Using Time-Dependent Adaptive Filters*
Attended part-time at University of Santa Clara, September 1980 through June 1983

M.S.

Electrical and Computer Engineering, June 1980, University of California, Davis
M.S. Project Topic: An EEG Data Acquisition and Analysis System

B.S.

Electrical and Computer Engineering, March 1979, University of California, Davis

Employment:

Professor, Virginia Tech, April 2001-present
Director, MPRG 200-2002
Associate Professor, Virginia Tech, 1997-2001
Co-Founder, Allied Communications, 2012
President and co-founder, Power Fingerprinting, 2011 - present
CTO and co-founder, Cognitive Radio Technologies, 2007-present
Co-founder, Dot Mobile, Inc., March 2000-2001
Consultant, Reed Engineering (Self-Employed), 1987-present
Assistant Professor, Virginia Tech, 1992-1997
Research Engineer, University of California, Davis, 1992
Lecturer, University of California, Davis, 1988-1992
Associate Instructor, University of California, Davis, 1985-1987
Teaching Assistant, University of California, Davis, 1984-1985
Member of Technical Staff, Signal Science, Inc., Santa Clara, CA and Hanover, MD, 1980-1985

Professional Affiliations:

Member of **Tau Beta Pi Honor Society**
Member of **Phi Kappa Phi Honor Society**
Member of AFCEA
Fellow of the IEEE

Professional Awards:

Wireless Innovations Forum International Achievement Award 2013
Honorary lifetime membership in the Wireless Innovation Forum, 2012
IEEE Vehicular Technology Society Distinguished Lecturer 2011
Named Willis G. Worcester Professor of ECE, summer 2005, Fall 2010
Industry Achievement Award, SDR Forum 2004
Institute of Electrical and Electronics Engineers Fellow, Dec. 2004

**Section II: Funded Research
(Principal Investigator or Co-Principal Investigator)**

LTE Communications Over 3.5 GHz Band for Broadband Public Safety Applications, CNS, \$100,000.00, 07/01/2013 - 06/30/2014

ICCAE, Faculty Development Supplement to 450181,DIA, \$5,000, 9/26/12 – 9/26/13

Radar-Communications Compatibility Experiments, NSWC, Dalghren, 4/15/13 – 8/9/13, \$124,985

ICTAS Seed Hospital Room of the Future, ICTAS, \$40,000, 7/172012 – 06/30/2013

ICTAS Testbed efforts, ICTAS, \$75,000, 7/172012 – 06/30/2013

Robust Satellite Communications under Hostile Interference, AFRL, \$76,067, 3/18/13 – 3/25/14

Ensuring Operational Privacy of Primary Users in Geo location Database-Driven Sharing, Motorola Solutions, \$374,948, 12/1/12 –

HAWKSNEST Enterprise Software Radio, Ventura,\$129,000, 1/1/2013 – 6/30/2013

Mobile Cognitive Radio, ICTAS,\$98,291, 07/01/2012 – 06/30/2013, Jeffrey Reed

Next Generation Cellular Networks, Center for Innovative Technology, \$100,000, 05/10/2013 - 08/09/2013

Sharing and Shaping 4G Cellular Resources, Allied Minds, \$369,152, 08/10/12 - 05/09/2013

Software Defined Radio Waveform and Device Development and Component Deployment Using OSSIE, DOD/LTS, \$975,639, 07/19/2007-07/31/2013

Android Security, Army Research Office (ARO), \$64,884, 08/01/2013 – 07/31/2013

Collaborative Proposal: Broadband Wireless Access and Applications Center (BWAC), National Science Foundation, \$3,000,000, 03/01/2013-02/28/2014

Intelligence Community Center of Academic Excellence (renewal), DIA, \$1,000,000, 9/23/13 – 9/22/14

Paving the Way to Dynamic Spectrum Sharing: Understanding Spectrum Regulatory and Enforcement Mechanics, NSF, \$466,485

Advanced Wireless Systems Technologies, NRO, \$8,128,864, 8/15/12-1/14/2014

Intelligence Community Center of Academic Excellence, DIA, \$1,000,000, 9/23/12 to 9/22/14

Sharing and Shaping of 4G Cellular Resources, AMFI, \$369,152, 8/10/12 – 5/9/13

Android Security, ARO, \$64,884, 6/1/12 – 5/31/13

SDR Shield: A Hardware-based Security Solution for Software Defined Radio, NSF, \$700,000, 9/1/12 – 8/29/18

Outdoor Cognitive Radio Network Test Bed, DoD, 6/15/12 – 6/14/13

Information Assurance of LTE-Advanced, L-3, \$30,000, 6/15/12 – 6/14/14

Enhanced Security Monitoring and Intrusion Detection Using Power Fingerprinting and SDR and CR Wireless Systems, Power Fingerprinting Inc., \$50,236.00
7/1/2012 – 12/31/2012

Rural Virginia Testbed Planning, CAER, \$169,999.00, 1/1/2012 – 9/30/2012

Wireless Assessment of the Gigapark Sites in the Mid Atlantic Broadband Footprint, Mid-Atlantic Broadband. \$54,419.00, 7/1/2011 – 9/1/2011

Cognitive Jammer Detection and Classification. Office of Naval Research (ONR), \$100,000.00, 10/1/2011 – 9/30/2013

The Android Tactical Application Analysis & Knowledge Cloud, AROSR/ARO

Mobile Cognitive Radio Testbed, ICTAS, \$98,291.00, 7/1/2010 – 6/30/2011

Updated to OSSIE Core Framework to Enhance Compatibility with Open CPI, Mercury Federal Systems, \$39,998, 7/1/2011 – 12/31/2011

Mobile Cognitive Radio Nodes Testbed, ARO (DURIP II), 5/13/2010 – 5/12/2011, \$213,566

Next Generation Secure, Scalable Communication Network for Smart Grid, Oak Ridge National Laboratory, 12/15/2010 – 09/30/2012 \$628,671.00

SDR Technology Development Support, Maryland Procurement Office, 9/30/10 – 9/29/2010
\$1,562.300 (expected duration 5 years at \$5M)

Mobile Cognitive Radio Testbed, ICTAS, 7/1/10 – 6/30/11 \$213,566 (co-PI)

Experimental Development Capability for Software Defined Radio with Agile Hardware, ONR, 1/27/2010 – 1/26/2011 \$277,718 (co-PI)

Collaborative Research: Enhancing Access to the Radio Spectrum (EARS) Workshop, NSF 4/15/2010 – 03/31/2011 \$21,860.00 (co-PI)

Recommendations for Transitioning Silvus MNM FPGA Core IP, DARPA (Silvus Technologies) 2/18/2010 – 2/17/2011, \$39,970.00 (co-PI)

NSWC-TO13-Wireless Distributed Computing: Concept to Reality, Naval Secure Warfare (DARPA) Center 8/16/10 – 8/15/2011 - \$498,798.0

Investigating the Relationship of OSSIE to Higher Layers, NSF 8/1/2009 – 2/28/10 \$76,040

VT-Cornet: Virginia Tech Cognitive Radio Network, ICTAS, 7/1/08 – 6/30/09 \$142,580

Cryptographic API and Subsystem Simulator, SCA Technica, 1/1/09 – 9/26/09 \$39,000

Cognitive Radio Network Testbed Instrumentation, Office of Naval Research, 4/15/09 – 4/14/10 \$347,979

VT-Cognet: Virginia Tech Cognitive Radio Network Testbed Phase 2, ICTAS 1/12/09 – 1/11/10 \$149,959 (co-PI)

CT-ISG: Assuring Security in Spectrum Agile Radio Networks, NSF, 01/01/07 - 12/31/10 \$499,997 (co-PI).

Improved Distribution and Error Recovery of the OSSIE Core Framework, SAIC 3/01/2009 – 9/30/2009 \$75,000

IC CAE: Emerging Technologies IC CAE, Howard University 9/23/2009 – 9/22/2011 \$2.5M

REU Supplement to award #0520418 Nets: Oriwub:An Open Systems Approach for Rapid Proto-typing Waveforms for Software Defined Radio, NSF \$41,800

Nets Prowin: An Open Systems Approach for Rapid Prototyping Waveforms for Software Defined Radio, National Science Foundation, 8/1/08 – 7/31/09 \$12,000 (asking for additional REU funding)

Enhancements to OSSIE: (Open Source SCA Implementation: Embedded), Science Applications International Corporation, 4/1/07 – 9/07 \$75,000

Collaborative Research: CT-T TRIESTE: A Trusted Radio Infrastructure For Enforcing Spectrum Etiquettes, NSF, 10/01/07 – 9/30/10, \$150,000 (Reed Co-PI)

Development Design of a Cognitive Engine and Anyalysis of WRAN Cognitive Radio Algorithms, ETRI, 7/01/07 – 12/31/07 \$119,999

An Integrated Tool for SCA Waveform Development, Testing, and Debugging and A Tool for Automated Estimation of DSP Resource Statistics for Waveform Components, US-Army-CERDEC Office, 6/12/07 – 6/11/08, \$326,125

Software Defined Radio Waveform and Device Development and Component Deployment Using OSSIE, DOD, 7/19/07 – 7/18/10, \$975,639 (\$184,744 awarded to this point)

Reasoning and Learning in Adaptive Wireless Networks, BBN Technologies, 10/1/07 – 12/31/10, \$913,196 (co-PI)

US/Ireland International Workshop on Next Generation Open Architectures for Software-Defined Radio, NSF, 9/15/07 – 8/31/08, \$35,963

VT-CogNet: Virginia Tech Cognitive Radio Network, ICTAS, 1/1/08 – 6/30/09, \$160,170 (Reed, Bose PIs)

Trade Study Of Implementation of SDR: Fundamental Limitations and Future Prospects (DARPA SEED), US Army Aviation & Missile Command, 9/11/07 – 6/30/08 (Reed PI) \$115,364

Distributed Computing for Collaborative Software Radio, Office of Naval Research, 02/05/07 - 02/04/10, \$533,722 (\$108,728 awarded first year)

A Panel of Commercial GSM Experts For Supporting JIEDDO Operations, JIEDDO, 12/18/06 - 2/28/07 \$38,275

Cognitive Radio Test-bed, Virginia Space Grant Consortium, 08/16/06 - 08/15/07 \$5,000

Emerging Wireless Technologies (EWT) Technology Assessment, Rosettex, 07/03/06 - 12/31/07 \$91,000

Development of a Cognitive Engine and Analysis of WRAN Cognitive Radio Algorithms, ETRI, 06/16/06 - 12/31/06 \$175,554.

Wireless@Virginia Tech Group Start-up, Institute for Critical Technology and Applied Science – ICTAS, 01/01/06 - 06/30/07 \$500,000.

A Low-Cost All-Band/All-Mode Radio for Public Safety, National Department of Justice (Dept. of Justice), 10/01/05 - 09/30/08 \$399,816 (Reed Co-PI)

Applying Artificial Intelligence Techniques to the Development of a Cognitive Radio Engine: Assessment, Evaluation, and Implementation, Army Research Office, 10/01/05 - 06/30/06 \$49,995.

Analysis of WRAN Algorithms, ETRI, 10/01/05 - 12/31/05 \$86,275

NeTS PROWIN: An Open System Approach for Rapid Prototyping Waveforms for Software Defined Radios, 08/15/05 - 08/14/09 \$999,995 (Reed Co-PI)

Cognitive Radios, Virginia Space Grant Consortium, 08/10/05 - 08/09/06 \$5000

A Software Defined Ultra Wideband Communication System Testbed, Virginia Space Grant Consortium, 08/10/05 - 08/09/06 \$5,000

Advanced Wireless Integrated Network: AWINN, Office of Naval Research, 12/20/04 - 06/24/06 \$484,200 (Reed portion)

Software Defined Radios: Evolution and Application Areas, Booz Allen Hamilton, 1/1/05 - 3/15/05 \$74,497

Ossie and Harriet, SAIC, 08/16/04 - 12/31/05 \$300,519

CDMA 2000 System Modeling and Simulation Program, Magnolia Broadband, Inc.,
12/15/03 - 12/14/04 \$84,500

Policy-based Resource Management in a Vehicular Ad-Hoc Network for First Responders, Naval Postgraduate School, 09/24/03 - 09/30/04 \$25,431

System Level Design Approach and Methodologies For Software Defined Radios,
National Imagery and Mapping Agency, 7/25/03 - 7/24/06 \$189,282

Smart Antennas Research At The MPRG, Army Research Office, 06/01/03-12/31/04 \$37,500

Proposal for GDDS Cluster X-SCA-Lite Architecture, General Dynamics, 05/01/03-10/31/03
\$85,691

Game Theoretic Analysis Of Radio Resource Management For Ad-Hoc Networks, Office
of Naval Research, 04/01/03-03/31/06 \$589,411

Game Theory In Radio Resource Management, Motorola University Partnership in Research,
09/01/02 - 05/31/04 \$60,000

Software Radios and Smart Antennas: Challenges for Creating Seamless Networks,
Samsung Electronics, 04/08/03 - 05/15/04 \$520,785

*UWB Propagation Measurements, Modeling, and Communication System
Enhancements*, DARPA, 08/16/01 - 12/31/03 \$688,620

*Tactical Communications Architecture and Implementation Plan for the U.S. Customs
Service*, Naval Surface Warfare Center, Dahlgren, 8/16/01 - 8/15/02 \$402,000

ACN Independent Innovative Research Component, Raytheon Systems, 12/1/01 -
11/30/02 \$11,250

Foundation Wireless Network for Medical Applications, Carilion Biomedical Institute,
8/6/01 - 8/10/02 \$75,000

Interference, Propagation, and Antenna Placement Issues for XM Radio, GM, 3/26/01 -
9/25/02 \$583,527

AOL Fellowship in Wireless Home Networking Technologies, AOL, 01/01/01 - 05/15/03
\$84,583

Reconfigurable Apertures and Space-Time Processing, Raytheon Systems, 05/00 - 09/02
\$841,350

Advanced Wireless Technology for Aerospace Communications, Virginia Space Grant
Consortium, 08/00 - 05/03 \$15,000

Research and Development for IMT-2000, LG Electronics, 05/15/00 - 09/31/01 \$350,000

Motorola University Partnership in Research: Overloaded Array Processing, Motorola,
09/01/00 - 08/31/02 \$84,944

Multiuser Detection for Overloaded Antenna Arrays, Raytheon, 05/00 - 05/02 \$1,126,194

An Investigation of Base Station Diversity For Cellular Applications - Phase II, Metawave, 02/29/00 - 02/28/01 \$104,000

Broadband Channel-Adaptive Radio Modem for NGI Network Extension and Access, Hughes Research Laboratory, 10/01/99 - 11/30/01 \$81,412

Research Into Signal Recovery Algorithms in Support of Spectral Spatial Interference Cancellation System (SSICS) – Phase II Research Effort, Raytheon Company, 02/01/00 - 05/15/01 \$149,756

Navy Collaborative Integrated Information Technology Initiative (NAVCIITI), Office of Naval Research, 04/00 - 06/04 \$9,651,087 (Reed portion \$534,089)

Research into Spatial Signal Recovery Algorithms in Support of Spectral Spatial Interference Cancellation System - Phase I (SSICS), Raytheon Company, 08/02/99 - 01/10/00 \$97,857

Low Power and Robust Communications Using Hand-Held Smart Antennas for Receiving and Transmitting, Texas Instruments, 07/01/98 - 06/30/00 \$331,993

An Investigation of Base Station Diversity for Cellular Applications, Metawave Communications, 03/01/99 - 02/28/01 \$179,706

International Wireless Communication Research Program, Virginia Tech Research and Graduate Studies' SEED Program, 01/01/99 to 06/30/00 \$7,500

Navy Collaborative Integrated Information Technology Initiative (NAVCIITI), Office of Naval Research, 11/14/98 - 09/30/00 \$2,700,000.

Enhancing the Capacity of IMT-2000 Through Turbo Coding and Smart Antennas, LGIC, 10/01/98 - 09/30/99 \$122,904

Low Power and Robust Communications Using Hand-Held Smart Antennas for Receiving and Transmitting, Texas Instruments, 07/01/98 - 06/30/99 \$132,000

Techniques for Evaluating Location Technologies, Comcast, 05/01/98 - 12/31/98 \$112,154

Development of Tools for CDMA Cellular Network Planning, Innovative Global Solutions (IGS), 04/01/98 - 01/31/99 \$42,889

Configurable and Robust Wireless Communications Nodes, DARPA, 07/01/97 - 12/30/00 \$2,015,431

Support of Telelink System Test, Global-Net, Inc., 09/25/96 - 09/24/97 \$50,000

Sprint RFI and Evaluation, Sprint Spectrum L. P., 09/26/96 - 12/31/96 \$31,158

Rural MayDay/800 Call-in System Feasibility, I-95 Corridor Coalition/ Virginia Department of Transportation, 02/01/96 - 01/31/97 \$299,176 (MPRG share \$157,988)

- A Study of Reconfigurable Receivers for Cellular and PCS***, Texas Instruments, 08/25/95 - 08/25/96 \$35,000
- CDMA/FM Evaluation Effort***, Comdial Corporation/Sigtek, 08/28/95 - 12/31/95 \$25,000 (plus \$7,500 CWT match)
- Measured DECT System Performance in Actual Radio Channels***, National Semiconductor, 10/01/94 - 2/15/96 \$35,024
- Investigation of BMP Impacts on Nonpoint Source Pollution Using System Analysis Procedures***, Virginia Water Resource Center/U.S. Dept. of Interior, 04/01/95 - 04/30/96 \$9,963
- Development and Implementation Of Interference Rejection Techniques for Cellular Communications***, SAIC, Center for Wireless Telecommunications (CWT), \$50,000 (SAIC, 03/22/95 to 12/31/95) \$25,000 (CWT, 07/01/95 to 06/31/96)
- Expanded Testing of a High Capacity Adaptive Wireless Receiver***, ARPA/AASERT, 08/01/95 - 07/31/98 \$125,522
- Co-Channel Interference Rejection for FM Mobile Phone Systems***, Motorola, 01/16/95 - 09/15/99, \$33,000
- Curriculum Innovation for Simulation and Design of Wireless Communications Systems***, National Science Foundation, 08/16/95 - 07/31/98 \$289,291
- A High Capacity Wireless Receiver Implemented with A Reconfigurable Computer Architecture***, ARPA/WAMIS, 09/94 - 08/30/97, \$1,727,230 (\$533,250 for the first year, \$586,750 second year)
- Development of a Low Power High Data Rate Spread-Spectrum Modem***, Grayson Electronics, Virginia's Center for Innovative Technology (CIT), Center for Wireless Telecommunications (CWT), \$29,833 (Grayson, 03/01/94 - 11/30/94), \$13,204 (CIT, 03/01/94 - 10/31/94) and \$16,000 (CWT matching funds, 04/01/94 - 06/30/95)
- Rejection of Interference in AMPS Cellular Communication***, ARGO Systems, VA's Center for Innovative Technology (CIT), \$25,000 (ARGO Systems, 12/10/93 - 05/10/94) and \$12,500 (CIT, 04/01/94 - 07/31/94)
- Capacity and Interference Resistance of Spread-Spectrum Automatic Vehicle Monitoring Systems in the 902-928 MHz Band***, Southwestern Bell Mobile Systems, 10/01/93 - 08/15/94 \$70,007
- University Road Connection - A Smart Highway***, Virginia Dept. of Transportation, 07/01/94 - 11/01/94 \$19,523.79
- Development of a Spread Spectrum Transceiver for the DECT System***, National Semiconductor, 07/01/94 - 06/30/95 \$30,000
- Investigation of a Dynamic Range Enhancer for an Electro-optic Interface***, Southwestern Bell Technology Resources, Inc., 08/01/93 - 06/01/94 \$45,000

IVHS Research Center of Excellence, Federal Highway Administration (FHWA), 1993 - 1998, \$1 million/year for 5 years (MPRG total approximately \$390,000 over performance period, \$330,000 received in 93-94, 94-95, 95-96, 96-97 contract years)

Center for Wireless Communications, Center for Innovative Technology, 09/01/93 - 08/31/98, \$300,000 for first year. (Anticipated total funding approximately \$1,490,835 plus an additional \$357,551 of cost sharing by Virginia Tech)

The Performance and Feasibility of Time-Dependent and Non-Linear Adaptive Filters for Rejecting High-Power Co-Located Co-Channel Interference, US Navy via Systems Research Center, 05/15/93 - 09/01/93, Amount: 1/2 summer session support (value approximately \$3,750)

Evaluation of an NTP-Based Protocol for Paging and Advanced Data Services, MobileComm, 07/01/93 - 09/30/93 \$39,986

Grants & Gifts:

Ted and Karyn Hume center for National Security and Technology Endowment Fund
January 2010, \$5,000,000 (Note that most of this money goes for student fellowships, with \$200k provided for center support.)
Total Amount - \$5,209,010.00

Intel – Jan. 2010, gift for unrestricted research \$50,000.00

Tektronix, reconditioned real time spectrum analyzer and two portable analyzers, ~ \$130,000

Tektronix - Dec. 2009, reconditioned Arbitrary Function Generator, 100 Mhz, 2 Channel
\$5,110.00

Wireless@VT Industrial Affiliates Membership 2006-2009:

Affiliate Funding for the year 2009 – 2010 for Dr. Jeffrey H. Reed is \$66,960.

Affiliate Funding for the year 2008 - 2009 for Dr. Jeffrey H. Reed is \$40,534

Intel Coporation:: 2009 to support the research in "Cognitive Radio for Minimizing Power Consumption" \$44,000

Tektronix, 12/2005, cash gift \$20,000

Texas Instruments, 08/2005, cash gift \$27,519

Tektronix, 07/2005, cash gift \$20,000

Texas Instruments. 12/2004, cash gift \$99,000

Tektronix, spring 2004, cash gift \$20,000

CISCO Systems, 08/2003 and 02/2005, cash gift \$176,000

Mercury Computer Systems, Inc., 2003, cash gift \$50,000

Analog Devices, 2001-2002, cash gift \$37,500

HRL, Smart Antenna Research, 2000, cash gift \$40,000

Rockwell, Flexible Communications Using Reconfigurable Computing, 1998, \$25,000
cash gift

Investigation of CDMA, donation from ITT, 1996, cash gift \$100,000

MPRG Industrial Affiliates Membership 1993-2006: Grant total split between the five MPRG faculty (total paid \$4,866,500 and an additional \$110,000 committed to date). Services provided to sponsors include advanced copies of thesis and dissertations, informal consulting, and special opportunities to employ students.

Intel, 10/2007, \$40,000, Support research in "Cognitive Radio for Minimizing Power Consumption," 5/2008, \$44,000

Texas Instruments, Evaluation Module Kit, 01/2007, \$995

Tektronix, Arbitrary Waveform Generator, 02/2007, \$138,000.

Xilinx, Inc., Xilinx System Generator, ChipScope Pro, Xilinx Real-PCI interface, AccelDSP Synthesis Tool with AccelWare DSP IP Toolkits, VLYNQ Interface LogiCORE, ISE Foundation, University Option Embedded Development Kit, 01/2007, \$39,615

Tektronix, equipment, \$114,000

Texas Instruments, 06/2006, \$49,500

Mercury Systems, AdapDEV 1280 Chassis with 900 MHz processor, 08/2003

Spectrum Signal Processing, Inc., Hardware necessary to implement a true software defined radio, 08/2002, \$62,329

Grayson Wireless, Cellular test and measurement system, 08/2002, \$66,312

Signia-IDT (formerly BAE), RF Front-end valve, 2002, ~\$6,000

Altera, MAX + Plus II Fixed Node Subscription (FPGA board), \$2,000

Texas Instruments, Evaluation Module incl. Code Composer Studio, 06/2001, \$19,960

Texas Instruments, ADC-Converter, 03/2001, \$99

Analog Devices, Evaluation Boards (5), Visual DSP software (2), In-Circuit Emulators (2), \$3,790

Wireless Valley Communications, 2 copies SitePlanner w/LanFielder \$49,980, 1 copy SiteSpy on SMT \$995, 2005, \$50,975

Analog Devices, receiver, processor, and receiver chip set, \$645

Texas Instruments, boards, 2001, \$2,495

HRL, 2000, Diversity Antenna, \$200

Altera, development package, 2000, \$995

Altera, (2) MAX+ PLUS II Fixed Node Subscription for PC, (1) design lab package, (1) Micro-Chip; \$4,765

Motorola, 56311EVM computer board with DSP and 56311 on it, software, documentation, tutorial, and input/output capabilities, 12/2000, \$2000

Texas Instruments, Evaluation software and manuals, 1998, \$2,500

Texas Instruments, Evaluation Software, 1997, \$1,000

Altera, Development Tools for Programming Configurable Logic Devices, \$350

Texas Instruments, DSP Development Systems and Software, 1997, \$11,475

Texas Instruments, DSP Hardware and Software, 1997, \$27,500

Analog Devices, DSP Development Boards, 1996, \$3,200

Altera, Software Materials, 1996, \$5,000

SIGTEK, Spread Spectrum Receivers, 1995, \$10,000

Section III. Teaching & Advising

Classes Taught:

Graduate Courses

- Cellular and Personal Communications (ECE6644)
- Software Radios: A Modern Approach to Radio Engineering (ECE5674)
- Digital Signal Processing (ECE5624)
- Cellular (ECE 5664)

Undergraduate Courses

- Implementation of Communication Systems (ECE4654)
- Signal Processing (ECE4624)
- Communication Systems (ECE3604)

Courses Developed:

- Major Revision of ECE course 5664 Cellular Radio and Personal Communications to focus on systems level description and design considerations of cellular standards this will take two more years to complete and result in a textbook.
- Implementation of Communication Systems (ECE 4654)
- Developed Class in Software Radio (ECE 5664)

Advising: Completed Ph.D. Dissertations:

Yash Vasavada, "An Iterative Confidence Passing Approach for Parameter Estimation and Its Applications to MIMO Systems," May, 2012

Hazem Shatila, "Adaptive Radio Resource Management in Cognitive Radio Communications Using Fuzzy Logic," April 2012

Ashwin Amanna, "Statistical Experimental Design Framework for Cognitive Radio," March 19, 2012

Carlos Aguayo Gonzales, "Power Fingerprinting for Integrity Assessment of Embedded Systems," December 5, 2011

Xueato Chen, "Resource Allocation for Wireless Distributed Computing Networks," (Co-Advised with Dr. Tamal Bose) completed May 2012

An He, " Power Consumption Optimization – A Cognitive Radio Approach," February 2011

Joseph Gaeddert, "Facilitating Wireless Communications through Intelligent Resource Management on Software-Defined Radios in Dynamic Spectrum Environments," January 2011

Lizdabel Moarles Tirando, "An Approach to Using Cognitive in Wireless Networks," December 2009

Kyou Woong Kim, "Exploiting cyclostationarity for radio environmental awareness in cognitive radios," May 2008

Youping Zhao, "Enabling cognitive radios through radio environment maps," May 2007

Rekha Menon, "Interference avoidance based underlay techniques for dynamic spectrum sharing," April 2007 (co-advised with Dr. Michael Buehrer)

Jong-Han Kim, "On the impact of MIMO implementations on cellular networks: An analytical approach from a system perspective," March 2007

Ramesh Chembil Palat, "Performance analysis of cooperative communications for wireless networks," December 2006

Jody Neel, "Analysis and design of cognitive radio networks and distributed radio resource management algorithms," September 2006

Chris Anderson, "A software defined ultra wideband transceiver testbed for communications, ranging, or imaging." September 2006

James Hicks, "Novel approaches to overloaded array processing," August 2003

Raqibul Mostafa, "Feasibility of smart antennas for the small wireless terminals," April 2003

William Newhall, "Radio channel measurements and modeling for smart antenna array systems using a software radio receiver," April 2003

Pablo Max Robert, "Reduction in coexistent WLAN interference through statistical traffic management," April 2003

Tom Biedka, "Analysis and development of blind adaptive beamforming algorithms," August 2001

Srikathyayani Srikanteswara, "Design and implementation of a soft radio architecture for reconfigurable platforms," July 2001

Rich Ertel, "Antenna array systems: Propagation and performance," July 1999

Nitin Mangalvedhe, "Development and analysis of adaptive interference rejection techniques for direct sequence code division multiple access systems," July 1999

Nishith Tripathi, "Generic handoff algorithms using fuzzy logic and neural networks," November 1997

Paul Petrus, "Novel adaptive array algorithms and their impact on cellular system capacity," April 1997

Jeff Laster, "Robust GMSK demodulation using demodulator diversity and BER estimation," January 1997

Rong He, "AMPS co-channel interference rejection techniques and their impact on system capacity, August 1996

Completed M.S. Theses:

Scott Meuleners, "Design and Implementation of a Distributed TDOA-Based Geolocation System using OSSIE and Low Cost USRP Boards," May 2012

Thomas Cooper, "Integration of Open-Source Networks," May, 2012

Shawn Hymel, "Massively Parallel Hidden Markov Models for Wireless Applications," December 5, 2011

Peter Sahmel, "Eigenspace Approach to Specific Emitter Identification of Orthogonal Frequency Division Multiplexing Signals," Nov. 2011

Hermie Mendoza, "Distributed Localization for Wireless Distributed Networks in Indoor Environments," June, 28, 2011

Soumava Bera, "Design and Implementation of a MAC Protocol for Wireless Distributed Computing," June 11

Hermie Mendoza, "Distributed Localization for Wireless Distributed Networks in Indoor Environments," May 2011

Matthew Price , "Automatic Modulation Classification Using Grey Relational Analysis,," April 2011

Ben Hilburn, "Component-Based Design and Service-Oriented Architectures in Software-Defined Radio," April 2011

Sabares S. Moola, "Rapid Prototyping of Software Defined Radios using Model Based Design for FPGAs," on July 22, 2010

Nikhil Challa, " Approaches for Optimizing Software Defined Radio Performance," on January 31, 2011

Ishtiaq Rouf, "Statistical Analysis of Wireless Communication Systems Using Hidden Markov Models," July 2009

Matthew Carrick, "Logical representation of FPGA's & FPGA circuits within the SCA," July 2009

Patrick Farrell, "Digital hardware designing decisions & trade-offs for software radio systems," May 2009

Philip Balister, "A software defined radio implemented using the OSSIE core framework deployed on a TI OMAP processor." December 2008

Jacob DePriest, "A practical approach to rapid prototyping of SCA waveforms," April 2006

Srinivasan Vasudevan, "A simulation for analyzing the throughput of IEEE 802.11b wireless LAN systems," January 2005

Brian Donlan, "Ultra-wideband narrowband interference cancellation and channel modeling for communications," January 2005

Anil Hebbar, "Empirical approach for rate selection in MIMO OFDM," December 2004

Seshagiri Krishnamoorthy, "Interference measurements and throughput analysis for 2.4 GHz wireless devices in hospital environments," April 2003

Yasir Ahmed, "A model-based approach to demodulation of co-channel MSK signals," December 2002

Ramesh Chembil Palat, "VT-Star – Design and implementation of a test bed for differential space-time block coding and MIMO channel measurements," October 2002

Jody Neel, "Simulation of an implementation and evaluation of the layered radio architecture," December 2002

Bing-Leung (Patrick) Cheung, "Simulation of adaptive algorithms for OFDM and adaptive vector OFDM systems," August 2002

Shakheela H. Marikar, "Resource management in 3G systems employing smart antennas, January 2002

M. Soni, "Computing engine for reconfigurable software radio," Oct. 2001

Christian Rieser, "Channel sounder for LMDS," May 2001 (co-advisor)

James Hicks, "Overloaded array processing with spatially reduced search joint detection," May 2000

Zhong Hu, "Evaluation of joint AOA and DOA estimation algorithms using the antenna array systems," May 1999

Kim Phillips, "Probability density function estimation for minimum bit error rate equalization," May 1999

Pablo (Max) Robert, "Simulation tool and metric for evaluating wireless digital video systems," May 1999

Steven F. Swanchara, "An FPGA-based multiuser receiver employing parallel interference cancellation," July 1998

Don Breslin, "Adaptive antenna arrays applied to position location," August 1997

Steve Nicoloso, "Investigation of carrier recovery techniques for PSK modulated signals in CDMA and multipath mobile environments," May 1997

Brian Fox, "Analysis and dynamic range enhancement of the analog-to-digital interface in multimode radio receivers," February 1997

Nena Zecevic, "Interference rejection techniques for the mobile unit direct-sequence CDMA receiver, August 1996

Kevin Saldanha, "Performance evaluation of DECT in different radio environments," August 1996

Milap Majmundar, "Adaptive single-user receivers for direct sequence CDMA systems," February 1996

Yash Vasavada, "Performance evaluation of a frequency modulated spread spectrum system," February 1996

Scott Elson, "Simulation and performance analysis of CDPD," January 1996

Matthew Welborn, "Co-channel interference rejection using model-based demodulator," January 1996

Francis Dominique, "Design and development of a frequency hopper based on the detection system for the 902-928 MHz ISM band," December 1995

Nitin Mangalvedhe, "An Eigenstructure technique for direct sequence spread spectrum synchronization," April 1995

Paul Petrus, "Blind adaptive arrays for mobile communications," December 1994

Sihano (Raymond) Zheng, "Channel modeling and interference rejection for CDMA automatic vehicle monitoring systems," November 1994

Fu-Sheng (Frank) Cheng, "A new approach to dynamic range enhancement," September 1994

Volker Aue, "Optimum linear single user detection in direct-sequence spread-spectrum multiple access systems," March 1994

Current Ph. D Students:

Eyosias Iman – Ph.D expected completion date December 2013

Dinesh Datla – Ph.D expected completion date July 2012

Karim Said – Ph.D expected completion date May

Abid Ullah – Ph.D expected completion date December 2013

Shravan Garlapati – Ph.D expected completion date May 2013

Matthew Vondall – Ph. D (Co-Advised with Amir Zaghoul) expected completion date Spring, 2013

Stephen Dudley – Ph.D expected completion date May 2014

Matthew Carrick – Ph.D. expected completion date May 2015

Current M.S. Students:

Karim Said - M.S expected completion date June 2012

Thomas Tsou – M.S. expected completion date June 2012

Michael Benonis – M.S. expected completion date December 2012

Sumedha Mohan – M.S. expected completion date May 2013

Section IV. Publications List

Books Authored or Co-Authored:

1. J. H. Reed, ed., An Introduction to Ultrawideband Communications Systems, Prentice Hall, March 2005, ISBN: 0-13-148103-7.
2. J. H. Reed, Software Radio: A Modern Approach to Radio Design, Prentice Hall, May 2002, ISBN: 0-13-081158-0.

3. N. D. Tripathi, J. H. Reed, and H. F. VanLandingham, Radio Resource Management in Cellular Systems, Kluwer Academic Publishers, Spring 2001.

Books & Proceedings Edited:

1. W. H. Tranter, B. D. Woerner, J. H. Reed, T. S. Rappaport, and P. M. Robert, Wireless Personal Communications – Bluetooth and Other Technologies, Kluwer Academic Publishers, 2000.
2. W. H. Tranter, B. D. Woerner, T. S. Rappaport, and J. H. Reed, Wireless Personal Communications – Channel Modeling and Systems Engineering, Kluwer Academic Publishers, 1999s.
3. W. H. Tranter, T. S. Rappaport, B. D. Woerner, and J. H. Reed, eds., Wireless Personal Communications: Emerging Technologies for Enhanced Communications, Kluwer Press, 1998.
4. T. S. Rappaport, B. D. Woerner, J. H. Reed, and W. H. Tranter, eds., Wireless Personal Communications: Improving Capacity, Services, and Reliability, Kluwer Press, 1997.
5. J. H. Reed, B. D. Woerner, and T. S. Rappaport, eds., Wireless Personal Communications: Advances in Coverage and Capacity, Kluwer Press, 1997.
6. T. S. Rappaport, B. D. Woerner, and J. H. Reed, eds., Wireless Personal Communications: The Evolution of PCS, Kluwer Press, 1996.
7. B. D. Woerner, T. S. Rappaport, and J. H. Reed, eds., Wireless Personal Communications: Research Developments, Kluwer Press, 1995.
8. T. S. Rappaport, B. D. Woerner, and J. H. Reed, editors, Wireless Personal Communications: Trends and Challenges, Kluwer Press, 1994.

Book Contributions:

1. Hamilton Turner, Jules White, Jeff Reed, José Galindo, Adam Porter, Madhav Marathe, Anil Vullikanti, Aniruddha Gokhale (Vanderbilt University, USA) "Building a Cloud-Based Mobile Application Testbed" "Software Testing in the Cloud: Perspectives on an Emerging Discipline", (382-403)" IGI Global , November 2012
2. A. He, A. Amanna, X. Chen, D. Datla, J. Gaeddert, S.M. Hasan, H. Volos, "Sustainable Green Computing: Practices, Methodologies and Technologies," edited by Dr. Wen-Chen Hu and Dr. Naima Kaabouch, University of North Dakota, USA IGI Global, 2012
3. H. I. Volos, D. Datla, X. Chen, A. He, A. Amanna, T. R. Newman, S.M. Shajedul Hasan, J. H. Reed, and T. Bose, "Green Communications: Realizing Environmentally Friendly, Cost Effective, and Energy Efficient Wireless Systems," in Energy-Aware Systems and Networking for Sustainable Initiatives, IGI Global, June 2012

4. "Technical Challenges in Applying Network Neutrality Regulations to Wireless Systems," "Net Neutrality: Contributions to the Debate," Nishith D. Tripathi and Jeffrey H. Reed, Edited by Jorge Perez Martinez, 2011
5. "The Radio Environment Map", (Book Chapter) Cognitive Radio Technology, Dr. Bruce Fette, ed., Y. Zhao, S. Mao, J. Neel, and J.H. Reed 2nd edition, 2 April 2009
6. J. Neel, J. Reed, A. MacKenzie, Cognitive Radio Network Performance Analysis in Cognitive Radio Technology, B. Fette, ed., Elsevier, 2nd edition, 2 April 2009.
7. Y. Zhao, S. Mao, J. Neel, and J. H. Reed, "The Radio Environment Map" (Book Chapter) in Cognitive Radio Technology, B. Fette, ed., 2nd ed., Elsevier, April 2009.
8. J. Neel, J. Reed, and A. MacKenzie, "Cognitive Radio Network Performance Analysis" (Book Chapter) in Cognitive Radio Technology, B. Fette, ed., 2nd ed., Elsevier Inc., April 2009.
9. Y. Zhao, B. Le, and J. H. Reed, "Network Support: The Radio Environment Map" (Book Chapter) in *Cognitive Radio Technology*, by B. Fette, Elsevier Inc., pp. 337-363, August 2006, ISBN: 978-0-7506-7952-7.
10. J. O. Neel, J. H. Reed, and A. B. MacKenzie, "Cognitive Radio Performance Analysis" (Book Chapter) in *Cognitive Radio Technology*, by B. Fette, Elsevier Inc., pp. 501-579, August 2006, ISBN: 978-0-7506-7952-7.
11. B. M. Donlan, R. M. Buehrer, and J. H. Reed, "Ultra-wideband Wireless Systems," in the *Encyclopedia of RF and Microwave Engineering*, pp. 5411-5423, Spring 2005, ISBN: 0-471-27053-9.
12. N. D. Tripathi, J. H. Reed, and H. F. VanLandingham, "Application of a Neurofuzzy System to Handoffs in Cellular Communications" (Book Chapter) in *Neuro-Fuzzy and Fuzzy-Neural Applications in Telecommunications (Signals and Communication Technology)*, by P. Stavroulakis, Springer Publishing, May 2004, ISBN: 3540407596.
13. J. H. Reed and C. J. Rieser, "Software Radio: Technical, Business and Market Implications," in *World Market Series Business Briefing Wireless Technology 2001*, WMRC PLC – World Markets Research Centre, pp. 146-150, October 2000, ISBN 1-903140-36-1.
14. P. Petrus and J. H. Reed, "Co-channel Interference in Wireless Communication Systems," in *Encyclopedia of Electrical and Electronics Engineering*, John Wiley & Sons, Inc., February 1999 (invited paper).
15. N. R. Mangalvedhe and J. H. Reed, "Analysis of an Eigenstructure Technique for DSSS Synchronization," in *Wireless Personal Communications: The Evolution of PCS*, Kluwer Press, 1996 (also appears in *Virginia Tech's Sixth Annual Symposium on Wireless Personal Communications*, June 1996), pp. 201-214.
16. J. D. Laster and J. H. Reed, "A Survey of Adaptive Single Channel Interference Rejection Techniques for Wireless Communications," in *Wireless Personal Communications: Research Developments*, Kluwer Press, 1995 (also appears in *Virginia Tech's Fourth Annual Symposium on Wireless Personal Communications*, June 1994), pp.29-54.

17. I. Howitt, J. H. Reed, V. Vemuri, and T. C. Hsia, "Recent Developments In Applying Neural Nets to Equalization And Interference Rejection," in *Wireless Personal Communications: Trends and Challenges*, Kluwer Press, 1994 (also appears in *Virginia Tech's Third Symposium on Wireless Personal Communications*, June 1993), pp.49-58.

Papers in Refereed Journals:

1. Jason Snyder, Deepan Seeralan, Shereef Sayed, Jeffery Wilson, Carl B. Dietrich, Stephen H. Edwards, Jeffrey H. Reed, "Open Source Software-defined Radio Tools for Education, Research, and Rapid Prototyping", *International Journal on Software Tools for Technology Transfer*, Springer, June 2012
2. Ashwin Amanna, Daniel Ali, David Gonzalez Fitch, and Jeffrey H. Reed, "Hybrid Experiential-Heuristic Cognitive Radio Engine Architecture and Implementation," *Journal of Computer Networks and Communications*, vol. 2012, Article ID 549106, 15 pages, 2012.
3. Amanna, Ashwin E., Daniel Ali, David Gonzalez Fitch, and Jeffrey H. Reed. "Parametric optimization of software defined radio configurations using design of experiments." *Analog Integrated Circuits and Signal Processing* 73, no. 2 (2012): 637-648. 1.
4. Reed, J. H.; Bernhard, J. T.; Park, J.-M. "Spectrum Access Technologies: The Past, the Present, and the Future," *Proceedings of the IEEE* , vol.100, no. Special Centennial Issue, pp.1676-1684, May 2012, (invited paper)
5. Xuetao Chen, Tamal Bose, S.M. Hasan and Jeffrey H. Reed, "Efficient detection of primary users in cognitive radio networks," *Journal International Journal of Communication Networks and Distributed Systems*, Publisher Interscience Enterprises Ltd, Issue Volume 8, Number 3-4/2012, Pages 267-285.
6. Raqibul Mostafa, Ramesh C. Pallat, Uwe Ringel, Ashok Arman Tikku, and Jeffrey H. Reed, Closed-Loop Transmit Diversity Techniques for Small Wireless Terminals and Their Performance Assessment in a Flat Fading Channel, *ETRI Journal*, vol.34, no.3, June 2012, pp.319-329.
7. Reed, J. H.; Bernhard, J. T.; Park, J.-M. "Spectrum Access Technologies: The Past, the Present, and the Future," *Proceedings of the IEEE* , vol.100, no. Special Centennial Issue, pp.1676-1684, May 2012, (invited paper)
8. Ashwin E Amanna, Daniel Ali, Manik Gadhiok, Matthew Price and Jeffrey H Reed, "Cognitive radio engine parametric optimization utilizing Taguchi analysis," *EURASIP Journal on Wireless Communications and Networking* 2012, 2012:5
9. Xuetao Chen, Tamal Bose, S.M. Hasan and Jeffrey H. Reed, "Efficient detection of primary users in cognitive radio networks," *Journal International Journal of Communication Networks and Distributed Systems*, Publisher Interscience Enterprises Ltd, Issue Volume 8, Number 3-4/2012, Pages 267-285.
10. Shatila, H., Khedr, M. and Reed, J. H., Opportunistic channel allocation decision making in cognitive radio communications. *Int. J. Commun. Syst.*. April 2012. DOI: 10.1002/dac.2350

11. Datla, D.; Chen, X.; Tsou, T.; Raghunandan, S.; Hasan, S.M.S.; Reed, J.H.; Dietrich, C.B.; Bose, T.; Fette, B.; Kim, J.; , "Wireless distributed computing: a survey of research challenges," *Communications Magazine, IEEE* , vol.50, no.1, pp.144-152, January 2012
12. T. Yang, W. Davis, W. Stutzman, J. Nealy, D. Dietrich, S.M. Hasan, J.H. Reed, "Antenna Design Strategy and Demonstration for Software-Defined Radio (SDR)," *Analog Integrated Circuits and Signal Processing: Volume 69, Issue 2 (2011)*, Page 161-171 (update paper from SDR'10 conference)
13. Harpreet S. Dhillon, Jeong-O Jeong, Dinesh Datla, Michael Benonis, R. Michael Buehrer and Jeffrey H. Reed, "A sub-space method to detect multiple wireless microphone signals in TV band white space," *Analog Integrated Circuits and Signal Processing, Springer Netherlands, December 2011, Volume 69, Issue 2*, pp. 297-306. (update paper from SDR'10 conference)
14. Carlos R. Aguayo González and Jeffrey H. Reed, "Power fingerprinting in SDR integrity assessment for security and regulatory compliance," *Analog Integrated Circuits and Signal Processing, Volume 69, Numbers 2-3 (2011)*, 307-327. (update paper from SDR'10 conference)
15. Dinesh Datla, Haris I. Volos, S. M. Hasan, Jeffrey H. Reed and Tamal Bose, "Task allocation and scheduling in wireless distributed computing networks," *Analog Integrated Circuits and Signal Processing* , Volume 69, Numbers 2-3 (2011), 341-353. (update paper from SDR'10 conference)
16. Amanna, K. Thamvichai, M. Carrick, AT. Bose, J. Reed, "Grey Systems Theory Applications to Wireless Communications," *Analog Integrated Circuits and Signal Processing: Volum 69, Issue 2 (2011)*, Page 259 (update paper from SDR'10 conference)
17. An He, Ashwin Amanna, Thomas Tsou, Xuetao Chen, Dinesh Datla, Joseph Gaeddert, Timothy R Newman, Shajedul Hasan, Haris I Volos, Jeffery H Reed, Tamal Bose, "Green Communications: A Call for Power Efficient Wireless Systems," *Journal of Communications, Vol 6, No 4 (2011)*, 340-351, Jul 2011
18. A. He, A. Amanna, T. Tsou, X. Chen. D. Datla, J. Gaeddert, T. Newman, S.M. Hasan, H. Volos, J.H. Reed, T. Bose, "Green Communications: A New Paradigm for Power Efficient Wireless Systems," *Journal of Communications Special Issue on Practical Physical Layer Techniques for 4G Systems & Beyond, Vol 6, No. 5. July 2011.*
19. D. Datla, H.I. Volos, S.M. Hasan, Jeffrey H. Reed and Tamal Bose, "Wireless Distributed Computing in Cognitive Radio Networks, Ad-Hoc Network (Elsevier," available online April 15, 2011. (Print copy to be issued)
20. T. Newman, S.M. Hasan, D.Depoy, T. Bose, J.H.Reed, "Designing and Deploying a Building-Wide Cognitive Radio Network Testbed," *IEEE Communications Magazine*, September 2010
21. A. He, S. Srikantesware, K.K. Bae, T.R. Newman, W. Tranter, M. Verhelst, J. Reed, "Power Consumption Minimization for MIMO Systems- A Cognitive Radio Approach," *IEEE JSAC* September 2010.
22. A. Amanna, M. Ghadiok, M. Price, J.H. Reed, "Railway Cognitive Radio," *IEEE Vehicular Technology Magazine, September 2010, Volume 5, Issue 3*, pages 82-89.

23. A. He, S. Srikanteswara, K. K. Bae, J. H. Reed, and W. H. Tranter, "Energy consumption minimization for mobile and wireless devices - a cognitive approach," *IEEE Transactions on Consumer Electronics*, vol. 56, no. 3, Aug. 2010.
24. A.R. Cormier, Carl B. Dietrich, Jeremy Price, and Jeffrey H. Reed, "Dynamic reconfiguration of software defined radios using standard architectures," *Physical Communication*, vol. 3, no. 2, June 2010, Pages 73-80 ,doi:10.1016/j.phycom.2009.09.002
25. An He, Kyung Kyoong Bae, T.R. Newman, J. Gaeddert, K. Kim, R. Menon, L. Morales, J. Neel, Y Zhao, J.H. Reed, W.H. Tranter, "A Survey of Artificial Intelligence for Cognitive Radios", *IEEE Transactions on Vehicular Technology*, vol. 59, no. 4, May 2010, pp. 1578-1592.
26. Donglin Hu, Shiwen Mao, Y. Thomas Hou, and Jeffrey H. Reed, "Fine grained scalability video multicast in cognitive radio networks," *IEEE Journal on Selected Areas in Communications*, Special Issue on Wireless Video Transmission, vol.28, no.3, pp.334--344, April 2010.
27. Carl B. Dietrich, Jeffrey H. Reed, Stephen H. Edwards, Frank E. Kragh, "Experiences From the OSSIE Open Source Software Defined Radio Project," *Open Source Business Resource*, March, 2010.
28. Menon, R. Macke, A Buehrer M., Reed, J.H. "Interference Avoidance in Networks with Distributed Receivers", *IEEE Transactions on Wireless Communications*, Vo.57, Issue 10, October 2009, pp. 3078-3091.
29. C. R. Anderson, S. Venkatesh, J. Ibrahim, R. M. Buehrer, and J. H. Reed, "Performance and analysis of a time-interleaved ADC array for a software-defined UWB receiver," Oct. 2009, Volume: 58, Issue: 8, pp. 4046-4063
30. C. R. Aguayo Gonzalez, C. B. Dietrich, F. E. Kragh, S. Sayed, H. I. Volos, J. D. Gaeddert, P. M. Robert, and J. H. Reed, "Open-source SCA-based core framework and rapid development tools enable software-defined radio education and research," *IEEE Commun. Mag.*, October 2009.
31. C. R. Aguayo Gonzalez, C. B. Dietrich, and J. H. Reed, "Understanding the software communications architecture," *IEEE Commun. Mag.*, vol. 47, no. 9, September 2009.
32. Y. Zhao, S. Mao, J.H. Reed, Y Huang, " Utility Function Selection for Streaming Videos with a Cognitive Engine Test Bed", *ACM/Springer Mobile Networks and Applications (MONET)* at SpringerLink, August 18, 2009.
33. An He, Joseph Gaeddert, Kyung Kyoong Bae, Timothy R. Newman, Jeffrey H. Reed, R. Chembil Palat, A. Annamalai, and J. H. Reed, "Accurate bit error rate analysis of bandlimited cooperative OSTBC networks under time synchronization errors," *IEEE Trans. Veh. Technol.*, vol. 58, no. 5, pp. 2191-2200, June 2009.
34. S. Haykin, D.J. Thomson, J.H. Reed, "Spectrum Sensing for Cognitive Radio," *Proceedings of the IEEE*, Vol. 97, Issue 5, May 2009, pp. 849-877.

35. R. Menon, A. B. MacKenzie, J. Hicks, R. M. Buehrer, and J. H. Reed, "A game-theoretic framework for interference avoidance," *IEEE Trans. Commun.*, vol. 57, no. 4, pp. 1087-1098, April 2009.
36. An He, J. Gaeddert, K. Bae, T. Newman, J. Reed, I. Morales, and C. H. Park, "Development of a case-based reasoning cognitive engine for IEEE 802.22 WRAN Applications," *ACM SIGMOBILE Special Issue on Cognitive Radio Technologies and Systems*, vol. 13, no. 2, pp. 37-48, April 2009.
37. Lizardabel Morales, Chang-Hyun Park, "Development of a Case-Based Reasoning Cognitive Engine for IEEE 802.22 WRAN Applications," *ACM Sigmobile Mobile Computing and Communications Review*, vol. 13, no.2, pp. 37-48, April 2009.
38. A. B. Mackenzie, J. H. Reed, P. Athanas, C. W. Bostian, R. M. Buehrer, L. A. DaSilve, S. W. Ellingson, Y. T. Hou, M. Hsiao, J. M. Park, C. Patterson, S. Raman, and C. R. C. M. da Silva, "Cognitive radio and networking research at Virginia Tech," *Proceedings of the IEEE*, vol. 97, no. 4, pp. 660-688, April 2009.
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46. S. Mao, X. Cheng, Y. T. Hou, H. D. Sherali, and J. H. Reed, "On joint routing and server selection for MD video streaming in ad hoc networks," *IEEE Trans. Wireless Commun.*, vol. 6, no. 1, pp. 338-347, January 2007.

47. C. A. Gonzalez, F. Portelinha, and J. H. Reed, "Design and implementation of an SCA core framework for a DSP platform," part 1, *Military Embedded Systems Mag.*, March/April 2007 issue. Part 2 in May/June 2007 issue.
48. J. O. Neal, R. Menon, A. B. MacKenzie, J. H. Reed, and R. P. Gilles, "Interference reducing networks," *MONET Special Issue - Cognitive Radio Oriented Wireless Networks Commun.*, February 2007.
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4. C. Dietrich and J.H. Reed, "OSSIE SCA-based Open Source SDR," 2011 IEEE MTT Society's International Microwave Symposium, June 5-10, Baltimore, MD
5. C. Dietrich, E. Wolfe, G. Vanhoy, C. Evans, "Cognitive Radio Testing Using Psychometric Approaches," Wireless Innovation Conference and Product Exposition (SDR'11-WinnCom) November 29-December 2, 2011 in Washington, DCC. Dietrich and J.H. Reed, "OSSIE SCA-based Open Source SDR," 2011 IEEE MTT Society's International Microwave Symposium, June 5-10, Baltimore, MD
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Papers, Talks, & Lectures Presented at Professional Meetings:

1. Security Issues for public safety radio, Keynote Address, Wireless Innovation Forum, Jan 2013.
2. Research Ideas, WSRD Workshop, Boulder, CO. July 2012. Mid Atlantic Broadband Corp. "Initiatives in Wireless Communications, April 2011
3. 66th Annual Meeting of the ORAU Council of Sponsoring Institutions, "The Hume Center", Oak Ridge TN, March 2011
4. Under invitation OSTP, "Testbed & Technology Platforms," White House Conference Center, Truman Room, Washington, DC January, 2011
5. Speaker, Oak Ridge National Laboratory Board of Governors, Oak Ridge, TN May 2010, "The Hume Center for National Security and Technology"
6. Keynote Presentation, "The Future of Cognitive Radio," Univ of Texas and Austin Technology Incubator. A group of faculty and VCs.
7. Invited Presentation, "The Second Wave of Wireless: A New Wave of Disruptive Technology," Atlantic Council (DC think-tank) to help inform international decision makers, Oct. 2010.
8. Cognitive Wireless Networking (CoRoNet), Keynote Speaker, Chicago, Illinois, September 20, 2010
9. The Ted & Karyn Hume Center Inauguration Reception and Board Meeting, Arlington, VA August 18, 2010.
10. NSF EARS Workshop, "Workshop on Enhancing Access To The Radio Spectrum", August 2010, Arlington, VA
11. Invited talk, "Cognitive Radio Research at VT," ISART, NTIA, July 2010.
12. DoD Technical Exchange Meeting at the Finnish Embassy under the aegis of the Secretary of Defense, Washington D.C. May 2010
13. Speaker, Oak Ridge National Laboratory Board of the Governors, May 2010
14. JASON, an independent group of scientists which advises the United States Government on matters of science and technology - San Diego, CA May 2010

15. Dr. Jeffrey Reed and Dr. Nishith Tripathi, *Wireless Net Neutrality Regulation: A Response to Afflerbach and DeHaven, March 2010*, submitted to the FCC.
16. Jeffrey H. Reed & Nishith D. Tripathi, *The Application of Network Neutrality Regulations to Wireless Systems: A Mission Infeasible*, submitted to the FCC, Jan. 2010
17. Note the two reports above are *responses to the FCC Notice of Proposed Rule Making on Network Neutrality (a highly controversial subject that poses a major threat to the US wireless industry)*
18. "The Nexus of Security and Technological Leadership, Deemed Export Rule Recommendations and Zero-based Methods to Identify Technologies that Require Deemed Export Control', Submitted to the Security of Commerce by the Emerging Technologies and Research Advisory Committee, A Federal Advisory Committee Appointed by the Secretary of Commerce To examine EARS Regulations. 2009. *Note current EARS regulations currently represent a major challenge to US industry and academia for engaging international personnel in research and this committee addressed this challenge.*
19. Institute for Defense and Government Analysis Conference – Security Issues in Cognitive Radio, 2010.
20. Army Research Lab Seminar, Sept. 2009
21. LECTURED VT-MENA in Alexandria, Egypt Nov. 2009
22. Technical seminar at Cairo University, Nov. 2009
23. Presented to NTIA, the telecom regulatory authority in Egypt, Nov. 2009
24. Korean US Communications Technology Symposium, July 2009
25. Finnish Embassy – US Military Collaboration with Finnish Government, March 10-11, 2008
26. Institute for Defense and Government Analysis Conference -- VT's Cognitive Radio and Security Research, March 2009
27. J. H. Reed, IEEE presentation to the IEEE San Diego Section, April 7, 2009 San Diego, CA.
28. J. H. Reed, "Distributed computing in collaborative software radio," presented to the Office of Naval Research, May 1, 2007.
29. J.H. Reed, Keynote Speaker at the *Communications Technology Program Review, Planning Assessment Meeting*, "Distributed computing for collaborative software defined radio," Naval Research Laboratory, May 2007.
30. J. H. Reed, "Issues in cognitive wireless networks," talk presented at the *Intel Research Forum Seminar Series*, Portland, OR, March 28, 2007.
31. J. H. Reed, "Issues in cognitive wireless networks," talk presented at NIST, March 2, 2007.

32. J. H. Reed, "Understanding the issues in software defined cognitive radios," seminar presented at the University of Pennsylvania, October 16, 2006.
33. J. H. Reed, "Issues in cognitive wireless networks," talk presented at the *IEEE Workshop Networking Technologies Software Defined Radio (SDR) Networks*, (held in conjunction with *SECON*), Reston, VA, September 25, 2006.
34. J. H. Reed, "Applications of Markov modeling to cognitive radio," presented at the *SASDCRT Conf.*, Naval Post Graduate School, Monterey, CA, September 12-13, 2006.
35. J. H. Reed, "Understanding the issues in software defined cognitive radios," seminar presented at Clemson University, SC, July 21, 2006.
36. J. H. Reed, "Understanding the issues in software defined cognitive radios," seminar presented at Kyung Hee University, Korea, June 12, 2006.
37. J. H. Reed, "Open architecture bridging the gap in emergency communications," guest speaker at the *International Wireless Communications Expo – IWCE Conf. Tektronix Symposium*, Las Vegas, NV, May 19, 2006.
38. J. H. Reed, "An introduction to cognitive radio and some research trends in cognitive radios," talk presented at *ETRI Cognitive Radio Workshop*, Seoul, Korea, April 2006.
39. J. H. Reed, S. Srikanteswara, and J. A. Neel, "Design choices for software radios," DVD tutorial. Available: <http://sdrforum.org/store.html>
40. Presentation titled "Software radio: The key for enabling 4G wireless networks," at the *International Forum - 4th Generation Mobile Commun.*, Centre for Telecommunications Research, May 2003.
41. J. H. Reed, "Key challenges in the design on software radios," workshop presented at *IDGA Software Radio Conf.*, Alexandria, Va., February 23, 2004.
42. J. H. Reed, "Issues in software radios," presented at Microsoft, Seattle, WA, March 3, 2003.
43. J. H. Reed, "Wireless convergence paradox," presented at *Samsung Telecom Forum*, Seoul, Korea, March 16-23, 2003.
44. W. H. Tranter, J. H. Reed, D. S. Ha, D. McKinstry, R. M. Buehrer, and J. Hicks, "High capacity communications using overloaded array," presented at *COMMTEC*, Chantilly, VA, September 16-20, 2002.
45. R. M. Buehrer and J. H. Reed, "Robust ad-hoc, short-range wireless networks for tracking and monitoring devices," presented to the Marine Corp., April 2002.
46. J. H. Reed, "Overloaded array processing with spatially reduced search joint detection," presented at the Dresden University of Technology, September 24, 2001.
47. J. H. Reed, Invited lecture series to several Korean companies, compliments of Samsung Advanced Institute of Technologies. The list of companies included: Samsung, LGIC, and ETRI. Spring 2000.

48. J. H. Reed, "The future of wireless," invited talk, Atlantic City, NJ, November 15, 1999.
49. J. H. Reed, "Software radios," *Motorola Futures Forum*, invited talk to corporate strategists, Phoenix, AZ, November 8, 1999.
50. P. Robert and J. H. Reed, "Digital video transmissions in a wireless system," *9th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
51. M. Hosemann and J. H. Reed, "Synchronization techniques for spread spectrum signals," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
52. S. Srikanteswara and J. H. Reed, "Development of a software radio architecture using reconfigurable computing," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
53. J. Hicks, P. Roy, J. Tilki, L. Beex, J. H. Reed, and W. Farley, "Simulation tool for speech recognition over wireless," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
54. R. Ertel and J. H. Reed, "Optimum SINR antenna array performance analysis," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
55. R. Banerjee, B. D. Woerner and J. H. Reed, "Case studies in software radios," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
56. P. M. Robert, A. M. Darwish, and J. H. Reed, "Fast bit error generation for the simulation of MPEG-2 transmissions in wireless systems," *IEEE Wireless Commun. Networking Conf.*, September 21-24, 1999. (Invited paper; proceedings on CD Rom.)
57. J. H. Reed and S. Srikanteswara, "Software radio architecture for a reconfigurable computing platform," *IEEE Commun. Theory Workshop*, Aptos, CA, May 23-26, 1999.
58. R. Ertel, Z. Hu and J. H. Reed, "Antenna array vector channel modeling and data collection system," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
59. P. M. Robert and J. H. Reed, "Digital video transmissions in a wireless system," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
60. S. Swanchara, S. Srikanteswara, P. Athanas, and J. H. Reed, "Implementation of a multiuser receiver on a reconfigurable computing platform," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
61. Maheshwari, et al., "Reconfigurable software radio," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
62. K. Phillips and J. H. Reed, "PDF estimation," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
63. N. Mangalvedhe and J. H. Reed, "Performance of reduced complexity algorithms in adaptive CDMA receivers," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)

64. R. Mostafa and J. H. Reed, "Study of smart antenna as an interference rejection technique for the handset," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
65. N. Mangalvedhe and J. H. Reed, "Adaptive receivers for multi-rate DS-SS systems," *8th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1998. (Poster session.)
66. J. H. Reed and B. D. Woerner, "Analog to digital conversion and digital signal synthesis for software radios," half-day tutorial presented at the *IEEE 9th International Symposium Personal, Indoor, Mobile Radio Commun.*, Boston, MA, September 13-16, 1998. (Invited tutorial.)
67. J. H. Reed, "The software radio: Modern radio engineering," Dresden University of Technology Guest Lecture, Dresden, Germany, November 25, 1997.
68. J. H. Reed, "Adaptive antenna arrays," Dresden University of Technology Guest Lecture, Dresden, Germany, November 26, 1997.
69. J. H. Reed, "Overview of fundamental wireless systems in today's telecommunications technology," *46th Annual International Wire Cable Symposium*, Philadelphia, PA, November 17-20, 1997. (Invited tutorial.)
70. J. H. Reed and R. D. James, "Position location: Overview and business opportunities," *Wireless Opportunities Workshop*, Roanoke, VA, October 22-23, 1997.
71. R. Ertel and J. H. Reed, "Geometrically based spatial channel models," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
72. A. Hannan and J. H. Reed, "GloMo radio API (application program interface)," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
73. S. Swanchara, J. H. Reed, and P. Athanas, "Design and implementation of the GloMo multiuser receiver on a reconfigurable computing platform," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
74. N. D. Tripathi, J. H. Reed, and H. VanLandingham, "High performance handoff algorithms using fuzzy logic and neural networks," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
75. D. Breslin and J. H. Reed, "Multi-sensor testbed hardware development at the mobile and portable radio research group," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
76. N. Mangalvedhe and J. H. Reed, "Blind CDMA interference rejection in multipath channels," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)
77. K. Phillips, J. Laster, and J. H. Reed "Adaptive signal processing by bit error rate (BER) estimation," *7th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1997. (Poster session.)

78. T. S. Rappaport, J. H. Reed, and T. E. Biedka, "Position location & E-911: Techniques for wireless systems," *IEEE International Conf. Universal Pers. Commun.*, Cambridge, MA, October 1, 1996. (Invited tutorial.)
79. N. Tripathi and J. H. Reed, "DSP implementation of communications systems: An NSF sponsored curriculum development initiative," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
80. B. Fox, G. Aliftiras, I. Howitt, J. H. Reed, and B. D. Woerner, "Flexible hardware architectures for multimode wireless handsets," *Sixth 6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
81. P. Petrus and J. H. Reed, "Geometrically based statistical single bounce macrocell channel model for mobile environments," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session; also in *IEEE Smart Antennas: Adaptive Arrays, Algorithms, & Wireless Position Location*, 1998, pp. 483-487.)
82. GloMo team, "GloMo adaptive antenna array research," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
83. GloMo team, "GloMo mobile user research," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
84. J. D. Laster and J. H. Reed, "Improved GMSK demodulation using non-coherent receiver diversity," *Sixth 6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
85. K. Khan, J. H. Reed, and I. Howitt, "Interference mitigation in AMPS/NAMPS and CMP using artificial neural networks," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
86. N. Tripathi, J. H. Reed, and H. VanLandingham, "Neural net & fuzzy logic approaches to handoffs in cellular systems," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
87. K. Saldanha and J. H. Reed, "Performance evaluation of an AMPS digital base station with automatic gain control," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
88. R. He and J. H. Reed, "System capacity improvement by using DSP interference rejection techniques," *6th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1996. (Poster session.)
89. B. D. Woerner, T. S. Rappaport, and J. H. Reed, "Improved spectral efficiency for CDMA systems," *Wireless Technology Conf. Exposition Proceedings*, Stamford, CT, September 1995.
90. P. Petrus and J. H. Reed, "New blind multichannel filtering techniques," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
91. N. Zecevic and J. H. Reed, "Comparative study of adaptive CDMA interference rejection techniques," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)

92. M. Majmundar and J. H. Reed, "Interference rejection for IS-54," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
93. D. Bailey and J. H. Reed, "MPRG: Signal processing and communications laboratory," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
94. R. He and J. H. Reed, "Co-channel interference for AMPS and NAMPS signals," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
95. N. Mangalvedhe and J. H. Reed, "An Eigenstructure technique for soft synchronization of DSSS signals," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
96. M. Welborn and J. H. Reed, "Interference rejection using model-based spectral estimation," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
97. A. Amanna, R. James, and J. H. Reed, "Communications on the smart road," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
98. F. Dominique and J. H. Reed, "Development of a frequency hopping system for the 902-928 MHz ISM band," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
99. S. Elson and J. H. Reed, "Modeling CDPD," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
100. P. Petrus, F. Dominique, and J. H. Reed, "Spectral redundancy exploitation in narrowband interference rejection for a PN-BPSK system," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
101. F. Cheng and J. H. Reed, "Dynamic range enhancement techniques for RF and fiber optic interface," *5th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1995. (Poster session.)
102. P. Petrus and J. H. Reed, "Blind adaptive arrays for mobile communications," *4th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1994. (Poster session.)
103. R. He and J. H. Reed, "Spectral correlation of AMPS signals with applications to interference Rejection," *4th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1994. (Poster session.)
104. R. Zheng and J. H. Reed, "System modeling and interference rejection for spread spectrum CDMA automatic vehicle monitoring systems," *4th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1994. (Poster session.)
105. N. Mangalvedhe and J. H. Reed, "An eigenstructure technique for soft spread spectrum synchronization," *4th Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1994. (Poster session.)
106. R. Holley and J. H. Reed, "Time-dependent filters For CDMA interference rejection," *3rd Annual Symposium Wireless Pers. Commun.*, Virginia Tech, June 1993. (Poster session.)

Technical Reports:

1. Y. Zhao, "Enabling cognitive radios through radio environment maps," [MPRG-TR-07-](#) Ph.D. dissertation, May 2007.
2. R. Menon and J. H. Reed, "Interference avoidance based underlay techniques for dynamic spectrum sharing," [MPRG-TR-07-](#), Ph.D. dissertation, April 2007.
3. J.-H. Kim and J. H. Reed, "On the impact of MIMO implementations on cellular networks: An analytical Approach from a system perspective," [MPRG-TR-07-](#), Ph.D. dissertation, March 2007.
4. R. Chembil Palat and J. H. Reed, "Performance analysis of cooperative communications for wireless networks," [MPRG-TR-06-](#), Ph.D. dissertation, December 2006.
5. J. O. Neel and J. H. Reed, "Analysis and design of cognitive radio networks and distributed radio resources management in algorithms," MPRG-TR-06-14, Ph.D. Dissertation, September 2006.
6. C. R. Anderson and J. H. Reed, "A software defined ultra wideband transceiver testbed for communications, ranging, and imaging," MPRG-TR-06-13, Ph.D. dissertation, September 2006.
7. C. R. Anderson, S. Venkatesh, D. Agarwal, R. Michael Buehrer, P. Athanas, and J. H. Reed, "Time interleaved sampling of impulse ultra wideband signals: Design challenges, analysis, and results," MPRG-TR-06-12, technical report, August 2006.
8. J.-H. Kim and J. H. Reed, "Efficacy of transmit smart antenna at mobile station in cellular networks," MPRG-TR-06-09, Ph.D. preliminary, May 2006.
9. J. A. DePriest and J. H. Reed, "A practical approach to rapid prototyping of SCA waveforms," MPRG-TR-06-06, M.S. thesis, April 2006.
10. B. M. Donlan, R. M. Buehrer, and J. H. Reed, "Ultra-wideband narrowband interference cancellation and channel modeling for communications," MPRG-TR-05-02, M.S. thesis, January 2005.
11. S. Vasudevan and J. H. Reed, "A simulator for analyzing the throughput of IEEE 802.11b wireless LAN systems," MPRG-TR-05-01, M.S. thesis, January 2005.
12. A. M. Hebbbar and J. H. Reed, "Empirical approach for rate selection in MIMO OFDM," MPRG-TR-04-11, M.S. thesis, December 2004.
13. C. R. Anderson, A. M. Orndorff, R. M. Buehrer, and J. H. Reed, "An introduction and overview of an impulse-radio ultrawideband communication system design," MPRG_TR-04-07, technical report, May 2004.
14. J. Hicks and J. H. Reed, "Novel approaches to overloaded array processing," MPRG-TR-03-19, Ph.D. dissertation, August 2003.

15. R. Mostafa and J. H. Reed, "Feasibility of smart antennas for the small wireless terminals," MPRG-TR-03-12, Ph.D. dissertation, April 2003.
16. S. Krishnamoorthya and J. H. Reed, "Interference measurements and throughput analysis for 2.4 GHz wireless devices in hospital environments," MPRG-TR-03-10, M.S. thesis, April 2003.
17. P. M. Robert and J. H. Reed, "Reduction in coexistent WLAN interference through statistical traffic management, MPRG-TR-03-09, Ph.D. dissertation, April 2003.
18. W. G. Newhall and J. H. Reed, "Radio channel measurements and modeling for smart antenna array systems using a software radio receiver," MPRG-TR-03-08, Ph.D. dissertation, April 2003.
19. Y. Ahmed and J. H. Reed, "A model-based approach to demodulation of co-channel MSK signals," MPRG-TR-02-24, M.S. thesis, December 2002.
20. R. Chembil Palat and J. H. Reed, "VT-STAR design and implementation of a test bed space-time block coding and MOMI channel measurements," MPRG-TR-02-19, M.S. thesis, October 2002.
21. W. Newhall and J. H. Reed, "Radio channel measurements, modeling, and characterization for antenna array Ssystems," MPRG-TR-02-16, Ph.D. preliminary, August 2002.
22. B.-L. Cheung and J. H. Reed, "Simulation of adaptive array algorithms for OFDM and adaptive vector OFDM systems," MPRG-TR-02-15, M.S. thesis, September 2002.
23. R. Mostafa, R. Gozali, W. Newhall, I. Akbar, J. H. Reed, B. D. Woerner, and W. H. Tranter, "Navy collaborative integrated information technology initiative," report #19, MPRG-TR-02-13, technical report, April 2002.
24. R. Mostafa, R. Gozali, W. Newhall, I. Akbar, J. H. Reed, B. D. Woerner, and W. H. Tranter, "Navy collaborative integrated information technology initiative," report # 17, MPRG-TR-02-05, technical report, January 2002.
25. S. Marikar, L. DaSilva, and J. H. Reed, "Resource management in 3G systems employing smart antennas," MPRG-TR-02-04, M.S. thesis, January 2002.
26. P. M. Robert and J. H. Reed, "Reduction in coexistent WLAN interference through statistical traffic management," MPRG-TR-02-01, Ph.D. preliminary, August 2001.
27. R. Mostafa, R. Gozali, W. Newhall, I. Akbar, J. H. Reed, B. D. Woerner, and W. H. Tranter, "Navy collaborative integrated information technology initiative," report # 16, MPRG-TR-01-17, technical report, October 2001.
28. M. Soni, P. Athanas, and J. H. Reed, "Computing engine for reconfigurable software radio," MPRG-TR-01-15, M.S. thesis, October 2001.
29. T. E. Biedka and J. H. Reed, "Analysis and development of blind adaptive beamforming algorithms," MPRG-TR-01-14, Ph.D. dissertation, August 2001.
30. R. Gozali, R. Mostafa, P. M. Robert, R. Chembil Palat, W. Newhall, B. D. Woerner, and J. H. Reed, "Design process of the VT-STAR multiple-input multiple-output (MIMO) test bed," MPRG-TR-01-12, technical report. August 2001.

31. R. Mostafa, R. Gozali, W. Newhall, I. Akbar, J. H. Reed, B. D. Woerner, and W. H. Tranter, "Navy collaborative integrated information technology initiative," report # 15, MPRG-TR-01-11, technical report, July 2001.
32. S. Srikanteswara and J. H. Reed, "Design and implementation of a soft radio architecture for reconfigurable platforms," MPRG-TR-01-10, Ph.D. dissertation, July 2001.
33. R. Mostafa and J. H. Reed, "Feasibility of transmit smart antenna at the handset," MPRG-TR-01-07, Ph.D. preliminary, December 2000.
34. J. Hicks and J. H. Reed, "Overloaded array processing with spatially reduced search joint detection," MPRG-TR-00-08, M.S. thesis, May 2000.
35. T. Biedka and J. H. Reed, "A general framework for the analysis and development of blind adaptive algorithms," MPRG-TR-00-05, Ph.D. preliminary, April 2000.
36. S. Srikanteswara and J. H. Reed, "Design and implementation of a soft radio architecture for reconfigurable platforms," MPRG-TR-00-02, Ph.D. preliminary, November 1999.
37. R. B. Ertel and J. H. Reed, "Antenna array systems: Propagation and performance," Ph.D. dissertation, July 1999.
38. N. R. Mangalvedhe and J. H. Reed, "Development and analysis of adaptive interference rejection techniques for direct sequence code division multiple access systems," Ph.D. dissertation, July 1999.
39. K. Phillips and J. H. Reed, "Probability density function estimation for minimum bit error rate equalization," MPRG-TR-99-04, M.S. thesis, May 1999.
40. Z. Hu and J. H. Reed, "Evaluation of joint AOA and DOA estimation algorithms using the antenna array systems," MPRG-TR-99-02, M.S. thesis, December 1998.
41. R. B. Ertel and J. H. Reed, "Antenna array systems: Propagation and performance," MPRG-TR-98-12, Ph.D. preliminary, December 1998.
42. N. R. Mangalvedhe and J. H. Reed, "Development and analysis of adaptive interference rejection techniques for direct sequence code division multiple access systems," MPRG-TR-98-13, Ph.D. preliminary, December 1998.
43. P. M. Robert and J. H. Reed, "Simulation tool and metric for evaluating wireless digital video systems," MPRG-TR-98-11, M.S. thesis, September 1998.
44. S. F. Swanchara and J. H. Reed, "An FPGA-based multiuser receiver employing parallel interference cancellation," MPRG-TR-98-06, M.S. thesis, July 1998.
45. N. Tripathi and J. H. Reed, "Generic handoff algorithms using fuzzy logic and neural networks," Ph.D. dissertation, MPRG-TR-97-18, November 1997.
46. D. Breslin and J. H. Reed, "Adaptive antenna arrays applied to position location," MPRG-TR-97-14, M.S. thesis, August 1997.

47. S. Nicoloso and J. H. Reed, "Investigation of carrier recovery techniques for PSK modulated signals in CDMA and multipath mobile environments," MPRG-TR-97-11, M.S. Thesis, May 1997.
48. N. Tripathi, J. H. Reed, and H. VanLandingham, "An adaptive direction biased fuzzy handoff algorithm with unified handoff candidate selection criterion," MPRG-TR-97-08, April 1997.
49. N. Tripathi, J. H. Reed, and H. VanLandingham, "An adaptive algorithm using neural encoded fuzzy logic system," MPRG-TR-97-07, April 1997.
50. N. Tripathi, J. H. Reed, and H. VanLandingham, "A new class of fuzzy logic based adaptive handoff algorithms for enhanced cellular system performance," MPRG-TR-97-06, April 1997.
51. B. Fox and J. H. Reed, "Analysis and dynamic range enhancement of the analog-to-digital interface in multimode radio receivers," MPRG-TR-97-02, February 1997.
52. A. Alexander, S. Panchapakesan, D. Breslin, J. H. Reed, T. Pratt, and B. D. Woerner, "The feasibility of performing TDOA based position location on existing cellular infrastructures," MPRG-TR-96-37, December 20, 1996.
53. N. Tripathi and J. H. Reed, "Handoffs in cellular systems: A tutorial," MPRG-TR-96-35, November 1996.
54. N. Zecevic and J. H. Reed, "Interference rejection techniques for the mobile unit direct-sequence CDMA receiver," MPRG-TR-96-27, August 1996.
55. K. J. Saldanha and J. H. Reed, "Performance evaluation of DECT in different radio environments," MPRG -TR-96-28, August 1996.
56. R. He and J. H. Reed, "AMPS co-channel interference rejection techniques and their impact on system capacity," MPRG-TR-96-25, July 1996.
57. N. Zecevic and J. H. Reed, "Techniques and adaptation algorithms for direct sequence spread spectrum capacity," MPRG-TR-96-27, July 1996.
58. M. K. Khan, J. H. Reed, and I. Howitt, "Interference mitigation in AMPS/NAMPS and GSM using artificial neural networks," MPRG-TR-96-24, June 1996.
59. J. H. Reed, T. S. Rappaport, and B. D. Woerner, "What you should know before returning to school," *RF Design*, pp. 67-69, March 1996.
60. T. Biedka and J. H. Reed, "Direction finding methods for CDMA mobile wireless systems," MPRG-TR-96-20, June 1996.
61. Y. M. Vasavada and J. H. Reed, "Performance evaluation of a frequency modulated spread-spectrum system," MPRG-TR-96-13, February 1996.
62. M. V. Majmundar and J. H. Reed, "Adaptive single-user receivers for direct sequence CDMA systems," MPRG-TR-96-12, January 1996.
63. R. He and J. H. Reed, "Co-channel interference rejection techniques for AMPS signals using spectral correlation characteristics," MPRG-TR-96-11, January 1996.

64. J. S. Elson and J. H. Reed, "Simulation and performance analysis of cellular digital packet data," MPRG-TR-96-08, February 1996.
65. J. D. Laster and J. H. Reed, "Improved GMSK demodulation emphasizing single channel interference rejection techniques," MPRG-TR-96-05, February 1996.
66. M. Welborn and J. H. Reed, "Co-channel interference rejection using model-based demodulator" MPRG-TR-96-04, January 1996.
67. F. Dominique and J. H. Reed, "Design and development of a frequency hopper based on the DECT system for the 902-928 MHz ISM band," MPRG-TR-96-02, January 1996.
68. P. Athanas, I. Howitt, T. S. Rappaport, J. H. Reed, and B. D. Woerner, "A high capacity adaptive wireless receiver implemented with a reconfigurable computer architecture," MPRG-TR-18, November 1995.
69. N. Mangalvedhe and J. H. Reed, "An eigenstructure technique for direct sequence spread spectrum synchronization," MPRG-TR-95-04, April 1995.
70. Y. M. Kim, N. Mangalvedhe, B. D. Woerner, and J. H. Reed, "Development of a low power high data rate spread-spectrum modem," MPRG-PPR-95-01, February 1995.
71. Y. M. Kim, N. R. Mangalvedhe, B. D. Woerner, and J. H. Reed, "Development of a low power high data rate spread-spectrum modem," MPRG-PPR-95-02, June 1995.
72. P. Petrus and J. H. Reed, "Blind adaptive antenna arrays for mobile communications," MPRG-TR-95-01, December 1994.
73. S. Yao and J. H. Reed, "Differential detection of GMSK signals," MPRG-TR-94-27, October 1994.
74. R. Zheng, J. Tsai, R. Cameron, L. Beisgen, B. D. Woerner, and J. H. Reed, "Capacity and interference resistance of spread-spectrum automatic vehicle monitoring systems in the 902-928 MHz ISM Band," MPRG-TR-94-26, final report to Southwestern Bell Mobile Systems, October 1994.
75. F.-S. Cheng and J. H. Reed, "A new approach to dynamic range enhancement," MPRG-TR-94-25, October 1994.
76. R. S. Zheng and J. H. Reed, "Channel modeling and interference rejection for CDMA automatic vehicle monitoring systems," MPRG-TR-94-21, November 1994.
77. R. He and J. H. Reed, "AMPS interference rejection: Blind time-dependent adaptive filtering - Volume I," final report to ARGO Systems Inc., MPRG-TR-94-19, July 1994.
78. T. H. Qazi and J. H. Reed, "Model-based demodulation of FM signals - Volume II," MPRG-TR-94-17, final report to ARGO Systems, August 1994.
79. M. Subramanian and J. H. Reed, "Noncoherent spread-spectrum communication systems," MPRG-TR-94-14, August 1994.

80. F. Cheng, A. Kelkar, I. Jacobs, and J. H. Reed, "Performance evaluation for the dynamic range enhancement technique (DRET)," MPRG-TR-94-10, final report to Southwestern Bell Technology Resources, September 1994.
81. V. Aue and J. H. Reed, "Optimum linear single user detection in direct-sequence spread-spectrum multiple access systems," MPRG-TR-94-03, March 1994.
82. R. Holley and J. H. Reed, "Time dependent adaptive filters for interference cancellation in CDMA systems," MPRG-TR-93-15, September 1993.

Other Papers & Reports:

1. P. M. Robert and J. H. Reed, "Va. Tech finds soft radio's missing link," *EE Times*, August 2004.
2. J. H. Reed, T. C. Hsia, and H. Etemad, "Differential demodulation of BPSK using time dependent adaptive filtering," final report to California MICRO Program, 1992.
3. J. H. Reed, "Adaptive filters and their application to interference rejection," *Defense Electronics*, pp. 85-86 and 89-90, May 1989.
4. W. Gardner, B. G. Agee, W. A. Brown, C. K. Chen, J. H. Reed, and R. S. Roberts, "A comparison of Fourier transformation and model fitting methods of spectral analysis," Signal and Image Processing Lab Report No. SIPL-86-4, Department of Electrical and Computer Engineering, University of California, Davis, 1986. (Also in *Statistical Spectral Analysis — A Non Probabilistic Theory*, Prentice-Hall.)

Selected Corporate Report Topics:

- * A DSP-Based Receiver for the New North American Digital Cellular Standard
- * Spread Spectrum Detection Techniques
- * Cyclic Spectral Analysis of Modulated Signals
- * Projection of Future High-Volume Digital Communication Systems
- * A High Speed Digital Filter for Sample Rate Conversion
- * A Least-Squares System Identification Method
- * Cyclic Adaptive Filtering for Interference Rejection
- * Implementation Issues of Adaptive Interference Rejection Techniques
- * Investigation of Modern Spectral Analysis Techniques
- * The Performance of Time-Dependent Adaptive Filtering of Real Data
- * A Maximum-Likelihood Estimator for Tracking and Detecting Frequency Hopping Signals
- * Digital Signal Processing Algorithms for Squelch Control
- * A Low-Cost Whitening Filter for Jammer Applications
- * Time-Dependent Single Channel and Multi-Channel Interference Rejection Algorithms

Patents

- Tamal Bose, Xuetao Chen, Jeffrey H. Reed, Tech ID: 09-022 Efficient Outphasing Transmitter USPO#: 8,290,086, Issue October 16, 2012
- Reed, Jeffrey, and Carlos Aguayo Gonzale, Using Power Fingerprinting (PFP) To Monitor The Integrity And Enhance Security Of Computer Based Systems, WIPO Patent 2012061663, submitted May 11, 2012.
- Saffet Bayram, Robert J. Boyle, James E. Hicks, Jeffrey H. Reed, Method and system for overloaded array processing, WO 2001089167 A2, issued Nov. 2011

Section V. Public Service/Outreach

Industrial Affiliate/Outside Agency Contacts:

Companies and Government Agencies visited in 2009 - 2012 to promote Wireless@VT and the Hume Center:

Apple Computer	Nokia
Booz Allan Hamilton	IDA
DARPA	Motorola
Army Research Lab	NSA
ZETA	MA-COMM
SAIC	Intel
DRT	NSF
Laboratory of Telecommunications Science	FCC
John Hopkins Applied Physics Lab	FBI
NRO	Samsung
NSA	Aerospace Corporation
CRT	CIA
Defense Spectrum Office	US Army
NIST	Thales Communications
NRL	Textronix
Northrup Grumman	ONR
ISI	SPAWAR
RINCOM	ATT
CERDEC	Ventura Solutions
Award Solution	Syracuse Research Corp
ONR	SPAWAR
Applied Signal Technologies	I-APRA
DSO	L-3
GE	DRS
MBC	CAER
LTS	Lockheed Martin

Funding Agency Reviewer:

NSF
University of California, MICRO
Kansas 2000
Qatar Science Foundation
ARO
Canadian Foundation for Innovation

Sponsored Visiting Researchers:

Ahmed Darwish from Cairo University, June-September 1999
Yeongjee Chung from Korea, January-August 1999
Shinichi Miyamoto from Kobe, Japan, April 2001-March 2002
Young-Soo Kim from Seoul, Korea, February 2002-February 2003
Friedrich Jondral from Karlsruhe, Germany, April-June 2004
Francisco Portelinha from Brazil, October 2004-February 2006
Seuck Ho Won from Korea, February 2005-January 2006
Duk Kyu Park from Seoul South Korea, January 2007-February 2008
Marojevic Vuk from Spain, September 2007-January 2008
Francisco Martins Portelinha from Brazil, February 2008-March 2008
Jeong Ho Kim from South Korea, July 2008 – February 2010
Stefan Werner Nagel from Germany, August 2009 - October 2009
Arthur Herzog from Darmstadt, Germany April 2010 – June 2010

Conference Organization & Technical Reviewing:

Editorial Board Member for the Proceedings of the IEEE
IEEE Fellows Selection Committee for Computer Society
General Chair DySPAN 2014
Organizing Committee for Globecom 2010
Technical Program Committee for IEEE Dyspan 2009/2010
Technical Program Committee for Globecom 2009
Technical Program Committee for VTC 2009
Technical Program Committee for COMCAS 2009 (and session chair)
Associate Editor for Proceedings of the IEEE, Issue on Cognitive Radio, April & May 2009
Associate Editor for IEEE Journal on Select Area of Communications, Issue on Cognitive Radio
Technical Program Committee for IEEE Conference on Communications
Technical Program Committee for CrownCom
Reviewer

IEEE Transactions on Antennas and Propagation
IEEE Transactions on Wireless Communications
IEEE Transactions on Communications
IEEE Transactions on Signal Processing
IEEE Transactions on Aerospace and Electronics Systems
IEEE Transactions on Selected Areas of Communications
IEEE Signal Processing Letters
IEEE Communications Magazine
IEEE Communications Letters

International Journal of Electronics

Session Chair for the SDR Forum 2007, Denver, CO, November 5 – 9, 2007

Advisory Board, *IEEE International Conf. Ultrawideband (ICU)*, September 2005.

Moderator for the paper session "Ultrawideband Design Approaches," at the *Communications Design Conf.*, March - April 2004.

Moderator for the panel, "UWB Panel on Communication Systems Design," at the *Communications System Design Conf.*, October 2003.

Chair of session titled, "Mobile Computing and Software Defined Radios," at the *International Conf. Engineering Reconfigurable Systems Algorithms (ERSA)*, June 2003.

Co-technical program chairman for the *SDR Forum Conf.*, November 2002.

General Chair for the *UWBST Conf.*, November 2003.

Technical program chairman for the *SDR Forum/MPRG Workshop Smart Antennas*, June 2003.

Federal & State:

President's Council of Advisors in Science and Technology working group on transitioning federal spectrum for commercial use and economic growth, 2011-2012. Recognition letter from President Obama.

Army Research Office Board of Visitors, 2012- present

Idaho National Labs Advisory Board, 2012 - present

IEEE Fellows Evaluation Committee for Computer Science, 2012

National Science Foundation workshop co-organizer, *Enhancing Access to the Radio Spectrum*, August, 2010. Goal was to develop a major research program to support spectrum research for the National Broadband Plan. Participants include Secretary of Commerce, a Commissioner of the FCC, interim head of NSF, multiple NSF Division Directors, Whitehouse and Capitol Hill staffers.

US Dept. of Commerce Committee on EARS Regulations 2008-2009. A Federal Advisory Committee Appointed by the Secretary of Commerce To examine EARS Regulations. 2009. *Note current EARS regulations currently represent a major challenge to US industry and academia for engaging international personnel in research and this committee addressed this challenge.* 2007.

Co-Leader for the SDR Forum and Object Management Group of Smart Antenna API standardization efforts 2008-2009

Co-Leader for NSF workshop on SDR held in Ireland on May 12 – 16, 2008.

Virginia Broadband Task Force (headed by now Senator Warner and US CTO Anish Chopra) to examine steps for bridging the digital divide.

DARPA panel member to identify and create new programs for DARPA to support NSA. This activity is expected to result in \$60M – \$80M in new DARPA programs. 2007

Workshop help DARPA define a new program in bio-mimesis, the imitation of living organisms through electronics and mechanics.

Assisted the Army Research Office in developing their five year research plan for communications.

University Professional Service Current & Past:

Distinguished Lecturer for the IEEE Vehicular Technology
Director Wireless @ Virginia Tech
Interim Director, Ted and Karyn Hume Center
Participation within the Center for Wireless Telecommunications (CWT)
Department Computing Committee
Faculty Advisor to the Honor System
Faculty Advisory Committee, Information Technology for VT
EE Graduate Administrative Committee (Grad AdCom)
Communications Area Committee
US Student Recruitment Strategy Task Force
Course supervisor of ECPE 5674 and ECPE 4654
ECE Department Head Search Committee
ECE Executive Committee
ECE Resource Committee
Deputy Director, MPRG
ECE Recruiting Committee

Section VI. Industrial Experience

Industrial Employment:

Allied Communications, co-founder, 2011- present
Power Fingerprint, Inc. President and Co-Founder, 2011-Present
Cognitive Radio Technology, LLC. CTO and co-founder, 2007- Present
Co-founded Dot Mobile, Inc. March 2000-2001
(Company specializes in mobile data applications including wireless-internet based applications.)

Past Clients

ACM Systems	Grass Valley Group
Analog Devices	BRTRC
DIGCOM	E-Systems
F&S	General Dynamics
Gray Cary	Harris Broadband
Honeywell	HRL
IWT	Jones Day
NORCOMM	SAIC
Labarge	IDA
SRC	Weil

Samsung	MITRE
Shafer	SCA Technica
IIT	Navsys
US Navy	Tantivy
Arnold Porter	Sidley Austin

Founded Reed Engineering, March 1986 – Present

(Company performs consulting, expert witnessing and training in wireless communications and signal processing.)

Member, Technical Staff Signal Science, Inc., Santa Clara, CA, 1980-1985

Areas of Specialization:

- Spread spectrum detection
- Foreign technology analysis
- Computer systems administration

Past and Current Advisory Board Positions:

TechContinuum
Idaho National Labs Homeland Security
Army Research Office Networking and Communications
Samsung Telecommunications
Spyrock
Totus Lighting
Airbee
FAWNA
Wayve Tech

Selected past industry projects:

- Technical Evaluation of AT&T and T-Mobile Merger
- Comments on FCC NPR making
- Expert Witness Wireless Email
- Software Architecture for Radios
- Company acquisition evaluation
- Expert witness in wireless location systems (multiple times)
- Evaluation of a wireless high-speed internet access system
- Evaluation of wireless/signal processing companies for acquisition
- Tutorials on software radio issues
- Tutorials on trends in wireless communications
- Adaptive interference rejection techniques
- Spread spectrum signal detection
- Expert witness for wireless power sources
- Study Panelist for NSA/DARPA programs via Schafer Corp.
- Advising on Trends in Communications: SAIC
- Provide Survey of Low Power Communications Trends: Mitre Corporation