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## EDUCATION

**UNIVERSITY AT BUFFALO, STATE UNIVERSITY OF NEW YORK,** Buffalo, New York
Ph. D in Physics, Degree Expected December 2003
Advisors: Professors Bruce D. McCombe and A. N. Cartwright – Center for Advanced Electronic and Photonic Materials (CAPEM) and the Laboratory for Spectroscopic Evaluation (LASELAB)
Thesis: "Time –Resolved Spectroscopy of GaN/AlN Quantum Well Heterostructures"

**UNIVERSITY OF BUCHAREST**, Bucharest, Romania
M.S in Semiconductor Physics, June 1997
Advisor: Professor Ioan Licea-Faculty of Physics, Division of Solid State Physics
Thesis: "Hot Electrons Distribution Function and Breakdown Ionization in Semiconductors"

**UNIVERSITY OF BUCHAREST**, Bucharest, Romania
B.S in Solid State Physics, June 1996
Advisor: Professor Ioan Licea-Faculty of Physics, Division of Solid State Physics
Thesis: "Poole-Frankel Effect in Amorphous Chalcogenides"

**Professional Society Affiliations:**

American Physical Society, Materials Research Society

**Selection of Upper Level Courses:**

Semiconductors Materials and Devices, Optoelectronics, Solid State Electronics, Numerical Methods in Solid State Physics, Quantum Theory of Solid State, Amorphous Semiconductors
**Education Courses**: Pedagogy, Methodology of Teaching Physics, Pedagogic Training, History of Physics, Psychology
**Languages**: Romanian (native), English (fluent), French (conversational)

## EXPERIENCE

**UNIVERSITY AT BUFFALO, STATE UNIVERSITY OF NEW YORK** Sept. 2001-Present

Research Assistant – Institute for Lasers, Photonics and Biophotonics and the Center for Advanced Photonics and Electronics Materials
Advisors: Prof. A. N. Cartwright and Prof. Bruce. D. McCombe

- Resolved the continuous wave and ultrafast optical properties of GaN/AlN quantum well heterostructures and AlGaN epilayers grown by Dr. W. Schaff's group at Cornell University by plasma-enhanced molecular beam epitaxy on a sapphire substrate. This included performing CW and time-resolved photoluminescence experiments, analyzing and modeling the data.
- Responsible for the CAPEM ultrafast laser facility which includes a Coherent Ti-sapphire oscillator and a regenerative amplifier pumped by a CW $Ar^+$ laser as well as a visible and an infrared optical parametric amplifier and several frequency doubling and tripling setups.
- Responsible for the CW and time-resolved photoluminescence and photoluminescence excitation studies of GaP and InP nanoparticles grown by colloidal chemistry by Dr. Prasad's group at the Institute for Lasers, Photonics, and Biophotonics. Duties included performing the experiments using the ultrafast CAPEM facility and a Jobin Yvon spectrofluorometer, as well as analyzing the data.
- Responsible for the purchase and installation of a Jobin-Yvon Fluorolog-3 Spectrofluorometer for the undergoing Biophotonics IGERT program (PI: Prof. A.N. Cartwright).
- Completed a market analysis and scientific evaluation of a laser spectrum analyzer system (a collaboration with the UB Technology Incubator and Imaging and Sensing Technologies, PI: A.N. Cartwright)
- Assisted in the writing of four grant proposals: "Market Analysis, Laser Spectrum Analyzer," Imaging and Sensing Technologies, N. Randell, A. N. Cartwright, 2/14/03-5/14/03, $7,062(funded), "Acquisition of Equipment for an Enhanced Ultrafast Laser Facility", National Science Foundation, A. N. Cartwright, B. D. McCombe, F. Bright, 8/01/03-8/01/05, $100,000 (funded), "Development of Tunable, High Speed, and High Power InN Based Light Emitters", A.N. Cartwright, W. J. Schaff, 11/01/03-11/01/06, $145,440 (pending), "Hybrid Inorganic/Organic Nanostructured Materials for Photonic Devices", A. N. Cartwright, P. N. Prasad, M. Swihart, V. Mitin and H. Luo, 04/01/04-03/31/08, $2,000,000 (pending)

**UNIVERSITY AT BUFFALO, STATE UNIVERSITY OF NEW YORK** Jan. 1999-Sept. 2001
Research Assistant- Center for Advanced Photonics and Electronics Materials
Advisors: Dr. Athos Petrou and Dr. Bruce D. McCombe.

- Studied the optical properties of ferromagnetic GaAs/Mn digital layers and Mn –doped GaAs epilayers grown by molecular beam epitaxy. The duties included performing magneto-photoluminescence, reflection and transmission experiments, analyzing and interpreting the data in connection with the structural, transport and SQUID measurements. (This work was part of the DARPA SpinS-Program- PI: Dr. Bruce D. McCombe)
- Studied the nature of recombination mechanisms in ZnMnSe/GaAs/AlGaAs Spin-LED's. The duties included performing magneto-photoluminescence and electroluminescence experiments as well as the detailed analysis of the data by extensive fitting of the EL and PL spectra.

- Performed optically detected resonance experiments on II-VI semiconductors as part of the study of internal transitions of negatively charged excitons and spin flip transitions in CdTe and CdMnTe quantum wells.
- Developed a Visual Basic application for the computer control of the optically detected resonance experiments in the ultraviolet region. The task involved the interfacing of several pieces of equipment (a spectrometer, several voltmeters, a lockin amplifier and a magnet power supply).

**UNIVERSITY AT BUFFALO, STATE UNIVERSITY OF NEW YORK** Sept.1997-Jan. 1999
Teaching Assistant – Physics Department

**Teaching Assignments:**

Fall '97: PHY 101 –College Physics 1 (Recitation)
Spring '98 PHY 102 – College Physics 2 (Recitation)
Fall '98 PHY 108 –General Physics 2 (Recitation)

**SEMICONIX DESIGN**, Bucharest, Romania July 1996-May 1997
Device Physicist

- Designed and improved the manufacturing processes for a 40V analog integrated power supply and a high breakdown voltage phototransistor. Duties included elaborating a process flow based on theoretical modeling of the devices SPICE parameters as well as modeling the process flow.

# PUBLICATIONS

## *Book Chapters:*

1. "*Quantum Dot Devices*" , M. Furis and A. N. Cartwright, in *Encyclopedia of Optical Engineerin*g, Marcel Dekker Inc. , New York , pp. 2188-2196 (2003).

## *Journals:*

1. "*Component-Resolved Photoluminescence Spectroscopy of High Al Mole Fraction Si-Doped $Al_xGa_{1-x}N$ Epilayers Grown by RF Plasma Enhanced Molecular Beam Epitaxy*", M. Furis, A. N. Cartwright, J. Hwang, and W. J. Schaff, in preparation
2. "*Room Temperature UV Emission from GaN/AlN Multiple Quantum Wells Heterostructures*", M. Furis, A. N. Cartwright, H. Wu, and W. J. Schaff, accepted for publication in *Appl. Phys. Lett.*
3. "*Many Body Effects and Internal Transitions of Confined Excitons in GaAs and CdTe Quantum Wells*", C. J. Meining, H. A. Nickel, A. B. Dzyubenko, A. Petrou, M. Furis, D. R. Yakovlev, and B. D. McCombe, Solid State Comm. **127,** pp. 821-827 (2003).
4. "*Surfactant-Imposed Interference in the Optical Characterization of GaP Nanocrystals* ", M. Furis, A. N. Cartwright, Y. Sahoo, D. J. MacRae, and P. N. Prasad, J. Phys. Chem B **107**, pp.11622-11625 (2003)

5. "*Optical phonon spectra of GaP nanoparticles*", F. S. Manciu, Y. Sahoo, D. J. MacRae, M. Furis, B. D. McCombe, and P. N. Prasad, Appl. Phys. Lett. **82**, pp. 4059-4061 (2003).
6. **"***Ultrafast Differential Transmission Spectroscopy of Excitonic Transitions in InGaN/GaN Multiple Quantum Wells*", F. Chen, M. C. Cheung, P. M. Sweeney, W. D. Kirkey, M. Furis, and A. N. Cartwright, J. Appl. Phys. **93**, pp. 4933-3935 (2003).
7. **"***Excitonic field screening and bleaching in InGaN/GaN multiple quantum wells***",** F. Chen, W. D. Kirkey, M. Furis, M. C. Cheung, and A. N. Cartwright, Solid State Comm. **125**, pp.617-622 (2003).
8. "*Si Doping of High-Al-Mole Fraction $Al_xGa_{1-x}N$ Alloys with RF Plasma-Induced Molecular Beam Epitaxy*", J. Hwang, W. J. Schaff, L. F. Eastman, S. T. Bradley, L. J. Brillson, D. C. Look, J. Wu, W. Walukiewicz, M. Furis, and A. N. Cartwright, Appl. Phys. Lett. **81**, pp.5192-5194 (2002).
9. "*Interaction of an Electron Gas with Photoexcited Electron-Hole Pairs in Modulation-Doped GaAs and CdTe Quantum Wells*", H. A. Nickel, T. Yeo, C. J. Meining, D. R. Yakovlev, M. Furis, A. B. Dzyubenko, B. D. McCombe, and A. Petrou, Physica E **12**, pp.499-502 (2002).
10. "*Quantifying Electrical Spin Injection:Component-Resolved Electroluminescence from Spin- Polarized Light-Emitting Diodes*", B. T. Jonker, A. T. Hanbicki, Y. D. Park, G. Itskos, M. Furis, G. Kioseoglou, and A. Petrou, Appl. Phys. Lett. **79**, pp.3098-3100 (2001).
11. "*Electrical Spin Injection Across Air-Exposed Epitaxially Regrown Semiconductor Interfaces*", Y. D. Park, B. T. Jonker, B. R. Bennett, G. Itskos, M. Furis, G. Kioseoglou, and A. Petrou, Appl. Phys. Lett. **77**, pp.3989-3991 (2000).

## *Conference Proceedings:*

1. "*Room-Temperature Time-Resolved Photoluminescence of UV Emission from GaN/AlN Quantum Wells*", M. Furis, F. Chen, A. N. Cartwright, H. Wu, and W. J. Schaff, 2002 MRS Fall Meeting Conference Proceedings **L11.14**, Dec $2^{nd}$-$6^{th}$ Boston, Massachusetts (2002).
2. "*Time-Resolved Optical Studies of InGaN Layers Grown on LGO* ", M. Cheung, F. Chen, M. Furis, A. N. Cartwright, G. Namkoong, W. A. Doolittle, and A. Brown, 2002 MRS Fall Meeting Conference Proceedings **L11.6**, Dec $2^{nd}$-$6^{th}$ Boston, Massachusetts (2002).
3. "*Femtosecond Pump and Probe Spectroscopy of Optical Nonlinearities in an InGaN/GaN Heterostructure*", F. Chen, P. M. Sweeney, W. D. Kirkey, M. Furis, and A. N. Cartwright, 2002 MRS Fall Meeting Conference Proceedings **L11.8**, Dec $2^{nd}$-$6^{th}$ Boston, Massachusetts (2002).
4. "*Molecular Beam Epitaxial Growth of AlN/GaN Multiple Quantum Wells*", H. Wu, W. J. Schaff, G. Koley, K. A. Mkhoyan, J. Silcox, M. Furis, A. N. Cartwright, W. Henderson, W. A. Doolittle, and A. V. Osinsky, 2002 MRS Fall Meeting Conference Proceedings **L6.2**, Dec $2^{nd}$-$6^{th}$, Boston, Massachusetts (2002).
5. "*Internal Transitions of Charged Magneto- Excitons in II-VI Quantum Well Heterostructures*", C. J. Meining, M. Furis, H. A. Nickel, D. R. Yakovlev, W. Ossau, A. Petrou, and B. D. McCombe, The $25^{th}$ International Conference on the Physics of Semiconductors ICPS25 **H086**, Sept. $17^{th}$-$22^{nd}$, Osaka, Japan (2000).

## *Oral Presentations:*

### • Material Research Society Meetings

1. "*Transmission Electron Microscopy Studies of ZnMnSe/AlGaAs/GaAs Spin-LEDs*", R. M. Stroud, Y. D. Park, B. T. Jonker, B. R. Bennett, G. Itskos, M. Furis, G. Kioseoglou, and A. Petrou, 2001MRS Spring Meeting **T6.6**, April 16-20th San Francisco, California (2001).
2. "*Efficient Electrical Spin Injection and Realization of Spin-LED*", B. T. Jonker, Y. D. Park, A. Hanbicki, R. M. Stroud, B. R. Bennett, G. Itskos, M. Furis, G. Kioseoglou, and A. Petrou, 2001 MRS Spring Meeting **T6.3**, April 16-20th San Francisco, California (2001).
3. "*Growth and Characterization of Digital Alloys and Heterostructures of GaAs/Mn*", X. Chen, K. P. Mooney, T. Yeo, M. Furis, H. Luo, B. D. McCombe, and A. Petrou, 2000 MRS Fall Meeting **I1.3**, Nov. 27th – Dec. 1st, Boston, Massachusetts (2000).

### • American Physical Society Meetings

1. "*Recombination Processes in GaAs/AlGaAs Spin Light Emitting Diodes (SpinLEDs*)", M. Furis, G. Itskos, G. Kioseoglou, A. Petrou, Y. D. Park, B. T. Jonker, A. Hanbicki, B. R. Bennett, X. Wei, The 2001 APS March Meeting **J25.009**, March 12-16th, Washington Convention Center, Seattle, Washington (2001).
2. "Efficiency of Electrical Spin Injection in GaAs-based Spin Light Emitting Diodes (SpinLEDs)", G. Itskos, M. Furis, G. Kioseoglou, A. Petrou, Y. D. Park, B. T. Jonker, R. Stroud, A. Hanbicki, and B. R. Bennett, The 2001 APS March Meeting **J25.007**, March 12-16th, Washington Convention Center, Seattle, Washington (2001).
3. "*Effects of Interfacial Microstructure on Spin Injection Efficiency in ZnMnSe/AlGaAs-GaAs Spin-LEDs*", R. Stroud, Y. D. Park, A. Hanbicki, B. R. Bennett, B. T. Jonker, M. Furis, G. Itskos, G. Kioseoglou, A. Petrou, The 2001 APS March Meeting **J25.008**, March 12-16th, Washington Convention Center, Seattle, Washington (2001).
4. "*Optical, Transport, Structural and Magnetic Properties of Digital Alloys of GaAs/Mn*", X. Chen, M. Furis, G. Itskos, K. P. Mooney, F. Lehmann, G. Kioseoglou, Y. L. Soo, S. Kim, H. Luo, B. D. McCombe, A. Petrou, Y. H. Kao, Y. Sasaki, X. Liu, and J. K. Furdyna, The 2001 APS March Meeting **L25.008**, March 12-16th, Washington Convention Center, Seattle, Washington (2001).
5. "*Internal Transitions of Charged Magneto-Excitons in II-VI Quantum Well Heterostructures*", C. J. Meining, M. Furis, H. A. Nickel, A. Petrou, B. D. McCombe, D. R. Yakovlev, and W. Ossau, The 2001 APS March Meeting **G30.005**, March 12-16th, Washington Convention Center, Seattle, Washington (2001).
6. "*Optically Detected Resonance Spectroscopy of Modulation-Doped GaAs/AlGaAs Multiple Quantum Well Structures*", H. A. Nickel, T. M. Yeo, G. Comanescu, H. D. Cheong, M. Furis, B. D. McCombe, and A. Petrou, The 2000 APS March Meeting **V32.008**, March 20-24th, Minneapolis, Minnesota (2000).
7. "*Magneto-Optical Study of Interface Roughness in type-II AlGaAs/AlAs Quantum Well Structures*", M. Furis, H.D. Cheong, G. Kioseoglou, A. Petrou, M. Dutta, J. Pamulapati, Y. J. Wang, and X. Wei, The 2000 APS March Meeting **V32.006**, March 20-24th, Minneapolis, Minnesota (2000).

8. "*Optically Detected Resonance of an n-Type Edge Doped GaAs/AlGaAs Quantum Well*", H. D. Cheong, T. Yeo, M. Furis, G. Itskos, A. Petrou, B. D. McCombe, and W. J. Schaff, The 2000 APS March Meeting **Y29.014**, March 20-24th, Minneapolis, Minnesota (2000).

### • Other Conferences

1. "*Insights into Electrical Spin Injection from Spin-LED Structures*", B. T. Jonker, Y. D. Park, A. Hanbicki, B. R. Bennett, G. Itskos, M. Furis, G. Kioseoglou, and A. Petrou, The 200th Meeting of the Electrochemical Society and the 52nd Annual Meeting of the International Society of Electrochemistry **no.1251**, Sept. 2nd-7th, San Francisco, California (2001).
2. "*Interaction of an Electron Gas with Photoexcited Electron-Hole Pairs in Modulation-Doped GaAs and CdTe Quantum Wells*", H. A. Nickel, T. Yeo, C. J. Meining, A. B. Dzyubenko, M. Furis, D. R. Yakovlev, B. D. McCombe, and A. Petrou, The 14th International Conference on the Electronic Properties of Two Dimensional Systems **MB.2**, July 30th-Aug. 3rd, Prague, Czech Republic (2001).
3. " *Growth and Characterization of Digital Alloys of GaAs/MnGa and GaInAs/MnGa*", X. Chen, K. P. Mooney, T. Yeo, M. Furis, L. Guo, H. Luo, B. D. McCombe, A. Petrou, S. Lee, Y. Sasaki, X. Liu, and J. K. Furdyna, The International Conference on the Physics and Applications of Spin-Related Phenomena in Semiconductors PASPS2000 **K2**, Sept. 13-15th, Sendai, Japan (2000).

## *Poster Presentations:*

### • Material Research Society Meetings

1. "*Room-Temperature Time-Resolved Photoluminescence of UV Emission from GaN/AlN Quantum Wells*", M. Furis, F. Chen, A. N. Cartwright, H. Wu, and W. J. Schaff, 2002 MRS Fall Meeting Conference Proceedings **L11.14**, Dec 2nd-6th Boston, Massachusetts (2002).
2. "*Time-Resolved Optical Studies of InGaN Layers Grown on LGO* ", M. Cheung, F. Chen, M. Furis, A. N. Cartwright, G. Namkoong, W. A. Doolittle, and A. Brown, 2002 MRS Fall Meeting Conference Proceedings **L11.6**, Dec 2nd-6th Boston, Massachusetts (2002).
3. "*Femtosecond Pump and Probe Spectroscopy of Optical Nonlinearities in an InGaN/GaN Heterostructure*", F. Chen, P. M. Sweeney, W. D. Kirkey, M. Furis, and A. N. Cartwright, 2002 MRS Fall Meeting Conference Proceedings **L11.8**, Dec 2nd-6th Boston, Massachusetts (2002).
4. "*Molecular Beam Epitaxial Growth of AlN/GaN Multiple Quantum Wells*", H. Wu, W. J. Schaff, G. Koley, K. A. Mkhoyan, J. Silcox, M. Furis, A. N. Cartwright, W. Henderson, W. A. Doolittle, and A. V. Osinsky, 2002 MRS Fall Meeting Conference Proceedings **L6.2**, Dec 2nd-6th, Boston, Massachusetts (2002).

### • Other Conferences

1. "*Optical and Transport Studies of GaAs Doped with Mn and GaAs/Mn Digital Alloys*", M. Furis, G. Comanescu, M. H. Na, A. Petrou, B. D. McCombe, H. Luo, Y. Sasaki, X. Liu, and J. K. Furdyna, The 1st International Conference and School on Spintronics and Quantum Information Technology SpinTech-I **no. 018,** May 13-18th, Maui, Hawaii (2001).

# REFERENCES

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