

Ronald L. Carter

Dr. Ronald L. Carter was born in Independence, Kansas on July 16, 1940. He received the BS. in Physics in 1962 and the MS. in Physics in 1964 from Iowa State University and the Ph.D. in Physics from Michigan State University in 1971 for the dissertation: "Electrical Resistivity of Aluminum Alloys at Low Temperatures."

Dr. Carter was appointed as an Instructor in the Department of Metallurgy and Materials Science of the University of Michigan for the academic year 1970-1971. He developed a new solid state physics course and new programs in electron microscopy, x-ray analysis and ceramics engineering for the senior lab.

In 1971, Dr. Carter joined the faculty of the University of Mississippi as an Assistant Professor of Physics. He taught general and engineering physics, electronics, astronomy and meteorology. He conducted research in the areas of thermoelectricity in metals and alloys, acoustics and fluid dynamics as applied to the human cardiovascular system.

Dr. Carter was New Product and Process Development Engineer at the FEPII production facility of Texas Instruments in Dallas, Texas, from August 1977 to January 1979. He developed processes, process flow and device characterization techniques for new metal oxide semiconductor and charged coupled device large scale integrated circuit products.

Professor Carter joined the faculty of the Electrical Engineering Department of The University of Texas at Arlington in January, 1979. He is a Professor of Electrical Engineering, having served the Department as Graduate Advisor, Chairman of the Graduate Studies Committee, and Director of the National Science Foundation Industry/University Cooperative Research Center for Advanced Electron Devices and Systems (NSF/CAEDS). His teaching and research interests are analog high frequency integrated circuit design, and semiconductor device physics, modeling and simulation. Past work has included integrated circuit manufacturing, process development and simulation; rapid thermal processing and ohmic and Schottky contacts of semiconductors; molecular beam epitaxy; and microwave devices and integrated circuits including high power HEMTs and HBT and microwave circuits. As Director of NSF/CAEDS from 1987 to 1990, he managed the growth of the Center to a faculty, student and staff complement of 25. The annual budget doubled to more than \$900,000 for 1990, and the laboratory capitalization doubled to \$3,500,000. Currently, Dr. Carter leads the Analog Integrated Circuit Research Group of The University of Texas at Arlington.

Dr. Carter is a member of Tau Beta Pi, Eta Kappa Nu, a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE), and is active in the Microwave Theory and Techniques (MTT) and Electron Devices (ED) Societies of the IEEE. He has served on the steering committee of the IEEE MTT-S International Symposium in 1982, 1987, 1990 and is Technical Program Chairman for MTT-S 2004. Dr. Carter is also active in the local MTT and ED chapters, having served as Program Chairman of the Dallas MTT section and Chairman of the Dallas section of the IEEE-EDS society, having been recognized in 1988 and 1989 for Outstanding Service to the EDS society. In 1990, Dr. Carter received the Haliburton Excellence in Research Leadership prize. Dr. Carter has directed 51 graduate theses and dissertations, published 64 papers in the technical literature, given 80 technical presentations. He was also a principal in \$7,188,917 as PI and co-PI for an average of \$221,766 per year in research contracts and grants at UTA.

Ronald L. Carter

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PERSONAL DATA

Born: July 16, 1940 in Independence, Kansas, US citizen
Married to Carole Ann (Brown) - two married children, five grandchildren

EDUCATION

1971 PhD (Physics) Michigan State University
Dissertation: Electrical Resistivity of Aluminum Alloys at Low Temperature
1964 MS (Physics) Iowa State University
Thesis: Thermal Diffusivity of Armco Iron
1962 BS (Physics) Iowa State University

PROFESSIONAL EXPERIENCE

1986 ... 2011 Professor in Electrical Engineering
The University of Texas at Arlington,
Arlington, TX 76019

Retired May 31, 2011. Recognized as Professor Emeritus in 2012.

Research Interests. Analog high frequency integrated circuit design. Silicon and III-IV device physics, modeling, characterization and simulation. High electron mobility transistor (HEMT) – low noise and high power, resonant tunneling diode (RTD), Heterojunction and bipolar junction transistors (HBT and BJT) including high power, step-recovery diode (SRD), thin oxide and EEPROM MOS transistors. **Associate Department Chair** (9/04 – 5/09). **Graduate Advisor** (1995 to 2000). Responsible for graduate program, curriculum, student admissions and matriculation. The program consisted of 27 full time faculty, and nearly 350 doctoral and masters students. Developed new procedures for doctoral diagnostic examinations. Developed new programs for distance education offering of the MSEE and PhD programs. **Chairman of the Committee on Graduate Studies** (1988 to 1990 and 1996 to 2001). **Research Director** (1997 to 2001) and **Director** (2001) of the NSF Center for Electronic Devices and Materials (CEMDAS). **Director** (1987 to 1990 and 2001), NSF Center for Advanced Electron Devices and Systems (CAEDS) – primarily microwave devices and circuits. Responsible for funding, fiscal management, and coordination of research effort for NSF/CAEDS. Managed the growth of the Center to 5 faculty, 16 graduate assistants, 3 staff and 6 undergraduate assistants. The total annual Center budget had doubled to more than \$900,000, and the laboratory capitalization to \$3,500,000. **Coordinator** (1981 to 1990) of the undergraduate teaching laboratories for Electronics including development of new manuals and instrumentation. **Teaching** responsibilities primarily in Device Theory, Electromagnetic Fields, Electronics, and Integrated Circuit Technology. Developed new courses in device theory, integrated circuits and electronics manufacturing. A principal in over \$7,188,917 research funding for \$221,766 per year average. Directed 51 graduate theses and dissertations, published 64 papers in the technical literature, given 80 technical presentations.

- Summer 2004 through 2007 National Semiconductor – Analog IC Design Center
Fort Collins, CO. In each year, a one-month on site collaboration with industry research partner.
- 1990 to 1991 NSF Industry/University Research Fellow.
Hewlett-Packard Network Measurements Division
Santa Rosa, CA 95408-1799
- Sabbatical leave funded by HP and the National Science Foundation Industry/University Cooperative Research Directorate from 7/90 through 1/91. Funded wholly by HP through 5/91. Developed model equations for Heterojunction Bipolar Transistors for use in Computer Aided Design Systems. Developed modification of dc and microwave model parameters of the Gummel-Poon model and verified for HBT devices made by HP, TI and TRW.
- 1981 to 1986 Associate Professor (with tenure) in Electrical Engineering, UTA.
- 1979 to 1981 Visiting Associate Professor in Electrical Engineering, UTA.
- 1977 to 1979 New Product and Process Development Engineer
Semiconductor Group, Texas Instruments, Dallas.
Development of processes, process flow and device characterization for new metal oxide semiconductor and charged coupled device large scale integrated circuits.
- 1971 to 1977 Assistant Professor of Physics
The University of Mississippi, Oxford, Mississippi.
Taught general and engineering physics, electronics, astronomy and meteorology. Research in elastic constants in titanates, piezoelectricity, and fluid dynamics.
- 1970 to 1971 Instructor of Metallurgy and Materials Science, College of Engineering
The University of Michigan, Ann Arbor, Michigan.
Taught solid state physics and developed laboratory programs in electron microscopy, x-ray analysis and ceramics engineering.
- 1967 to 1971 Research Assistant, Department of Physics, Michigan State University, East Lansing, MI.
- 1966 Teaching Assistant, Department of Physics, Michigan State University, East Lansing, MI.
- 1964 to 1966 Assistant Professor of Science, Graceland College, Lamoni, Iowa.
- 1966 NSF Summer Research for College Teachers, University of Florida, Gainesville.
- 1965 NSF Summer Research for College Teachers, University of Colorado, Boulder.

CONSULTING

- 2005 Reviewer for *IEEE Trans. Electron Devices Letters*
- 2003 – 2004 Reviewer for John Wiley & Sons.
- 1999 National Science Foundation Technical Panels - Reviewed Phase I STTR and Phase II

SBIR proposals for award recommendations.

- 1995-96 West Publishing. Reviewed - *Principles of Electronic Circuits*, by Burns and Bond.
- 1993 National Semiconductor. Taught integrated circuit and device theory to engineering professionals in process and device engineering assignments.
- 1984 to 1987 Texas Instruments. Taught integrated circuit and device theory to new engineers assigned to design and processing areas.
- 1982 Houdaille, Inc. Consulting in safety issues.
- 1981 Adelphon, Inc. Consulting in Electrostatic protection.
- 1979 Texas Instruments, Inc. Consulting in EPROM processing.

PROFESSIONAL SOCIETY ACTIVITIES

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE). Member since October 1, 1980. Senior Member since March 1, 1990.

Activities in IEEE Microwave Theory and Techniques Society (IEEE-MTT).

'98 to '04 Technical Program Committee Chairman for the 2004 MTT Symposium

'92 to '94 On assignment from MTT Administrative Committee as MTT Transactions tutorial papers editor.

'89 to '91 On special assignment from MTT Administrative Committee. (1) developed a Student Paper Contest for the 1991 MTT Symposium and (2) inaugurated participation of Universities in the Symposium Exhibition.

'88 to '90 1990 MTT Symposium (Dallas) Publicity Chairman

'85 to '87 1987 MTT Symposium (Las Vegas) Local Arrangements Chairman. Responsible for hotel catering and meeting room assignments for entire conference with 1600 registered and 5500 attending the exhibition. Created a record of all catering, room assignments, audio-visual requirements, and other meeting arrangements into an interactive personal computer-based daybook.

'85 to '86 Dallas Section MTT Program Chairman

'80 to '82 1982 MTT Symposium (Dallas) Local Arrangements Co-Chairman

Activities in the IEEE-Electron Devices Society (IEEE-ED). Member since January 1, 1981.

'87 to '88 ED Dallas Section Chairman

'86 to '87 ED Dallas Section Vice Chairman

'04 Member of Advisory Committee of the 7th International Conference on Solid-State and Integrated-Circuit Technology October 18-21, 2004, Beijing, China Chairman

Activities in the IEEE-Solid State Circuits Society (IEEE-SSCS). Member.

February 2006 - Reviewer for 2006 International Symposium on Circuits and Systems

August 2006 - Reviewer for ISCICT-2006, Shanghai

TEXAS MICROWAVE EDUCATION COUNCIL (TMEC - Engineering Faculty throughout Texas with Microwave specialization) Member 1984 to 1990.

1987 Meeting Convenor.

PATENTS

“An All-NPN Bipolar Junction Transistor Precision Current Mirror with Capability for Driving Multiple

Loads”, U.S. Patent #7,636,016, awarded October 8, 2009. Howard T. Russell, Jr., Ronald L. Carter, W. Alan Davis.

US patent application # 12/867,801, “Passive Wireless Antenna Sensor for Strain, Temperature, Crack and Fatigue Measurement,” filed August 16, 2010 (now pending). (UTA Ref. No. 08-04).

US patent application # 12/878,953, “Remote Interrogation of a Passive Wireless Antenna Sensor,” filed September 9, 2010 (now pending).

HONORS AND AWARDS

2005&06 Research Excellence Award in the College of Engineering
1990 Halliburton Excellence in Research Leadership
1989 IEEE-Electron Devices Society Dallas Section Outstanding Service Award
1988 IEEE-Electron Devices Society Dallas Section Outstanding Service Award
1987 Tau Beta Pi Distinguished Engineer
1980 Eta Kappa Nu

EDUCATIONAL CONTRIBUTIONS IN THE COLLEGE OF ENGINEERING

Courses Taught:

EE 2312--Electrical Science I
EE 3303--Electronics I
EE 3304--Electronics II
EE 3318--Electromagnetics I
EE 4329--Physical Electronics
EE 4345 - Semiconductor Electronics Design Project (developed by RLC 2001)
EE 5305--Advanced Electronics
EE 5340--Device Theory and Network Models I
EE 5341--Device Theory and Network Models II
EE 5342--Semiconductor Device Modeling and Characterization (developed by RLC)
EE 5343--Integrated Circuit Fabrication Technology (developed by RLC)
EE 5345--Electronics Manufacturing (developed by RLC)
EE 5345--Semiconductor Device and Process Simulation (revised in 2003 by RLC)
EE 5349--Heterojunction Devices (developed by RLC)

COURSE AND INSTRUCTIONAL DEVELOPMENT

1981 to 1990 EE 3181 and 3182 - Junior EE Laboratory Supervision. Integrated the use of computer aided design and computer aided testing into the junior lab sequence with the incorporation of the Hewlett-Packard PC Instruments and AT-compatible personal computers with PSpice, and Asyst software packages. This instrumentation is used for the electronics laboratory experiments which supplemental to EE 3303 and 3304 - Electronics I and II.
1984 to 1989 EE 5343 - Integrated Circuit Techniques. With Dr. T.-J. Shieh developed a clean room to be used as a facility for instruction in MOS integrated circuit fabrication and testing.
1989 to 1992 EE 5345 - Electronics Manufacturing. Developed a new course which addresses semiconductor integrated circuit manufacturing. Subjects included are: Process design, control, modeling, simulation, measurements, testing and diagnostics. Yield analysis, modeling and management. Product design for manufacturability, testing, quality and reliability.

- 1994 to 1995 EE 5349/001 - Heterojunction Devices. Heterojunction physics as applied to determine the terminal characteristics of the heterostructure bipolar transistor and heterostructure field effect transistors. Device model equations will be developed and compared with the model equations used for the bipolar junction transistor and the junction field effect transistor in SPICE.
- 1996 to 1997 EE 5342 - Semiconductor Device Modeling and Characterization. Device models and characterization procedures for the PN junction and Schottky diodes, the BJT, JFET, MOSFET, HBT, and optical sources and detectors. SPICE derived and higher level circuit simulator models are presented.
- 1999 EE 5341 - Semiconductor Device Theory I - Updated the course to make all course materials available on the www.

Seminar Organization: Spring and Summer 1998. Organized "Seminars on Instructional Design", "Seminars on Electronic Delivery for Distance Education", and "Tutorial on Electronic Delivery" for the College of Engineering.

SERVICE TO THE UNIVERSITY

- 1986 to 1989- Faculty Senate. Served on Equity Committee (Chairman 1987/88), President's Advisory Committee (1988/89) and Budget Liaison Committee.
- 1987 to 1990 - Student Publications Committee. Chairman for 1988/89 and 1989/90.
- 1993 to 1997 - Graduate Assembly. Chairman of the Committee on Graduate Program Policy for 1995/96 and 1996/97.
- 1997 to 2007 - Student Publications Committee.
- 1998 to 2002 - Elections Committee.
- 2002 to 2003 - Provost Review Committee.
- 2002 to 2006 - Library Appeals Committee.
- 2002 to 2006 - Program Review Committee (Reviews chairman for: History Program – 2003; Art/Art History – 2004).
- 2006 to 2007 – Engineering Laboratory Building Expansion Committee

RESEARCH FUNDING

(Totaling \$7,188,917 as PI and co-PI for \$221,766 per year average)

1. TUNABLE MICROWAVE TRANSVERSAL FILTERS, Resonators and Time Delay Elements Based on MSW Propagation in EPI YIG Garnets," by J. M. Owens, C. V. Smith, Jr., and R. L. Carter. AFOSR/ RADC, \$310,431 for 8/80 to 10/83; \$318,178 for 1/84 to 1/86.
2. OPTIMIZED HYBRID OSCILLATOR, by J. M. Owens and R. L. Carter. Wavetek, Indiana, \$123,000 for 10/80 through 12/83.
3. GaAs EPITAXIAL FILM GROWTH SYSTEM, by R. L. Carter. Honeywell Optoelectronics Division, \$16,275 for 1/82 to 1/84.
4. TUNABLE MICROWAVE TRANSVERSAL FILTERS AND DISPERSIVE DELAY LINES BASED ON OBLIQUE INCIDENCE REFLECTION OF MAGNETOSTATIC WAVES PROPAGATING IN EPITAXIAL GARNETS, by J. M. Owens, C. V. Smith, Jr., and R. L. Carter. ARO, \$196,315 for 6/82 to 6/85.
5. OPTIMIZE OPERATING CHARACTERISTICS OF MSW DISPERSION COMPENSATED DEVICE, by R. L. Carter and J. M. Owens. Rockwell International, \$97,877 for 6/82 to 3/85.

6. DETERMINATION OF REVERSE BREAKDOWN CHARACTERISTICS OF GaAs SCHOTTKY DIODE GATES, by R. L. Carter. Texas Instruments, Inc., \$153,180 for 1/85 to 1/88.
7. CENTER FOR ADVANCED ELECTRON DEVICES AND SYSTEMS: INDUSTRIAL MEMBERSHIPS, R. L. Carter, 8/87 to present. J. M. Owens and R. L. Carter, 1/85 to 8/87. E-Systems Garland Division, E-Systems Greenville Division, General Dynamics, Honeywell, LTV Aerospace, Mostek, Rockwell, Sandia Corporation, and Texas Instruments. \$1,600,000 membership total committed through 1991.
8. CENTER FOR ADVANCED ELECTRON DEVICES AND SYSTEMS: CLEANROOM CONSTRUCTION, J. M. Owens and R. L. Carter. UTA and Texas Engineering Experiment Station, \$300,000 for 9/85 to 8/86.
9. MAGNETOSTATIC WAVE TRANSDUCERS, RESONATORS AND DISPERSION CONTROL, J. M. Owens and R. L. Carter. AFOSR, \$288,178 for 12/85 to 10/86.
10. CAEDS: CENTER FOR ADVANCED ELECTRON DEVICES AND SYSTEMS-A NATIONAL SCIENCE FOUNDATION INDUSTRY/UNIVERSITY COOPERATIVE RESEARCH CENTER INDUSTRY/UNIVERSITY COOPERATIVE RESEARCH CENTER, R. L. Carter, 8/87 to 6/92. J. M. Owens and R. L. Carter, 7/86 to 8/87. NSF 6/86 to 6/91, \$50,000 minimum per year, \$345,000 awarded for funding through 6/92.
11. MOLECULAR BEAM EPITAXY MACHINE, J. M. Owens and R. L. Carter. Texas Higher Education Coordinating Board Advanced Research Program (ARP), \$478,416 for 1987.
12. CENTER FOR ADVANCED ELECTRON DEVICES AND SYSTEMS: MILLIMETER WAVE UPGRADE FOR HP 8510, R. L. Carter. UTA College of Engineering, \$108,897 for 1988.
13. HETEROSTRUCTURE COMPOUND SEMICONDUCTOR GROWTH BY MOLECULAR BEAM EPITAXY, T.-J. Shieh and R. L. Carter. Texas Higher Education Coordinating Board ARP, \$169,838 for 6/88 to 9/89.
14. CONTACT TECHNOLOGY TO THE InP/InGaAsP MATERIAL SYSTEM, R. L. Carter. Rockwell, International, \$12,000 for 7/88 to 8/89.
15. CLASS 100 CLEANROOM EQUIPMENT EVALUATION, R. L. Carter. IBM, East Fishkill Facility, \$28,181, for 5/89 to 7/89.
16. OPTOELECTRONIC DEVICES AND INTEGRATION: MOLECULAR BEAM EPITAXY GROWTH AND FABRICATION, K. Alavi and R. L. Carter. Texas Higher Education Board ARP, \$170,000 for 1/90 to 12/92.
17. INTEGRATION OF EDUCATION AND RESEARCH IN MICROWAVES, ELECTRONICS AND DEVICES, R. L. Carter. Hewlett-Packard Corporation, \$106,000 for 1990.
18. INDUSTRY/UNIVERSITY FELLOWSHIP: DEVICES AND NONLINEAR SYSTEM MODELING, R. L. Carter. National Science Foundation, \$24,667 (part of item 10) for 7/15/90 to 1/31/91.
19. INDUSTRY/UNIVERSITY FELLOWSHIP: DEVICES AND NONLINEAR SYSTEM MODELING, R. L. Carter. Hewlett-Packard Network Measurements Division, \$96,395 for 7/15/90 to 8/31/94 (renewed for summer 1994).
20. NONLINEAR HETEROJUNCTION DEVICE MODELS FOR COMPUTER AIDED ENGINEERING, R. L. Carter. Hewlett-Packard Network Measurements Division, \$139,207 for 9/1/91 to 8/31/95 (annual renewals).
21. MICROWAVE DESIGN LABORATORY, R. L. Carter and D. P. Klemer. Hewlett-Packard Network Measurements Division, \$77,818, 8/92.
22. MICROWAVE COMPUTER AIDED DESIGN LABORATORY, R. L. Carter. Hewlett-Packard Santa Rosa Systems Division, \$100,027 for 1994.
23. SIMULATION OF THE OPERATING CHARACTERISTICS OF PHOTODIODES, R. L. Carter

- (with K. Alavi). Honeywell/Microswitch (CEMDAS membership), \$30,000, 9/1/95 TO 8/31/96.
24. EFFECT OF ELECTRIC FIELD, LOCAL TEMPERATURE AND IONIZATION OF THE DEVICE CHARACTERISTICS AND STABILITY OF HETEROSTRUCTURE FIELD EFFECT TRANSISTORS, R. L. Carter. Texas Instruments (CEMDAS membership), \$30,000, 1/1/96 to 12/31/96.
 25. SIMULATION OF THE OPERATING CHARACTERISTICS OF PHOTODIODES, R. L. Carter. Honeywell/Microswitch (CEMDAS membership), \$30,000, 9/1/96 TO 8/31/97.
 26. SIMULATION OF ELECTRON DYNAMICS IN AND DEVELOPMENT OF DEVICE MODELS FOR HETEROSTRUCTURE HIGH ELECTRON MOBILITY TRANSISTORS, R. L. Carter. TriQuint (formerly Texas Instruments CEMDAS membership), \$90,000, 1/1/97 TO 12/31/99.
 27. EEPROM CHARACTERIZATION AND COMPACT MODEL DEVELOPMENT", R. L. Carter. National Semiconductor, (CEMDAS membership), \$30,000, 6/1/97 to 5/30/98.
 28. DELIVERY OF GRADUATE STUDIES IN ELECTRICAL ENGINEERING FOR UNIVERSITY OF TEXAS CAMPUSES AT ARLINGTON, BROWNSVILLE AND PAN AMERICAN: A DISTANCE EDUCATION PROJECT FOR DEVELOPING THE VIRTUAL UNIVERSITY, R. L. Carter, J. Fitzer, W.E. Wells, W.D. Lewis, and E. LeMaster. The University of Texas System, \$60,000, 6/1/97 to 1/15/99.
 29. CENTER FOR ADVANCED ELECTRON DEVICES AND SYSTEMS (CEMDAS), Acting Director, R. L. Carter, NSF Industry/University Cooperative Research Center, \$30,000, 10/1/01 to 9/31/02.
 30. DEVELOPMENT OF NEXT GENERATION VLSI TECHNOLOGY FOR VERY HIGH SPEED ANALOG CHIP DESIGN, R. L. Carter and W. A. Davis, Texas Higher Education Coordinating Board Technology Development and Transfer Program, \$200,000, 01/01/02 to 8/31/04. EE Department cost-sharing of \$50,000, and National Semiconductor cost-sharing (see 31) \$200,000.
 31. DEVELOPMENT OF NEXT GENERATION VLSI TECHNOLOGY FOR VERY HIGH SPEED ANALOG CHIP DESIGN, R. L. Carter and W. A. Davis, National Semiconductor, Santa Clara, CA, \$200,000, 01/01/02 to 12/31/03. Cost sharing for THECB TCT project.
 32. Support of Research of the Analog Integrated Circuit Research Lab, R. L. Carter and W. A. Davis, National Semiconductor, Santa Clara, CA, \$116,200 unrestricted gifts, plus ~\$120,000 in-kind contribution in the form of circuit processing, 01/01/04 to 12/31/04.
 33. Support of Research of the Analog Integrated Circuit Research Lab, R. L. Carter and W. A. Davis, National Semiconductor, Santa Clara, CA, \$116,000 unrestricted gifts plus ~\$120,000 in-kind contribution in the form of circuit processing, 07/01/05 to 06/30/06.
 34. Support of Research of the Analog Integrated Circuit Research Lab, R. L. Carter and W. A. Davis, National Semiconductor, Santa Clara, CA, \$117,000 unrestricted gifts plus ~\$120,000 in-kind contribution in the form of circuit processing, 07/01/06 to 06/30/07.
 35. "Exploratory study of MM wave patch antennas for strain measurement and crack detection", Haiying Huang, R. L. Carter and J. C. Chiao, AFSOR/OFC of Naval RSCh San Diego, \$44,977, 6/1/2007 to 11/30/2007.
 36. Support of Research of the Analog Integrated Circuit Research Lab, R. L. Carter, H. Russell and W. A. Davis, National Semiconductor, Santa Clara, CA, \$100,000 unrestricted gifts plus ~\$120,000 in-kind contribution in the form of circuit processing, 07/01/07 to 06/30/08.
 37. Support of Research of the Analog Integrated Circuit Research Lab, R. L. Carter, National Semiconductor, Santa Clara, CA, \$242,000 unrestricted gift 07/01/08 to 06/30/12.
 38. 3-dimensional p-n junctions in Macroporous Semiconductors, R. L. Carter, BetaBatt, Inc., Houston, TX. \$70,721, June 1, 2009 through May 30, 2010.
 39. Advanced detector Research Electronics for Picosecond Time-of-Flight Measurement, Andrew Brandt, Ronald L. Carter, and W. Alan Davis, ATLAS project for CERN, \$172,139, 2011-2012.

PUBLICATIONS

1. R. L. Carter, P. Sidles, P. H. Maycock, G. C. Danielson, Thermal Diffusivity Measurements with Radial Sample Geometry," J. Appl. Phys. 36, 2333 (1965).
2. R. L. Carter, A. I. Davidson, C. L. Foiles, P. A. Schroeder, "Thermopower of Cubic Transition Metals," J. Phys. Chem. Solids (GB) 31, 2372 (1970).
3. R. L. Carter, "High Stability Operational Amplifier Current Source," Rev. Sci. Instrum. 46, 495 (1975).
4. K. W. Reed, J. M. Owens, C. V. Smith, Jr., and R. L. Carter, "Simple Magnetostatic Delay Lines in Microwave Pulse Compression Loops," 1980 IEEE MTT-S Symposium Proceedings, IEEE Catalog #80 CH 1525-3 MTT, 40-42 (May, 1980).
5. R. L. Carter, C. V. Smith, Jr., and J. M. Owens, "Magnetostatic Forward Volume Wave-Spin Wave Conversion by Etched Gratings in LPE-YIG," IEEE Trans. Mag., MAG-16, 1159-1161 (1980).
6. J. M. Owens, R. L. Carter, C. V. Smith, Jr., and J. H. Collins, "Magnetostatic Wave Devices, Microwave SAW", 1980 Ultrasonics Symposium Proceedings, IEEE Catalog #80 CH 1602-2, Volume 1, 506-513 (1980).
7. J. M. Owens, R. L. Carter, C. V. Smith, Jr., and G. Hasnain, "A 3-port Model for Magnetostatic Wave Transducers," 1980 Ultrasonics Symposium Proceedings, IEEE Catalog #80 CH 1602-2, Volume 1, 538-542 (1980).
8. W. R. Brinlee, J. M. Owens, C. V. Smith, Jr., and R. L. Carter, "Two-port Magnetostatic Wave Resonators Utilizing Periodic Metal Reflective Arrays," J. Appl. Phys., 52, 2276-2278 (1981).
9. J. M. Owens, C. V. Smith, Jr., and R. L. Carter, "The Status of Magnetostatic Wave Devices," 35th Ann. Freq. Control Symposium Proceedings, USAERADCOM, Ft. Monmouth, N. J. 077030, 358-363 (1981).
10. R. L. Carter, J. M. Owens, W. R. Brinlee, Y. W. Sam, and C.V. Smith, Jr., "Tunable Magnetostatic Surface Wave Oscillator at 4 GHz," 1981 IEEE MTT-S Symposium Proceedings, IEEE Cat. No. 81 CH 1592-5, 383-385 (1981).
11. C. V. Smith, Jr., J. M. Owens, N. D. Parikh and R. L. Carter, "Anisotropic Propagation of Magnetostatic Waves in Epitaxial YIG Films," IEEE Trans. Magn., MAG-17, 2967-2969 (1981).
12. R. L. Carter, J. M. Owens, C. V. Smith, Jr., and K. W. Reed, "Ion Implanted Oblique Incidence Magnetostatic Wave Reflective Array Filters," 1982 IEEE MTT-S Symposium Proceedings, IEEE Cat. No. 82CH1705-3, 83-85 (1982).
13. R. L. Carter, J. M. Owens, C. V. Smith, Jr., and K. W. Reed, "Ion Implanted Magnetostatic Wave Reflective Array Filter," J. Appl. Phys. 53, 2655-2657 (1982).
14. J. M. Owens, C. V. Smith, Jr., and R. L. Carter, "MSW Reflecting Array Filters," Proceedings of the 1981 RADC Microwave Magnetics Technology Workshop, RADC-TR-83-15, Rome Air Development Center, Griffis Air Force Base, NY 13441, pp. 106-116 (1983).
15. C. V. Smith, Jr., J. M. Owens, R. L. Carter, and K. W. Reed, "Microwave Pulse Compression Loops Using Magnetostatic Wave Delay Lines," Proceedings of the 1981 RADC Microwave Magnetics Technology Workshop, RADC-TR-83-15, Rome Air Development Center, Griffis Air Force Base, NY 13441, pp. 277-289 (1983).
16. J. M. Owens and R. L. Carter, "Magnetostatics Advance: The Shape of Things to Come," Microwave System News, 13, pp. 103-111 (March, 1983).
17. K. W. Reed, J. M. Owens, R. L. Carter, and C. V. Smith, Jr., "An Oblique Incidence Ion Implanted MSFVW RAF with Linear Group Delay," 1983 IEEE MTT-S Symposium Proceedings, IEEE Cat. No. 83 CH 1871-3, 259-261 (1983).

18. J. M. Owens, R. L. Carter, and Y. W. Sam, "A Hybrid GaAs MIC Using a Magnetostatic Wave Resonator," 1983 IEEE MTT-S Symposium Proceedings, IEEE Cat. No. 83 CH 1871-3, 323-325 (1983).
19. Kok Wai Chang, J. M. Owens, and R. L. Carter, "Linearly Dispersive Time-Delay Control of Magnetostatic Surface Wave by Variable Ground-Plane Spacing, Electronics Letters 19, No. 14, 546-547 (1983).
20. L. R. Adkins, H. L. Glass, F. S. Stearns, R. L. Carter, Kok Wai Chang, J. M. Owens, "Electronically Variable Time Delays Using Cascaded Magnetostatic Delay Lines," J. Appl. Phys. 55, pp. 2518-2521 (March 15, 1984).
21. R. L. Carter and J. M. Owens, "The Status of Magnetostatic Wave Oscillators," Proceedings of the 37th Annual Frequency Control Symposium, IEEE Cat. No. 83 CH 1957-018310000-0477, pp. 477-480 (1983).
22. Kok Wai Chang, Duccio Gerli, R. L. Carter, and J. M. Owens, "Passive Magnetostatic Wave Pulse Compression Loop," 1984 IEEE MTT- S International Microwave Symposium Digest, IEEE Cat. No. 84 CH 2034-7, pp. 85-86 (1984).
23. R. L. Carter, J. M. Owens, and D. K. De, "YIG Oscillator's: Is A Planar Geometry Better?" 1984 IEEE MTT-S International Microwave Symposium Digest, Cat. No. 84 CH 2034-7, pp. 77-78 (1984).
24. R.L. Carter, J.M. Owens, and D.K. De, "YIG Oscillators: Is A Planar Geometry Better?", IEEE Trans. MTT-32, pp. 1671-74(1984).
25. K. W. Reed, J. M. Owens, and R. L. Carter, "Current Status of Magnetostatic Wave Reflective Array Filters," invited paper Circuits, Systems and Signal Processing, Vol. 4, pp. 157-180, Nov. 1985.
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