

David L. Shealy

Education

- 1962–1973 University of Georgia Athens, GA
- Ph.D., Physics, 1973. Phi Beta Kappa. NSF Graduate Trainee, 1966-70.
- B. S. in Physics, 1966. Phi Kappa Phi. Ted L. Simons Memorial Award and Wheatly Award as Outstanding physics major, University of Georgia, 1965-66.

Experience

- 1984-present: **Professor and Chair**, Department of Physics, UAB
 - Fellow, Optical Society of America, 1988. Member, SPIE - The International Society of Optical Science & Engineering. Direct MS, PhD, and postdoctoral research projects. Research Paper Award, Alabama Section, Institute of Electrical and Electronic Engineers, 1984. SPIE Laser Beam Shaping IX Meritorious Achievement Award, San Diego, Aug 12, 2008.
 - Built strong and viable graduate programs in Physics; increased significantly the extramural funding by hiring nationally competitive faculty; expanded and enhanced the functionality of the research and educational space; upgraded teaching and research infrastructure.
 - Founding Director of the Laser & Photonics Research Center, December 1996, which broadened scope and changed name to Center for Optical Sensors and Spectroscopies (COSS) under leadership of C.M. Lawson and S.B. Mirov and obtained long-term NSF center funding. See <http://www.coss.phy.uab.edu/> for more information.
 - Member of Board of Trustees, UAB Research Foundation, 1988 – 90. Founding UAB Director of the Joint University of Alabama System Interdisciplinary Doctoral Materials Science Program.
- 1997-present: **Director**, UAB IT Research Computing Services unit.

Worked with IT and academic units to improve UAB Cyber-infrastructure by developing significant internal, corporate, and NSF grant funding for campus-wide advanced networking services.

caBIG[®] 2009 Deployment Award was presented to the UAB Team at the 2009 caBIG[®] Annual Meeting, July 22, 2009, Marriott Wardman Park, Washington, D.C.

For more information see Researchers tab at www.uab.edu/it and <http://docs.uabgrid.uab.edu/wiki/Welcome>
- 1980–1984: **Principal Engineer, Staff Scientist**, Motorola, Inc., Phoenix, AZ
 - Sabbatical and research leave (24 months) to work on optical and electronic packaging research in the Materials Technology Lab.
 - Silver Quill and Publication Awards, Motorola Semiconductor Product Sector, 1982-83.
- 1976–1984: **Associate Professor**, Department of Physics UAB
 - NASA – ASEE Summer Faculty Fellowship, Jet Propulsion Laboratory, Pasadena, California, 1980-81.
- 1973–1976: **Assistant Professor**, Department of Physics UAB

Research Interest

Summary: long-term research is directed towards fundamental understanding of new optical systems for applications using lasers and soft-x-rays to characterize and process materials. Recent work includes developing general solutions of the eikonal equation which yield analytic solutions for wave front and caustic surfaces when plane waves are reflected or refracted from multi-surface optical system. Developed innovative solutions for designing of laser beam

shaping systems with genetic algorithm optimization and differential equation methods and for using diffraction theory and geometrical optics for simulating the performance of laser and free-electron laser cavities/systems and of soft-x-ray optical elements as applied to multi-layer and grazing incident microscopes and projection lithography.

Keywords: geometrical optics; caustic theory; aberration theory; optical design; optimization; genetic algorithms; differential equations; laser beam shaping; numerical analysis; and mathematical physics.

**Recent
Professional
Activities**

- Topical Editor in Geometrical Optics for *Applied Optics – Optical Technologies*, 2003-09
- Published 153 journal and proceedings articles, book chapters, and reports. Presented over 154 invited and contributed papers. Extramural funding 1997-2007 is approximately \$3.5M as PI or co-PI.
- Member of NSF Committee of Visitors during Summer 2000 for the purpose of reviewing the Advanced Networking & Infrastructure Research Programs (ANIR) during the past 3 years. Invited participant in AAAS National Workshop on Developing Guidance for NSF Advanced Networking Infrastructure Support, February 22-23, 1999.
- Co-chair of SPIE Laser Beam Shaping II-VIII, 2000-07.
- Review manuscripts and proposals for NSF, NASA, National Research Council, Applied Optics, J. Applied Physics B, J. Optical Society of America, Optical Engineering, J. Modern Optics, and Optics Letters.

**Theses and
Dissertations
Directed at
UAB**

- P.W. Rhodes, "Design and analysis of refractive optical systems for irradiance redistribution of collimate radiation," MS, 1979.
- A.M. Kassim, "The design and analysis of several configurations for a two-channel three mirror x-ray telescope," MS, 1981.
- B.A. Harmon, "Design and analysis of a thermal shield system for the STARPROBE spacecraft," MS, 1982.
- D.R. Gabardi, "Coupling of domed light-emitting diodes with a multimode step-index optical fiber," MS, 1984.
- A. M. Kassim, "Caustic wave aberration theory for general optical systems," PhD, 1985.
- I.H. Al-Ahdali, "Optimization of three and four-element lens system by minimizing the caustic merit function," PhD, 1989.
- D.R. Gabardi, "Optical analysis of grazing incidence ring resonators for free-electron lasers," PhD, 1990.
- C. Wang, "A differential equation design method for finite-conjugate, multi-mirror imaging systems," PhD 1992.
- W. Jiang, "Application of a laser beam profile reshaper to enhance performance of holographic projection systems," PhD 1993.
- D.B. Gore, "A Silicon/Silver multilayer Fabry-Perot bandpass transmission filter for use near 28.4 nm," PhD, 1999.
- N.C. Evans, "Genetic algorithm optimization methods in geometrical optics," PhD, 1999.

PUBLICATIONS AND PRESENTATIONS

David L. Shealy

Journal Articles

1. S.C. Hurlock, K. Narahari Rao, D. G. Burkhard, and D. L. Shealy, Infrared emission for a V-shaped metal groove compared with that from a flat surface of the same metal. *Review of Scientific Instruments* **40** 977, 1969.
2. D. G. Burkhard, D. L. Shealy, and R. V. SEXT, Specular reflection of parallel heat radiation from an arbitrary reflector surface to an arbitrary receiver surface. *International Journal of Heat and Mass Transfer* **16**, 271-280, 1973.
3. D. L. Shealy and D. G. Burkhard, Heat flux contours on a plane for parallel radiation specularly reflected from a cone, a hemisphere and a paraboloid. *International Journal of Heat and Mass Transfer* **16**, 281-290, 1973.
4. D. G. Burkhard and D. L. Shealy, Flux density for ray propagation in geometrical optics. *Journal of the Optical Society of America* **63.3**, 299-304, 1973.
5. D. G. Burkhard and D. L. Shealy, View function in a curvilinear coordinates for specular reflection of radiation from a curved surface. *International Journal of Heat and Mass Transfer* **16**, 1492-1496, 1973.
6. D. L. Shealy and D. G. Burkhard, Flux density for ray propagation in discrete index media expressed in terms of the intrinsic geometry of the deflecting surface. *Optica Acta* **20.4**, 287-301, 1973.
7. D. L. Shealy and D. G. Burkhard, Caustic surfaces and irradiance for reflection and refraction from an ellipsoid, elliptic paraboloid, and elliptic cone. *Applied Optics* **12.12**, 2955-2959, 1973.
8. D. G. Burkhard and D. L. Shealy, Equation for the intensity of acoustic rays deflected by an object in a variable velocity medium. *Journal of the Acoustical Society of America* **56.6**, 1327-1335, 1974.
9. D. L. Shealy and D. G. Burkhard, Analytical illuminance calculation in a multi-interface optical system. *Optica Acta* **22.6**, 484-501, 1975.
10. D. L. Shealy and W. M. Rosenblum, Caustic and analytical illuminance calculations for a model of the human eye. *Optical Engineering* **14.3**, 237-240, 1975.
11. D. G. Burkhard and D. L. Shealy, Specular aspheric surface to obtain a specified irradiance from discrete or continuous line source radiation. *Applied Optics* **14.6**, 1279-1284, 1975.
12. W. M. Rosenblum and D. L. Shealy, Computerized analysis of the image quality of the human eye with optical aids. *American Journal of Optometry and Physiological Optics* **52.8**, 561-566, 1975.
13. D. G. Burkhard and D. L. Shealy, Design of reflectors which will distribute sunlight in a specified manner. *Journal of Solar Energy* **17.4**, 221-227, 1975.
14. D. L. Shealy, Caustic surface and the Coddington equations. *Journal of the Optical Society of America (Letter)* **66.1**, 76-77, 1976.

15. D. L. Shealy, Analytical illuminance and caustic surface calculations in geometrical optics. *Applied Optics* **15.10**, 2588-2596, 1976.
16. D. G. Burkhard, G. L. Strobel, and D. L. Shealy, Solar concentrating properties of truncated hexagonal, pyramidal, and circular cones. *Applied Optics* **17.15**, 2431-2448, 1978.
17. W. M. Rosenblum and D. L. Shealy, Caustic analysis of intraocular lens implants in humans. *Contact and Intraocular Lens Medical Journal* **5.1**, 136-140, 1979.
18. G. L. Strobel and D. L. Shealy, Caustic surface analysis for a gradient-index lens. *Journal of the Optical Society of America* **70.10**, 1264-1269, 1980.
19. P. W. Rhodes and D. L. Shealy, Refractive optical systems for irradiance redistribution of collimated radiation: their design and analysis. *Applied Optics* **19.20**, 3545-3553, 1980.
20. D. G. Burkhard and D. L. Shealy, Simplified formula for the illuminance in an optical system. *Applied Optics* **20.5**, 897-909, 1981.
21. D. G. Burkhard and D.L. Shealy, Formula for the density of tangent rays over a caustic surface. *Applied Optics* **21.18**, 3299-3306, 1982.
22. D. G. Burkhard, D.L. Shealy, and G. L. Strobel, Imaging characteristics of a conical primary, aspheric secondary x-ray telescope. *Applied Optics* **21.20**, 3713-3718, 1982.
23. D. J. Reed and D.L. Shealy, A transmission line model of a VLSI package. *Solid State Technology*, 172-181, February, 1983.
24. H.M. Berg, D.L. Shealy, C.M. Mitchell, D. Stevenson, M. Quill, L. Lofgran, Optical coupling in fiber optics packages with surface emitting LED's. *IEEE Transactions on Components, Hybrids, and Manufacturing Technology*, **CHMT6.3**, 334-342, 1983. Also appeared in *Proceedings of the Electronics Component Conference*, *IEEE* **32**, 111-119, 1982.
25. D.L. Shealy and H. M. Berg, Simulation of optical coupling from surface emitting LEDs. *Applied Optics* **22.11**, 1722-1730, 1983.
26. D.L. Shealy, Theoretical analysis of infrared radiation shields of spacecraft. *Journal of Spacecraft and Rockets* **21.3**, 293-300, 1984.
27. A. Kassim and D.L. Shealy, Design and analysis of a two channel, three mirror x-ray telescope. *Applied Optics* **23.16**, 3482-3486, 1984.
28. R.B. Hoover, D.L. Shealy, S.H. Chao, Spectral slicing x-ray telescope. *Optical Engineering* **25.8**, 970-978, 1986.
29. S. H. Chao and D.L. Shealy, Application of the flux flow equation to the Wolter I x-ray telescope and thin-film multilayered optics. *Applied Optics* **25**, 1997-2002, 1986.
30. D. R. Gabardi and D.L. Shealy, Coupling of domed light-emitting diodes with a multimode step-index optical fiber. *Applied Optics* **25.19**, 3435-3442, 1986.
31. S. H. Chao and D.L. Shealy, Theoretical analysis of stable and unstable aspherical laser cavities. *Applied Optics* **27.1**, 75-79, 1988.
32. A.M. Kassim and D.L. Shealy, Wave front equation, caustics, and wave aberration function of simple lenses and mirrors. *Applied Optics* **27.3**, 516-522, 1988.

33. D.L. Shealy, D. R. Gabardi, R. B. Hoover, A. B. C. Walker, Jr., J. F. Lindblom and T. W. Barbee, Jr., Design of a normal incidence multilayer imaging x-ray microscope. *Journal of X-Ray Science and Technology* **1**, 190-206, 1989.
34. A.M. Kassim, D.L. Shealy, and D. G. Burkhard, Caustic merit function for optical design. *Applied Optics* **28.3**, 601-606, 1989.
35. D.L. Shealy and T. T. Saha, Formula for the RMS blur circle radius of Wolter telescopes based on aberration theory. *Applied Optics* **29.16**, 2433-2439, 1990.
36. D. R. Gabardi and D.L. Shealy, Optical analysis of grazing incidence ring resonators for free-electron lasers. *Optical Engineering* **29.6**, 641-648, 1990.
37. D.L. Shealy, R. B. Hoover, T. W. Barbee, Jr., and A. B. C. Walker, Jr., Design and analysis of a Schwarzschild imaging multilayer x-ray microscope. *Optical Engineering* **29**, 721-727, 1990.
38. I.H. Al-Ahdali and D.L. Shealy, Optimization of three- and four-element lens systems by minimizing the caustic surfaces. *Applied Optics* **29.31**, 4551-4559, 1990.
39. D.L. Shealy, W. Jiang, and R. B. Hoover, Design and analysis of aspherical multilayer imaging x-ray microscope. *Optical Engineering* **30.8**, 1094-1099, 1991.
40. R. B. Hoover, D.L. Shealy, B. R. Brinkley, P.C. Baker, T. W. Barbee, Jr., and A. B.C. Walker, Jr., Development of the water window imaging x-ray microscope utilizing normal incidence multilayer optics. *Optical Engineering* **30.8**, 1086-1093, 1991.
41. C. Wang and D.L. Shealy, Differential equation design of finite-conjugate reflective systems. *Applied Optics* **32.7**, 1179-1188, 1993.
42. C. Wang and D.L. Shealy, Design of gradient-index lens systems for laser beam reshaping. *Applied Optics* **32.25**, 4763-4769, 1993.
43. D.L. Shealy, C. Wang, and R. B. Hoover, Prospects for achieving ultra-high resolution with a multilayer, two-mirror microscope. *Journal of Soft X-Ray Science and Technology* **5**, 1-19, 1995.
44. W. Jiang, D.L. Shealy, and K.M. Baker, Development and testing of a holographic projection system. *Applied Optics* **35.20**, 5994-5998, 1996.
45. N. C. Evans and D. L. Shealy, Design and optimization of an irradiance profile shaping system with genetic algorithm method. *Applied Optics* **37.22**, 5216 - 5221, August 1, 1998.
46. D. L. Shealy and F. M. Dickey, Laser Beam Shaping. Special Section Guest Editorial in *Optical Engineering* **42.11**, 3077-3079, November 2003.
47. D. L. Shealy and S-H. Chao, Geometrical optics-based design of laser beam shapers. *Optical Engineering* **42.11**, 3123-3138, November 2003.
48. D. L. Shealy and J. A. Hoffnagle, Laser beam shaping profiles and propagation. *Applied Optics* **45.21**, 5118-5131, 2006.
49. D. L. Shealy and J. A. Hoffnagle, Wavefront and caustics of a plane wave refracted by an arbitrary surface. *Journal of the Optical Society of America A* **25.9**, 2370-2382, October 2008.

Books Edited

50. *Laser Beam Shaping II*, edited by Fred M. Dickey, Scott C. Holswade, and David L. Shealy, Proceedings SPIE **4443**, ISBN 9-8194-4157-0, pp. 1-198, 2001.
51. *Laser Beam Shaping III Conference* edited by Fred M. Dickey, Scott C. Holswade, and David L. Shealy, Proceedings SPIE **4770**, ISBN 0-8194-4537-1, pp. 1-158, 2002.
52. *Laser Beam Shaping IV Conference*, edited by Fred M. Dickey and David L. Shealy, Proceedings SPIE **5175**, ISBN 0-8194-5048-0, pp. 1-242, 2003.
53. *Laser Beam Shaping V Conference*, edited by Fred M. Dickey and David L. Shealy, Proceedings SPIE **5525**, ISBN 0-8194-5463-X, pp. 1-238, 2004.
54. *Laser Beam Shaping VI Conference*, edited by Fred M. Dickey and David L. Shealy, Proceedings SPIE **5876**, ISBN 0-8194-5881-3, pp. 1-380, 2005.
55. *Laser Beam Shaping VII Conference*, edited by Fred M. Dickey and David L. Shealy, Proceedings SPIE **6290**, ISBN 0-8194-6369-8, pp. 1-324, 2006.
56. *Laser Beam Shaping VIII Conference*, edited by Fred M. Dickey and David L. Shealy, Proceedings SPIE, **0777-786X**, v. 6663, ISBN 9780819468116, 2007.
57. *Laser Beam Shaping Applications*, edited by Fred M. Dickey, Scott C. Holswade and David L. Shealy, ISBN 0-8247-5941-9, pp. 1-357, CRC Press, Taylor & Francis Group, Boca Raton, FL, 2006.

Book Chapters

58. D.L. Shealy and V. K. Viswanathan, Design survey of x-ray/XUV projection lithography systems. in *SPIE Advent Technology Series, AT 2*, ed. Richard Feinberg, SPIE Optical Engineering Press, Bellingham, WA, 320-331, 1991.
59. D. L. Shealy, "Chapter 4: Geometrical Methods," in *Laser Beam Shaping Theory and Techniques*, edited by Fred M. Dickey and Scott C. Holswade, Marcel Dekker, New York, 2000, pp. 163-213.
60. N. C. Evans and D. L. Shealy, "Chapter 5: Optimization-Based Techniques for Laser Shaping Optics," in *Laser Beam Shaping Theory and Techniques*, edited by Fred M. Dickey and Scott C. Holswade, Marcel Dekker, New York, 2000, pp. 215-248.
61. D. L. Shealy, "Chapter 8: Classical (Non-laser) Methods," in *Laser Beam Shaping Theory and Techniques*, edited by Fred M. Dickey and Scott C. Holswade, Marcel Dekker, New York, 2000, pp. 313-348.
62. D. L. Shealy, "Chapter 9: History of Beam Shaping," in *Laser Beam Shaping Applications*, edited by Fred M. Dickey, Scott C. Holswade and David L. Shealy, ISBN 0-8247-5941-9, CRC Press, Taylor & Francis Group, Boca Raton, FL, 2006, pp. 307-347.
63. D.L. Shealy and J. A. Hoffnagle, "Aspheric Optics for Laser Beam Shaping," in *Encyclopedia of Optical Engineering*, edited by Ron Driggers, DOI: 10.1081/E-EOE-120029768, ISBN: 0-8247-0940-3 (paper) 0-8247-0939-X (electronic), (Taylor & Francis, 2006), URL of article

<http://www.dekker.com/sdek/abstract~db=enc~content=a713626925> (accessed 6 February 2007).

Conference Proceedings Articles

64. D. G. Burkhard, D.L. Shealy and G. L. Strobel, Comparison of the solar concentrating properties of truncated hexagonal, pyramidal and circular cones. *Proceedings SPIE* **114**, 67-94, 1977.
65. W. Cash, D.L. Shealy, and J. H. Underwood, Astronomical applications of grazing incidence telescopes with polynomial surfaces. *Proceedings SPIE* **184**, 228-233, 1979.
66. J. H. Underwood, T. W. Barbee, D.L. Shealy, X-ray and extreme ultraviolet imaging using layered synthetic microstructures. *Proceedings SPIE* **316**, 79-89, 1981.
67. H.M. Berg, D.L. Shealy, C.M. Mitchell, D. Stevenson, M. Quill, L. Lofgran, Optical coupling in fiber optics packages with surface emitting LED's. *Proceedings of the Electronics Component Conference, IEEE*, **32**, 111-119, 1982. Also, *IEEE Transactions on Components, Hybrids, and Manufacturing Technology*, **CHMT6.3**, 334-342, 1983.
68. D.L. Shealy, S. Chao and D.J. Reed, Lossy transmission line model of a VLSI package. *Proceedings of the University / Government / Industry Microelectronics Symposium, IEEE*, **CH1906**, 144-148, 1983.
69. D.L. Shealy, S. Chao and D.J. Reed, Lossy transmission line model of a VLSI package. *Proceedings of the University / Government / Industry Microelectronics Symposium, IEEE*, **CH1906**, 144-148, 1983.
70. R. B. Hoover, S. H. Chao, D.L. Shealy, Design and analysis of spectral slicing x-ray telescope systems. *Proceedings SPIE* **563**, 280-290, 1985.
71. S. H. Chao, D.L. Shealy, Formula for the meridional section of the point spread function of Wolter I x-ray telescope and thin-film multilayered optics. *Proceedings SPIE* **563**, 291-298, 1985.
72. D.L. Shealy and R. B. Hoover, Hybrid x-ray telescope systems. *Proceedings SPIE* **640**, 28-44, 1986.
73. D.L. Shealy, R. B. Hoover, and D. R. Gabardi, Multilayer x-ray imaging systems. *Proceedings SPIE* **691**, 83-91, 1986.
74. D. G. Burkhard and D.L. Shealy, A different approach to lighting and imaging: Formulas for flux density, exact lens and mirror equations and caustic surfaces in terms of the differential geometry of surfaces. *Proceedings SPIE* **692**, 248-272, 1986.
75. H.C. Cheung, J. C. Martin, D.L. Shealy and R. D. Wells, Lasers in Medicine. *Medical Electronics*, 86-87, October 1986.
76. R. G. Thompson, D.L. Shealy and H.T. Tohver, Compatibility studies in metal-cordierite systems for electronic packaging. *Proceedings Electronics Components Conference, IEEE* **CH2448-9**, 420-426, 1987.

77. R. G. Thompson, J. Shyu, J. C. Poret, C. Buckhalt, D.L. Shealy, H.T. Tohver, A study of porous cordierite as a potential candidate for VLSI substrates. Proceedings SPIE **877**, 103-110, 1988.
78. D.L. Shealy, H.T. Tohver, D.A. Hill, Z. Shehadeh, R. G. Thompson, J. Shyu, Physical properties of ceramic-glass-copper micro-interconnect systems for VLSI/VHSIC packaging applications. Proceedings SPIE **877**, 97-102, 1988.
79. R. B. Hoover, D.L. Shealy, D. R. Gabardi, A. B. C. Walker, Jr., J. F. Lindblom, and T. W. Barbee, Jr., Design of an imaging microscope for soft x-ray application, Proceedings SPIE **984**, 234-246, 1988.
80. D.L. Shealy and T. T. Saha, Formula for the RMS blur circle radius of Wolter telescopes based on aberration theory. Proceedings SPIE **1113**, 21-25, 1989.
81. R. G. Thompson, J. C. Poret, and D.L. Shealy, Stability of metallization films on porous ceramic substrates. Proceedings of the 2nd ASM International Electronic Materials and Processing Congress, **8902-009**, 223-230, 1989.
82. D. R. Gabardi and D.L. Shealy, Optical analysis of grazing incidence ring resonators for free-electron lasers. Proceedings SPIE **1160**, 337-348, 1989.
83. D.L. Shealy, R. B. Hoover, A. B. C. Walker, Jr. and T. W. Barbee, Jr., Development of a normal incidence multilayer imaging x-ray microscope. Proceedings SPIE, **1160**, 109-121, 1989. Also, NASA/MSFC Space Science Laboratory Preprint Series, No. 89-123, June, 1989.
84. D.L. Shealy, V. K. Viswanathan, Design survey of x-ray/XUV projection lithography systems. Proceedings SPIE, **1343**, 229-240, 1990.
85. D.L. Shealy and W. Jiang, Design and analysis of aspherical multilayer imaging x-ray microscope. Proceedings SPIE, **1343**, 122- 132, 1990 Also, NASA/MSFC Space Science Laboratory Preprint Series, No 90-125, September, 1990.
86. R. B. Hoover, D.L. Shealy, B. R. Brinkley, P.C. Baker, T. W. Barbee, Jr., and A. B. C. Walker, Jr., Water window imaging x-ray microscope for cancer research. Proc. NASA Technology 2000, NASA Conf. Publ. 3109, Vol. 1, 73-82, 1991.
87. R. B. Hoover, P.C. Baker, D.L. Shealy, B. R. Brinkley, A. B. C. Walker, Jr., and T. W. Barbee, Jr., Design and analysis of a water window imaging x-ray microscope. Proceedings SPIE **1426**, 84-96, 1991.
88. R. B. Hoover, D.L. Shealy, P.C. Baker, T. W. Barbee, Jr., and A. B. C. Walker., Jr., Development of the water window imaging x-ray microscope. Proceedings SPIE **1546**, 125-136, 1991.
89. D.L. Shealy, C. Wang, and V. K. Viswanathan, Design and analysis of multi-mirror soft x-ray projection lithography systems. in Soft-X-Ray Projection Lithography, Technical Digest Series, Optical Society of America, Washington, DC, 119-121, 1991. Also appeared in OSA Proceedings on Soft X-Ray Projection Lithography, Vol. **12**, 22-26, ed. Jeffrey Bokos, Optical Society of America, 1991.
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91. C. Wang and D.L. Shealy, Differential equation method for design of multi-mirror x-ray projection lithography systems. Proceedings SPIE **1547**, 111-126, 1991.
92. D.L. Shealy, C. Wang, W. Jiang, L. Jin, and R. B. Hoover, Design and analysis of a fast, two-mirror soft-x-ray microscope. Proceedings SPIE **1741**, 20-31, 1992.
93. S. H. Chao and D.L. Shealy, Application of aberration theory to calculate encircled energy of Wolter I-II telescopes. Proceedings SPIE **1742**, 273-283, 1992.
94. R. B. Hoover, P.C. Baker, D.L. Shealy, D.B. Gore, A. B.C. Walker, Jr., T. W. Barbee, Jr., T. Kerstetter, Imaging Schwarzschild multilayer x-ray microscopy. Proceedings SPIE **1742**, 660-673, 1992. Also, NASA/MSFC Space Science Laboratory Preprint Series No. 92-124, December, 1992.
95. A.M. Kassim and D.L. Shealy, Imaging characteristics of radial gradient index lenses. Proceedings SPIE **2000**, 340-349, 1993.
96. W. Jiang, D.L. Shealy, and J. C. Martin, Design and testing of a refractive reshaping system. Proceedings SPIE **2000**, 64-75, 1993.
97. C. Wang and D.L. Shealy, Multi-mirror anastigmat design. Proceedings SPIE **2000**, 28-33, 1993.
98. W. Jiang, D.L. Shealy, and K. M. Baker, Optical design and testing of a holographic projection system. Proceedings SPIE **2152**, 244-252, 1994.
99. A.M. Kassim and D.L. Shealy, Optical performance of axial gradient and aspheric surface lenses: study and analysis. Proceedings SPIE **2263**, 33-41, 1994.
100. V. Oliker, L. D. Prussner, D.L. Shealy and S. Mirov, Optical design of a two-mirror asymmetrical reshaping system and its application in superbroadband color center lasers. Proceedings SPIE **2263**, 10-18, 1994.
101. R. B. Hoover, D.L. Shealy, A. B. C. Walker, Jr., P.C. Baker, N. Grupido, G. Gutman, and T. W. Barbee, Jr., Development of the water window imaging x-ray microscope. Proceedings SPIE **2270**, 195-208, 1994.
102. D.L. Shealy, Optical design via solution of differential equations. Proceedings of the Georgia Theoretical Physics Symposium, 31-35, 1994.
103. W. Jiang, D.L. Shealy, and K. M. Baker, Physical optics analysis of the performance of a holographic projection system. Proceedings SPIE **2404**, 227-234, 1995.
104. K. M. Baker, D.L. Shealy, and W. Jiang, Directional light filters: three-dimensional azo dye formed micro-honeycomb images within optical resins. Proceedings SPIE **2404**, 144-158, 1995.
105. S. H. Chao and D.L. Shealy, "Design of an anastigmat two-mirror microscope," in *Current Developments in Optical Design and Engineering V*, edited by Robert E. Fischer and Warren J. Smith, Proceedings SPIE **2540**, 21-32, 1995. Also, appear in *Selected SPIE Papers on CD-ROM*, edited by Donald C. O'Shea, (SPIE, Bellingham, WA, February, 1999), vol. 2.
106. S.H. Chao, N.C. Evans, D.L. Shealy, and R.B. Johnson, Design of three-mirror telescopes via a differential equation method, Proceedings SPIE **2863**, 276-286, 1996.

107. D.L. Shealy, "Theory of geometrical methods for design of laser beam shaping systems (Invited Paper)," in *Laser Beam Shaping*, edited by Fred M. Dickey and Scott C. Holswade, Proceedings SPIE **4095**, 1-15, 2000.
108. N.C. Evans and D.L. Shealy, "Design of a gradient-index beam shaping system via a genetic algorithm optimization method," in *Laser Beam Shaping*, edited by Fred M. Dickey and Scott C. Holswade, Proceedings SPIE **4095**, 26-39, 2000.
109. W. Jiang and D.L. Shealy, "Development and testing of a refractive laser beam shaping system," in *Laser Beam Shaping*, edited by Fred M. Dickey and Scott C. Holswade, Proceedings SPIE **4095**, 165-175, 2000.
110. D.L. Shealy and S.H. Chao, "Design and analysis of an elliptical Gaussian laser beam shaping system," in *Laser Beam Shaping II*, edited by Fred M. Dickey, Scott C. Holswade, and David L. Shealy, Proceedings SPIE **4443**, 24-35, 2001.
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151. D.L. Shealy, W. Jiang, and K. M. Baker, Holographic projection processing of micro-optical devices. Final report submitted to Alabama Space Grant Consortium, Subcontract No. UAH 90-204, December 1, 1994.
152. D. L. Shealy (PI); co-PI: S. A. McClellan, J. Gemmill, P. A. Hancock; Sr. Personnel: J. W. Iannuzzi, S. M. Sanders, D. Brown, D. Cordes, S. Szygenda; Technical Personnel: D. McLean, C. Bell, L. B. Manderson, C. White, J. Waters, Annual Project Report for Award ANI-9729500. NSF FASTLANE, October 31, 1998.
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Invited Presentations/Seminars/Colloquia

1. "Energy flux density monitoring in geometrical optics," Materials Technology Laboratory, Motorola, Inc., December 13, 1979.
2. "Fiber optics," Physics Department, University of Alabama in Huntsville, Winter, 1981.
3. "Fiber optics coupling to light emitting diodes (LED)," Materials Technology Laboratory, Motorola, Inc., Fall, 1980.

4. "Optical coupling in fiber optics packages with surface emitting LED's," Materials Technology Laboratory, Motorola, Inc., June 2, 1982.
5. "Modeling the light coupling in optoelectronics packages," Materials Technology Laboratory, Motorola, Inc., June 2, 1982.
6. "Transmission line model of the power and signal leads in VLSI packages," Material Technology Laboratory, Motorola, Inc., August 11, 1982.
7. "Transmission line model of high speed switching noise in VLSI semiconductor package," Physics Department, University of Alabama in Huntsville, January 25, 1983.
8. "Transmission line model of VLSI semiconductor packages," Dept. of Physics and Astronomy, University of Alabama, March 2, 1983.
9. "Lossy transmission line model of a VLSI package," Department of Computer & Information Science, University of Alabama in Birmingham, April 20, 1983.
10. "Transmission line model of a VLSI package," Physical Sciences Center, Honeywell, Inc., July 12, 1985.
11. "X-ray optics," Annual Meeting of Southeastern Section American Physical Society, December 2, 1985.
12. "Applications of x-ray optics," Free-Electron Laser Group, Los Alamos National Laboratory, August 27, 1987.
13. "New materials for high speed microelectronic packaging applications," NSF and Alabama EPSCoR Site Visit, Birmingham, Feb 16, 1989.
14. "Optical analysis of grazing incidence resonators for soft x-ray/EUV FEL applications," Free-Electron Laser Group, Los Alamos National Laboratory, March 2, 1989.
15. "XUV projection optics," part of Los Alamos National Laboratory presentation entitled "Development of 0.1 μm -resolution lithography based on an XUV free-electron laser," DARPA Advisory Committee on Advanced Lithography, Dallas, November 10, 1989.
16. "Status of x-ray microscopy," Seminar in Department of Materials Science and Engineering, University of Alabama at Birmingham, February 12, 1991.
17. "Soft x-ray optics: microscopy and projection lithography," Sigma Xi Lecture at The University of Alabama in Huntsville, April 24, 1991.
18. "Overview of soft x-ray imaging applications using multilayer optics," Keynote address in the Imaging and Tomography Session at the 41st Annual Denver X-ray Conference, Colorado Springs, August 3-7, 1992. Also presented as colloquium to Department of Physics, UAB, October 16, 1992.
19. "Caustic, irradiance, and differential equation design of optical systems," Colloquium presented to the Department of Mathematics and Computer Science, Emory University, October 29, 1992.
20. "Prospects of achieving ultra-high resolution with a multilayer, two-mirror microscope," Invite talk presented to Soft X-Rays in the 21st Century, Provo, Utah, February 10 -13, 1993.
21. "Directional light filters," Seminar presented by K. M. Baker and D.L. Shealy to PPG Industries, Chemicals Group Technical Center, Monroeville, PA, January 10, 1994.

22. "Optical design via solution of differential equations," Invited talk presented to Special Theoretical Physics Symposium, University of Georgia, Athens, GA, September 16, 1994.
23. "Holographic projection processing of micro-optical devices," Seminar presented to Rhodes College, Memphis, TN, November 3, 1994.
24. "Report on Internet2 General Meeting." D. Shealy and S. McClellan presented to UAB TIMGROUP, February 20, 1997.
25. "Networking and Information Technology," J. Lorden, D. Shealy, S. Plutchak, J. Gemmill, E. Lefkowitz, UAB Executive Council, June 16, 1997.
26. "Internet2 and Proposals," D. Shealy, S. McClellan, J. Gemmill, UAB Academic Program Council, September 10, 1997.
27. "Internet2," D. Shealy, J. Gemmill, UAB Graduate Council, November 12, 1997.
28. "Internet2," D. Shealy, J. Gemmill, S. McClellan, UAB Academic Program Council, December 19, 1997.
29. "Internet2 - What it means to UAB," J. Gemmill and D. Shealy, UAB IT Day, February 26, 1998.
30. "Dynamics of the Networked Academy - University Panel," sponsored by Mississippi State University Information Technologies Oversight Committee, SURA, and UCAID, Starkville, MS, September 9-11, 1998.
31. "Alabama's Internet2 and Advanced Networking Infrastructure," David Cordes, David Shealy, Sara Graves, and David McGirt, Alabama EPSCoR Conference, Auburn, AL, February 24-25, 1999.
32. "Theory of geometrical methods for design of laser beam shaping systems," David L. Shealy, Laser Beam Shaping Conference 4095, SPIE International Symposium on Optical Science and Technology, San Diego, 2 August 2000.
33. "Geometrical methods for laser beam shaping," David L. Shealy, Laser Materials Processing Session 11: Laser Beam Shaping, Quality & Transmission, 20th International Congress on Applications of Lasers & Electro-Optics, Paper No. 1102, Jacksonville, 18 October, 2001.
34. "Optical design of laser beam shaping systems," David L. Shealy, International Optical Design Conference, Paper No. IWA2, Tucson, June 5, 2002.
35. "Innovations in beam shaping and illumination applications," David L. Shealy, Frontiers in Optics Conference – 87th Annual Meeting of OSA, Tucson, October 5 – 7, 2003.
36. "UAB NMI Testbed Program: Integrated Directory Services and Grid Computing," David L. Shealy, Jill Gemmill, John-Paul Robinson, Jason Lynn, Zach Garner, Ramesh Puljala, Rajani Sadasivam, Aditya Srinivasan, Pravin Joshi, Silbia Peechakara, Yiyi Chen; invited presentation for the NMI Integration Testbed "Finale" Results Workshop at the Internet2 Member Meeting, Austin, Sept 28 – Oct 1, 2004.
37. "Personal reflections of physics education at University of Georgia & Innovations in laser beam shaping," David L. Shealy, Colloquium & Physics/Astronomy Awards Day, Department of Physics & Astronomy, University of Georgia, April 29, 2004.

38. "Geometrical optics: some applications of the law of intensity," David L. Shealy, SPIE Novel Optical System Design and Optimization IX Conference at the SPIE Optics & Photonics Symposia, San Diego August 13-17, 2006.

Contributed Presentations and/or Published Abstracts

39. "Ionization potential for first row diatomic hydrides," D. G. Burkhard and D. L. Shealy, *Bulletin of the Georgia Academy of Science* **29**, 138, 1971.
40. "Specular reflection of light from curved surfaces," D. G. Burkhard and D. L. Shealy, *Bulletin of the Georgia Academy of Science* **29**, 135, 1971.
41. "An analytical method for flux monitoring in discrete and variable index media in the ray optics limit," D. G. Burkhard and D. L. Shealy, *Bulletin of the Georgia Academy of Science* **30**, 1972.
42. "An analytical method for flux monitoring in discrete index media in the ray optics limit," D. L. Shealy and D. G. Burkhard, *Journal of the Optical Society of America* **62.10**, 1393A, 1972.
43. "Acoustic flux density for ray propagation in discrete index media and in gradient index media," D. G. Burkhard and D. L. Shealy, 84th Annual Meeting of the Acoustical Society of America, 1972.
44. "Flux density for ray propagation in discrete index media," D. L. Shealy and D. G. Burkhard, Annual Meeting of the Southeastern Section of the American Physical Society, 1972.
45. "Acoustics flux density for ray propagation in gradient index media," D. G. Burkhard and D. L. Shealy, Annual Meeting of the Southeastern Section of the American Physical Society, 1972.
46. "Illumination and caustics in two-dimensional optics," D. G. Burkhard and D. L. Shealy, Spring Meeting of the Optical Society of America, 1973.
47. "Design of reflecting or refracting surfaces to produce specified intensity distribution on a receiver surface," D. G. Burkhard and D. L. Shealy, *Journal of the Optical Society of America* **63.10**, 1296A, 1973.
48. "Flux monitoring in a multi-interface optical system," D. L. Shealy and D. G. Burkhard, *Journal of the Optical Society of America* **63.10**, 1295A, 1973.
49. "Caustic surface for reflection and refraction from ellipsoid, elliptic cone, and elliptic paraboloid," D. L. Shealy and D. G. Burkhard, Spring Meeting of the Optical Society of America, 1973.
50. "Conversion by reflection of line-source radiation into an arbitrary irradiance pattern," D. G. Burkhard and D. L. Shealy, *Journal of the Optical Society of America* **64.10**, 1357A, 1974.
51. "Caustic and energy flux density of a model of the human eye," D. L. Shealy and W. M. Rosenblum, *Journal of the Optical Society of America* **64.10**, 1357A, 1974.
52. "Analytical flux monitoring in optical systems," D. L. Shealy, Annual Meeting of the Alabama Academy of Science, April 15, 1974.

53. "A proposed simplified new x-ray telescope," D. G. Burkhard, M. G. Miller and D. L. Shealy, Georgia Academy of Science, April 25-26, 1975.
54. "Analytical illuminance and caustic surface calculations in geometrical optics," D. L. Shealy, International Lens Design Conference, Haverford, PA, June 23-27, 1975.
55. "Caustic surface of an optical system," D. L. Shealy, Optics News, September, 1975.
56. "Aspheric lens and ellipsoidal reflector to heat a sphere uniformly," G. L. Strobel, D. G. Burkhard, and D. L. Shealy, Optics News, Summer, 1976.
57. "Energy over the caustic surface," D. G. Burkhard and D. L. Shealy, Optics News, Summer, 1976.
58. "Caustic surface merit functions in optical design," D. L. Shealy and D. G. Burkhard, Optics News, Summer, 1976.
59. "Shaping a refractor surface to produce a specified energy distribution over a receiver surface," D. G. Burkhard and D. L. Shealy, Optics News, Summer, 1976.
60. "X-ray telescope design," D. G. Burkhard, G. L. Strobel, and D. L. Shealy, Optics News, Summer, 1976.
61. "Solar concentrating properties of some simple truncated cones," D. G. Burkhard, G. L. Strobel, and D. L. Shealy, Optics News, Summer, 1976.
62. "Evaluation of the energy density in the region of the caustic surface of an optical system," D. G. Burkhard and D.L. Shealy, 43rd Annual Meeting of the Southeastern Section of the American Physical Society, Old Dominion University, November 11-13, 1976.
63. "Some new results in geometrical optics: analytical illuminance calculations in a multiple interface optical system," D. G. Burkhard and D.L. Shealy, Spring Meeting of the American Physical Society, Washington, DC, April 25-28, 1977.
64. "Solar concentrating properties of truncated cones," D. G. Burkhard, G. L. Strobel, and D. L. Shealy, 21st International Symposium, Society of Photo-Optical Instrumentation Engineers, San Diego, CA, August 23-24, 1977.
65. "Caustic analysis of intraocular lens implants in humans," W. M. Rosenblum and D.L. Shealy, Annual Meeting of the Optical Society of America, Toronto, Canada, October 10-14, 1977.
66. "Solar concentrating properties of truncated pyramidal, hexagonal, and circular cones," D. G. Burkhard, D.L. Shealy and G. L. Strobel, Annual Meeting of the Optical Society of America, Toronto, Canada, October 10-14, 1977.
67. "Formulas for the illuminance and caustic surfaces in an optical system," D. L. Shealy and D. G. Burkhard, Fall Meeting of the American Physical Society, Miami, FL, November 21-23, 1977.
68. "Some new results in geometrical optics," D. G. Burkhard and D. L. Shealy, Journal of the Optical Society of America **68.10**, 1452A, 1978.
69. "Astronomical applications of grazing incidence telescopes with polynomial surfaces," W. Cash, D. L. Shealy and J. H. Underwood, Space Optics Imaging X-ray Optics Workshop of the Society of Photo-Optical Instrumentation Engineers, Huntsville, AL, May 22-24, 1979.

70. "Caustic analysis for a gradient index lens," G. L. Strobel and D. L. Shealy, *Journal of the Optical Society of America* **69.10**, 1429A, 1979.
71. "Design of refractive optical system for irradiance redistribution of collimated radiation," P. W. Rhodes and D. L. Shealy, *Optics News* **6.3**, 48A, 1980.
72. "Design of a three mirror Wolter-Schwarzschild x-ray telescope," A. Kassim and D. L. Shealy, 58th Annual Meeting of the Alabama Academy of Science, 1981.
73. "Design of an isothermal primary heat shield for the STARPROBE satellite mission," A. Harmon and D. L. Shealy, 58th Annual Meeting of the Alabama Academy of Science, 1981.
74. "Design of an x-ray microscope for use with an extended range x-ray telescope," A. Kassim, S. Chao, and D.L. Shealy, 59th Annual Meeting of the Alabama Academy of Science, 1982.
75. "A transmission line model of a VLSI package," D. J. Reed and D.L. Shealy, VLSI Packaging Workshop sponsored by NBS and IEEE-CHMT, Gaithersburg, MD, September 13-14, 1982.
76. "A formula for the density of tangent rays over a caustic surface," D. G. Burkhard, D.L. Shealy, Annual Meeting of the Optical Society of America, Tucson, AZ, October 18-22, 1982.
77. "Design of a glancing incidence x-ray telescope - microscope system," D.L. Shealy, R. B. Hoover, A. Kassim, S. Chao, Annual Meeting of the Optical Society of America, Tucson, AZ, October 18-22, 1982.
78. "Numerical simulation of a VLSI package," D. J. Reed and D.L. Shealy, Conference on Numerical Simulations of VLSI Devices sponsored by SIAM and IEEE-ED Society, Boston, MA, November 2-4, 1982.
79. "Lossy transmission line analysis of semiconductor packages," S. Chao and D.L. Shealy, 60th Annual Meeting of the Alabama Academy of Science, March 3-5, 1983.
80. "New developments in optical aberration theory," A. Kassim and D.L. Shealy, 60th Annual Meeting of the Alabama Academy of Science, March 3-5, 1983.
81. "Lossy transmission line model of a VLSI package," D.L. Shealy and S. H. Chao, 1983 University/Government/Industry Microelectronics Symposium, IEEE-CHMT, College Station, TX, May 24-27, 1983.
82. "Exact geometrical aberration function for spherical reflector," D.L. Shealy and A. Kassim, Annual Meeting of the Optical Society of America, New Orleans, LA, October 17-21, 1983.
83. "Caustic merit function for lens design," A.M. Kassim and D.L. Shealy, Annual Meeting of the Optical Society of America, San Diego, CA, October 30-November 2, 1984.
84. "Formula for the meridional section of the point spread function of Wolter I x-ray telescope and thin-film multilayered optics," S. H. Chao, D.L. Shealy, Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, San Diego, August 17-23, 1985.
85. "Design and analysis of spectral slicing x-ray telescope systems," R. B. Hoover, S. H. Chao, D.L. Shealy, Technical Symposium of Society of Photo-Optical Instrumentation Engineers, San Diego, August 17-23, 1985.
86. "Coupling of domed light-emitting diodes with a step-index multimode optical filter," D. Gabardi and D. Shealy. 63rd Annual Meeting of the Alabama Academy of Science, Montgomery, AL, April 2-5, 1986.

87. "Hybrid x-ray telescope systems," D.L. Shealy, Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, Orlando, FL, April 2-4, 1986.
88. "A different approach to lighting and imaging: Formulas for flux density, exact lens and mirror equations and caustic surfaces in terms of the differential geometry of surfaces," D. G. Burkhard and D.L. Shealy. Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, San Diego, August 19-21, 1986.
89. "Multilayer x-ray imaging systems," D.L. Shealy, R. B. Hoover, D. G. Gabardi. Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, San Diego, August 21-22, 1986.
90. "Compatibility studies in metal-cordierite systems for electronic packaging," R. G. Thompson, D.L. Shealy, J. Shyu and H.T. Tohver. 37th Electronic Components Conference, Boston, May 11-13, 1987.
91. "Use of cordierite and copper as advanced packaging materials," D.L. Shealy, H.T. Tohver, R. G. Thompson. VLSI & GAAS Packaging Workshop, Research Triangle Park, NC, September 14-16, 1987.
92. "The effect of second phase distribution on the dielectric constant of cordierite," R. G. Thompson, C. S. Shyu, H.T. Tohver, and D.L. Shealy. International Symposium on Ceramic Substrates and Packages: Low Dielectric Constant Oxide Compositions, Denver, October 18-21, 1987, and Alabama Materials Research Conference, Birmingham, AL., September 29-30, 1987.
93. "Physical properties of an advanced micro-interconnect system using cordierite and copper," D.A. Hill, Z. Shehadeh, G. Srinivasan, H.T. Tohver, D.L. Shealy, and R. G. Thompson. Alabama Materials Research Conference, Birmingham, AL., September 29-30, 1987.
94. "Caustic merit function for optical design," I. H. Al-Ahdali and D.L. Shealy. Annual Mtg. Opt. Soc. Am., Rochester, NY, October 18-23, 1987.
95. "Physical properties of ceramic-glass-copper micro-interconnect systems for VLSI/VHSIC packaging applications," D.L. Shealy, H.T. Tohver, D.A. Hill, Z. Shehadeh, G. Srinivasan, R. G. Thompson, and J. Shyu. Symposium on Innovative Science & Technology: Micro-Optoelectronics Materials, Los Angeles, January 13-14, 1988.
96. "A study of porous cordierite as a potential candidate for VLSI dielectric substrates," R. G. Thompson, J. Shyu, J. C. Poret, C. Buckhalt, D.L. Shealy, and H.T. Tohver. Symposium on Innovative Science & Technology: Micro-Optoelectronics Materials, Los Angeles, January 13-14, 1988.
97. "Design of an imaging microscope for soft x-ray application," R. B. Hoover, D.L. Shealy, D. R. Gabardi, A. B.C. Walker, Jr., J. F. Lindblom, and T. W. Barbee, Jr. Technical Symposium of the Society of Photo-Optical Instrumentation Engineers, San Diego, August 17-19, 1988.
98. "Dielectric constants and pulse propagation velocities of sintered cordierite micro strip transmission lines," D. Hill, H.T. Tohver, D.L. Shealy, and R. G. Thompson. Alabama Materials Research Conference, Auburn, AL, October 12-13, 1988.

99. "Optical analysis of grazing incidence resonators for soft x-ray/EUV FEL applications," D. R. Gabardi and D.L. Shealy, Presented to Free-Electron Laser Group, Los Alamos National Laboratory, March 2, 1989.
100. "Formula for the RMS blur circle radius of Wolter telescopes based on aberration theory," D.L. Shealy and T. T. Saha. Symposium on Optics, Electro-Optics, and Sensors: Design and Fabrication of Reflective Optics, Orlando, March 27-31, 1989.
101. "Stability of metallization films on porous ceramic substrates," R. G. Thompson, J. C. Poret, D.L. Shealy, and H.T. Tohver. ASM International Electronic Packaging Conference, 1989, Philadelphia, April 25-27, 1989.
102. "Development of a normal incidence multilayer imaging microscope," D.L. Shealy, R. B. Hoover, A. B. C. Walker, Jr., and T. W. Barbee, Jr., Technical Symposium of the Society of Photo-Optical Instrumentation Engineers: X-Ray/EUV Optics for Astronomy and Microscopy, San Diego, August 6-11, 1989.
103. "Optical analysis of grazing incidence ring resonators for free-electron lasers," D. R. Gabardi and D.L. Shealy, Symposium of the Society of Photo-Optical Instrumentation Engineers: X-Ray/EUV Optics for Astronomy and Microscopy, San Diego, August 6-11, 1989.
104. "Pulse propagation velocity measurements in cordierite micro strips," D. Hill, H.T. Tohver, and D.L. Shealy, Alabama Materials Research Conference, Huntsville, AL, September 20-21, 1989.
105. "Imaging x-ray optics in materials research," D.L. Shealy, Alabama Materials Research Conference, Huntsville, AL, September 20-21, 1989.
106. "Stability of metallization films on porous ceramic substrates," R. G. Thompson, J. C. Poret, and D.L. Shealy, 1989 TMS Fall Meeting, Indianapolis, October 1-5, 1989.
107. "Optimization of three- and four-element lens systems by minimizing the caustic," I. Al-Ahdali and D.L. Shealy, Annual Meeting of the Optical Society of America, Orlando, October 16-20, 1989.
108. "Design and analysis of reflective optical systems," D.L. Shealy, Annual Meeting of the Optical Society of America, Orlando, October 16-20, 1989.
109. "Optical analysis of two types of grazing incidence ring resonators for free electron lasers operating in the extreme ultraviolet," D. R. Gabardi and D.L. Shealy, Annual Meeting of the Optical Society of America, Orlando, October 16-20, 1989.
110. "Design and analysis of aspherical multilayer imaging x-ray microscope," D.L. Shealy and W. Jiang, Society of Photo-Optical Instrumentation Engineers, San Diego, July 9-13, 1990.
111. "Design survey of x-ray/XUV projection lithography systems," D.L. Shealy and V. K. Viswanathan, Society of Photo-Optical Instrumentation Engineers, San Diego, July 9-13, 1990.
112. "Design and optimization technique for three-mirror projection lithography," C. Wang and D.L. Shealy, 68th Annual Meeting of the Alabama Academy of Science, Jacksonville, AL., March 8, 1991.

113. "Design and analysis of multi-mirror soft x-ray projection lithography systems," D.L. Shealy, C. Wang, and V. K. Viswanathan, OSA Topical Meeting, Soft-X-Ray Projection Lithography, Monterey, CA, April 10-12, 1991.
114. "Differential equation method for design of multi-mirror projection lithography systems," C. Wang and D.L. Shealy, SPIE's 1991 International Symposium on Optical Applied Science and Engineering, San Diego, July 22, 1991.
115. "Design and analysis of soft x-ray imaging microscopes," D.L. Shealy, C. Wang, W. Jiang, and R.B. Hoover, SPIE's 1991 International Symposium on Optical Applied Science and Engineering, San Diego, July 23, 1991.
116. "Development of water window imaging x-ray microscope," R. B. Hoover, D.L. Shealy, A. B. C. Walker, Jr., T. W. Barbee, Jr., and P.C. Baker, SPIE's 1991 International Symposium on Optical Applied Science and Engineering, San Diego, July 23, 1991.
117. "Analysis of characteristics of generalized aspherical surfaces," C. Wang and D.L. Shealy, Annual Meeting of the Optical Society of America, San Jose, November 5, 1991.
118. "Two-mirror reflecting microscope for soft x-ray uses," D.L. Shealy, C. Wang, W. Jiang, and R. B. Hoover, Annual Meeting of the Optical Society of America, San Jose, November 6, 1991.
119. "Design and analysis of a fast, two-mirror soft-x-ray microscope," D.L. Shealy, C. Wang, W. Jiang, L. Jin, and R. B. Hoover, SPIE's 1992 International Symposium on Optical Applied Science and Engineering, San Diego, July 19-24, 1992.
120. "Application of aberration theory to calculate the encircled energy of Wolter I-II telescopes," S. H. Chao and D.L. Shealy, SPIE's 1992 International Symposium on Optical Applied Science and Engineering, San Diego, July 19-24, 1992.
121. "Imaging Schwarzschild multilayer x-ray microscope," R. B. Hoover, P.C. Baker, D.L. Shealy, D.B. Gore, A. B. C. Walker, Jr., T. W. Barbee, Jr., and T. Kerstetter, poster presented to SPIE's 1992 International Symposium on Optical Applied Science and Engineering, San Diego, July 19-24, 1992.
122. "Design of a reflective optical system by solving surface differential equations," C. Wang and D.L. Shealy, Annual Meeting of the Optical Society of America, Albuquerque, September 20-25, 1992.
123. "Design of a gradient-index lens system for laser beam reshaping," C. Wang and D.L. Shealy, Annual Meeting of the Optical Society of America, Albuquerque, September 20-25, 1992.
124. "Optical analysis of the performance of a laser beam shaper," C. Wang and D.L. Shealy, Annual Meeting of the Optical Society of America, Albuquerque, September 20-25, 1992.
125. "Multi-mirror anastigmat design," C. Wang, D.L. Shealy, SPIE's 1993 International Symposium on Optics, Imaging, and Instrumentation, San Diego, July 11, 1993.
126. "Design and analysis of a refractive reshaping system," W. Jiang, D.L. Shealy, and J. C. Martin, SPIE's 1993 International Symposium on Optics, Imaging, and Instrumentation, San Diego, July 11, 1993.

127. "Laser beam reshaping system used in holographic projectors," W. Jiang, D.L. Shealy, and K. M. Baker, Alabama Materials Research Conference, Huntsville, AL, September 21-22, 1993.
128. "Design and testing of a laser beam profile reshaping system," W. Jiang, D.L. Shealy, and K. M. Baker, Annual Meeting of the Optical Society of America, Toronto, October 3-8, 1993.
129. "Holographic pattern generation with binary optics," K. M. Baker, D.L. Shealy, and W. Jiang, Annual Meeting of the Optical Society of America, Toronto, October 3-8, 1993.
130. "Optical design and testing of a holographic projection system," W. Jiang, D.L. Shealy, and K. M. Baker, OE/LASE '94, Los Angeles, January 22-28, 1994.
131. "Development of the water window imaging x-ray microscope," R. B. Hoover, D.L. Shealy, A. B. C. Walker, Jr., P.C. Baker, N. Grupido, G. Gutman, and T. W. Barbee, Jr., SPIE's 1994 International Symposium on Optics, Imaging, and Instrumentation, San Diego, July 24-29, 1994.
132. "Optical design of a two-mirror asymmetrical reshaping system and application in superbroadband color center laser," V. Oliner, L. D. Prussner, D.L. Shealy, and S.B. Mirov, SPIE's 1994 International Symposium on Optics, Imaging, and Instrumentation, San Diego, July 24-29, 1994.
133. "Optical performance of axial gradient index and aspherical surface lenses," A.M. Kassim and D.L. Shealy, SPIE's 1994 International Symposium on Optics, Imaging, and Instrumentation, San Diego, July 24-29, 1994.
134. "Optical design via solution of differential equations," D.L. Shealy, Special Theoretical Symposium, The University of Georgia, Athens, GA, September 16, 1994.
135. "Fabricating micro-optical structures using a holographic projector," W. Jiang, D.L. Shealy, and K. M. Baker, Annual Meeting of the Optical Society of America, Dallas, TX, October 2-7, 1994.
136. "Physical optics analysis of the performance of a holographic projection system," W. Jiang, D.L. Shealy, and K. M. Baker, Annual Meeting of the Optical Society of America, Dallas, TX, October 2-7, 1994.
137. "Solid state laser with superbroadband or control generation spectrum for signal multiplexing or information coding," S.B. Mirov, C.M. Lawson, D.L. Shealy, T. T. Basiev, and P.G. Zverev, Annual Meeting of the Optical Society of America, Dallas, TX, October 2-7, 1994.
138. "Physical optics analysis of the performance of a holographic projection system," W. Jiang, D.L. Shealy, and K. M. Baker, SPIE's Photonics West '95, San Jose, February 4-10, 1995.
139. "Directional light filters: three-dimensional azo dye formed micro-honeycomb image within optical resins," K. M. Baker, W. Jiang, and D.L. Shealy, SPIE's Photonics West '95, San Jose, February 4-10, 1995.
140. "Design of an anastigmat two-mirror microscope," S. H. Chao and D.L. Shealy, SPIE's 1995 International Symposium on Optical Science, Engineering, and Instrumentation, San Diego, July 9-14, 1995.

141. "Calculation of irradiance profiles for reflective laser reshaping systems using *Code V*," N. C. Evans and D.L. Shealy, Southeastern Section of the American Physical Society, Tallahassee, FL, November 9-11, 1995.
142. "Design of three-mirror telescopes via differential equation method," S.H. Chao, N. C. Evans, D.L. Shealy, and R.B. Johnson, SPIE's 1996 International Symposium on Optical Science, Engineering, and Instrumentation, Denver, August 4-9, 1996.
143. "Optical design and optimization with a genetic algorithm method and CODE V[®]," N.C. Evans and D. L. Shealy, Novel Optical Systems Design and Optimization II Conference 3430, SPIE International Symposium on Optical Science and Technology, Denver, 21 August 1998.
144. "Design of a gradient-index beam shaping system via a genetic algorithm optimization method," N. C. Evans and D. L. Shealy, Laser Beam Shaping Conference 4095, SPIE International Symposium on Optical Science and Technology, San Diego, 2 August 2000.
145. "Development and testing of a refractive laser beam shaping system," W. Jiang and D.L. Shealy, Laser Beam Shaping Conference 4095, SPIE International Symposium on Optical Science and Technology, San Diego, 2 August 2000.
146. "Design and analysis of an elliptical Gaussian laser beam shaping system," David L. Shealy and Shao-Hua Chao, Laser Beam Shaping Conference II 4443, SPIE International Symposium on Optical Science and Technology, San Diego, 2 August 2001.
147. "Historical perspective of laser beam shaping," David L. Shealy, Laser Beam Shaping Conference III 4770-03, SPIE International Symposium on Optical Science and Technology, Seattle, 11 July 2002.
148. "Design of GRIN laser beam shaper," David L Shealy and Shao-Hua Chao, Laser Beam Shaping V, Paper 5525-15, SPIE International Symposium on Optical Science and Technology, Denver, 5 August 2004.
149. "Beam shaping profiles and propagation," David L Shealy and John A Hoffnagle, Laser Beam Shaping VI Conference, 5876, SPIE International Symposium on Optical Science and Technology, San Diego, August 2005.
150. "Effects of dispersion on the performance of a refractive beam shaper," John A Hoffnagle and David L Shealy, Laser Beam Shaping VI Conference, 5876, SPIE International Symposium on Optical Science and Technology, San Diego, August 2005.
151. "Analytic beam shaping for flattened output irradiance profiles," David L. Shealy, John A. Hoffnagle and Karl-Heinz Brenner, Laser Beam Shaping VII Conference, 6290, SPIE International Symposium on Optical Science and Technology, San Diego, August 2006.
152. "Caustic surfaces in a Keplerian two-lens beam shaper," John A. Hoffnagle and David L. Shealy, Laser Beam Shaping VIII Conference, 6663, SPIE International Symposium on Optical Science and Technology, San Diego, August 2007.
153. "Wavefront and caustic surfaces of refractive laser beam shaper," David L. Shealy and John A. Hoffnagle, Novel Optical Systems Design and Optimization X Conference, 6668, SPIE International Symposium on Optical Science and Technology, San Diego, August 2007.

154. "Wavefront generated by reflection of a plane wave from a conic section," John A. Hoffnagle and David L. Shealy, *Current Developments in Lens Design and Optical Engineering IX*, 7060, SPIE International Symposium on Optical Science and Technology, San Diego, August 2008.

GRANTS & CONTRANTS

1. Jill Gemmill (PI), John-Paul Robinson, and David L Shealy, "NMI-Enabled Open Source Collaboration Tools for Virtual Organizations," NSF MWIR-0330543, 09/15/2003-8/31/2005, \$305,742.
2. David L. Shealy (PI) and Jill Gemmill (co-PI), "UAB Middleware Testbed Program: Integrated Directory Services, PKI, Video, and Parallel Computing," NSF ANI-0123937 via SURA-2002-103 Subcontract, \$180,000, April 1, 2002 – August 31, 2004.
3. David L. Shealy (PI) and Jill Gemmill (co-PI), "Alabama Internet2 Middleware Initiative," UAB component (University of Alabama subcontract 01-016) of the Alabama EPSCoR Research Infrastructure Initiative, NSF EPSCoR, EPS-0091853, NSF funds \$446,973, State funds \$249,108, UAB cost-sharing \$32,142, February 1, 2001 - January 31, 2004.
4. Larry Krannich (PI), Linda Lucas(co-PI) and David L. Shealy (co-PI), GAANN Fellowships in Chemistry, Biomedical Engineering, and Physics Experimental and Computational Materials Research, US Dept Education, OE-P200A000900, \$306,000, August 15,2000 – August 14, 2003.
5. David L. Shealy (PI), Jill Gemmill (co-PI), Priscilla A. Hancock (co-PI), Stan A, McClellan (co-PI), "High Performance Connection for Research Universities in Alabama," NSF ANI-9729500, 2/15/98-1/31/00. Cumulative Award Amount:\$1,188,867. Basic award \$700,000 (\$350,000 funded FY98, \$350,000 approved FY99). Institutional cost-sharing \$930,000 (\$500,000 from UAB and \$430,000 UA-Tuscaloosa). Year 1 award date was February 26, 1998, and year 2 (supplement 3) was awarded February 12, 1999. Supplement 1 for MCI subscription cost of UAB in year 1, \$45,000, awarded June 30, 1998. Supplement 2 from NSF EPSCoR for extraordinary cost of advanced telecommunication services, \$200,000, awarded September 3, 1998. Supplement 3 was year 2 basic award funding. Supplement 4 for REU support in year 2, \$10,000, awarded May 3, 1999. Supplement 5 for MCI subscription cost of UAB in year 2, \$118,800, awarded July 15, 1999. Supplement 6 for MCI subscription cost of UA in year 2, \$93,067, awarded September 16, 1999. Supplement 7 for REU support for year 3, \$10,000. Supplement 8 for no-cost extension to 31 March 2001. Supplement 9 for REU support for year 4, \$12,000.
6. David L. Shealy (PI), Jill Gemmill (co-PI), and Stan A. McClellan (co-PI), Alabama EPSCoR Cooperative Agreement - Regional Connection to Internet2, UAB component, NSF/Alabama EPSCoR, EPS-9720653, February 1, 1998 - January 31, 2001, and EPS- 0096193, April 1, 2000 – March 31, 2001. NSF funds \$506,074, State funds \$78,430, UAB cost-sharing \$584,504.

7. Yogesh K. Vohra (PI) and David L. Shealy (co-PI), Regional Initiative to Promote Undergraduate Participation in Experimental and Computational Materials Research, NSF DMR REU-Site, DMR-9619405, \$149,535, February 1, 1997 - January 31, 2000.
8. Larry Krannich (PI) and David L. Shealy (co-PI), GAANN Fellowships in Chemistry and Physics Experimental and Computational Materials Research, US Dept Education, OE-P200A70718, \$457,650, September 1, 1997 - August 31, 2000.
9. David L. Shealy (PI), University Laser Laboratory for Technology and Research Applications (ULLTRA) Center, UAB Research Advisory Group (RAG) funded \$100,000, October 1, 1996 - September 30, 1998.
10. Larry Krannich (PI) and David L. Shealy (co-PI), GAANN Fellowships in Chemistry and Physics Materials Research, US Dept Education, OE-P200A40727, \$450,048, September 1, 1994 - August 31, 1997.
11. David L. Shealy (PI), Physics Teaching Assistant, Vestavia Hills School Board, \$90,000, September 1, 1987 - August 31, 1997.
12. Chris M. Lawson (PI), Sergey Mirov (co-PI), and David L. Shealy (co-PI), Alabama Laser Research Initiative, NSF EPSCoR-ESI, \$199,911, August 1, 1994 - July 31, 1995.
13. David L. Shealy (PI) and David B. Gore (Ph.D. student), Development of a water window imaging soft x-ray microscope for biological applications, NASA Graduate Student Researchers Program, \$88,000, August 1, 1992 - July 31, 1996.
14. David L. Shealy (PI), Physics Teaching Assistant, Homewood School Board, \$25,000, September 1, 1993 - August 31, 1995.
15. David L. Shealy (PI), Holographic Projection Processing of Micro-Optical Devices, Alabama Space Grant Consortium, \$10,000, February 1, 1994 - January 31, 1995.
16. David L. Shealy (PI), Ultra high resolution water window x-ray microscope optics, NASA/Marshall Space Flight Center, \$17,995, March 18, 1992 - December 17, 1992.
17. David L. Shealy (PI), Advanced water window x-ray microscope design and analysis, NASA/Marshall Space Flight Center, \$15,000, September 1, 1991 - August 31, 1992.
18. David L. Shealy (PI), X-ray microscope assembly and alignment support and advanced x-ray microscope design and analysis, NASA/Marshall Space Flight Center, \$17,896, June 1, 1990 - September 30, 1991.
19. David L. Shealy (PI), Design and analysis of x-ray optical systems. Alabama Supercomputer Authority, 75 hours CRAY CPU time, July 1, 1989 - June 30, 1990.
20. David L. Shealy, Design and analysis of multilayer x-ray/XUV microscope. NASA/Marshall Space Flight Center, \$20,018, May 1, 1989 - January 30, 1990.
21. D.L. Shealy and R. G. Thompson (Co-P.I.s), Development of new microelectronic packaging materials, Alabama Department of Economic and Community Affairs, \$39,917, July 1, 1989 - June 30, 1990.
22. David L. Shealy (PI), Design and analysis of FEL x-ray/ultraviolet cavities, Univ of California (Los Alamos National Lab), \$101,068, June 1, 1988 - September 30, 1991.

23. David L. Shealy (PI), Modeling and numerical simulation of nonlinear optical planar waveguide structures, Battelle, \$16,792, June 1, 1988 - October 1, 1989.
24. David L. Shealy (PI of physics component), New materials for high speed microelectronics packaging applications, NSF/EPSCoR, \$501,601, 1986-91. This grant is one of four independent projects subcontracted to UAB in the area of Materials Science through the NSF/EPSCoR Program: On the relationship among structure properties, and processing of materials, R. G. Thompson (P.I.), B. R. Patterson and J. E. Lemons (advisors), J. B. Andrews, R.N. Andrews, D. E. Kiely, W.R. Lacefield, Jr., L.C. Lucas, D.L. Shealy, H.T. Tohver (Co-Investigators), 1986-91, \$3,808,040.