

Curriculum Vitae

Gregory P. Nordin

Professor
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Research Activities and Interests

Photonics-enabled chemical and biological sensors, nanophotonics and integrated optics, micro- and nanofabrication, MEMS, microfluidics, rigorous electromagnetic analysis and design of optical structures, electro-optics, and polymer materials and devices.

Academic History

Summary

BS (cum laude)	Brigham Young University	Physics	1984
MS	UCLA	Physics	1986
PhD	University of Southern California	Electrical Engineering	1992

Scholarships and Fellowships

Presidential Scholarship (BYU)
John Einar Anderson Scholarship (BYU)
Elvira S. Barrett Scholarship (BYU)
Hughes Aircraft Company Masters Degree Fellowship, 2 years (UCLA)
Hughes Aircraft Company Doctoral Fellowship, 6 years (USC)
Center for Photonic Technology Prize Fellowship (USC)

Honors and Awards

- NSF CAREER Development Award, 1996-2001
- UAH Outstanding Researcher Award, 1998-1999
- UAH Outstanding Researcher Award, 1999-2000
- UAH Foundation Award for Research and Creative Achievement, 2000
- Founding Director, Nano and Micro Devices Center (UAH), 2003

Professional Experience

Brigham Young University, Provo, Utah (2005 - present)

Engineering and Technology Endowed Chair (2006 – present)

Professor (2005 – present)

Department of Electrical and Computer Engineering

University of Alabama in Huntsville, Huntsville, Alabama (1992 - 2005)

Director, Nano and Micro Devices Center (NMDC) (2003-2005) and Technical Associate Director, LICOS (precursor to NMDC) (1999-2003)

- Report directly to the Vice President for Research as of January 1, 2003. Calendar year appointment.
- NMDC approved by the University of Alabama System Board of Trustees as an official campus research center on April 16, 2004. Prior to this it operated as a campus-designated research center.
- Responsible for hiring and directing center staff (5-7) as well as working with associated faculty (5) and students (15-20).
- Set up nano/microfabrication facility in 1,300 sq. ft. cleanroom space, 1995-1999.
- Enlarged facility to 7,600 sq. ft. (5,500 sq. ft. cleanroom) with greatly expanded tool set (<http://nmdc.uah.edu/facilities/equipment.html>) based on grants and \$2M gifts from community benefactor, 2000-2002.
- Developed computing facility using linux clusters created by my group for rigorous electromagnetic design and analysis of nanophotonic structures with parallelized custom software tools developed in my group, 2001-2004.

Adjunct Professor (2005–present)

Professor (2001–2005)

Associate Professor (1996–2001) (promoted 2 years early in 1996 and granted tenure one year early in 1997)

Assistant Professor (1992–1996)

Department of Electrical and Computer Engineering; Optical Science and Engineering Ph.D. Program; Materials Science Ph.D. Program (2002-2005).

Research Activities at UAH

Microcantilever-based chemical and biological detectors, photonic crystals and planar lightwave circuits, polymer integrated optics, subwavelength polarization filters and arrays for imaging polarimetry, diffractive optical elements, micro- and nanofabrication, microfluidic device fabrication, interferometric lithography, liquid crystal lenses, real-time 3-D holographic-like displays, volume holographic optical memories, stratified volume holographic optical elements, high resolution liquid crystal gratings, liquid crystal gratings on silicon VLSI electronics.

Hughes Aircraft Company, El Segundo and Malibu, California (1984-1992)

Hughes Research Laboratories (1990-1992)

Multiplexed volume holographic interconnections for optical neural network applications.

Curriculum Vitae—Gregory P. Nordin

Electrooptical and Data Systems Group (1985-1990)

High energy laser phased array beam transmission systems, conceptual design of satellite-borne high energy laser beam profile testing apparatus, part of system design team for space station/shuttle laser docking system.

Radar Systems Group (1984-1985)

Supported development of a synthetic aperture radar pseudo-image generator for testing of advanced SAR concepts, B-2 radar SAR module software specification.

Funding Summary (1992 – present)

Single-Investigator Contracts and Grants:	\$7,035,141
Multi-Investigator Contracts and Grants as PI:	\$10,104,981
Multi-Investigator Contracts and Grants as Co-PI:	\$3,512,218
Total:	\$20,652,340

(Note: in the following sections, current contracts and grants are in blue.)

Funding Details – Single-Investigator Contracts and Grants (sorted by end date)

National Science Foundation/Defense Intelligence Agency/MASINT/NCMR	
“MEMS-Based Chemical and Biological Sensors” (07/01/05-08/31/10)	\$507,700
Defense Intelligence Agency/MASINT/NCMR/PNNL	
“PNNL Partnership—Chem/Bio Sensors” (03/11/09-09/30/09)	\$103,508
DARPA (as subcontractor to Clemson University)	
“Laboratory for Advanced Photonic Composites” (10/11/02-9/26/05)	\$1,673,560
“Laboratory for Advanced Photonic Composites” (10/10/05-4/21/10) (BYU)	\$1,562,180
Innolume, Inc. (San Jose, CA)	
“Silicon Photonic Device Development” (8/15/06 – 2/29/08)	\$43,110
ACTR (Provo, UT)	
“Prototype Device Fabrication” (8/15/06 – 12/31/07)	\$81,901
Tetramer, Inc (Clemson, SC)	
“New PFCB Polymers for High Speed Electronically Tunable Fiber Optic Filter” (11/26/05 – 11/25/07)	\$21,000
Army Research Laboratory (as subcontractor to NC State University)	
“Photonic MEMS Sensors” (8/1/04-7/31/06)	\$236,100
Army/SED	
“Investigations into the Excitation and Relaxation of Carriers, Excitons, and Phonons in Hetero- and Nanostructures” (9/6/05-12/31/05)	\$51,505
FAA (as subcontractor to University of Alabama)	
“Multi-Channel Fiber Optic Gyroscope” (1/1/00-5/15/05)	\$1,018,563
Polaris Sensor Technologies, Inc. (Huntsville, AL)	
“Diamond Etch Development” (3/3/04-4/30/04)	\$7,299
“Diamond Diffractive Optical Element” (9/21/04-12/21/04)	\$15,700
Nanochip, Inc. (San Jose, CA)	
“SiO ₂ Nano-Feature Etch” (11/22/04-11/29/04)	\$2,012

Curriculum Vitae—Gregory P. Nordin

CFD Research Corporation (Huntsville, AL)	
“Microfabrication of CFDRC Bead-Based Biochip Designs” (10/1/02-10/31/04)	\$40,091
General Dynamics	
“Wire Polarizer Analysis” (7/13/04-9/30/04)	\$4,504
MEMS-Optical, Inc. (Huntsville, AL)	
“Reactive Ion Etching Service” (7/31/98-9/30/98)	\$2,000
“Reactive Ion Etching Services” (8/25/98-9/25/98)	\$2,500
“FDTD Software Program Development” (2/18/00-5/31/01)	\$38,998
“Task Order Contract” (7/27/00-6/30/02)	\$20,000
“Reactive Ion Etching” (9/18/00-3/31/01)	\$60,567
“Materials and Supplies Funding” (2/20/01-3/31/01)	\$1,433
“Reactive Ion Etching of Various Materials for Microfabrication” (5/11/01-2/19/02)	\$60,575
“Fabricate Sample Antenna Structures Based on Bowtie Design” (11/8/01-11/20/01)	\$1,425
“FDTD” (2/5/02-9/5/02)	\$32,690
“Multiple Purchase Orders” (11/11/02-9/30/04)	\$3,775
Brother International Corporation (Memphis, TN)	
“Vapor Deposition Service” (3/6/03-5/5/03)	\$3,012
Goodrich (Danbury, CT)	
“Wire Polarizer Fabrication” (5/8/02-3/31/03)	\$135,882
Oak Ridge National Laboratory	
“SEM Imaging Lithography” (10/1/02-3/31/03)	\$4,999
Rice Systems (Huntington Beach, CA)	
“ZBLAN Waveguides” (8/2/02-12/15/02)	\$23,000
OPTS, Inc. (Huntsville, AL)	
“Task Order Contract, Thin Film Stress” (9/1/00-4/16/02)	\$60,000
DRS Sensors & Targeting Systems, Inc (Anaheim, CA)	
“Modeling of Fine-Line Lithography Performance” (8/28/01-3/31/02)	\$15,500
Morgan Research Corporation (Huntsville, AL)	
“SOI DRIE Silicon Release Processing” (12/18/02-3/24/02)	\$3,077
ERIM/Veridian International (Ann Arbor, MI)	
“Polarimetric Imaging” (4/17/00-8/31/00)	\$9,970
“Polarimetric Enhanced Thermal Sensing System” (9/20/00-12/31/00)	\$11,744
“Polarimetric Enhanced Thermal Sensing System II” (2/2/01-1/1/02)	\$22,666
SY Technology, Inc (Huntsville, AL)	
“Reactive Ion Etching” (5/12/98-9/30/98)	\$5,000
“Analysis of Lithography on Wafers” (8/29/01-10/15/01)	\$1,500

Curriculum Vitae—Gregory P. Nordin

National Science Foundation

“Stratified Volume Holographic Optical Elements for Volume Holographic Data Storage”
(8/1/96 – 7/31/01), NSF CAREER Development Award \$310,000

New Focus, Inc. (San Jose, CA)

“Liquid Crystal Device Research” (5/21/01-8/24/01) \$8,329

Nichols Research Corporation/CSC, Inc. (Huntsville, AL)

“Design & Fabrication of Micro-Optic Devices” (9/1/96-5/31/97) \$34,000

“Diffractive Optical Element Mid-IR Camera Development” (1/29/97-1/31/98) \$60,243

“Development & Fabrication of Micro-Optics for DEWAR Upgrade” (9/15/97-1/31/98)\$15,000

“Initiate Diffractive Optical Element Design for Pixel Array” (2/9/98-9/30/98) \$16,000

“Diffractive Optical Element Design for an Effective 256x256 Pixel Array” (2/9/98-9/30/98) \$22,000

“Labor for Waveplate and Wire Grid Array Fabrication” (3/1/98-9/30/98) \$8,832

“Continuing Research Effort for Diffractive Optical Element Design” (4/1/98-6/30/99)\$194,399

“Diffractive Optical Element, continuation” (8/26/98-9/30/98) \$13,215

“Development of Full Polarimetric Micro-Optics” (10/9/98-4/30/99) \$20,000

“Development of Full Polarimetric Micro-Optics II” (8/25/98-5/15/99) \$53,883

“Continuation of Micro-Optics Development” (1/1/99-4/30/99) \$87,768

“Polarimetric Micro-Optics” (6/1/99-5/31/00) \$302,461

Funding Details – Multi-Investigator Contracts and Grants as PI

National Science Foundation

“SIRG: Photonic Microcantilever Arrays for Chemical and Biological Sensing” (1/1/05-12/31/09), Nordin portion: \$1,256,564, Moved to BYU 01/06 Total: \$1,575,000

“Integrated Research Environment for Intermeshed Optoelectronics” (5/15/98-9/30/01),
NSF funds: \$1,843,016 with Nordin portion: ~50%.
Total with university match: \$3,791,329

“Integrated MEMS Photonics for Computer and Communication Systems” (2/1/01-1/31/05), NSF funds: \$2,250,000 with Nordin portion: ~50%.
Total with university match: \$4,738,652

Funding Details – Multi-Investigator Contracts and Grants as Co-PI

National Science Foundation

“MRI: Acquisition of Chlorine-Based Reactive Ion Etcher” (8/1/07-7/31/09), \$300,000

DARPA (as subcontractor to Clemson University)

“Laboratory for Advanced Photonic Composites” (7/19/01-11/18/02),
Nordin portion: ~\$700,000 \$765,500

MICOM/DARPA

“ICVision 3-D Display: Extension to Full Color” (4/1/95-9/30/95), Nordin portion:
~\$25,000 \$100,000

Curriculum Vitae—Gregory P. Nordin

NASA

“Chemical and Biological Microelectromechanical Smart Sensor Arrays” (8/1/01-7/31/06), Nordin portion: ~\$77,000 \$1,059,963

National Science Foundation

“Alabama Consortium for Optical Technology” (10/1/95-9/30/98),
Nordin portion: ~\$350,000 \$1,254,408

MEMS-Optical, Inc. (Huntsville, AL)

“Investigation of Candidate Photoresist/Developer and Etch Chemistries for DOEs on CaF₂” (10/1/01-3/19/02) \$18,484

“Ion Beam Milling Development for CaF₂” (4/29/02-7/5/02) \$13,863

Donations

Feb. 2002, JDS-Uniphase, photonics equipment, \$102,778

March 2002, \$500,000 cash donation to LICOS from local benefactor in March, 2000 to purchase microfabrication equipment and expand cleanroom (UAH team that arranged for donation: Provost McManus, M. Abushagur, G. Nordin, Engineering Dean Aunon, and ECE Chair Adhami). G. Nordin in charge of use of all funds.

August 2000, \$1,500,000 cash donation to LICOS from local benefactor to purchase micro/nanofabrication equipment and further expand cleanroom (UAH team that arranged for donation: Provost McManus, M. Abushagur, G. Nordin, Engineering Dean Aunon, and ECE Chair Adhami). G. Nordin in charge of use of all funds.

Fellowships

NASA/ASEE Summer Faculty Fellowship, NASA

June 3, 1996 – August 9, 1996. Summer salary for myself and one graduate student to work at the NASA Marshall Space Flight Center developing new beam scanning techniques based on diffractive optical elements for space-borne laser radar systems.

Teaching - BYU

EngT 231 Moral Leadership in a Technological World

Fall 09

ECEn 360/361/362 Electromagnetics

Win 06, Fall 06, Fall 07, Win 09

ECEn 462 Electromagnetic Radiation and Propagation

Fall 08

ECEn 466 Introduction to Optical Engineering

Fall 08

ECEn 662R Physical Optics

Win 07, Win 08

Teaching - UAH

EE/OSE/PH 632 Coherent Optical Systems & Holography, Graduate Fourier optics

Sp 94

EE/OSE/PH 542 Physical Optics, First year graduate physical optics

Fa 94, Sp 95, Fa 95, Sp 96, Fa 96, Sp 97, Fa 97, Sp 98, Sp 99, Fa 99, Sp 00, Fa 00, Sp 01, Fa 01, Sp 02, Fa 02, Fa 03, Fa 04

EE/OSE/PH 541 Geometrical Optics, First year graduate geometrical optics

Fa 95

OPE 451 Optoelectronics, Senior optical engineering course

Fa 92, Fa 93

EE 197 Computer Methods in Engineering, Freshman computer programming

W 93, Sp 93, Su 93, Sp 94, Su 94

Average course evaluation score for all classes taught: 93.8/100

ECE Department average: 85.9/100

Students

Ph.D. Dissertations Supervised

1. Michael W. Jones, "Partial Pixels: A Real-Time 3-D Display Architecture," 1996
2. Panfilo C. Deguzman, "Stacked Subwavelength Gratings for Imaging Polarimetry," 2000.

3. Diana M. Chambers, “Stratified Volume Diffractive Optical Elements,” 2000.
4. Jiang Jianhua, “Rigorous Analysis and Design of Diffractive Optical Elements,” 2000.
5. Steve Mellin, “Design and Analysis of Finite Aperture Diffractive Optical Elements,” 2001.
6. Arthur Ellis, “Design and Grayscale Fabrication of Beamfanners in a Silicon Substrate,” 2001.
7. Yi Sun, “Liquid Crystal Adaptive Lens With Circular Electrodes,” 2002.
8. Lixia Li, “Compact Waveguide Bends and Application in a Waveguide Depolarizer,” 2004.
9. Seunghyun Kim, “Hybrid Photonic Crystal and Conventional Waveguide Structures,” 2004.
10. Jingbo Cai, “Rigorous Analysis and Design of Compact Photonic Components,” 2004.
11. Jaime Cardenas, “Microphotonic Devices for Compact Planar Lightwave Circuits and Sensor Systems,” 2005.
12. Bin Wang, “Waveguide Grating Couplers Operating in the Strong Coupling Regime,” 2005.
13. Ashwini Kadam, “Study of Thermally Induced Higher Order Microcantilever Modes,” 2006.
14. Yongbin Lin, “Compact Perfluorocyclobutyl (PFCB) Waveguide Devices For WDM Applications,” 2007.
15. Nazli Rahmanian, “High Efficiency Perfluorocyclobutyl Air-Trench Splitters For Use in Compact Ring Resonators,” 2007.
16. Yusheng Qian, “Compact Trench-Based Bend and Splitter Devices for Silicon-on-Insulator Rib Waveguides,” 2008.

Six additional Ph.D. students are currently under supervision.

M.S. Theses

1. Patrick Nasiatka, “Creating and Controlling Dynamic Diffractive Optical Elements for Use in the Partial Pixel 3-D Display Architecture,” 1996.
2. Bettina Wendling, “Preparation and Optical Properties of Mixed-Dimensional Gold Nanostructures,” 2001.
3. Aimee Dorman, “Effect of a Conformal Anti-Reflection Coating on a Diffraction Grating,” 2001.
4. David Sparks, “Implementation and Testing of a Compact Corneal Microscope Design,” 2001.
5. Bryan Lafayette Redd III, “Development of Acceptance Testing Methods for a 473 nanometer Frequency-Doubled Nd:YAG Laser Module,” 2001.
6. Koon-Kim Jeremy Wong, “Optical Metrology and Applications of a PLZT Lens,” Committee chair: Greg Nordin, Thesis Adviser: Bruce Peters, 2001.
7. Earlie O. Oliver, “The Photo-Chemistry and Photo-Polymerization of Matrix-Isolated Diacetylenes,” Committee chair: Greg Nordin, Thesis Adviser: David D. Smith, 2003.

Curriculum Vitae—Gregory P. Nordin

8. Jiguo (Peter) Song, “Compact Trench-Based Silicon-on-Insulator Rib Waveguide 90 degree and 105 degree Bend and Splitter,” 2008.

Professional Society Affiliations

Optical Society of America, Member

IEEE, Member

SPIE, Member

Professional Service

- Proposal Reviewer *National Science Foundation*
NASA
- Journal Reviewer *Applied Optics*
Applied Physics Letters
IEEE Journal of Selected Topics in Quantum Electronics
IEEE Transactions on Multimedia
JEOS—Pure and Applied Optics
Journal of Materials Research
Journal of Microlithography, Microfabrication, and
Microsystems
Journal of the Optical Society of America A
Journal of Vacuum Science and Technology B
Journal of X-Ray Science & Technology
Optics Communications
Optical Engineering
Optics & Laser Technology
Optics Letters
- General Co-Chair: Nanophotonics, 2006 (new Optical Society of America topical meeting).
- Conference Co-Organizer: *Micromachining Technology for Microoptics and Nanooptics I through V*, SPIE Photonics West, 2002-2007.

Optics in the Southeast, Huntsville, Alabama, Oct. 25-26, 2002.
- Program Committee Chair *Nanophotonics, Integrated Photonics Research Topical Meeting*, Optical Society of America, 2005.
- Technical Review Comm *Nano Science and Technology Review Institute*, Nanotech 2008.
- Program Committee *Annual Meeting of the European Optical Society*, Paris, Sept. 29 – Oct. 2, 2008.

Micro (MEMS) and Nanotechnologies for Defense and Security, SPIE Defense & Security Symposium, 2008.

Integrated Photonics and Nanophotonics Research and Applications, 2008.

Optics in the Southeast, Atlanta, Georgia, Oct. 6-7, 2005.

Curriculum Vitae—Gregory P. Nordin

Diffraction Optics and Microoptics Topical Meeting,
Optical Society of America, 2002 and 2004.

Photonics Materials Topical Conference, AVS 49th
International Symposium, November 4-8, 2002.

*Application and Theory of Periodic Structures
Conference*, SPIE International Symposium on Optical
Science and Technology, July 29 – August 3, 2001.

Wavelength Scale Optical Devices Conference, SPIE
International Symposium on Optical Science and
Technology, July 29 – August 3, 2001.

Micromachining Technology for Microoptics Conference,
SPIE *Micromachining and Micrfabrication Symposium*,
October 22-25, 2001.

Committee Member: New Focus/Bookham Student Award Committee, Optical
Society of America, 2005-2006.

Modeling, Numerical Simulation and Theory
Subcommittee, *Integrated Photonics Research Topical
Meeting*, Optical Society of America, 2004.

Dielectric Waveguide Subcommittee, *Integrated
Photonics Research and Applications Topical Meeting*,
Optical Society of America, 2007.

Steering Committee for SPIE’s Polarization Technical
Group.

Workshops and Seminars

Invited panelist “Nanotechnology: Funding the Next Growth Revolution,”
at TopTech 2004: Revolution, sponsored by the North
Carolina Electronics and Information Technology
Association (NCEITA), Charlotte, North Carolina, May
25, 2004.

Invited exhibitor 5th annual Coalition for National Science Funding (CNSF)
on May 19, 1999. This exhibit is held to educate members
of Congress and their staff on research supported by the
National Science Foundation

Participant “Diffraction Optics Workshop” Sept. 14-17, 1993,
Georgia Institute of Technology.

Educational Outreach Activities

- 5th Grade Science Demonstration and Discussion. One hour program focused on understanding basic concepts about heat, temperature, states of matter, and phase changes. Includes demonstrations with liquid nitrogen and dry ice. Approximately 325 students have participated in sessions conducted in 1994, 1997, 1998, and 1999.
- High School Holography Day. On May 16, 1997, advance placement physics students from Huntsville's Grissom High School came to my laboratories at The University of Alabama in Huntsville to learn principles of holography and holographic displays. As part of their activities they made their own white-light holograms to take home and experienced an example of a real-time holographic-like display developed by myself and several other UAH faculty members.
- Laboratory tours and discussions conducted for Boy Scout troops.

Personal

Citizenship: USA

Age: 49, married, three children

Eagle scout

Hobbies: Off-road motorcycle riding and racing (2007 KTM 300 xc), mountain biking, hiking, skiing, cross country skiing

Publications—Refereed Journal Articles

1. G. P. Nordin, R. V. Johnson, and A. R. Tanguay, Jr., "Diffraction Properties of Stratified Volume Holographic Optical Elements," *J. Opt. Soc. Am. A*, **9**(12), pp. 2206-2217 (1992).
2. G. P. Nordin and A. R. Tanguay, Jr., "Photopolymer-Based Stratified Volume Holographic Optical Elements," *Opt. Lett.* **17**(23), pp. 1709-1711 (1992).
3. P. Asthana, G. P. Nordin, A. R. Tanguay, Jr., and B. Keith Jenkins, "Analysis of Weighted Fan-out/Fan-in Volume Holographic Interconnections," *Applied Optics Special Issue on Neural Networks* **32**(8), pp. 1441-1469 (1993).
4. G. P. Nordin and P. Asthana, "Effects of Crosstalk on Fidelity in Page-Oriented Volume Holographic Optical Data Storage", *Opt. Lett.* **18**(18), pp. 1553-1555 (1993).
5. R. G. Lindquist, J. H. Kulick, G. P. Nordin, J. M. Jarem, S. T. Kowel, M. Friends and T. Leslie, "High Resolution Liquid Crystal Phase Grating Formed by Fringing Fields From Interdigitated Electrodes", *Opt. Lett.* **19**(9), pp. 670-72 (1994).
6. G. P. Nordin, J. H. Kulick, M. Jones, P. Nasiatka, R. G. Lindquist, and S. T. Kowel, "Demonstration of a Novel 3-D Autostereoscopic Display", *Opt. Lett.* **19**(12), pp. 901-903 (1994).
7. J. H. Kulick, G. P. Nordin, A. Parker, S. T. Kowel, R. G. Lindquist, M. Jones, and P. Nasiatka, "Partial Pixels: A Three-Dimensional Diffractive Display Architecture", *J. Opt. Soc. Am. A*, **12**(1), pp. 73-83 (1995).
8. R. G. Lindquist, G. P. Nordin, A. Thomsen, P. J. Nasiatka, J. H. Kulick, and S. T. Kowel, "Pulse Width Modulation Drive Technique for High Resolution Liquid Crystal Gratings", *Opt. Lett.* **20**(5), pp. 510-512 (1995).
9. A. Thomsen, R. G. Lindquist, J. H. Kulick, P. J. Nasiatka, G. P. Nordin, and S. T. Kowel, "A Pixel Scale Digital-to-Analog Converter Array for Liquid Crystal on VLSI Displays", *IEEE Trans. On Circuits & Systems I*, **42**(9), pp. 545-548 (1995).
10. M. W. Jones, G. P. Nordin, J. H. Kulick, R. G. Lindquist, and S. T. Kowel, "Real-Time Three-Dimensional Display Based on the Partial Pixel Architecture", *Opt. Lett.* **20**(12), pp. 1418-1420 (1995).
11. G. P. Nordin, J. H. Kulick, R. G. Lindquist, P. J. Nasiatka, M. W. Jones, M. Friends, S. T. Kowel, "Liquid Crystal-on-Silicon Implementation of the Partial Pixel Three-Dimensional Display Architecture", *Appl. Opt.* **34**(19), pp. 3756-3763 (1995).

12. G. P. Nordin, M. W. Jones, J. H. Kulick, R. G. Lindquist, and S. T. Kowel, "A 3-D Display Utilizing a Diffractive Optical Element and an Active Matrix Liquid Crystal Display", *Opt. Eng.* **35**(12), pp. 3404-3412 (1996).
13. G. P. Nordin, J. T. Meier, P. C. Deguzman, and M. W. Jones, "Micropolarizer Array for Infrared Imaging Polarimetry", *J. Opt. Soc. Am. A* **16**(5), pp. 1184-1193 (1999).
14. D. M. Chambers and G. P. Nordin, "Stratified Volume Diffractive Optical Elements as High Efficiency Gratings", *J. Opt. Soc. Am. A* **16**(5), pp. 1168-1174 (1999).
15. G. P. Nordin and P. C. Deguzman, "Broadband Form Birefringent Quarter-Wave Plate for the Mid-Infrared Wavelength Region", *Opt. Express* **5**(8), pp. 163-168 (1999), <http://www.opticsexpress.org/abstract.cfm?URI=OPEX-5-8-163>.
16. J. Jiang and G. P. Nordin, "A Rigorous Unidirectional Method for Designing Finite Aperture Diffractive Optical Elements", *Opt. Express* **7**(6), pp. 237-242 (2000), <http://www.opticsexpress.org/abstract.cfm?URI=OPEX-7-6-237>.
17. M. A. Jensen and G. P. Nordin, "Finite-Aperture Wire Grid Polarizers", *J. Opt. Soc. Am. A* **17**(12), pp. 2191-2198 (2000).
18. H. Shah, D. Smith, Jr., J. Ballato, S. Foulger, P. Deguzman, and G. Nordin, "Direct Generation of Optical Diffractive Elements in Perfluorocyclobutane (PFCB) Polymers by Soft Lithography," *IEEE Photonics Tech. Let.* **12**(12), 1650 (2000).
19. S. D. Mellin and G. P. Nordin, "Limits of Scalar Diffraction Theory and an Iterative Angular Spectrum Algorithm for Finite Aperture Diffractive Optical Element Design", *Optics Express* **8**(13), pp. 705-722 (2001), <http://www.opticsexpress.org/abstract.cfm?URI=OPEX-8-13-705>.
20. M. A. Jensen and G. P. Nordin, "Characterization of Two-Dimensional Finite-Aperture Wire Grid Polarizers by a Spectral-Domain Technique," *Appl. Opt.* **40**(26) pp. 4738-4745 (2001).
21. P. C. Deguzman and G. P. Nordin, "Stacked Subwavelength Gratings as Circular Polarization Filters," *Appl. Opt.* **40**(31), pp. 5731-5737 (2001).
22. G. P. Nordin, S. Kim, J. Cai, and J. Jiang, "Hybrid integration of conventional waveguide and photonic crystal structures," *Opt. Express* **10**(23), 1334-1341 (2002), <http://www.opticsexpress.org/abstract.cfm?URI=OPEX-10-23-1334>.
23. D. M. Chambers, G. P. Nordin, and Seunghyun Kim, "Fabrication and performance of a three-layer stratified volume diffractive optical element high-efficiency

- grating,” Opt. Express **11**(1), 27-38 (2003).
<http://www.opticsexpress.org/abstract.cfm?URI=OPEX-11-1-27>.
24. L. Li, G. P. Nordin, J. M. English, and J. Jiang, “Small-area bends and beamsplitters for low-index-contrast waveguides”, Opt. Express **11**(3), 282-290 (2003). <http://www.opticsexpress.org/abstract.cfm?URI=OPEX-11-3-282>
 25. J. Jiang, J. Cai, G. P. Nordin, and L. Li, “Parallel microgenetic algorithm design for photonic crystal and waveguide structures,” Opt. Lett. **28**(23), pp. 2381-2383 (2003).
 26. S. Kim, G. P. Nordin, J. Cai, and J. Jiang, “Ultracompact high-efficiency polarizing beam splitter with a hybrid photonic crystal and conventional waveguide structure,” Opt. Lett. **28**(23), pp. 2384-2386 (2003).
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