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EDUCATION

Ph.D., University of Iowa, 1995
Major: Electrical and Computer Engineering, GPA 4.0/4.0.
Thesis Title: “Nonlinear optical properties of hetero *n-i-p-i* device structures”

B.S., University of Iowa, 1989 (with Highest Distinction), GPA 4.0/4.0
Major: Electrical and Computer Engineering

EMPLOYMENT HISTORY

UNIVERSITY AT BUFFALO, THE STATE UNIVERSITY OF NEW YORK,
Professor, Department of Electrical Engineering, August 2005 - Present
Adjunct Associate Professor, Department of Physics, March 2005 - Present
Director, UB2020 Integrated Nanostructured Systems Initiative, August 2006 - Present
Director, Institute for Lasers, Photonics and Biophotonics, August 2002 – Present
Director, National Science Foundation Integrative Graduate Education and Research
Traineeship in “Biophotonics: Materials and Applications,” September 2001 – Present

UNIVERSITY AT BUFFALO, THE STATE UNIVERSITY OF NEW YORK, Associate Professor
Department of Electrical Engineering
August 2000 – August 2005

INSTITUTE FOR LASERS, PHOTONICS AND BIOPHOTONICS, THE STATE UNIVERSITY OF NEW YORK, Deputy Director of Lasers and Photonics
Deputy Director, Institute for Lasers, Photonics and Biophotonics, Dec. 1999 – August 2002

UNIVERSITY AT BUFFALO, THE STATE UNIVERSITY OF NEW YORK, Assistant Professor
Department of Electrical Engineering
August 1995 – August 2000

UNIVERSITY OF IOWA
Postdoctoral Scientist - Laboratory for Photonics and Quantum Electronics
March 1995 - August 1995

UNIVERSITY OF IOWA
Research Assistant - Laboratory for Photonics and Quantum Electronics
August 1989 - February 1995

PROFESSIONAL AND ACADEMIC HONORS/AWARDS

2006 Faculty in Leadership Participant (1 of 4 participants), University at Buffalo
2003 Most Valuable Workshop Contribution, First International Workshop on Indium Nitride
2002 State University of New York Chancellor's Award for Excellence in Teaching
2000 University at Buffalo Top 100 Federal Grantee
2000 Department of Defense, Office of Naval Research Young Investigator Award
1998 National Science Foundation CAREER Award
1996, 1997, 1998 University at Buffalo Reifler Award
1993 NATO Advanced Studies Institute Travel Award
1989 NCR Most Promising Student Scholarship
1987-1989 Exxon Honors Scholarship, Caterpillar Honors Scholarship, State of Iowa Scholarship

PUBLICATIONS

REFEREED JOURNALS

(NOTE: IN THIS FIELD, AUTHORS ARE LISTED BY INSTITUTION WITH PROFESSORS LISTED LAST FOR THEIR INSTITUTION. THE INSTITUTION THAT CONTRIBUTES THE MOST IS LISTED FIRST.)

1. R.M. Bukowski, V.P. Chodavarapu, A.H. Titus, A.N. Cartwright, F.V. Bright, "Phase Fluorometric Glucose Biosensor using Oxygen as Transducer and Enzyme doped Xerogels," Accepted to *IEE Electronics Letters*, January (2007).
2. V. P. Chodavarapu, R. M. Bukowski, D. O. Shubin, A. H. Titus, A. N. Cartwright, F. V. Bright, "CMOS based Phase Fluorometric Oxygen Sensor System," *IEEE Transactions on Circuits and Systems-I*, **54**, 111-118, (2007).
3. D.M. Ramos, F. Kamal, E.A. Wimmer, A.N. Cartwright, and A. Monteiro, "Temporal and spatial control of transgene expression using laser induction of the hsp70 promoter," *BMC Developmental Biology*, **6**(55), (2006).
4. K. R. Maskaly, V. K.S. Hsiao, A. N. Cartwright, and P. N. Prasad, P.F. Lloyd and T. J. Bunning, W. C. Carter, " Experimental verification of the applicability of the homogenization approximation to rough one-dimensional photonic crystals using a holographically fabricated reflection grating," *Journal of Applied Physics*, **100**(6), 066103-13, (2006).
5. K. Moazzami, T.E. Murphy, J.D. Phillips, M.C-K. Cheung and A.N. Cartwright, "Sub-bandgap photoconductivity in ZnO epilayers and extraction of trap density spectra," *Semiconductor Science and Technology*, **21**(6), 717-723, (2006).
6. E. Trybus, G. Namkoong, W. Henderson, S. Burnham, W. A. Doolittle, M. Cheung, and A. Cartwright, "InN: A material with photovoltaic promise and challenges," *Journal of Crystal Growth*, **288**(2), pp. 218-224, (2006).
7. Z. Tao, E. C. Tehan, R. M. Bukowski, Y. Tang, E. L. Shughart, W. G. Holthoff, A. N. Cartwright, A. H. Titus, and F. V. Bright, "Templated xerogels as platforms for biomolecule-less biomolecule sensors," *Analytica Chimica Acta*, **564**, pp. 59-65, (2006).

8. V.P. Chodavarapu, A.H. Titus and A.N. Cartwright, "Differential read-out architecture for CMOS ISFET Microsystems," *Electronics Letters*, **41**(12), 698-699, (2005).
9. F. Chen, A.N. Cartwright, C. Liu, I.M. Watson, "Emission Dynamics of Red Emitting InGaN/GaN Single Quantum Wells," *Physica Status Solidi C: Conferences and Critical Reviews*, **2**(7) 2787-2790, (2005).
10. F. Chen, A.N. Cartwright, H. Lu, W.J. Schaff, "Hole Transport and Carrier Lifetime in InN Epilayers," *Applied Physics Letters*, **87**(21), 212104/1-212104/3, (2005).
11. V.P. Chodavarapu, R.M. Bukowski, S.J. Kim, A.H. Titus, A.N. Cartwright, F.V. Bright, "Multi-sensor System Based on Phase Detection, an LED Array, and Luminophore-doped Xerogels," *Electronic Letters*, **41**(18), 1031-1033, (2005).
12. V.K.S. Hsiao, William D. Kirkey, Fei Chen, Alexander N. Cartwright, Paras N. Prasad and Timothy J. Bunning, "Organic Solvent Vapor Detection using Holographic Photopolymer Reflection Gratings," *Advanced Materials*, **17**(18), 2211-2214, (2005).
13. F. Chen, A.N. Cartwright, H. Lu, and W.J. Schaff, "Temperature Dependence of Carrier Lifetimes in InN," *Phys. Stat. Soli. A: Applications and Materials Science*, **202**(5), 768-772, (2005).
14. M. Furis, A.N. Cartwright, E.L. Waldron, and E.F. Schubert, "Spectral and Temporal Resolution of Recombination from Multiple Excitation States in Modulation-Doped AlGaIn/GaN Multiple Quantum Wells Heterostructures," *Applied Physics Letters*, **86**(1) 162103/1-162103/3, (2005).
15. M.C. Cheung, G. Namkoong, F. Chen, M. Furis, H.E. Pudavar, A.N. Cartwright, and W.A. Doolittle, "Photoluminescence Study of MBE Grown InGaIn with Intentional Indium Segregation," *Phys. Stat. Soli.(c)* **2**(7), 2779-2782, (2005).
16. F. Chen, A.N. Cartwright, C. Liu and I.M. Watson, "Emission Dynamics of Red Emitting InGaIn/GaN Single Quantum Wells," *Phys. Stat. Soli.(c)* **2**(7), 2787-2790, (2005).
17. W.D. Kirkey, Y. Sahoo, X. Li, Yuanqing He, M.T. Swihart, A.N. Cartwright, S. Bruckenstein, and P.N. Prasad, "Quasi-reversible photoluminescence quenching of stable dispersions of silicon nanoparticles," *Journal of Materials Chemistry*, **15**(20), 2028-2034, (2005).
18. E. Trybus, G. Namkoong, W. Henderson, W.A. Doolittle, R. Liu, J. Mei, F. Ponce, M. Cheung, F. Chen, M. Furis, and A. Cartwright, "Growth of InN on Ge Substrate by Molecular Beam Epitaxy," *Journal of Crystal Growth*, **279**, 311-315, (2005).
19. D.W. Lucey, D.J. MacRae, M. Furis, Y. Sahoo, A.N. Cartwright, and P.N. Prasad, "Monodispersed InP Quantum Dots Prepared by Colloidal Chemistry in a Noncoordinating Solvent," *Chemistry of Materials*, **17**, 3754-3762, (2005).
20. V.K.S. Hsiao, C. Lu, G.S. He, M. Pan, A.N. Cartwright, P.N. Prasad, R. Jakubiak, R.A. Vaia, and T.J. Bunning, "High contrast switching of distributed-feedback lasing in dye-doped H-PDLC transmission grating structures," *Optics Express*, **13**, 3787-3794, (2005).

21. X. Fang, V. K. S. Hsiao, V. P. Chodavarapu, A. H. Titus, and A. N. Cartwright, "Colorimetric Porous Photonic Bandgap Sensors with Integrated CMOS Color Detectors," *IEEE Sensors Journal*, **6**(3), 661 – 667, (2006).
22. P.P. Markowicz, V.K.S. Hsiao, H. Tiryaki, A.N. Cartwright, P.N. Prasad, K. Dolgaleva, N. N. Lepeshkin and R.W. Boyd, "Enhancement of third-harmonic generation in a polymer-dispersed liquid-crystal grating," *Applied Physics Letters*, **87**, 051102/1-051102/3, (2005).
23. D.S. Kaputa, A.N. Kuzmin, A.V. Kachynski, A.N. Cartwright, and P.N. Prasad, "Dynamics of multiple trapping by a single beam laser tweezer," *Applied Optics*, **44**(19), 3963-3968, (2005).
24. V.K.S. Hsiao, T.-C. Lin, G.S. He, A.N. Cartwright, P.N. Prasad, L.V. Natarajan, V.P. Tondiglia, and T.J. Bunning, "Optical microfabrication of highly reflective volume Bragg gratings," *Applied Physics Letters*, **86**(1), 131113/1-131113/3, (2005).
25. B. Jaiswal, A.H. Titus, T. Dishongh, and A.N. Cartwright, "Innovative Circuit Board Level Routing Designs for BGA Packages," *IEEE Transactions on Advanced Packaging*, **27**(4) 630-639, (2004).
26. F. Chen, A.N. Cartwright, H. Lu and W.J. Schaff, "Ultrafast carrier dynamics in InN epilayers," *Journal of Crystal Growth*, **260** 10-14, (2004).
27. H. Liu, C. Basaran, A.N. Cartwright, W. Casey, "Application of moiré interferometry to determine strain fields and debonding of solder joints in BGA packages," *IEEE Transactions on Components and Packaging Technologies*, **27**(1) 217-223, (2004).
28. H. Liu, A.N. Cartwright, C. Basaran, "Moiré interferogram phase extraction: A ridge detection algorithm of continuous wavelet transforms," *Applied Optics-Information Processing*, **43**(4) 850-857, (2004).
29. F. Chen, A.N. Cartwright, H. Lu, and W.J. Schaff, "Temperature dependent optical properties of wurtzite InN," *Physica E-Low-Dimensional Systems & Nanostructures* **20**(3-4) 308-312, (2004).
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31. M. Furis, A.N. Cartwright, H. Wu, W.J. Schaff, "Room-temperature ultraviolet emission from GaN/AlN multiple-quantum-well heterostructures," *Applied Physics Letters*, **83**(17) 3486-3488, (2003).
32. G. S. He, T-C. Lin, V.K.S. Hsiao, A.N. Cartwright, P.N. Prasad, L.V. Natarajan, V.P. Tondiglia, R. Jakubiak, R.A. Vaia, T.J. Bunning, "Tunable two-photon pumped lasing using a holographic polymer-dispersed liquid-crystal grating as a distributed feedback element," *Applied Physics Letters*, **83**(14) 2733-2735, (2003).
33. F. Chen, A.N. Cartwright, "Out-of-well carrier screening in a strained InGaN/GaN multiple quantum well structure," *Physical Review B*, **68**(23) 233304-1-233304-4, (2003).

34. F. Chen, A.N. Cartwright, H. Lu, and W.J. Schaff, "Time-resolved spectroscopy of carrier recombination and relaxation dynamics in InN," *Applied Physics Letters*, **83**(24) 4984-4986, (2003).
35. A.A. Kachynski, A.N. Kuzmin, H. Pudavar, D. Kaputa, A.N. Cartwright, P.N. Prasad, "Measurement of optical trapping forces by use of the two-photon fluorescence of microspheres," *Optics Letters*, **28**(23) 2288-2290, (2003).
36. M. Furis, Y. Sahoo, D.J. MacRae, F.S. Manciú, A.N. Cartwright, and P.N. Prasad, "Surfactant-Imposed Interference in the Optical Characterization of GaP Nanocrystals," *J. Phys. Chem. B.*, **107**(42) 11622-11625, (2003).
37. H. Liu, A.N. Cartwright, C. Basaran, "Sensitivity improvement in phase shifted moiré interferometry using 1D continuous wavelet transform image processing," *Optical Engineering*, **42**(9) 2626-2652, (2003).
38. F. Chen, M.C. Cheung, P.M. Sweeney, W.D. Kirkey, M. Furis, A.N. Cartwright, "Ultrafast differential transmission spectroscopy of excitonic transitions in InGaN/GaN multiple quantum wells," *Journal of Applied Physics*, **93**(8) 4933-4935, (2003).
39. F. Chen, W.D. Kirkey, M. Furis, M.C. Cheung, A.N. Cartwright, "Excitonic field screening and bleaching in InGaN/GaN multiple quantum wells," *Solid State Communications*, **125**(11-12) 617-622, (2003).
40. M. Cheung, G. Namkoong, M. Furis, F. Chen, A.N. Cartwright, W.A. Doolittle, and A. Brown, "Time resolved optical studies of InGaN layers grown on LGO," presented at GaN and Related Alloys, Boston, MA, United States, (2002).
41. J. Hwang, W.J. Schaff, L.F. Eastman, S.T. Bradley, L.J. Brillson, D.C. Look, W. Walukiewicz, M. Furis, A.N. Cartwright, "Si doping of high Al mole fraction $\text{Al}_x\text{Ga}_{1-x}\text{N}$ alloys with RF plasma induced molecular beam epitaxy," *Applied Physics Letters*, **81**(27) 5192-5194, (2002).
42. T. Dishongh, C. Basaran, A.N. Cartwright, Y. Zhao, H. Liu, "Impact of temperature cycle profile on fatigue life of solder joints," *IEEE Transactions on CPMT Advanced Packaging*, **25**(3), 433-438, (2002).
43. A. Patra, M. Pan, C.S. Friend, T-C Lin, A.N. Cartwright, P.N. Prasad, R. Burzynski, "Electroluminescence properties of systematically derivatized organic chromophores containing electron donor and acceptor groups," *Chem. Mater.*, **14**(10) 4044-4048, (2002).
44. C. Basaran, H. Ye, P. Bush, A.N. Cartwright, "Inspection of under bump metallisation – solder ball interface by SEM, EDX and moiré interferometry," *TAPTechnology*, Fourth Edition, 17-22, (2002).
45. P.M. Sweeney, M.C. Cheung, F. Chen, A.N. Cartwright, D.P. Bour M. Kneissl, "Spectroscopy and modeling of carrier recombination in III-N heterostructures," *Phys. Stat. Sol. (b)*, **228**(1) 115-119, (2001).
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47. D. Visco, A.N. Cartwright, "A New Model for ASEE Student Chapters," *Journal of Engineering Education*, **90**(4) 641-643, (2001).
48. H.C. Chang, G. Kioseoglou, E.H. Lee, J. Haetty, M.H. Na, Y. Xuan, H. Luo, A. Petrou, A.N. Cartwright, "Lasing modes in equilateral-triangular laser cavities," *Physical Review A*, **62**(1) 013816-1-013816-6, (2000).
49. Y. Zhao, C. Basaran, A.N. Cartwright, T. Dishongh, "Thermomechanical Behavior of Micron Scale Solder Joints Under Dynamic Loads," *Mechanics of Materials*, **32**(3) 161-173, (2000).
50. A.N. Cartwright, P.M. Sweeney, T. Prunty, D.P. Bour, M. Kneissl, "Electric field distribution in strained p-i-n GaN/InGaN multiple quantum well structures," *MRS Internet J. Nitride Semicond. Res.* **4**(12), (1999).
51. Y. Zhao, C. Basaran, A.N. Cartwright, T. Dishongh, "Thermomechanical behavior of micron scale solder joints: an experimental observation," *Journal of the Mechanical Behavior of Materials*, **10**(3) 135-146, (1999).
52. Y. Zhao, T. Dishongh, A.N. Cartwright, C. Basaran, "Creep behavior of BGA solder joints during thermal cycling by moiré interferometry," *Advances in Electronic Packaging*, EEP-**26**(1) 685-691, (1999).
53. J. W. Palmer, W.A. Anderson, A.N. Cartwright, "Novel metal-semiconductor-metal photodetectors on bulk semi-insulating indium phosphide," *IEEE Photon. Technol. Lett.*, **9**(10) 1385-1387, (1997).
54. X.R. Huang, S.K. Cheung, A.N. Cartwright, A.L. Smirl and W.F. Tseng, "An interdigitated stacked p-i-n multiple-quantum-well modulator," *IEEE Photon. Technol. Lett.*, **8**(9) 1172-1175, (1996).
55. X.R. Huang, A.N. Cartwright, D.R. Harken, D.S. McCallum, A.L. Smirl, J.L. Sánchez-Rojas, A. Sacedón, F. González-Sanz, E. Calleja and E. Muñoz, "Per carrier nonlinear optical response of [111]-oriented InGaAs/GaAs multiple quantum wells," *J. Appl. Phys.*, **79**(1) 417-423, (1996).
56. A.N. Cartwright, X.R. Huang and A.L. Smirl, "Scaling of Stark-shifted per-carrier nonlinearities in multiple-quantum-well device structures," *IEEE Journal of Quantum Electronics*, **31**(10) 1726-1733, (1995).
57. X.R. Huang, D.R. Harken, A.N. Cartwright, A.L. Smirl, J.L. Sánchez-Rojas, A. Sacedón, F. González-Sanz, E. Calleja and E. Muñoz, "In-well screening nonlinearities in piezoelectric multiple quantum wells," *Appl. Phys. Lett.* **67**(7) 950-952, (1995).
58. D.R. Harken, A.N. Cartwright, X.R. Huang, A.L. Smirl, J.L. Sánchez-Rojas, A. Sacedón, F. González-Sanz, E. Calleja and E. Muñoz, "Nonlinear optical response, screening, and distribution of strain in piezoelectric multiple quantum wells," *J. Appl. Phys.* **76**(12) 7870-7873, (1994).
59. X.R. Huang, D.S. McCallum, D. R. Harken, A.N. Cartwright, A.L. Smirl, A. Sacedón, J.L. Sánchez-Rojas, E. Calleja and E. Muñoz, "Strained piezoelectric [111] multiple quantum wells: clamped or free?," *Superlattices and Microstructures*, **15**(2) 171-174, (1994).

60. D.S. McCallum, A.N. Cartwright, A.L. Smirl, W. Tseng, J. G. Pellegrino, and J. Comas, "Scaling of the nonlinear optical cross sections of GaAs-AlGaAs multiple quantum well hetero n-i-p-i's," *IEEE Journal of Quantum Electronics*, **30**(12) 2790-2797, (1994).
61. A.N. Cartwright, D.S. McCallum, T. F. Boggess, A.L. Smirl, T.S. Moise, L.J. Guido, R.C. Barker and B.S. Wherrett, "Magnitude, origin and evolution of piezo-electric optical nonlinearities in strained [111]B InGaAs/GaAs quantum wells," *J. Appl. Phys.* **73**(11) 7767-7774, (1993).
62. A.L. Smirl, D.S. McCallum, A.N. Cartwright, X.R. Huang, T.F. Boggess and T.C. Hasenberg, "Ultrafast decay of photodiffractive gratings in hetero n-i-p-is by enhanced in-plane transport," p. 503, Springer Series in Chemical Physics, **55** 503-504, "Ultrafast Phenomena VIII", Eds. J.-L. Martin, A. Migus, G. A. Mourou, A.H. Zewail, Springer, Berlin, (1993).
63. D.S. McCallum, A.N. Cartwright, X.R. Huang, T.F. Boggess, A.L. Smirl and T.C. Hasenberg, "Enhanced ambipolar in-plane transport in an InAs/GaAs hetero n-i-p-i," *J. Appl. Phys.* **73** 3860-3866 (1993).

REFEREED CONFERENCE PROCEEDINGS

1. Z. Lu, A.N. Cartwright, "Novel Methods to Reduce Pattern Size and Pitch for Data Storage Using Electron Beam Writing," *Materials Research Society Symposium O Proceedings*, accepted (2007).
2. S.J. Kim, V.P. Chodavarapu, R. Bukowski, A.H. Titus, A.N. Cartwright, M.T. Swihart, F.V. Bright, and T.J. Bunning, "Nanostructured porous polymeric photonic bandgap structures for sensing," *Proceedings of SPIE-The International Society for Optical Engineering*, **6447**, 64470O, *Invited Paper* (2007)
3. A.V. Osinsky, J.W. Dong, J.Q. Xie, B. Hertog, A.M. Dabiran, P.P. Chow, S.J. Pearton, D.P. Norton, D.C. Look, W. Schoenfeld, O. Lopatiuk, L. Chernyak, M. Cheung, A.N. Cartwright, and M. Gerhold, "ZnCdO/ZnMgO and ZnO/AlGaN heterostructures for UV and visible light emitters," *Materials Research Society Symposium Proceedings*, **891**, 371-379, (2006).
4. V.P. Chodavarapu, D.O. Shubin, R.M. Bukowski, E.C. Tehan, A.H. Titus, A.N. Cartwright, and F. V. Bright, "CMOS-based biosensor systems using integrated nanostructured recognition elements," *Proceedings of SPIE-The International Society for Optical Engineering*, **6095**, 60950O/1-60950O/8, (2006).
5. F. Chen, A.N. Cartwright, H. Lu, and W.J. Schaff, "Carrier recombination, relaxation, and transport dynamics in InN," *Materials Research Society Symposium Proceedings*, **892**, 95-103, (2006).
6. S. Chikkerur, A.N. Cartwright, V. Govindaraju, "K-plet and Coupled BFS: A Graph Based Fingerprint Representation and Matching Algorithm," *Advances in Biometrics, Proceedings Lecture Notes in Computer Science 3832*: 309-315 (2006).
7. V.P. Chodavarapu, D.O. Shubin, R.M. Bukowski, A.H. Titus, A.N. Cartwright, F.V. Bright, "CMOS-based Biosensor System using Integrated Nanostructured Recognition Elements," *Proceedings of SPIE Photonics West, San Jose* (2006).

8. V.K.S. Hsiao, W.D. Kirkey, A.N. Cartwright, P.N. Prasad, P.F. Lloyd, and T.J. Bunning, "Organic solvent vapor sensing using porous photopolymer photonic bandgap structures," *Proceedings of SPIE-The International Society for Optical Engineering*, **5926**, 59260K/1-59260K/6, (2005).
9. V.P. Chodavarapu, A.H. Titus, D. O. Shubin, A.N. Cartwright, R.M. Bukowski, and F.V. Bright, "CMOS mixed-signal phase detector for integrated chemical sensor systems," *IEEE Sensors 2005, [IEEE Conference on Sensors], 4th, Irvine, CA, United States, Oct. 30-Nov. 3, 2005*, **2**, 1068-1071, (2005).
10. V.P. Chodavarapu, A.H. Titus, and A.N. Cartwright, "CMOS ISFET microsystem for biomedical applications," *IEEE Sensors 2005, [IEEE Conference on Sensors], 4th, Irvine, CA, United States, Oct. 30-Nov. 3, 2005*, **1**, 109-112, (2005).
11. Z. Tao, E.C. Tehan, R.M. Bukowski, Y. Tang, E.L. Shughart, W. G. Holthoff, A.N. Cartwright, A. H. Titus, and F. V. Bright, "Biomolecule-less sensors for biomolecules based on templated xerogel platforms," *Proceedings of SPIE-The International Society for Optical Engineering*, **5969**, 59690F/1-59690F/9, (2005).
12. V.P. Chodavarapu, D.O. Shubin, R.M. Bukowski, A.H. Titus, A.N. Cartwright, F.V. Bright, "CMOS Mixed-Signal Phase Detector for Integrated Chemical Sensor Systems," *Proceedings of IEEE Sensors Conference*, 1068-1071 (2005).
13. A. Cartwright, T.M. Cooper, S.P. Karna, and H. Nakanishi, "Preface," *Materials Research Society Symposium Proceedings*, **846**, pp. xiii, (2005).
14. S. Chikkerur, A.N. Cartwright, V. Govindaraju, "Fingerprint Image Enhancement Using STFT Analysis," *Pattern Recognition and Image Analysis, PT 2, Proceedings Lecture Notes in Computer Science 3687*: 20-29 (2005).
15. V.P. Chodavarapu, A.H. Titus, A.N. Cartwright, "CMOS ISFET-based Microsystem for Biomedical Applications," *Proceedings of IEEE Sensors Conference*, pp. 109-112, Irvine, (2005).
16. Z. Tao, E.C. Tehan, R.M. Bukowski, Y. Tang, E.L. Shughart, W.G. Holthoff, A.N. Cartwright, A.H. Titus, F.V. Bright, "Biomolecule-less Sensors for Biomolecules Based on Templated Xerogel Platforms," *Proceedings of SPIE-The International Society for Optical Engineering*, **5969**, 60-68 (2005).
17. V.K.S. Hsiao, W.D. Kirkey, A.N. Cartwright, P.N. Prasad, P.F. Lloyd, T.J. Bunning, "Organic Solvent Vapor Sensing using Porous Photopolymer Photonic Bandgap Structures," *Proceedings of SPIE-The International Society for Optical Engineering*, (Tuning the Optical Response of Photonic Bandgap Structures II), 59260K/1-59260K/6 (2005).
18. W.D. Kirkey, M. Pan, A.N. Cartwright, Y. Sahoo, P.N. Prasad, X. Li, Y. He, and M.T. Swihart, "Optical Properties of Polymer-Embedded Silicon Nanoparticles," *Quantum Dots, Nanoparticles and Nanowires, Materials Research Society Symposium – Proceedings Quantum Dots, Nanoparticles and Nanowires*, **789** 357-361 (2003).
19. M. Furis, D.J. MacRae, Y. Sahoo, A.N. Cartwright, and P.N. Prasad, "Spectroscopy Studies of InP Nanocrystals Synthesized Through a Fast Reaction," *Quantum Dots, Nanoparticles*

- and Nanowires, Materials Research Society Symposium – Proceedings Quantum Dots, Nanoparticles and Nanowires, **789** 89-94 (2003).
20. M. Furis, A.N. Cartwright, J. Hwang, W.J. Schaff, “Time Resolved Photoluminescence of Si-Doped High Al Mole Fraction AlGa_N Epilayers Grown by Plasma-Enhanced Molecular Beam Epitaxy,” Materials Research Society Symposium – Proceedings, (Ga_N and Related Alloys-2003) **83**(17) 667-672 (2003).
 21. M. Furis, A.N. Cartwright, H. Wu, W.J. Schaff, “Emission Mechanisms in UV Emitting Ga_N/Al_N Multiple Quantum Well Structures,” Materials Research Society Symposium – Proceedings, (Ga_N and Related Alloys-2003) 35-40 (2003).
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61. A.L. Smirl, X.R. Huang, D. R. Harken, A.N. Cartwright, D.S. McCallum, J. L. Sánchez-Rojas, A. Sacedón, F. González-Sanz, E. Calleja and E. Muñoz, "Piezoelectric Optical Nonlinearities in Strained [111] InGaAs-GaAs Multiple Quantum Well p-i-n Structures," Nonlinear Optics: Materials, Fundamentals and Applications Conference, Waikaloa, HI (1994).

62. A.N. Cartwright, D.S. McCallum, A.L. Smirl, W. Tseng, J. Pellegrino, and J. Comas, "Magnitudes of Optical Nonlinearities in GaAs/AlGaAs Hetero n-i-p-i's," paper P12 4, Interdisciplinary Laser Science Conference (ILS-IX), Toronto, Canada (1993).
63. A.L. Smirl, D.S. McCallum, A.N. Cartwright, T. F. Boggess, T. S. Moise, L. J. Guido, R. C. Barker and B. S. Wherrett, "Optical Nonlinearities Associated with Piezo-electric Field Screening in [111] Strained-layer InGaAs/GaAs Quantum Wells," paper QFB4, Quantum Optoelectronics Conference, Palm Springs, CA (1993).
64. D.S. McCallum, A.N. Cartwright, T. F. Boggess, A.L. Smirl, T. S. Moise, L. J. Guido and R. C. Barker, "Magnitude and Evolution of Piezoelectric Nonlinearities in (111)-oriented Strained Multiple Quantum Wells," paper WD3, Nonlinear Optics: Materials, Fundamentals and Applications, Maui, HI (1992).
65. A.L. Smirl, D.S. McCallum, A.N. Cartwright, X.R. Huang, T. F. Boggess and T. C. Hasenberg, "Ultrafast Decay of Photodiffractive Gratings in Hetero n-i-p-i's by Enhanced In-plane Transport," paper, 8th International Conference on Ultrafast Phenomena, Antibes - Juan-les-Pins, France (1992).
66. A.N. Cartwright, D.S. McCallum, X.R. Huang, T. F. Boggess, A.L. Smirl and T. C. Hasenberg, "Picosecond Dynamics of Photorefractive and Photoabsorptive Gratings in an All-binary InAs/GaAs hHetero n-i-p-i," paper C W K4, Conference on Lasers and Electro-Optics, Anaheim, CA (1992).

NON-REFEREED CONFERENCE PRESENTATIONS

1. F. Chen, A.N. Cartwright, SUNY Buffalo, H. Lu, W.J. Schaff, Cornell University, Ithaca, NY, "Ultrafast Carrier Dynamics in MBE Grown InN Epilayers," Materials Research Society Symposium on GaN and Related Alloys (2003).
2. F.V. Bright, A.N. Cartwright, A.H. Titus, "Smart Multi-modal Biosensor Arrays," Infotonics Technology center Inc., University Days, Canandaigua, NY, May (2003).
3. A.N. Cartwright, and C. R. Wie, "Semiconductor and Photonics Learning Modules Based on Consumer Product Case Studies," National Science Foundation Showcase of Projects, American Society for Engineering Education Annual Conference, St. Louis, Missouri, June (2000).
4. A.N. Cartwright, "Development of Java Based Engineering Courseware," St. Lawrence Section of American Society for Engineering Education Spring Sectional Meeting, Alfred, NY, March–April (2000).
5. A.N. Cartwright, and C. R. Wie, "Semiconductor and Photonics Learning Modules Based on Consumer Product Case Studies," National Science Foundation Showcase of Projects, American Society for Engineering Education Annual Conference, Charlotte, North Carolina, June (1999).
6. A.N. Cartwright, "Incorporating Design in Photonics Courses," St. Lawrence Section of American Society for Engineering Education Spring Sectional Meeting, SUNY at Binghamton, Binghamton, NY (1998).

7. A.N. Cartwright, "Stimulating Student Interest Through Cooperative Learning Environments," St. Lawrence Section of American Society for Engineering Education Fall Sectional Meeting, SUNY at Utica, Utica, NY (1997).
8. C. Wengerter, S. Nagarathnam, A.N. Cartwright, J. L. Sanchez-Rojas, "Differential Reflection Measurements of Quantum Well Structures for Optical Modulators", Workshop on Photonic Materials and Devices, Buffalo, NY, October (1997).
9. X.R. Huang, A.N. Cartwright, D. R. Harken, D.S. McCallum, A.L. Smirl, J. L. Sánchez-Rojas, A. Sacedón, E. Calleja, E. Muñoz, "Nonlinear Optical Properties of Piezoelectric Multiple Quantum Wells," paper Q15, March meeting of the American Physical Society, San Jose, CA (1995).
10. A.N. Cartwright, D.S. McCallum, A.L. Smirl, W. Tseng, J. Pellegrino, and J. Comas, "Scaling of the Nonlinear Cross Sections and Dynamic Range of GaAs/AlGaAs Hetero *n-i-p-i*'s," paper C20 7, March Meeting of the American Physical Society, Pittsburgh, PA (1994).
11. A.N. Cartwright, D.S. McCallum, X.R. Huang, T. F. Boggess, A.L. Smirl, and T. C. Hasenberg, "Enhanced Ambipolar In-plane Transport in a Hetero *n-i-p-i*," International School of Material Science and Technology, NATO Advanced Studies Institute, "Nonlinear Optical Materials and Devices for Application in Information Technology," Ettore Majorana Centre for Scientific Culture, Erice, Sicily, July (1993).
12. D.S. McCallum, A.L. Smirl, A.N. Cartwright, T. F. Boggess, T. S. Moise, L. J. Guido, R. C. Barker and B. S. Wherrett, "Comparison of Optical Nonlinearities in [111] Strained InGaAs/GaAs Quantum Wells," paper Q28 1, March Meeting of the American Physical Society, Seattle, WA (1993).
13. A.N. Cartwright, D.S. McCallum, X.R. Huang, T. F. Boggess, A.L. Smirl, and T. C. Hasenberg, "Enhanced Ambipolar In-plane Transport in a Hetero *n-i-p-i*," paper Q28 6, March Meeting of the American Physical Society, Seattle, WA (1993).
14. D.S. McCallum, X.R. Huang, A.N. Cartwright, D. R. Harken, T. F. Boggess, A.L. Smirl, T. C. Hasenberg and A. Kost, "Photorefractive and Photoabsorptive Nonlinearities in an All-binary Hetero *n-i-p-i*," paper S21 10, March Meeting of the American Physical Society, Indianapolis, IN (1992).

WORKSHOP PARTICIPATION

1. National Science Foundation Case Studies in Science Workshop, Buffalo, NY, Summer, 1998.
2. American Society Engineering Education/National Science Foundation Visiting Scholars Teaching Workshop focusing on Collaborative Learning, Buffalo, NY, February 1998.
3. National Science Foundation Sponsored: *Applied Optics for College Teachers* workshop focusing on optical methods including Moiré, Speckle, Holographic interferometry and Photoelasticity, Oakland University, Rochester, MI, August 1997.
4. National Science Foundation Sponsored *Women in Science Curriculum Reform Institute*, University of Wisconsin at Oshkosh, June 1997.

5. *American Society for Engineering Education* Annual Meeting, Milwaukee, WI, June (1997).

INTERNAL UNIVERSITY AT BUFFALO PRESENTATIONS

1. A.N. Cartwright, Department of Chemistry, University at Buffalo, State University of New York, "Ultrafast Carrier Dynamics in III-N Based Heterostructures & Devices," February 15, 2006.
2. A.N. Cartwright, Department of Surgery, University at Buffalo, Faculty Development Retreat, "Engineering Applications (Devices, Sensors, and Haptics): Research Opportunities for UB Surgeons, March 2004.
3. A.N. Cartwright, Center for Unified Biometrics and Sensors, Guest Lecturer for General Dynamics Corp. presentation, Vice President for Special Projects and Programs, State University of New York at Buffalo, Buffalo, NY, November 2003.
4. W.D. Kirkey, M. Pan, A.N. Cartwright, and X. Li, Y. He, M.T. Swihart, and Y. Sahoo, P.N. Prasad, "Photoluminescence Characterization of Silicon Nanoparticles," Defense University Research Initiative on Nanotechnology Annual Meeting, 2002.
5. A. Patra, P.N. Prasad, C. S. Friend, T. C. Lin, R. Burzynski, M. Pan, A.N. Cartwright, "Electroluminescence Properties of Systematically Derivatized Organic Chromophores Containing Electron Donor and Acceptor Groups," Defense University Research Initiative on Nanotechnology Annual Meeting, 2002.
6. D. J. MacRae, Y. Sahoo, P.N. Prasad, M. Furis, A.N. Cartwright, F. Manciu and B. D. McCombe, "An Alternate Approach to the Synthesis of Gallium Phosphide (GaP) Nanocrystals," Defense University Research Initiative on Nanotechnology Annual Meeting, 2002.
7. M. Furis, A.N. Cartwright, jF. Manciu, B. D. McCombe, Y. Sahoo, D. J. MacRae, P.N. Prasad, "Challenges in Nanochemistry Route to GaP Nanoparticles," Defense University Research Initiative on Nanotechnology Annual Meeting, 2002.
8. F. Manciu, B. D. McCombe, Y. Sahoo, D. J. MacRae, P.N. Prasad, M. Furis, A.N. Cartwright, "Chemical Preparation and Infrared Spectroscopy of GaP Nanoparticles," Defense University Research Initiative on Nanotechnology Annual Meeting, 2002.
9. A.N. Cartwright, "From EE Education to Gallium Nitride Heterostructures," Electrical Engineering Departmental Graduate Seminar, April 2000.
10. A.N. Cartwright, "Piezoelectricity in III-N Materials," Center for Advanced Photonics and Electronic Materials Seminar, March 2000.
11. A.N. Cartwright, "Blue/Green Optoelectronics," Center for Advanced Photonics and Electronic Materials Seminar, May 1999.
12. A.N. Cartwright, "Blue/Green Optoelectronics," Electrical Engineering Departmental Graduate Seminar, March 1999.
13. A.N. Cartwright, Sundari Nagarathnam, "Comparison of Photodegradation in Single and Asymmetric Coupled ZnSe/ZnCdSe Quantum Wells," CAPEM Semiconductor Group Seminar, 1997.

14. A.N. Cartwright, "Electrical and Computer Engineering," EAS140 Presentation on Electrical and Computer Engineering, School of Engineering and Applied Sciences, State University of New York at Buffalo, Buffalo, NY, September 1997.
15. A.N. Cartwright, "Ultrafast Photonics," ECE Senior Seminar, Department of Electrical and Computer Engineering, State University of New York at Buffalo, Buffalo, NY, September 1997.
16. A.N. Cartwright, "Time Resolved Laser Spectroscopy," Guest Lecturer for ECE 509, "Characterization, Phenomena and Packaging of Compound Semiconductors," Electrical and Computer Engineering, State University of New York at Buffalo, Buffalo, NY, February and March 1997.
17. A.N. Cartwright, "Ultrafast Photonics," Chemistry Graduate Seminar, Department of Chemistry, State University of New York at Buffalo, Buffalo, NY, February 1997.
18. A.N. Cartwright, "Ultrafast Lasers," ECE Senior Seminar, Electrical and Computer Engineering, State University of New York at Buffalo, Buffalo, NY, October 1996.
19. A.N. Cartwright, "Ultrafast Lasers," ECE Graduate Seminar, Electrical and Computer Engineering, State University of New York at Buffalo, Buffalo, NY, October 1995.