

**VITA**  
**CARL B. DIETRICH, JR.**  
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**Education:**

- Ph.D., Electrical Engineering, May 2000**, Virginia Tech, Blacksburg, VA  
**Dissertation:** “Adaptive Arrays and Diversity Antenna Configurations for Handheld Wireless Communication Terminals” (defended on February 15, 2000)
- M.S., Electrical Engineering, December 1992**, Virginia Tech, Blacksburg, VA
- B.S., Electrical Engineering, May 1987**, Texas A&M University, College Station, TX  
Awarded National Merit Scholarship, University Honors Program Scholarship, EE Department Scholarship, and Lechner Fellowship, Passed Engineer-in-Training exam

**Experience:**

**Research Associate, Antenna Group, Virginia Tech**

February 1999 to present

- Investigate compact handset arrays for adaptive beamforming and diversity combining
- Write proposals for funding of research on antenna and communication systems
- Document and present research
- Provide briefings to current and prospective sponsors
- Design, build, integrate, and test hardware and software systems as needed to support investigations
- Supervise research of graduate and undergraduate students as needed

**Senior Research Assistant, Antenna Group, Virginia Tech**

May 1995 to February 2000

- Conducted measurements and simulations of single- and multi-polarized antenna arrays for adaptive and diversity combining in hand-held radios
- Developed software tools to model adaptive and diversity combining in multipath channels using any combination of array geometry, element patterns, and element polarizations
- Designed and built proof-of-concept switched-beam antenna system
- Modeled performance of optimum beamforming on cellular reverse link using currently installed base station antenna systems
- Supervised research of two international M.S. students

**Experience, continued:**

**Research Assistant, Mobile and Portable Radio Research Group, Virginia Tech**

January 1992-December 1994

- Implemented site-specific propagation model to support design of indoor wireless communication systems using distributed antenna systems
- Investigated fading characteristics of distributed antenna systems
- Developed approach for modeling reflection of polarized waves
- Supported development of site-specific propagation prediction tool
- Assisted in measurements to validate ray-tracing propagation prediction software

**Research Assistant, Satellite Communications Group, Virginia Tech**

May-August 1990

- Wrote functional specification for ground station software for low earth orbit satellite-based store and forward packet communications system
- Identified and recommended computer hardware and software for use in low earth orbit satellite ground station

**Teaching Assistant, Virginia Tech, August 1989-May 1990, September 1990-December 1991, August-December 1993, January-May 1995**

- Instructed students in use of equipment and control system/filter design software
- Taught Analog and Digital Communications lab, teaching evaluation: 3.8/4.0
- Graded for graduate Radar Systems, and undergraduate Satellite Communications, Industrial Electronics, Network Analysis, and Electromagnetics courses

**Cell Site Common Equipment Engineer, Bell Northern Research, Richardson, TX**

May-August 1992 and January-August 1993

- Maintained and upgraded alarm processing firmware for prototype microcell system
- Investigated advantages of distributed antennas for indoor wireless communication
- Designed radio frequency distribution system and distributed antenna system for indoor microcell trial
- Identified alternative RF components for projected savings of \$30,000 on microcell prototypes

**Electronics Engineer, Defense Information Systems Agency, Arlington, VA  
(formerly Defense Communications Agency)**

August 1987 - August 1989

- Evaluated and proposed tests for interoperability among telephone switches
- Helped establish facility for testing modifications to Defense Switched Network
- Developed and reviewed concepts for secure point-to-multipoint video teleconferencing
- Awarded performance bonus

### **Publications and Papers:**

- [1] C. B. Dietrich, Jr., K. Dietze, J. R. Nealy, and W. L. Stutzman, "Single- and Multi-Polarized Adaptive Arrays for Mobile Radio Handsets," Submitted to *Electronics Letters* February 2000.
- [2] K. Dietze, C. B. Dietrich, Jr., and W. L. Stutzman, "Analysis of a Two-Branch Maximal Ratio and Selection Diversity System with Unequal SNR's and Correlated Inputs for a Rayleigh Fading Channel," Submitted to *IEEE Journal on Selected Areas in Communications*, December 1999.
- [3] C. B. Dietrich, Jr., K. Dietze, J. R. Nealy, and W. L. Stutzman, "Spatial, Polarization, and Pattern Diversity for Wireless Handheld Terminals," Submitted to *IEEE Transactions on Antennas and Propagation* September 1999.
- [4] C. B. Dietrich, Jr., K. Dietze, K. Takamizawa, and W. L. Stutzman, "Envelope Correlation, Power Imbalance, and Diversity Gain of Spatial, Polarization, and Pattern Diversity for Hand-Held Radios in Multipath Channels," *IEEE AP-S/URSI Symposium*, Orlando FL, July 1999.
- [5] Warren L. Stutzman and Carl B. Dietrich, Jr., "Wireless Monitoring and Position Location," *Advancing Microelectronics*, vol. 25, no. 3, 1998 Special Wireless Issue.
- [6] Warren L. Stutzman and Carl B. Dietrich, Jr., "Moving Beyond Wireless Voice Systems," *Scientific American*, pp. 92-93, April 1998.
- [7] Carl B. Dietrich, Jr. and Warren L. Stutzman, "Smart Antennas Enhance Cellular/PCS Performance," *Microwaves&RF*, Part I, pp. 76-86, April 1997, Part II, pp. 164-168, May 1997.
- [8] C. B. Dietrich, W.L. Stutzman, and W. A. Davis, "Interference Reduction in Cellular Systems using Switched Beam Smart Antennas," *National Radio Science Meeting*, Boulder, CO, January 1996.
- [9] P. Chow, A. Karim, V. Fung, and C. Dietrich, "Performance Advantages of Distributed Antennas in Indoor Wireless Communication Systems," *Proc. 44th IEEE Vehicular Technology Conference*, vol. 3, pp. 1522-1526, 1994.

**Computer Languages and Software:** FORTRAN, C/C++, 68020 Assembler, MATLAB, NEC, MININEC, WIRE, and AutoCAD

### **Activities:**

**IEEE:** Member of Antennas and Propagation, Vehicular Technology, and Communications Societies

**Eta Kappa Nu:** Recording Secretary 1994-95, developed and maintained chapter's web page

**Amateur Radio:** Technician Plus license, call sign N4YCL

**Whitewater Raft Guide,** 1990-91